DIKSHANT | दीक्षांत Education Centre

DIKSHANT TODAY

NOVEMBER 2023

What's special

- Aspirational Blocks Programme
- 'One Nation, One ID'
- Lok Sabha Ethics Committee
- China-Bhutan boundary talks
- Global Hunger Index 2023
- Army's Project Udbhav
- Cloud seeding experiment
- AI applications in ophthalmology
- National Turmeric Board
- Nobel Prize 2023
- EU Human Rights Prize
- Practice Question For UPSC Pre. & Mains Exam

For better preparation of Current Affairs, must attend Daily Free Current Affairs class on Dikshant Education App

Scan the QR code to download DIKSHANT APP

DIKSHANT TODAY

NOVEMBER 2023

EDITOR IN CHIEF

Dr. S. S. Pandey

DIRECTOR

Shipra Pandey

EXECUTIVE EDITOR

Rakesh Pandey

CO-EXECUTIVE EDITOR

Saket Anand

MANAGEMENT CONSULTING

Shankar Bharti, Marina

EDITING SUPPORT

Niraj, Sudhir Prasad, Manoj Singh, Abhijeet, Md. Shoaib, Prakash Jaiswal

TYPE SETTING AND DESIGNING

Suryajeet, Sunil, Praveen

****

HEAD OFFICE

289, Dhaka Johar, Near Dusshara Ground, Dr. Mukherjee Nagar, Delhi-09

CONTACT OFFICE

704, In Front of Batra Cinema, Dr. Mukherjee Nagar, Delhi-09

Contact: 7428092240, 9312511015, 8851301204

Email : dikshantias2011@gmail.com

Web.: www.dikshantias.com

CONTENTS

CURRENT AFFAIRS

POLITY & GOVERNANCE

INTENATIONAL RELATIONS

ECONOMY

SECURITY

ENVIRONMENT

SCIENCE & TECHNOLOGY

SOCIAL ISSUE

HEALTH

MISCELLANEOUS

PRELIMS FACT

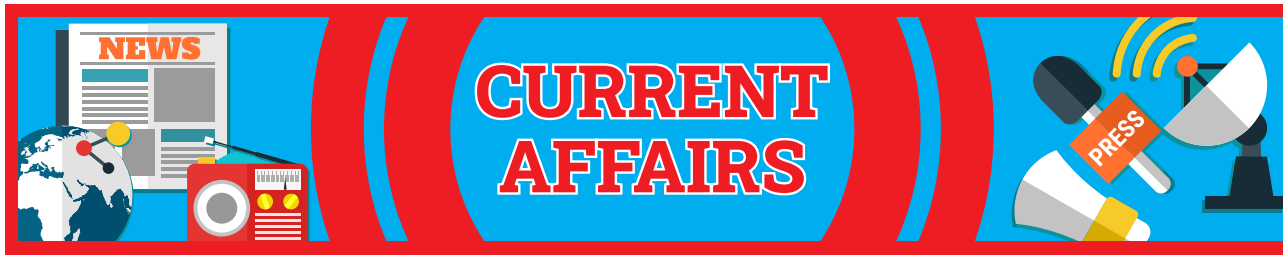
POLITY & GOVERNANCE

INTERNATIONAL RELATIONS

ECONOMY

SECURITY

ENVIRONMENT



POLITY & GOVERNANCE

ASPIRATIONAL BLOCKS PROGRAMME, GOVT TO SPEND RS 100-CR IN 500 MOST BACKWARD BLOCKS

Why in news?

- The Union government will be spending Rs 100 crore this fiscal to improve governance and enhance the quality of life of people living in 500 of the most backward and poorest blocks of the country, as part of the ambitious Aspirational Blocks Programme (ABP).

Implementation:

- The NITI Aayog is implementing the ABP in 329 districts of the country.
- A three-year timeframe has been set for improving socio-economic indicators in five major areas; health and nutrition, education, agriculture, drinking water and sanitation, financial inclusion, basic infrastructure and overall social development.

Blockwise development:

- Of the 500 blocks, the maximum, 68, are in Uttar Pradesh, followed by 61 in Bihar, 42 in Madhya Pradesh, 34 in Jharkhand and 29 in Odisha.
- The ABP will support blocks to develop their development strategy, which will factor in block-specific challenges and opportunities.
- Blocks would identify key interventions across all the sectors of the ABP that could help achieve saturation of services and surpass the state average on key socio-economic parameters.
- All the blocks will be ranked every quarter, based on their performance. The financial incentives to blocks will also be given on a quarterly basis.
- A total of nine core sectors have been identified and relevant 11 central ministries and departments would see to it that blocks achieve the desired results in partnership with the respective state governments.
- Special focus would be given to 60 blocks in Odisha, Chhattisgarh and Madhya Pradesh, which are inhabited by vulnerable tribal groups.

Background:

- The ABP programme, launched by Prime Minister in January, takes off from the Aspirational Districts Programme that was launched in 2018 to improve living standards in 117 of the most under-developed districts across India.
- With the Aspirational Districts Programme completing five years, the Centre identified 500 of the poorest blocks to launch the ABP.
- A block is a subdivision of a district. In all, there are 7,000 blocks in the country. One-third of the blocks under the ABP fall in districts covered under the Aspirational Districts Programmes while 217 blocks have been identified in new districts.

CONCERNS ABOUT GOVT. FACT CHECK UNIT

Why in news?

- The Bombay High Court reserved its verdict in a batch of petitions challenging the constitutionality of the Information Technology (Intermediary Guidelines and Digital Media Ethics Code) Amendment Rules, 2023 (IT Rules).
- The Rules permit a Fact Check Unit (FCU) of the Union Government to identify "fake or false or misleading" online content "related to the business of the Central Government" and demand its removal.

Background:

- In April 2023, the Ministry of Electronics and IT (MEiTY) promulgated the 2023 IT Rules, which amended the Information Technology Rules, 2021, and allowed the Ministry to appoint a fact checking unit.

- Subsequently, Kunal Kamra, a political satirist, the Editors Guild of India, and the Association of Indian Magazines filed writ petitions before the Bombay High Court challenging Rule 3(1)(b)(v) of the IT Rules that permit the constitution of a FCU.
- The petitioners contend that the provision would enable government-led censorship online and empower the government to be the "prosecutor, the judge, and in that loose sense, the executioner" of what constitutes the 'truth' online.
- Defending the provision, the government has argued that the FCU will only notify intermediaries or online platforms that the content they are hosting is fake, false, or misleading, and that intermediaries can choose to take it down or leave it up with a disclaimer.
- A Bench comprising Justices G.S. Patel and Neela Gokhale of the High Court said that it will pass its ruling on the controversial amendment on December 1. The government has apprised the Court that the FCU will not be notified until the judgment is delivered.

What does the amendment say?

- The amendment brings about significant changes to Rule 3(1)(b)(v) of the IT Rules, 2021, which deals with the responsibilities of intermediaries.
- They are now under an obligation to make "reasonable efforts" to ensure that users do not "host, display, upload, modify, publish, transmit, store, update, or share any information" which is "identified as fake or false or misleading by a fact check unit of the Central government" in respect of "any business of the Central government."
- Failure to comply with this puts intermediaries at risk of losing the safe harbour protection provided under Section 79 of the IT Act, 2000.
- The safe harbour safeguard exempts intermediaries from liability for any third-party information made available or hosted by them.

What did the High Court say?

- Early on in the proceedings, in April, the Bombay High Court observed that the amended Rules no matter how well-intentioned, lack necessary safeguards.
- The Court expressed the opinion that prima facie, the Rules do not seem to offer protection for fair criticism of the government like parody and satire.
- Highlighting the ambiguity surrounding the term "any business of the Central government," the Court wondered if speeches made ahead of the 2024 Lok Sabha elections would fall within its ambit. It then enquired if publications questioning the veracity of such political speeches would be covered by the amendment, thus empowering the government to identify "fake or misleading news" about itself.
- Additionally in July, the Court remarked that if the consequences of a law are unconstitutional, it has to be done away with no matter how laudable the motive for its introduction was.
- The remark was made after Senior Advocate Navroz Seervai argued that the amendment violates Article 14 of the Constitution by discriminating between false news about the government and other false news.
- The Court also questioned the sudden need for a FCU, pointing out that the Press Information Bureau (PIB) has been efficiently fact-checking for years. Also, referring to undefined terms in the Rules such as "fake, false, and misleading," the Court outlined that what is misleading for one may not necessarily be misleading for another.

No recourse:

- Observing that the powers bestowed upon the FCU were sort of a 'diktat', the Court expressed surprise that there is no provision in the Rules that provides an opportunity for an aggrieved intermediary to justify or defend the flagged content. This violates the principles of natural justice.
- Similarly, the Court said that it was troubled by the fact that even the user whose post has been removed or whose account has been suspended by the intermediary after being flagged by the FCU, was left with no recourse or remedy.

BENEFITS 'ONE NATION, ONE ID' PROMISE FOR STUDENTS, INSTITUTIONS

Why in news?

- The concept of creating a lifelong ID number for students, known as the Automated Permanent Academic Account Registry (APAAR) or popularly known as 'One Nation, One Student ID', is a step towards modernising the Indian education system by the Ministry of Education (MoE).
- It would provide every student, from pre-primary to higher education, a unique identification number that will serve as a digital repository, chronicling their academic achievements, exam results, learning outcomes, etc.
- The MoE recently directed schools to initiate the process of adopting APAAR.

Details:

- As part of the National Education Policy (NEP) 2020, the National Educational Technology Forum (NETF)

was conceived as an autonomous body as a platform for the free exchange of ideas on the use of technology to enhance learning, assessment, planning and administration both for schools and higher education.
- NETF cited the need for a registry arose to tackle problems like errors in databases, variation in formats used by different regulators to collect data, difficulties related to authentication, etc.

Advantages offered by APAAR:

Seamless tracking of academic journey:

- Under APAAR, every student, from pre-primary to higher education, will get a unique identification number. This number would serve as a digital repository, chronicling their academic achievements, exam results, learning outcomes, and co-curricular accomplishments.
- Upon enrolling in APAAR, each student's identity will be authenticated through their Aadhaar ID or other officially recognised documents, and a distinct identification number will be generated for them.
- A parallel verification procedure will be implemented for instructors working in Higher Education Institutions (HEIs).
- Registration using PAN cards will also be made available to students and faculty members. Furthermore, international students will have the option to complete their registration on APAAR using their passports.

Effortless storage of academic records:

- With regards to educational institutions, the government has said that the Registry ID shall be based on UDISE ID for school education, AISHE ID in case of higher education and PAN/TAN for education providers, skill providers, etc. The registries will be used for storing credits earned by students in the Academic Bank of Credits (ABC) in Edu Locker.
- APAAR would enable students to digitally store and manage their academic records securely. This system will significantly reduce the risk of losing important documents and provide a convenient platform to store and access transcripts, certificates, and other academic accomplishments.
- APAAR registry shall be minimal and shareable through consent with other government departments, regulators, state governments, etc., for education-related purposes.

Recognition of co-curricular achievements:

- Beyond traditional academic records, APAAR will also encompass co-curricular achievements, such as rankings in Olympiads, specialised skill training, and extra-curricular accomplishments.
- This comprehensive repository will help students showcase their holistic growth and diverse talents, which are increasingly valued by universities and employers.

Streamlined admission process:

- A significant benefit of APAAR is its potential to simplify the admission process for transfer from one school or educational institution to another.
- With APAAR, a student's entire academic history and achievements are readily available to the new institution, making the admission process smoother and more transparent.
- This is particularly advantageous for families that relocate frequently due to job transfers or other reasons.

Data-driven decision making:

- For educational institutions, APAAR will provide valuable insights into student performance, learning trajectories, and areas needing improvement.
- With the help of this data, academic institutions can tailor their teaching methods and support services to better meet the needs of individual students, fostering a more personalised and effective education system.

Enhanced accountability:

- APAAR could also serve as a tool for increased accountability and transparency in the education sector.
- It would make it easier for authorities, educational boards, and institutions to track student progress, monitor performance, and assess the effectiveness of education policies.

Way Forward:

- In a nutshell, APAAR not only streamlines academic processes but also empowers students to take control of their education and achievements.

SUPREME COURT PULLS UP TWO FROM NCLAT, ISSUES CONTEMPT NOTICE

Why in news?

- Recently, the Supreme Court issued a show-cause notice to two National Company Law Appellate Tribunal (NCLAT) members for allegedly defying orders in a company dispute.

Details:

- This situation arose in regard to an annual general meeting (AGM) of Finolex Cables and a tussle between

cousins Prakash Chhabria and Deepak Chhabria over the company's control.
- Rakesh Kumar and Alok Srivastava of the appellate tribunal delivered a judgement despite the SC having put out a status-quo order on the matter.

National Company Law Tribunal (NCLT)

- The National Company Law Tribunal (NCLT) is a quasi-judicial body established under the Companies Act of 2013 to resolve corporate civil disputes. It has the same powers and procedures as a judge or a court of law and evaluates facts, makes decisions based on natural justice principles, and issues orders according to its findings.
- The NCLT consists of a president, judicial, and technical members appointed by the central government, and it handles fact-finding and evidence-gathering.
- NCLT was established to ensure speedy judgment of cases, considering the burden on judges and courts with numerous pending cases. Parties that are dissatisfied with the tribunal's judgment can appeal to NCLAT and then to the Supreme Court for further legal recourse.

National Company Law Appellate Tribunal (NCLAT)

- The National Company Law Appellate Tribunal (NCLAT), or appellate tribunal, was constituted under Section 410 of the Companies Act, 2013, to hear appeals against the orders of NCLT.
- NCLAT acts as an intermediate appellate forum where appeals are heard after the tribunal's decision. NCLAT also handles appeals against orders passed by the Insolvency and Bankruptcy Board of India (IBBI) and the Competition Commission of India (CCI). Its decisions can be appealed to the Supreme Court.

Composition:

- The NCLAT consists of a chairperson, three judicial members, and two technical members. The appellate tribunal can consist of no more than 11 members in total.
- All members must be at least 50 years old. For judicial members, applicants should have been a judge of a high court or a district judge for at least five years or have a minimum of ten years of experience. At the same time, technical members require at least 15 years of experience as a chartered accountant, cost accountant or company secretary.
- The NCLAT has two benches, one principal bench in New Delhi and the other in Chennai.
- A retired judge of the Supreme Court, Ashok Bhushan, is the current chairman of NCLAT. He took up the position after a nearly 20-month gap following the retirement of its first chairperson, Justice S J Mukhopadhaya.

Legal representation for NCLT and NCLAT:

- Parties involved in proceedings before NCLT or NCLAT can either represent themselves or appoint legal representatives, chartered accountants, company secretaries, or cost accountants to represent them.

Why were NCLT and NCLAT formed?

- The creation of both NCLT and NCLAT was driven by the need to enforce new rights due to increasing state activities and evolving justice demands.
- The purpose of these tribunals is to strike a balance between a court and a government agency, ensuring fairness and efficiency in handling corporate civil disputes.
- The primary jurisdiction is with NCLT, which handles fact-finding and evidence-gathering, while NCLAT handles appeals, evaluating NCLT's decisions on points of law or fact.
- Both tribunals have the same jurisdiction, powers, and authority as a High Court to deal with contempt of the tribunal cases.

Finolex case:

- While the Supreme Court had filed a status quo regarding the Finolex Cables AGM results, NCLAT ruled that Deepak Chhabria would remain the chairman of Finolex Cables on the same day.
- Prakash Chhabria has filed a contempt petition with the Supreme Court, which has been taken into consideration.
- As per the Supreme Court's orders, the NCLAT chairperson, Justice Ashok Bhushan, will conduct an inquiry.

WHY SLLS ALSO NEED TO BE REFORMED

Why in news?

- Recently, the bills were tabled to amend the substantive criminal law as codified in the Indian Penal Code (IPC), Code of Criminal Procedure (CrPC) and Indian Evidence Act (IEA).
- The offences and procedures outlined in the IPC or CrPC represent just one facet of a general criminal law and its vital to recognise that the most critical offences and procedures are encompassed within the Special and Local Laws (SLLs).

Why SLLs?

- Keeping SLLs away from the ongoing reform process is a major drawback. SLLs have immense quantitative

and qualitative relevance in the Indian criminal justice system.

- To illustrate, nearly 39.9% of all cognisable offences registered in 2021 were under SLLs. As per the Crime in India Statistics of 2021, of the total of nearly 61 lakh cognisable offences registered, 24.3 lakh offences were registered under SLLs alone.
- On the qualitative side, SLLs have given rise to several fundamental and pertinent debates, discourses and discussions regarding the limits on the state's power of criminalisation especially in the context of violation of individual rights and liberties.

Need for reform in SLLs:

- The substantive issues in SLLs are not only abundant but also varied. SLLs such as the Unlawful Activities (Prevention) Act, 1967 (UAPA) and the Maharashtra Control of Organised Crime Act, 1999 (MCOCA) suffer from glaringly deficient, ambiguous and vague definitions of offences and terms such as 'terrorist act', 'unlawful activity', 'organised crime', 'organised crime syndicate' etc.
- The Protection of Children from Sexual Offences Act, 2012 is increasingly being criticised for its applicability to consensual sexual activities between minors.
- Concerns have also been raised regarding criminalisation of such conduct through SLLs which would otherwise fall squarely within the domain of civil wrongs or at best, regulatory wrongs.
- To illustrate, the Supreme Court in the case of P. Mohanraj versus M/s Shah Brothers Ispat Ltd. (2021) referred to Section 138 of the Negotiable Instruments Act, 1881 as a 'civil sheep' in a 'criminal wolf's' clothing.
- It is through SLLs that universally accepted due process values are increasingly being diluted. Increased powers of search and seizure under Section 43A of the UAPA and the admissibility of confessions recorded by police officers under Section 18 of the MCOCA are prime examples.
- The stringent provisions provided for under Section 43(D)(5) of the UAPA, Section 37 of the Narcotic Drugs and Psychotropic Substances Act, 1985 and Section 45 of the Prevention of Money Laundering Act (PMLA) 2002 make the grant of bail a near impossibility.

Comprehensive collection:

- Between the enactment of the IPC in 1860 and today, there has been a major shift in the canvas of criminal laws.
- The increasing enactments and application of SLLs represents an understanding of criminal laws which is out of sync with the original project of codification.
- The shift represents a major move from the idea of a complete codification of all criminal laws inspired by Bentham's idea of a "Pannomion" , an all comprehensive collection of rules codified in a single place. The IPC was thus meant to contain within its pages all criminal laws of the time.
- IPC today is criticised for the retention of an archaic morality as well as the colonial roots which underpins many of its offences.
- The challenges to homosexuality under Section 377 in Navtej Johar versus Union of India (2018) and sedition under Section 124A in S.G. Vombatkere versus Union of India (2022) are all symbolic of the need to reform several aspects of our criminal laws.

Conclusion:

- As successive governments place increasing reliance on the SLLs for a variety of reasons, it becomes imperative that the same should not be allowed to overpower the idea of codification of penal laws as imbibed in the IPC as well as the CrPC.
- All SLLs which criminalise/seek to criminalise a conduct should find a place as separate chapters within the larger structure of the penal code.
- All SLLs which create a separate procedure for reporting of offences, arrest, investigation, prosecution, trial, evidence and bail must be included either as separate procedures within the CrPC or as exceptions to the general provisions provided therein.
- Non-inclusion of the substantive and procedural aspects of the SLLs in the ongoing reform project is a serious limitation. It is imperative therefore that a second generation of reforms be brought in, in order to address the lacunae.

PRADHAN MANTRI ANUSUCHIT JAATI ABHUYDAY YOJANA

Why in news?

- Pradhan Mantri Anusuchit Jaati Abhuyday Yojana (PM- AJAY) is a merged scheme of 03 Centrally Sponsored Scheme namely
  a) Pradhan Mantri Adarsh Gram Yojana (PMAGY),
  b) Special Central Assistance to Scheduled Castes Sub Plan (SCA to SCSP) and
  c) Babu Jagjivan Ram Chhatrawas Yojana(BJRCY).

Aim:

- It has been implemented since 2021-22 with an aim to reduce poverty of the SC communities by generation

of additional employment opportunities through Skill development, income generating schemes and other initiatives and to improve socio-economic developmental indicators by ensuring adequate infrastructure and requisite services in the SC dominated villages.

The Scheme has three components:

- Development of SC dominated villages into an "Adarsh Gram".
- 'Grants-in-aid' for District/State-level Projects for socio-economic betterment of SCs that may include creation of infrastructure in SC dominated villages including those selected under Adarsh Gram component, construction of Hostels/Residential schools, Comprehensive Livelihood Projects which may include components such as Skill development, related infrastructure development, financial assistance towards loans taken by beneficiaries for acquisition/creation of assets required for livelihood generation etc.
- Construction of Hostels in higher educational institutions which are top-ranked as per the National Institutional Ranking Framework (NIRF) of Government of India and are funded by the Centre/ State/UT Governments either fully or partially. Similarly, construction of hostels in schools which are either fully or partially funded by the Centre/ State/UT Governments and recommended by the Ministry of Education.

Objectives of Adarsh Gram Component (erstwhile Pradhan Mantri Adarsh Gram Yojana):

- The objective of this component is to ensure integrated development of SC majority villages so that, inter alia, there is:
  - Adequate infrastructure: All requisite infrastructure necessary for socio-economic development needs are to be provided under the Scheme.
  - Improvement in Socio-Economic Indicators: The identified socio-economic indicators, known as Monitorable indicators, are to be improved so that the disparity between SC and non-SC population is eliminated and the level of indicators is raised to atleast that of the National average.
  - All BPL SC families should have food and livelihood security, all SC children should complete education at least up to the secondary level, all factors leading to maternal and infant mortality are addressed and incidence of malnutrition, especially among children and women, is eliminated.

About Grants-in-aid for District/State-level Projects for Socio-Economic betterment of SCs {erstwhile scheme of Special Central Assistance to Scheduled Caste Sub Plan}

Comprehensive Livelihood Projects:

- Such projects which create an entire eco-system for producing sustainable income, or social advancement to the Scheduled Castes only shall be taken up. The projects should preferably be a combination of two or more of following :
  a) Skill Development: Skilling courses as per norms of MSDE. Related facilities and infrastructure for conducting Skill Development Activities conducted by the Government. Skill Development Institutions can also be funded.
  b) Grants for creation/acquisition of assets for beneficiaries/households: There shall be no standalone individual asset distribution under the scheme. However, if project has provision for acquisition/creation of assets for beneficiaries/ households needed for livelihood generation, financial assistance towards loans taken by the beneficiary for such acquisition/creation of assets, would be upto Rs.50,000 or 50% of the asset cost, whichever is less, per beneficiary/household.
  c) Infrastructure development: Development of infrastructure related to the project and also Hostels and residential schools.
- Other infrastructure- Various other infrastructure development projects in SC majority villages.

Special Provisions:

- Upto 15% of the total Grants exclusively on viable income generating economic development schemes/ programme for SC Women.
- Upto 30% of the total Grants utilized for infrastructure development
- Atleast 10% of the total funds for skill development
- Promote SC Women Cooperatives engaged in production and marketing of consumer goods and services.

Achievements during the current Financial Year 2022-23:

- Under Adarsh Gram Component, a total of 1260 villages have been declared as Adarsh Gram during the current FY 2023-24.
- A total of 09 new hostels have been sanctioned under Hostel component of the scheme. Perspective plan for 07 States have been approved under Grant-in-aid component during the current financial year.

LOK SABHA ETHICS COMMITTEE

Why in news?

- The Lok Sabha Ethics Committee will take up Nishikant Dubey's complaint against Mahua Moitra.

Details:

- Businessman Darshan Hiranandani alleged that he paid Trinamool Congress MP Mahua Moitra to raise questions in Parliament on his behalf.
- He further alleged that she had given him her Parliament login credentials and that she was targeting the Adani Group for fame.

- The Lok Sabha Ethics Committee, headed by Bharatiya Janata Party (BJP) MP Vinod Kumar Sonkar, will examine the allegations and conduct a thorough investigation into the claims.

History of Ethics Committees:

- A Presiding Officers' Conference held in Delhi in 1996 first mooted the idea of ethics panels for the two Houses.
- Then Vice President K. R. Narayanan constituted the Ethics Committee of the Upper House on March 4, 1997, and it was inaugurated that May to oversee the moral and ethical conduct of members and examine cases of misconduct referred to it. The Rules applicable to the Committee of Privileges also apply to the ethics panel.
- In the case of Lok Sabha, a study group of the House Committee of Privileges, after visiting Australia, the UK, and the US in 1997 to look into practices pertaining to the conduct and ethics of legislators, recommended the constitution of an Ethics Committee, but it could not be taken up by Lok Sabha.
- The Committee of Privileges finally recommended the constitution of an Ethics Committee during the 13th Lok Sabha. The late Speaker, G M C Balayogi, constituted an ad hoc Ethics Committee in 2000, which became a permanent part of the House only in 2015.
- The most recent meeting of the Lok Sabha's Ethics Committee was on 27 July, 2021, when an evaluation was held on the code of conduct for MPs.

Tenure

- All members are appointed by the Speaker.
- Its role is to investigate any complaint relating to unethical conduct of a Lok Sabha member referred to it by the Speaker and make such recommendations as it deems proper.
- The term of both the Rajya Sabha and Lok Sabha committees is one year.

Procedure for complaints:

- Any person can complain against a Member through another Lok Sabha MP, along with evidence of the alleged misconduct, and an affidavit stating that the complaint is not "false, frivolous, or vexatious". If the Member himself complains, the affidavit is not needed.
- The Speaker can refer to the Committee any complaint against an MP.
- The Committee does not entertain complaints based only on media reports or on matters that are sub judice. The Committee makes a prima facie inquiry before deciding to examine a complaint. It makes its recommendations after evaluating the complaint.
- The Committee presents its report to the Speaker, who asks the House if the report should be taken up for consideration. There is also a provision for a half-hour discussion on the report.

Ethics Committee & the Privileges Committee

- The work of the Ethics Committee and the Privileges Committee often overlap.
- The Ethics Committee and the Privileges Committee are both concerned with maintaining the dignity and decorum of Parliament and its members. However, they have some differences in their scope and functions.
- Instead of the Ethics Committee, more serious complaints go to privileges or special panels in the Lok Sabha. The rules applicable to the Ethics Committee also apply to the Committee of Privileges.
- The Privileges Committee deals with cases of breach of privilege or contempt of Parliament by MPs or non-MPs. The Ethics Committee deals with cases of ethical misconduct or violation of the code of conduct by MPs only.
- The Privileges Committee can recommend punitive actions against those found guilty of breach of privilege or contempt of Parliament. These actions may include admonition, reprimand, suspension or expulsion from Parliament.
- The Ethics Committee can recommend corrective actions against those found guilty of ethical misconduct or violation of the code of conduct. These actions may include apology, censure, withdrawal of parliamentary facilities or privileges, or removal from parliamentary committees.
- In an instance, such as Moitra's case that has a corruption allegation, the complaint can be sent to either of the committees as it involves an accusation of serious breach of privilege and contempt of the House. However, Moitra's case has now been referred to the Ethics Committee.

When was Privilege Committee formed?

- The Privilege Committee was formed by the Speaker of the 17th Lok Sabha Om Birla on October 9, 2019.
- The committee has 15 members in Lok Sabha and 10 members in Rajya Sabha, who are nominated by the Speaker and the Chairman, respectively. The deputy chairperson of Rajya Sabha is the head of the privilege committee in that House.

- The committee's role is to examine cases of breach of privilege or contempt of the House and make suitable recommendations. The committee can summon witnesses and documents for its inquiry and submit a report within a month of receiving a reference from the House or the Speaker.
- The report of the committee is presented to the House by the Chairman or any member of the committee in his absence.
- When the Speaker refers a matter pertaining to privilege to the committee pursuant to Rule 227 of the Ethics Committee handbook, the committee's report is brought before the Speaker, who has the authority to make final decisions or order that it be placed on the House Table.

INTERNATIONAL RELATIONS

HOW HAS NAGORNO KARABAKH STANDOFF ENDED?

Why in news?

- Recently, Azerbaijan claimed full control over the contentious Nagorno-Karabakh region after local forces, mostly Armenians, agreed to disarm and disband.
- While the disputed region is home to a majority population of ethnic Armenians and an Azeri minority, it is internationally recognised as a part of Azerbaijan.

What happened?

- A fresh round of violence broke out in September when Azerbaijan launched an attack against ethnic Armenian forces in Nagorno-Karabakh.
- The fighting lasted one day, and a ceasefire was announced a day later.

What is the history of the conflict?

- Nagorno-Karabakh is located within the international borders of Azerbaijan. It is in the South Caucasus region between eastern Europe and western Asia, spanning the southern part of the Caucasus mountains that roughly includes modern-day Armenia, Azerbaijan, and Georgia.
- The conflict between Azeris and Armenians goes back a century, when the Ottomans attacked the South Caucasus during World War I with the help of Azeris.
- They targeted ethnic Armenians during this attack, and the conflict between Azerbaijan and Armenia descended into a full-blown war in 1920. This war incorporated the region into the Azerbaijan Democratic Republic.
- Soon after, both countries became part of the Soviet Republic, and Nagorno-Karabakh was made an autonomous Oblast (administrative region) in Azerbaijan's territory.
- When the Soviet Union disintegrated in 1991, full-scale fighting again broke out between the countries as Armenian rebels declared Nagorno-Karabakh an independent territory. The war lasted till 1994 and killed around 30,000 people.
- In 1994, Azerbaijan and Armenia entered a ceasefire brokered by Russia, but international borders for the countries were not demarcated.
- A four-day war again broke out between the two countries in 2016, with no resolution being arrived at.

What happened in 2020?

- In 2020, Azerbaijan President Ilham Aliyev launched an offensive to take Nagorno-Karabakh back, leading the country into a fierce war with Armenia that lasted six weeks and killed more than 2,000 people.
- The Azeri forces attacked Armenian defences and took back 40% of Nagorno-Karabakh. Azerbaijan was backed by Turkey, and while Armenia's ally Russia did little to support Armenia, it helped broker a ceasefire.
- However, despite the ceasefire, Azerbaijan did not give up attempts to capture Nagorno-Karabakh.
- In December 2022, it blockaded the Lachin Corridor, the main road connecting Nagorno-Karabakh to Armenia and the rest of the world, adding to the economic misery of the region. The road was blocked under the pretext of environmental concerns.

How did Azerbaijan capture the area?

- Experts believe that Turkey had a big role to play in the latest developments in the Nagorno-Karabakh region. Turkey, however, denied any direct involvement in Azerbaijan's offensive.
- Russia's absence in the Caucasus is owed to its war in Ukraine.
- As retaliation for Russia's lack of help over the last few years, Armenia voted to join the International Criminal Court (ICC) despite Russia's warnings (the ICC has issued a warrant for the arrest of Russian President Vladimir Putin).
- Over 1,00,000 ethnic Armenians from Nagorno-Karabakh, have fled to Armenia. The exodus has triggered a massive humanitarian crisis.

UN LAUNCHES 10 PRINCIPLES TO CLOSE ASIA PACIFIC SUSTAINABLE FINANCE GAP

Why in news?

- Recently, the United Nations Economic and Social Commission for Asia and the Pacific (ESCAP) launched the 'The Sustainable Finance: Bridging the Gap in Asia and the Pacific'.

Details:

- It has put forward 10 principles for action for policymakers, regulators and private finance for mobilising and deploying financing for key UN-mandated Sustainable Development Goals, particularly around climate action.
- The principles will help stakeholders cooperatively and efficiently shift and scale up capital to finance climate action by reducing obstacles, addressing climate risk underpricing, and reducing sectoral and regional capital-investment mismatches.
- Even as global emissions and energy needs rise, financing climate action in Asia and the Pacific has lagged due to macroeconomic challenges and public debt sustainability concerns.

The principles put forward are:

- Developing new climate finance partnerships
- Developing effective NDC financing strategies
- Developing policy coherence and capacities across key government ministries
- Taking decisive regulatory action to shift capital in Asia and the Pacific towards the Net Zero transition
- Driving investment in the capacities of financial personnel
- Driving investment in much-needed sectoral and project-based financial data is undertaken
- Committing to Net Zero pledges for 2050 with credible transition pathways and including 2030 goals
- Increasing local-currency financing of energy transition projects as well as green technologies and other net-zero investments
- Expanding and accelerating concessional financing and risk-sharing by multilateral development banks, bilateral development financial institutions, and public development banks
- Increasing investment of time and effort with partners in project preparation

Financing climate action:

- The ESCAP report stated that it aimed to stimulate a more robust and informed debate among member states on key measures to move the region towards sustainability and to provide greater clarity on the benefits and consequences of selected policy and financing choices in the short and long term.
- Only 17 of the 51 Asia-Pacific countries party to the UN Framework Convention on Climate Change have assessed and reported their financial needs to meet their Nationally Determined Contributions and only seven have broken down financial needs between adaptation and mitigation.
- Furthermore, average economic losses in the region from disaster-related and other natural hazards are expected to rise to $1.1 trillion in a moderate climate-change scenario and $1.4 trillion in a worst-case scenario.

Conclusion:

- There is sufficient capital and liquidity to close the global financing gap in sustainable finance. However, deploying capital for climate action faces a number of challenges.

WILL ISRAEL GAZA OFFENSIVE STOP HAMAS

Why in news?

- On October 7, a Jewish Sabbath day, Hamas launched a surprise attack into southern Israel, raiding its military bases and residential areas, killing at least 1,300 people and injuring thousands more.

Details:

- The Hamas attack has triggered a massive military response from Israel, which has been pounding Gaza ever since, using missiles, jets and dangerous munitions, including white phosphorus.
- Some 1,900 Gazans have been killed in strikes, and Israel has also asked some 1.1 million people living in northern Gaza to move towards the south within 24 hours, while it is preparing for a ground attack.

Why did Hamas launch the attack?

- One explanation is that Hamas wanted to break the status quo. Over the years, the Israelis had built

a security model that allowed them to keep the Palestinians under check while the occupation continued. Israel has a network of extensive checkpoints and barriers in the West Bank.

- Israel also saw that the Palestine issue was no longer a hindrance to improving ties with other Arab countries.
- When the UAE signed a normalisation agreement in 2020, Israel gave no concessions to the Palestinians. Similarly, Saudi Arabia and Israel were in advanced stage of talks.
- So, from an Israeli point of view, the status quo allowed them to treat the Palestinian problem as a security nuisance that can be managed without major consequences.
- Hamas shattered this model, it not just drilled holes into Israel's perceived sense of security but also brought Palestine back to the fore of West Asia's geopolitical cauldron.

What was status quo before Hamas's attack?

Palestinian territories:

- The contested Palestinian territories include three parts of historical Palestine — the West Bank, East Jerusalem (both were captured by Israel from Jordan in 1967) and Gaza strip (captured in the same year from Egypt).
- There's no geographical contiguity between the West Bank (which is on the western bank of the Jordan River) and the Gaza strip, a tiny enclave sandwiched between Israel and the Mediterranean Sea. Since then, the West Bank has been under Israel's military occupation.
- In 1980, Israel passed the Jerusalem law, declaring unified Jerusalem as its capital, effectively annexing the eastern half of the city, including the Old City, which hosts the Al-Aqsa Mosque, the Wailing Wall and the Church of the Holy Sepulchre.
- Since the 1970s, Israel has also encouraged Jewish settlements in the West Bank and East Jerusalem, which together now have close to 7,00,000 Jewish settlers.
- Gaza was under Israeli occupation and had Jewish settlers until 2005 when Israel, faced with Hamas's violent resistance, announced a unilateral disengagement from the enclave.
- Currently, East Jerusalem is under Israel's total control, though a vast majority of Arabs of the city are not Israeli citizens; the West Bank is under Israel's direct occupation (the Palestinian Authority, a provisional self-governing body established as part of the 1993 Oslo Agreement, has very limited powers in limited areas of the West Bank) and Gaza is under Israel's blockade.
- The Islamist Hamas has been running Gaza since 2007, while the secular Fatah, the backbone of the Palestinian Liberation Organisation (PLO), has been running the Palestinian Authority since its formation, except for a brief interregnum in 2006 when Hamas swept the parliamentary elections.
- There is no peace process, no united or organised Palestinian movement and no international push for the two-state solution.

What would be the impact of the attack?

- By carrying out the largest attack by a non-state actor in Israel's history, Hamas has taken a huge risk. It was certain that Israel's response would be much more forceful this time than its past attacks on Gaza.
- Hamas's attack, from a strategic and humanitarian sense, has put the life of millions of Palestinians in further danger. Hamas has also put itself on the line.
- The Islamist group, which had carried out suicide attacks in the 1990s and early 2000s, had shown signs of moderation in recent years, it came up with a new charter in 2017 that had expunged the anti-Semitic language of its original charter and promised a lasting ceasefire (hudna) with Israel if it withdraws to the 1967 border.
- But the recent attack, in which Israeli civilians were indiscriminately targeted, suggests that Hamas hasn't evolved much when it comes to using terror as a means. Hamas is now likely to face a long phase of military attacks from Israel.

Is there a risk of wider regional war?

- Since 1973, no Arab country has gone to war with Israel. On the contrary, six Arab countries reached normalisation agreements with Israel ever since, even when the occupation continued and deepened. But Israel faces at least three non-state rivals (Hezbollah, Hamas and the Islamic Jihad) and one conventional rival (Iran).
- Hamas and the Islamic Jihad, both based in Gaza, were part of the Sabbath attack. Hezbollah, the Shia militia-cum-political party of Lebanon, had fired rockets into Lebanon's contested Shebaa Farms, which are occupied by Israel, showing solidarity with the Palestinians, and Israel has retaliated with strikes on southern Lebanon.
- Hezbollah says it's ready to fight Israel when the time comes, but doesn't show any immediate inclination to join Hamas's war.
- Iran, which has close ties with Hamas and the Islamic Jihad, has issued a statement saying it supports Palestinian resistance, but is unlikely to join a direct war with Israel, unless it comes under direct attack. So, as of now, the chances for a regional spillover are slim.

What does this attack mean for Netanyahu?

- If Hamas took a huge risk and put the Gazans and itself in further jeopardy by carrying out the Sabbath attack, Israel's Prime Minister also doesn't have easy options.

- He has promised to crush Hamas. But Hamas, unlike the transnational, pan-Islamist jihadist outfits such as al-Qaeda and the Islamic State, has deep roots in the Palestinian nationalist cause and is popular among the Palestinians.
- Israel's own past military operations against non-state actors show a complicated history, Israel had won the battles many times, but failed to make long-term strategic gains or peace. It fought Hezbollah for 18 years in southern Lebanon but the Shia militant group today is as powerful as ever.
- If Israel's deterrence against Hamas had worked, the Sabbath attack wouldn't have occurred in the first place.
- So here, the question before Israel is whether it wants to carry out a short-term operation in Gaza and retreat or reoccupy the enclave of 2.3 million people and bring them under Israel's direct control.
- The first option would allow Hamas to regroup in the long term, and the second option could trigger a long urban war of attrition in one of the world's most densely populated areas.

ISRAEL, HAMAS, AND THE LAWS OF WAR

Why in news?

- On October 7, Hamas, a Palestine-based terrorist group, launched an attack on Israel, killing hundreds of civilians and taking many hostage.
- Israel has retaliated with all its might, triggering a war in West Asia.

What are the laws of war?

- There are two separate and independent international law questions related to wars.
  a) First, under what conditions or when can countries use force in their international relations? This is known as jus ad bellum, regulated by the United Nations (UN) Charter.
  b) Second, how is a war to be fought, that is, what military actions are permissible? This is known as jus in bello.
- Assuming a country is justified under the UN Charter to use force, it still must ensure that it satisfies jus in bello obligations. Justification to use force does not relieve a country of its obligations to use such force in accordance with international law.
- The 'how' of using force or the law of war is known as International Humanitarian Law (IHL), which provides the rules that must be followed during an armed conflict.
- IHL is contained in customary international law, the Geneva Conventions of 1949 and the Additional Protocols of 1977.
- It regulates the conduct of the parties or groups engaged in an armed conflict. Its primary objective is to protect civilians and reduce the suffering a war unleashes. No matter how just the cause of fighting a war, warring parties must comply with IHL.

Do the laws of war apply to the ongoing military conflict?

- Yes, because the military conflict between Israel and Hamas is an armed conflict.
- As was held by the International Criminal Tribunal for former Yugoslavia in the Prosecutor versus Dusko Tadić case, an armed conflict in international law exists when "there is a resort to armed force between States or protracted armed violence between governmental authorities and organised armed groups or between such groups within a State".
- International law classifies armed conflicts into two categories; international armed conflict (IAC) and non-international armed conflict (NIAC).
- According to Common Article 2 of the Geneva Conventions, IAC includes all cases of declared war or any other armed conflict between two or more countries.
- NIAC includes non-governmental forces (Hamas) involved in battle with governmental forces (Israel). Common Article 3 of the Geneva Convention applies to NIAC. Thus, Israel and Hamas are obliged to abide by IHL.

What about civilian killings?

- The primary objective of IHL is that during an armed conflict, a distinction is always made between combatants and civilians.
- War parties can only attack combatants and military targets, not civilians and civilian objects. Indiscriminate attacks that fail to distinguish between combatants and civilians are forbidden and thus illegal.
- Accordingly, the killing of civilians by Hamas is illegal. Israel's illegal and belligerent occupation of the Palestinian territory since 1967 does not allow Hamas to kill, injure, abduct, or torture Israeli civilians or target civilian installations.
- Also, any military attack that causes disproportionate harm to civilians, when judged against the expected military benefit, is barred. Israel reportedly dropped 6,000 bombs on Gaza, causing widespread destruction and death. This is a disproportionate use of force.

- Hamas's horrific attack on Israel does not justify Israel inflicting disproportionate harm on the civilian population in Gaza. All this amounts to grave breaches of the 1949 Geneva Conventions and constitutes as war crimes.

Is hostage-taking legal?

- Hamas has taken Israelis hostage. This is illegal.
- Hostage-taking is specifically recognised as a war crime by Article 8 of the Rome Statute, a treaty establishing the International Criminal Court.
- Article 1 of the International Convention Against the Taking of Hostages recognises hostage-taking as a crime.

What about the Gaza Strip blockade?

- Israel's plan to block the supplies of food, electricity, water, and fuel in the Gaza Strip, where close to two million people live, amounts to collective punishment; retaliating against a group for the conduct of individual/s said to belong to that group. This action will exacerbate the already harsh air and sea blockade of the Gaza Strip since 2007.
- Such an action violates a fundamental tenet of IHL that no person should be punished for actions they didn't commit. Punishing all Gaza Strip residents for Hamas's actions is illegal and a war crime.
- Additionally, under IHL, warring parties must give advance warning to civilians to evacuate before attacking, which should be effective. If civilians are not given adequate time to evacuate, the warning will be ineffective. Israel's warning to the residents of the Gaza Strip is not effective.
- Given the air and sea blockade, the civilians do not have a realistic possibility of moving to safe places. In any case, civilians who do not move out despite the warning must also be protected.
- Both sides need to respect their IHL obligations and an investigation should be launched into the war crimes committed.

THE UN APPROVED KENYA-LED SECURITY MISSION TO HAITI

Why in news?

- Recently, the United Nations Security Council (UNSC) has approved international intervention in the form of a foreign security mission, led by Kenya, to restore security, protect critical infrastructure and control spiralling violence in the country.
- Haiti has experienced a surge in violence over the past year as armed groups took control of large parts of the country, including the capital Port-au-Prince.
- This has resulted in the killings of nearly 2,800 people, including 80 minors, between October 2022 and June 2023.

Why is UN sending a mission to Haiti?

- Haitian Prime Minister Ariel Henry first sought international support to assist the national police in October 2022 after the country plunged into a crisis when a group of gangs called "G9 and Family" seized control of the entry of the main fuel port Varreux in the capital protesting the PM's decision to cut fuel subsidies.
- The blockade brought the country to a standstill and led to massive shortages. The lack of gas and diesel adversely affected transportation and forced several hospitals and other medical institutions that relied on fuel-powered generators to halt operations.
- A UNICEF report at the time claimed that the operations of three-quarters of the country's major hospitals were hit due to the blockade. To make matters worse, there was a shortage of bottled water in the backdrop of a new outbreak of cholera.
- The stalemate ended in July 2023 after Kenya proposed to head the multinational force, following which the resolution was forwarded to the UNSC.

Key Highlights of the resolution:

- Unlike the UN peacekeeping mission to Haiti that ended in 2017, the multi-national security mission (MSS) will not be operated by the UN. Kenya has volunteered to lead the force. Other countries like the Bahamas, Jamaica and Antigua and Barbuda have also offered support.
- The resolution says that the force will provide "operational support" to the Haitian National Police, including building its capacity to counter gangs, improve security conditions in the country and secure ports, airports and critical intersections.
- The resolution adds that the forces will have the authority to make arrests in coordination with Haitian police. It also intends to create favourable conditions in the country to pave the way for elections.
- Polls have not taken place in Haiti since 2016. The strength of the force in Haiti has not been specified in the resolution, although discussions suggest that 2,000 personnel would be part of the mission.
- While the U.S. has made it clear that it won't send its troops, it has pledged $100 million in logistical support like intelligence, communications, airlift operations and medical aid.

What led to the delay?

- Haiti's troubled past with foreign military interventions is being viewed as the primary reason for the delay in deployment. The last time a force was sent to stabilise Haiti was in 2004 when former Haitian President Jean-Bertrand Aristide was overthrown in a rebellion.
- This was followed by a UN peacekeeping mission which went on from 2004 to 2017. The mission was marred by allegations during its deployment in the country.
- A sewage runoff from a peacekeeper camp was blamed for causing a cholera epidemic which saw more than 10,000 deaths.
- There were also serious allegations of sexual abuse against the UN peacekeepers. Since then, Haitians have been sceptical about the intervention of a foreign armed force.
- Moreover, countries were wary of lending support to PM Henry who doesn't enjoy the popular support of Haitians.

THE ABORIGINAL REFERENDUM IN AUSTRALIA

Why in news?

- A majority of Australian voters have rejected the proposal to establish an Aboriginal and Torres Strait Islander Voice to Parliament, with the final results likely to be about 40% voting "yes" and 60% voting "no".
- Aboriginal and Torres Strait Islander people constitute 3.8% of Australia's population.

What was the referendum about?

- In this referendum, Australians were asked to vote on whether to establish an Aboriginal and Torres Strait Islander Voice to Parliament.
- The Voice was proposed as a means of recognising Aboriginal and Torres Strait Islander peoples as the First Peoples of Australia in the Constitution.
- It was to be an advisory body for the national parliament and government. Had the referendum succeeded, Australia's Constitution would have been amended with a new section 129.

Features of new section 129:

- In recognition of Aboriginal and Torres Strait Islander peoples as the First Peoples of Australia:
  a) There shall be a body, to be called the Aboriginal and Torres Strait Islander Voice.
  b) The Aboriginal and Torres Strait Islander Voice may make representations to the Parliament and the Executive Government of the Commonwealth on matters relating to Aboriginal and Torres Strait Islander peoples.
  c) The Parliament shall, subject to this Constitution, have power to make laws with respect to matters relating to the Aboriginal and Torres Strait Islander Voice, including its composition, functions, powers and procedures.

Uluru Statement from the Heart:

- This proposal was drawn from the Uluru Statement from the Heart. The Uluru Statement from the Heart is a 2017 petition to the people of Australia, written and endorsed by the Australian Aboriginal and Torres Strait Islander leaders.
- The document calls for constitutional change and structural reform through the creation of two new institutions; a constitutionally protected First Nations Voice and a Makarrata Commission, to oversee agreements and truth-telling between governments and First Nations from 250 Indigenous leaders, which called for three phases of reform; Voice, followed by Treaty and Truth, telling about Australia's colonial history.

How did Australians vote?

- Every eligible Australian citizen over 18 years of age is obliged to vote in elections and referendums.
- Australia has one of the highest rates of voter turn out in the world; over 90% of those eligible have voted in every national election since compulsory voting was introduced in 1924.
- Australia has a written Constitution. A successful referendum vote is required to change the Constitution in any way.
- To succeed, a referendum proposition requires a double majority. This means it must be agreed to by a majority of voters, and a majority of states. Australia has six states, so at least four must have a majority of voters in favour for a referendum to succeed.
- Since federation in 1901, 45 questions have been put to Australian voters in referendums. Only eight of those have succeeded.

What happens now?

- The government is bound to abide by the referendum result.
- Prime Minister Anthony Albanese has confirmed that his government will not seek to legislate a Voice as an alternative to the constitutional model.

US MILITARY REPORT ON CHINA FLAGS ITS AGGRESSION TOWARDS INDIA

Why in news?

- China's aggressive tactics at the Line of Actual Control (LAC) and its ramping up of nuclear stockpile along with massive scaling up of naval and missile technology has been flagged by the US in its latest military report.
- The report, 'Military and Security Developments Involving the People's Republic of China', said the Chinese had also deployed its special forces along the LAC in Eastern Ladakh.

Details:

- Talking about the India-China tensions, the US Department of Defense (DoD) has said negotiations between the two neighbours made "minimal progress as both sides resisted losing perceived advantages on the border".
- In 2022, China continued to develop military infrastructure along the LAC. These improvements include underground storage facilities near Doklam, new roads in all three sectors of the LAC, new villages in disputed areas in neighboring Bhutan, a second bridge over Pangong Lake, a dual-purpose airport near the center sector, and multiple helipads.

Growing nuclear arsenal:

- The Beijing will probably have over 1,000 operational nuclear warheads by 2030.
- Many of these warheads will be deployed at higher readiness levels and will continue growing to 2035 in line with the goal of ensuring PLA modernisation is "basically complete" that year, serving as an important milestone in Xi's goal of a "world class" military by 2049.
- China is expanding the number of land, sea, and air-based nuclear delivery platforms while investing in and constructing the infrastructure necessary to support further expansion of its nuclear forces.
- China characterises its view of strategic competition in terms of a rivalry among powerful nation states, as well as a clash of opposing ideological systems.
- The PRC's national strategy is to achieve "the great rejuvenation of the Chinese nation" by 2049.

Tech advances:

- The Beijing has made advancements in its defence industrial capabilities.
- China is the world's top ship-producing nation by tonnage and is capable of producing a wide range of naval combatants, gas turbine and diesel engines, and shipboard weapons and electronic systems, which makes it nearly self-sufficient for all shipbuilding needs.
- China is developing beyond-visual-range air-to-air missiles and exploring missile capabilities that improve target-selection and make the missiles more resistant to countermeasures.
- In 2022, China launched its first domestically designed and manufactured aircraft carrier, featuring an electromagnetic catapult launch and arresting devices.

China-US Communication:

- In 2022, the PLA largely denied, cancelled, and ignored recurring bilateral engagements and US' Department of Defense's (DoD) requests for communication. The PLA's refusal to engage with the DoD has largely continued in 2023.
- The PLA's refusal to engage in military-to-military communications with the US, combined with its increasingly coercive and risky operational behaviour, "raises the risk of an operational incident or miscalculation spiraling into crisis or conflict".

Belt and Road Initiative:

- China uses BRI to support its strategy of national rejuvenation by seeking to expand global transportation and trade linkages to support its development and deepen its economic integration with various nations.
- In 2022, BRI projects saw mixed economic outcomes, experiencing both growth and decline.

Russia-Ukraine:

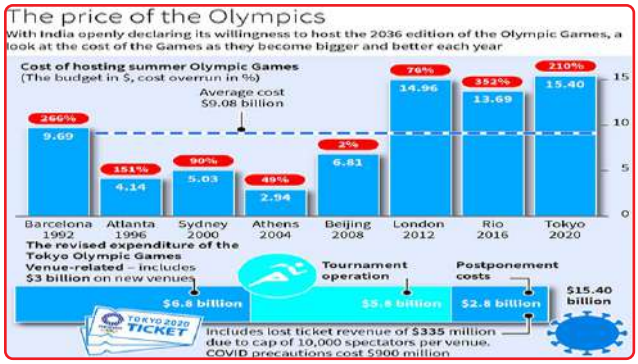
- China almost certainly is learning lessons that are most applicable to its goal of strengthening its approach to countering a perceived US-led containment strategy.
- Western sanctions against Russia almost certainly have amplified PRC's push for defence and technological self-sufficiency and financial resilience.

HOW OLYMPIC CITIES ARE SELECTED

Why in news?

- Recently, the Prime Minister publicly declared India's intention to host the Olympic Games, preferably in 2036, during the opening ceremony of the 141st International Olympic Committee (IOC) session in Mumbai.

- He also mentioned India's ambition to host the Youth Olympics in 2029 although the quadrennial event is currently scheduled for 2030.



Olympics in Asia:

- Only three Asian countries have ever hosted the Olympics; China, South Korea and Japan, with Japan hosting the games twice in 1964 and 2020.

How was a host country initially selected?

- In the older system of electing an Olympic host, cities, through their respective national Olympic committees, would submit a letter of interest to the IOC to start a multi-year, multi-step evaluation process. The bidding cities would complete a series of questionnaires, evaluated by the IOC.
- The second step of the process involved scrutiny from the IOC Evaluation Commission and a series of inspections of all venues before the final bids are put to vote at an IOC session, ending in a host being decided seven years in advance as per the Olympic Charter.
- It often led to excessive spending among the bidders, to secure rights, often ending in huge debts, corruptions and scandals.
- However, after Thomas Bach took over as the IOC president in 2013, he put in place the Olympic Agenda 2020, as a roadmap for the future of the Olympic Movement, approved by the 2014 IOC session.
- One part of the agenda dealt with a new process for host city selection, called the 'new norm' that was officially adopted during the 2019 IOC session in Lausanne.

What was the new approach?

- The new process placed emphasis on three main aspects; flexibility, sustainability and cost-effectiveness with the motto being 'The Games adapt to the region, the region does not adapt to the Games'.

How has the process become more flexible?

- With respect to flexibility, the seven-year rule was done away with and there has been greater flexibility in deciding the hosts, the IOC has said that the 2036 edition could be decided even as late as after 2030.
- In contrast, Paris and Los Angeles were selected through a tripartite agreement in 2017 that assured both countries hosting rights in 2024 and 2028 respectively.
- Brisbane too was named host for the 2032 edition in 2021.

Two-stage process:

Continuous dialogue:

- There is now a two-stage process; a continuous dialogue and a targeted dialogue without any fixed deadlines, to assess, discuss and guide potential hosts.
- The continuous dialogue is a non-committal stage not specific to any particular edition. It is basically a discussion between the IOC's Future Hosts Commission (FHC) and interested parties about the hosts' vision for the Games, its purpose and long-term legacy.
- Master
- This is followed by putting together a master plan and working out logistical details, with every potential host free to work out their own template. Also, unlike the past, the Games can be planned to be held across cities or even in conjunction with another country.

Targeted dialogue:

- Once there is seriousness in a bid to progress to the next level, it will enter the 'targeted dialogue' phase with the interested parties termed 'preferred host'.
- However, unlike in the past when a party, once rejected, would be discouraged from bidding again, now the other interested parties can continue continuous dialogue for future events.
- In a targeted dialogue, the bids become more determined. While there is again no time-frame for a targeted dialogue, it is anticipated to not exceed 12 months.
- It explores the proposals to host a specific edition of the Olympic Games and brings the IOC's executive board into the picture for detailed discussions.
- This is where each of the 'preferred hosts' answer the FHC's questions and provides guarantees on infrastructure, accommodation, security and public services among others and makes the final submission.
- The FHC then prepares an advisory report for the executive board which has the power to either recommend a single host or shortlist more than one for elections by the IOC members.

What about sustainability and cost-effectiveness?

- In order to ensure the long-term sustainability of the infrastructure and to avoid any public backlash, hosts are encouraged as far as possible to use existing and temporary venues. Any new venues built must be in line with existing developmental plans and have a long-term justification irrespective of the Games.
- All editions of the summer/winter/youth Olympic Games from 2030 onwards must also adhere to the IOC's climate positive commitment.

- As per the IOC's claims, the focus on using existing and temporary venues has led to an 80% decrease in the bid budgets for the 2026 Winter Games compared to the 2018 and 2022 editions.
- Los Angeles has claimed to not build any new infrastructure for the 2028 Games while Paris has declared using 95% existing or temporary venues for 2024. The IOC also provides technical support and expertise to 'preferred host(s)' on marketing, venue development and sustainability to reduce costs.

WHY ARE THE CHINA-BHUTAN BOUNDARY TALKS SIGNIFICANT?

Why in news?

- China and Bhutan held their 25th round of boundary talks in Beijing and signed a Cooperation Agreement on the "Responsibilities and Functions of the Joint Technical Team (JTT) on the Delimitation and Demarcation of the Bhutan-China Boundary."
- This advances their three-Step Roadmap initiated in 2021 for border resolution, building on the positive momentum since their last talks in 2016.

Why are the talks this week significant?

- The Boundary talks between Bhutan and China were held after a gap of seven years and indicate significant progress has been made. Bhutan and the Tibetan Autonomous Region share a contiguous border to Bhutan's north and west.
- Since 1984, Bhutan and China had held 24 rounds of talks to resolve the disputes until 2016, but the 25th round appeared to have been held up after the Doklam Standoff between Indian and Chinese armies in 2017, and then the COVID-19 pandemic in 2019-2021.
- However, the two sides used the pause to hold talks at other levels in rapid succession, especially after China threatened to open a new front for a border dispute to Bhutan's east.
- Since then, the Expert Group of diplomats on both sides met in 2021 to agree on a 3-step roadmap, and the first boundary delimitation technical talks were held in August 2023.

What is the 3-Step Roadmap?

- The 3-Step roadmap MoU signed by the Bhutanese Foreign Minister and Chinese Assistant Foreign Minister in 2021, and the JTT established to implement the roadmap by the Expert Group in August are hoping to draw a line clearly delineating Bhutanese and Chinese territory for the first time.
- Bhutan and China don't have diplomatic ties, as Bhutan has traditionally avoided diplomatic relations with all the United Nations Security Council permanent members.
- The 3-Step Roadmap involves
  a) first, agreeing to the border "on the table";
  b) hen visiting the sites on the ground; and
  c) then formally demarcatingthe boundary.

Why is India watching closely?

- For India, given the breakdown in its ties with China over the standoff at the Line of Actual Control from 2020, any hint of closer ties between China and one of its closest neighbours is a cause for worry.
- More specifically, India is watching the demarcation discussions over Doklam, as amongst the proposals China has placed on the table is an agreement to "swap" areas in Doklam under Bhutanese control with areas in Jakarlung and Pasamlung which China claims.
- The Doklam trijunction cuts very close to India's Siliguri corridor a narrow area that connects the North Eastern States to the rest of India and India would not like to see China gain access to any area closer to it.
- Since the Doklam standoff in 2017, China has doubled down on its control of the Doklam plateau, and according to a recent Pentagon report, has continued to build "underground storage facilities, new roads and new villages in disputed areas in neighbouring Bhutan," erasing many of the strategic gains that India had hoped for after China agreed to step back from the standoff point in 2017.
- Finally, India's worry is over China's demand for full diplomatic relations with Bhutan, and opening an Embassy in Thimphu.
- Given India's challenges with Chinese projects and funding in other neighbouring countries including Bangladesh, Nepal, Sri Lanka and the Maldives, any Chinese presence in a small country like Bhutan would be problematic.
- However, Bhutan's leadership has thus far said that all decisions would consider India's interests and that it has always consulted India on issues of concern.

THE UNGA VOTE ON GAZA WAR, AND WHY INDIA ABSTAINED

Why in news?

- India abstained in a UN General Assembly vote on a resolution that called for an immediate humanitarian truce in the Israel-Hamas conflict.
- The resolution, which does not contain the words 'Hamas' and 'hostage', was carried with 120 votes in favour and 14 against.

Details:

- Before this vote, an amendment to the text proposed by Canada, naming Hamas, was rejected because it failed to get the support of two-thirds of members present and voting. India voted in favour of this amendment, along with 86 other nations.
- India's abstention in the vote exemplified the balancing act it has adopted on the ongoing conflict in the Gaza Strip.

Key takeaways:

Protection of civilians and upholding legal and humanitarian obligations:

- India joined Australia, Canada, Germany, Japan, Ukraine, and the United Kingdom in the group of 45 countries that abstained on the resolution titled "Protection of civilians and upholding legal and humanitarian obligations".
- The resolution, which called for an "immediate, durable and sustained humanitarian truce leading to a cessation of hostilities" and unhindered humanitarian access to the Gaza Strip, was drafted by a group of 22 Arab countries and was proposed by Jordan, which has been vocal in its criticism of the Palestinians civilian casualties in the Israeli bombardment.
- Among the co-sponsors of the resolution were Bangladesh, Maldives, Pakistan, Russia, and South Africa.
- Israel, the United States, five small Pacific island nations, and four Eastern European countries; Austria, Croatia, Czechia, and Hungary were among the 14 members who voted against the resolution.
- Jordan said a vote against the resolution would amount to approving a "senseless war" and "senseless killing", while Israel rejected the vote as "infamy".

Fixing the responsibility of Hamas in the crisis:

- The amendment proposed by Canada and co-sponsored by the US, sought to fix the responsibility of Hamas in the crisis.
- The amendment asked for the insertion of a paragraph in the resolution that would state that the General Assembly "unequivocally rejects and condemns the terrorist attacks by Hamas that took place in Israel starting on 7 October 2023 and the taking of hostages, demands the safety, well-being and humane treatment of the hostages in compliance with international law, and calls for their immediate and unconditional release".
- India went with the majority (87) on this vote, while 55 member states voted against it, and 23 abstained. The President of the 78th session of the UNGA, Dennis Francis, announced that the draft amendment could not be adopted.

Outcome of resolutions:

- Unlike resolutions of the UN Security Council, resolutions of the UNGA are not legally binding.
- Therefore, despite the comprehensive defeat, Israel and the US are not obliged to act on the resolution. However, the resolution carries "incredible weight and moral authority".

India's approach:

- The balanced position taken by India was in line with the one that it has maintained in the other ongoing and deeply polarising conflict in the world: the Russia-Ukraine war.
- While the circumstances, politics, and conditions of the two wars are vastly different and not comparable, the diplomatic toolkit of hedging and balancing between the warring sides has been a consistent feature of India's approach.
- This is the approach that carried the day during the consensus-building exercise at the G20 Summit as well.
- However, the geopolitics of the Middle East are both more volatile and complicated, as well as closer home and India will need to mobilise all its diplomatic skills and goodwill with the main actors to negotiate the coming weeks and months.

ECONOMY

CBIC CANVASSES SUPPORT FOR INDIA'S CANDIDATURE FOR TIR EXECUTIVE BOARD (TIREXB)

Why in news?

- The Central Board of Indirect Taxes and Customs, Ministry of Finance, in association with the Ministry of External Affairs organised an event in New Delhi for ambassadors and delegates from Contracting Parties to the Convention on International Transport of Goods Under Cover of TIR Carnets (TIR Convention, 1975) to canvass support for India's candidature for TIR Executive Board (TIRExB).
- The elections are scheduled to be held during the 81st session of the TIR Administrative Committee in October 2023, at Palais des Nations, Geneva.

Why it matters?

- India seeks to integrate with the international transport networks under the aegis of the Convention and recognises that cross-border connectivity has a key role in regional integration, economic growth, and geopolitical stability.
- With the election of India's expert in the TIR Executive Board, India intends to contribute significantly to the global integration of multi-modal transport system through implementation of the related procedures and methods, especially the full digitisation of TIR.
- India intends to expand the geographical coverage of the Convention and leverage it for redefining the transit arrangements in the South Asia region.

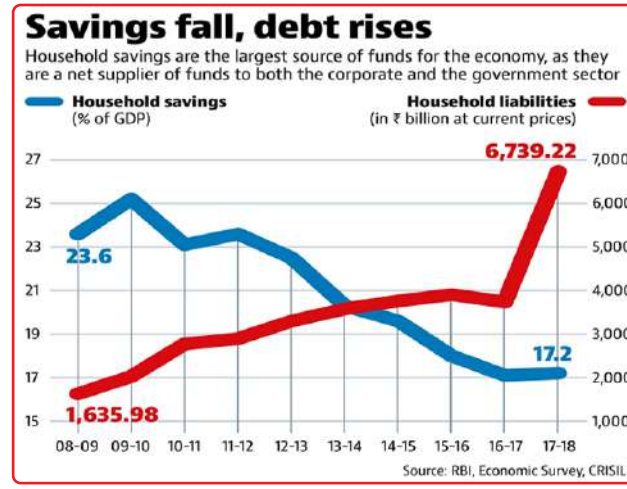
About TIR Convention:

- TIR Convention, 1975 is an international harmonised system of Customs control, which enables seamless transport of goods crossing multiple international borders using a single customs document (TIR Carnet) and a unified system of guarantee.
- It has 78 Contracting Parties, including India. More than 33,000 operators are authorized to use the TIR system and around 1.5 million TIR transports are carried out per year.
- The TIR Executive Board (TIRExB) is a subsidiary body of the TIR Administrative Committee. It supervises and provides support in the application of the TIR procedure. It is composed of 9 members, each from different Contracting Parties.

India's accession:

- India is a significant trading nation in the Asia Pacific region and a key participant in the International North-South Transport Corridor (INSTC).
- Since its accession to the Convention in 2017, India has taken several measures to promote the use of TIR. A National Guaranteeing Association has been appointed and a Circular 48/2018-Cus has been issued detailing the procedure and authorising ports and other customs stations of the country.
- India has also conducted pilot runs, including one using digital TIR. Measures have been initiated to ensure effective usage of TIR through stakeholder consultations.

HAVE HOUSEHOLD SAVINGS REDUCED?



Why in news?

- The release of the Reserve Bank of India's (RBI) Monthly Bulletin in September revealed that households' net financial savings had fallen to 5.1% from 11.5% in 2020-21.

Details:

- Financial liabilities of households rose faster than their assets, with many writers highlighting this trend as an indication of rising indebtedness and increasing distress. The government, however, countered these claims.
- The Finance Ministry explained that while household financial savings may be reducing, it did not imply total savings were falling, since households took advantage of low interest rates after the pandemic to invest in assets such as vehicles, education and homes.

The optimistic claim:

- There is evidence to support the government's narrative of a shift from financial to physical assets. Post-COVID, there has been an increase in household construction.
- Between 2020-21 and 2021-22, the construction sector was the fastest growing sector, growing at nearly 15% (when measured in 2011-12 prices), and 10% between 2021-22 and 2022-23. Only the trade, hotels, transport and communications sector grew faster in the latter period.
- Housing loans from Scheduled Commercial Banks (SCBs) grew at double-digit rates in all years between 2018-19 and 2022-23, with loans from housing finance companies growing almost 17 times between 2019-20 and 2022-23.
- Liabilities in other non-financial assets have also increased. Education and vehicle loans from SCBs increased significantly between 2021-22 and 2022-23, growing at 17% and around 25% respectively. This

has led to significant changes in the composition of household savings.

- The share of physical assets is almost 60% of households' total net savings, with the share of financial savings reducing from 39.6% in 2017-18 to 38.77% in 2021-22.
- That is, by taking advantage of the low interest rates set by the RBI in the wake of the pandemic, households may have increased their liabilities not to fuel consumption, but to purchase non-financial assets such as houses.

The pessimistic claim:

- Other evidence points to a slightly different picture. The fall in household net financial savings was driven largely by a rise in liabilities.
- Gross financial assets declined marginally as a share of GDP between 2021-22 and 2022-23 from 11.1% to 10.9%. Gross liabilities, remaining steady at roughly 3.8% of GDP between 2019-20 and 2021-22, increased to 5.8% of GDP in 2022-23.
- This rise in liabilities would not imply households have reduced savings if increasing loans financed the construction and purchase of homes. However, there is evidence to the contrary.
- While loans for housing, education and vehicles have no doubt increased, other components of personal loans have risen even faster.
- The share of housing loans in total non-food personal loans from SCBs has fallen from 51.08% in 2018-19 to 47.4% in 2022-23. The share of education loans has fallen from 3.32% to 2.37%, while vehicle loans have remained constant at around 12%.
- In contrast, outstanding credit card loans increased from 3.8% to 4.7% over this period, with loans against gold jewellery rising from 1.07% to 2.16%, and the category of "Other Personal Loans" showing the largest rise from 24% to 27.42%.
- The biggest contributor to the large rise in financial liabilities between 2021-22 and 2022-23 has been loans from non-banking institutions, which grew by almost ten times in just the last year, contributing to 32.1% of the total rise in financial liabilities over this period.

Conclusion:

- An examination of the data reveals that even though housing loans increased, other forms of loans which might possibly be used for consumption increased even faster.
- One could say that households are borrowing to maintain consumption in the face of income loss after COVID and high inflation. On the other hand, it could also be that pent-up demand during the pandemic is being realised in the form of debt-financed consumption, with households optimistic about future repayment.
- However, even if the optimistic narrative is true, there are grounds for concern. The U.S. Federal Reserve's commitment to maintaining higher interest rates to combat inflation would have a knock-on effect on interest rates around the world.
- Rising interest rates in India would cause significant stresses for households to meet increasing liabilities. If households have invested in real estate, rising interest rates would curtail their consumption spending and reduce aggregate demand in the economy.
- If, however, the narrative of distress borrowing is true, households would be subjected to further stress if interest rates rise. Policy must be observant of the myriad pitfalls facing the Indian economy.

RUPAY DOMESTIC CARD SCHEME AGREEMENT BETWEEN INDIA AND THE UAE

Why in news?

- NPCI International Payments Limited (NIPL), a wholly-owned subsidiary of the National Payments Corporation of India (NPCI), has entered into a strategic partnership agreement with Al Etihad Payments (AEP) for Domestic Card Scheme (DCS) Implementation in UAE.
- AEP is an indirect subsidiary of the Central Bank of UAE (CBUAE).

Domestic Card Scheme (DCS):

- As per the agreement, NIPL and AEP will work together to build, implement, and operationalize UAE's national domestic card scheme.
- The DCS will aim to facilitate the growth of e-commerce and digital transactions in the UAE, bolster financial inclusion, support the UAE's digitization agenda, increase alternate payment options, reduce the cost of payments, and enhance the UAE's competitiveness and position as a global payments leader.
- The DCS solution is based on the principles of sovereignty, speed to market, innovation, digitization, and strategic independence.
- The DCS solution provided by NIPL consists of a RuPay stack and value-added services like fraud monitoring services and analytics. NIPL will also

assist AEP in formulating the operating regulations for their domestic card scheme.

RuPay:

- RuPay is an indigenous, highly secure, and widely accepted card payment network in India. RuPay cards have debit, credit, and prepaid propositions.
- More than 750 Million RuPay cards are in circulation as of date. RuPay cards make up more than 60% of total cards issued in India, with every second Indian having a RuPay card now. These cards are issued through the entire banking spectrum, including public sector, private, and small banks.

DPI framework in India:

- India's world-renowned Digital Public Infrastructure (DPI) is driving massive transformation in the payment space.
- DPI framework includes digital identity, digital payments, and digital data exchange layers, a combination of these three is the force behind the fintech revolution in India.
- In India, nearly every adult has access to banking services, a way to remotely authenticate themselves (through Aadhar), and access to the internet through efficient and affordable mobile connectivity.
- A combination of these factors makes India the third largest fintech ecosystem in the world, with rapidly surfacing unicorns.
- India has witnessed an exponential growth of 367% in customers participating in digital transactions in the last five years, with an active customer base of more than 340 million.

CLAUDIA GOLDIN WINS 2023 ECONOMICS NOBEL PRIZE

Why in news?

- The Nobel Prize for economics was awarded to Harvard University professor Claudia Goldin for her research that has advanced the understanding of the gender gap in the labour market.
- She is just the third woman to win the prize out of 93 economics laureates.

Focus of research:

- She has studied 200 years of women's participation in the workplace, showing that despite continued economic growth, women's pay did not continuously catch up to men's and a divide still exists despite women gaining higher levels of education than men.
- While her research focused on the US, her findings are applicable to many other countries.

Pre & post industrialisation:

- Before Goldin's book was published in 1990, data mainly from the 20th century had been published, and researchers believed that as the economy grew, so did women's labour force participation.
- Goldin reached back to older data to reveal that before industrialisation, more women were likely to have been involved in economic activity related to agriculture and various cottage industries. With greater industrialisation, work was concentrated in factories, and women found it difficult to leave their homes and travel to work.
- This trend reversed in the early 20th century, with the growth of the services sector. Two other factors played a crucial role in women's access to higher education and employment; marriage and the contraceptive pill.

Limitations of marriage

- Goldin's work found that by the beginning of the 20th century, while around 20 per cent of women were gainfully employed, the share of married women was only five per cent.
- She noted that legislation known as "marriage bars" often prevented married women from continuing their employment as teachers or office workers.
- Despite an increasing demand for labour, married women were excluded from parts of the labour market. This type of legislation peaked during the 1930s' Great Depression and the years following it, but was not the only reason.
- She also demonstrated that there was another important factor in the slow reduction of the gap between men's and women's rates of employment, namely women's expectations for their future careers.
- Women's expectations were based on the experience of their mothers, and thus their educational and professional decisions were not taken with the expectation of having a long, uninterrupted, and fruitful career.

Contraceptive pills:

- By the end of the 1960s, as easy-to-use contraceptive pills became more popular, women could exercise greater control over childbirth and actually plan careers and motherhood.
- Women also ventured beyond the services sector, studying subjects like law, economics, and medicine.
- Now, women were catching up in terms of education and fields of employment. However, one glaring gap still remained and continues to this day, the gender-based pay gap.

Pay gap and parenthood:

- Till the time men and women worked in factories, where the pay depended on the day's countable output, the pay gap was not too high. It became wider when monthly pay contracts came into the picture.
- One factor significantly impacted how men were paid versus women, childbirth. As women had to shoulder more of the parenting responsibilities once a child was born, they were also punished for this at the work front in terms of a slower rise on the payscale.

About the Economics Nobel:

- A Nobel Prize in Economics was not part of Alfred Nobel's 1895 will that established the other prizes.
- The prize is based on a donation received by the Nobel Foundation in 1968 from Sveriges Riksbank (Sweden's central bank), on the bank's 300th anniversary.
- It is formally called the Sveriges Riksbank Prize in Economic Sciences in Memory of Alfred Nobel.
- Goldin is only the third woman to win this honour.
- In 2009, Elinor Ostrom got the award along with Oliver E Williamson, while in 2019, Esther Duflo shared it with Abhijit Banerjee and Michael Kremer.

IMF RAISES INDIA FY24 GDP GROWTH FORECAST TO 6.3 PERCENTAGE

Why in news?

- Recently, the International Monetary Fund (IMF) raised India's economic growth forecast for the current fiscal year to 6.3%, from 6.1% earlier.
- The IMF expects retail inflation in the South Asian nation to quicken to 5.5% in 2023/24 before easing to 4.6% in 2024/25.

Details:

- The RBI has projected CPI-based inflation for the current fiscal year at 5.4% while GDP growth is seen at 6.5%. Monetary policy projections are consistent with achieving the Indian central bank's inflation target over the medium term.
- India's current account deficit is expected to remain at 1.8% of GDP in FY24 and FY25.

Key Highlights:

- While the IMF's upward revision of India's 2023-24 GDP growth comes in the wake of a strong 7.8% growth in the quarter ending June 2023, the annual growth number is still lower than the 6.5% projection by RBI's Monetary Policy Committee.
- IMF now expects global GDP growth to be 3% in 2023, which is the same as its July forecast. Global GDP growth for 2024, however, has seen a reduction of 10 basis points from the July forecast to 2.9%.

Downturn from 2022:

- While not much has changed between the July and October editions of the WEO as far as growth in major economies is concerned, 2023 and 2024 projections signify a major downturn from 2022 performance.
- Global GDP growth is expected to fall by 50 basis points between 2022 and 2023 while advanced economies will grow at just 1.5% in 2023 compared to 2.6% in 2022.
- The Chinese economy is expected to grow at 5% in 2023, which is higher than the 3% it grew at in 2022. To be sure, this number needs to be read with the economic headwinds from China's zero-Covid policy until last year.
- IMF's October forecast for China's 2023 and 2024 growth is 20 and 30 basis points lower than its July projections, which suggests that world's second largest economy might be losing momentum. In fact, WEO flags China's property sector crisis a potential downside risk for growth of emerging market and commodity exporting economies.

Factors hindering growth:

- Growth has lagged on account of tight monetary policies as central banks have kept money supply tight to fight inflation which rose to 8.7% in 2022.
- And it has logged on account of an uneven recovery from the pandemic and supply chain disruptions caused by Russia's invasion of Ukraine.
- Hamas' surprise assault on Israel threatens to destablise West Asia, a region that accounts for a third of the world's oil production.

Way Forward:

- The global growth projections remains below the historical (2000-19) range of 3.8% and "forecasts for global growth over the medium term, at 3.1%, are at their lowest in decades, and prospects for countries to catch up to higher living standards are weak.

GI TAG FOR THE CASHEW INDUSTRY IN GOA

Why in news?

- Recently, Goan cashew (kernel) got the geographical indication (GI) tag.

What is GI tag?

- A GI tag is conferred upon products originating from a specific geographical region, signifying unique characteristics and qualities.
- Essentially, it serves as a trademark in the international market. It is given by the Geographical Indications Registry in Chennai.

Significance:

- The GI tag would help consumers differentiate between authentic Goan cashews and cashews sourced from outside the state, which are often marketed as 'Goan cashews'.
- The Goan cashew, derived from the Portuguese name 'caju' or 'kaju' in Konkani.

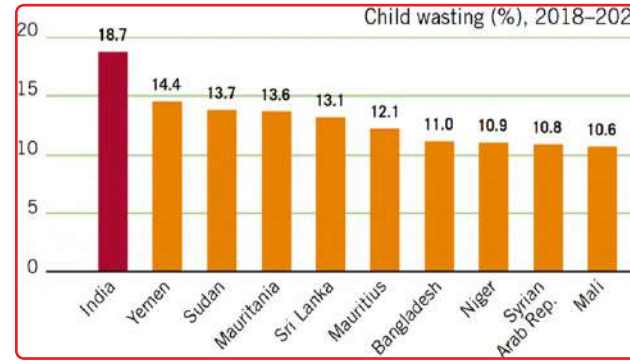
How did cashew come to Goa and become a contributor to the economy?

- Cashew was native to northeast Brazil in Latin America and was introduced to Goa by the Portuguese in the 16th century (1570).
- At the time of its introduction on Indian coasts, cashew was known mainly as a crop for afforestation and soil conservation.
- Historical records says that Christian missionaries imported high yielding varieties from Latin American countries and cultivated them extensively in Goa. However, the economic value of cashew nuts became known about a century after its introduction.
- The edible value of cashew nut was discovered by Goan prisoners exiled to the Portuguese territory of Africa (Mozambique) during Goa's freedom movement in the mid-18th century.
- According to a research thesis by Murelle Maria Leonildes Da Costa titled 'History of Trade and Commerce in Goa 1878-1961', the first cashew factory in Goa started operations in 1926 and the first consignment of cashew kernels was exported in 1930.
- Cashew production gradually evolved from a cottage industry to a large-scale one, facilitating foreign trade because of demand, mainly in the USA.
- The import of nuts from Portuguese East Africa induced foreigners to establish factories in Goa due to the lower import duty, favourable port dues, shipping and clearing expenses, lower rents, wages, and salaries.
- By 1961, the cashew processing industry accounted for about 60 per cent of industrial production in Goa, a bulk of which was exported.

GLOBAL HUNGER INDEX 2023

Why in news?

- India topped the list of countries with the highest child-wasting rate in the world, at 18.7 per cent, reflecting acute undernutrition, according to the Global Hunger Index (GHI) 2023 released recently.



About Global Hunger Index (GHI):

- GHI is a peer-reviewed annual report, jointly published by non-profits Concern Worldwide and Welthungerhilfe.
- The indicators: undernourishment, child stunting, child wasting and child mortality; reflect deficiencies in calories (quantity) as well as in important micronutrients.

Child wasting in India:

- Child wasting, one among the four indicators underlying GHI scores refers to the share of children under age five who have low weight for their height.
- India's child wasting rate is higher than that of conflict-ridden Yemen (at 14.4 per cent) and Sudan at (13.7 per cent), which hold the second and third positions, respectively.
- Moreover, India has been ranked at the 111th position out of 124 countries, with neighbouring Pakistan (102th), Bangladesh (81st), Nepal (69th) and Sri Lanka (60th) faring better than it in the index. The country slipped four notches from its 107th position in 2022.
- India scored 28.7 on the GHI, classifying it under the 'serious' hunger category. Other countries in the same classification include Pakistan (26.6), Afghanistan (30.6), Zambia (29.3), Botswana (20) and Sudan (27).

Indian government's response:

- The Union government, however, rejected the findings of the report, calling the methodology "an erroneous measure of hunger with serious methodological issues".
- Poshan Tracker, a mobile-based application rolled out by the Union Ministry of Women and Child Development, consistently reports a child wasting rate of less than 7.2 per cent each month, against the 18.7 per cent recorded in GHI, the Centre claimed.

Indian in other parameters:

- In India, the prevalence of undernourishment was recorded at 16.6 per cent and the under-five mortality rate was at 3.1 per cent.
- The report also pointed out it is critical to address the challenges faced by small farmers in India.

- Children afflicted by wasting experience compromised immunity, are vulnerable to developmental delays and face a high mortality risk, especially in cases of severe wasting.
- The report also noted that among Indian women aged 15 to 24 years, the prevalence of anaemia was at a staggering 58.1 per cent, slightly above Nigeria.
- Low weight and height of mothers are associated with stunting and wasting in their children, and child undernutrition tends to occur in the same regions as maternal undernutrition.
- The prevalence of anaemia is high and persistent in many countries, and currently, no region of the world is on track to meet the 2030 target to halve the rate of anaemia in adolescent girls and women, the report added.

Conclusion of 2023 GHI:

- The 2023 GHI shows that, after many years of advancement up to 2015, progress against hunger worldwide remains largely at a standstill.
- As the effects of crises multiply and intensify, more and more people are experiencing severe hunger, with the situation expected to worsen throughout the year.
- South Asia and sub-Saharan Africa are the global regions characterised by the most severe hunger levels, both holding a GHI score of 27, signifying a serious state of hunger.

INDIAN RAILWAYS PSUS, RITES LTD AND IRCON GRANTED NAVRATNA STATUS

Why in news?

- The Ministry of Finance recently conferred 'Navratna' status on RITES and IRCON.
- IRCON International Limited (IRCON) and RITES Ltd(RITES) both Central Public Sector Enterprise (CPSE) under the Ministry of Railways, have been announced as 15th and 16thNavratna respectively among CPSEs.

About RITES Ltd:

- RITES Ltd, formerly known as Rail India Technical and Economic Service Limited was incorporated on April 26, 1974.
- Entering its 50th year of incorporation, RITES Ltd is a leading transport infrastructure consultancy and engineering firm in India.
- It provides services in the diverse sectors of transportation, railways, export of rolling stock, highways, airports, metros, urban engineering & sustainability, ports & waterways, and energy management.
- The award of Navratna status will enable RITES to further nurture its brand, compete more effectively in the global market and pursue new frontiers more aggressively for growth.

About IRCON:

- Indian Railway Construction International Limited (IRCON) was established in 1976, by the Indian Railways under the Indian Companies Act 1956.
- The core competence of IRCON in 47th years is in Railways, Highways & Extra High Tension substation engineering and Construction.
- The company has executed projects operated in the areas of Railway construction including ballast less track, electrification, tunnelling, signal & telecommunication as well as leasing of locos, construction of roads, highways, commercial, industrial & residential buildings and complexes, airport runway and hangars, metro and mass rapid transit system, etc.
- The company has posted a consolidated annual turnover of Rs.10,750crore and Profit after Tax of Rs.765 crore in the Financial Year 2022-23.

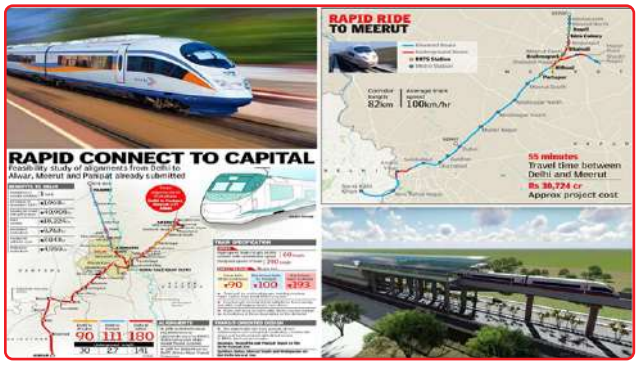
About Navratna Status:

- Earlier in April 2023, RVNL was also awarded 'Navratna' status.
- The 'Navratna' companies are typically selected based on their financial performance, operational efficiency, and strategic importance to the Indian economy. These companies are given more freedom in making decisions related to investments, joint ventures, mergers, and acquisitions.
- Other companies that hold the 'Navratna' status are
  - Bharat Electronics, Shipping Corporation of India,
  - Hindustan Aeronautics,
  - Rashtriya Ispat Nigam,
  - Engineers India,
  - NMDC,
  - National Buildings Construction Corporation,
  - ONGC Videsh,
  - NLC India,
  - Oil India,
  - Mahanagar Telephone Nigam,
  - National Aluminium Company, and
  - Container Corporation of India.
- Navratna companies can achieve 'Maharatna' status by meeting specific performance benchmarks and fulfilling certain eligibility criteria.

Way Forward:

- With the grant of "Navratna" status, the companies should benefit in enhancing the market credibility and in undertaking larger size PPP projects.

REGIONAL RAPID TRANSIT SYSTEM (RRTS)



Why in news?

- Prime Minister recently inaugurated the first leg of the Regional Rapid Transit System (RRTS), India's first mass rapid system dedicated to regional connectivity.
- Capable of running at speeds up to 180 km/hour, trains on the first section will eventually cut the journey time between Delhi and Meerut to less than an hour.

What is the RRTS project?

- The RRTS is an integrated, mass transit network which aims to ensure "balanced and sustainable urban development" through better connectivity and access across the NCR.
- RRTS is supposed to serve the region around Delhi and enhance inter-state connectivity.
- The idea of such a network lies in a study which the Indian Railways was commissioned to carry out in the year 1998-99. The study identified the possibility of an RRTS network to connect various locations in the NCR through fast commuter trains.
- The proposal was re-examined in the year 2006 with the extension of the Delhi Metro lines to some NCR towns such as Gurgaon, Noida and Ghaziabad.
- It was soon taken up by the National Capital Region Planning Board (NCRPB) while developing its "Functional Plan on Transport for NCR-2032".
- The NCRPB identified and recommended eight RRTS corridors to connect NCR towns with high speed rail-based commuter transit services.

Stakeholders:

- The National Capital Region Transport Corporation (NCRTC), which is a joint venture company of the Central government and the governments of Delhi, Haryana, Rajasthan and Uttar Pradesh, has constructed the Regional Rapid Transit System (RRTS) also known as Namo Bharat.
- The body, under the Ministry of Housing and Urban Affairs, is mandated with implementing the RRTS project across the National Capital Region, which is spread across an estimated 55,000 square kilometres and is home to a population of over 46 crore with a combined GDP of an estimated $370 billion.

How is the RRTS different from existing metro or railways systems?

- When compared with metros, the RRTS network is faster. It will cater to commuters who want to travel relatively longer distances across the NCR in a short time.
- Compared with the Indian Railways, though the RRTS train will cover relatively smaller distances, it will do so at higher frequency and provide relatively more comfort than the average Railways coach.
- The RRTS is modelled on systems such as the RER in Paris, Regional-Express trains in Germany and Austria as well as the SEPTA Regional Rail in the United States, among others.

What is the objective behind the RRTS project?

- The RRTS seeks to "unlock the entire potential" of the NCR in various ways in addition to enhancing multi-modal connectivity at the existing transportation hubs within it.
- One of the most significant aims of the project is to nudge commuters towards public transportation and have a positive impact on relieving the congestion both on its road/highways as well as existing metro and railway networks.
- In terms of the economy, the project aims to give a push to employment generation and the opening up of newer commercial hubs along the current contours of the NCR.
- Shorter travel times are expected to increase the overall economic productivity of the region and allow more economic activity to spring up in and around suburban locations spread across the states of Uttar Pradesh, Rajasthan and Haryana.

How fast can RRTS trains travel?

- RRTS trains will travel significantly faster than metro trains. These will operate at a speed of 160 km/hour but are designed to be able to run at speeds up to 180 km/hour.
- Delhi Metro trains can operate at 100 km/hour to 120 km/hour, at the most, depending on the line.
- The Delhi Metro Rail Corporation's fastest line, the Airport Express Line, for example, operates at a speed of 120 km/hour.

Which corridors are being developed under the RRTS project?

- Eight corridors will be developed under the project, of which three are being constructed under phase I: the 82-km Delhi-Ghaziabad-Meerut, the 164-km Delhi-Gurugram-SNB-Alwar, and the 103-km Delhi-Panipat corridors.

- The corridors to be developed in future include Delhi – Faridabad – Ballabgarh – Palwal; Ghaziabad – Khurja; Delhi – Bahadurgarh – Rohtak; Ghaziabad-Hapur; and Delhi-Shahadra-Baraut.
- The RRTS station at Sarai Kale Khan in the heart of the capital will form the backbone of the entire project with all three corridors being constructed under phase I, connecting the city to U.P, Haryana and Rajasthan, converging at it.

NAMIBIA IS BUILDING A BLUE ECONOMY

Why in news?

- The United Nations Food and Agriculture Organization (FAO) estimates that over one-third of seafood is lost or wasted while more than 92% of global fisheries are harvested at maximum yield or over-fished.

Potential of by-products of seafood processing:

- Losses occur at sea from primary processing of the catch and on land from processing in factories. Much of this can go toward production of fishmeal or fish oil.
- Around 25-35% of fishmeal production currently comes from by-products of seafood processing with demand increasing to meet the needs of the expanding aquaculture sector. Additionally, high value products can be developed from, for example, skins and livers.
- Food and job insecurity remain high concerns among many nations, particularly for coastal communities reliant on marine resources.
- The increased seafood processing would create more employment opportunities whilst supporting the scaling of local by-product innovations. Increasing the overall value of the fish may also allow for certain by-products to be sold to local communities.

Iceland Ocean Cluster:

- The Iceland Ocean Cluster, a company which facilitates networking opportunities for ocean related industries in Iceland and worldwide, has led the way in achieving increased utilization of their cod fishery. In doing so, they have created about 700 jobs and increased the market value of the fishery to around $500 million.
- New products and start-up companies in this movement have included wound dressings, nutraceuticals and a cola-style drink that has overtaken sales of premium cola brands in Iceland.
- Fish by-product innovation is gaining traction in many other coastal countries, such as in Kenya, where there is development of the fish leather industry.

Namibia towards a sustainable blue economy

- The Namibia Ocean Cluster is in the process of joining this network as the seafood industry collaboratively explores ways to optimize the utilization of post-harvest seafood losses and maximize the socioeconomic benefits derived from the country's marine capture fisheries.
- Namibia faces significant challenges, with 22% of the population being food insecure and a 33% unemployment rate.
- The fishing sector plays a crucial role in the country's economy, contributing 3.6% to its GDP, meaning it is well placed to play a positive role in addressing these systemic problems.
- It has strong enabling conditions to develop a collaborative approach as the fisheries are considered well-managed through Total Allowable Catch (TAC) systems and MSC certification for its primary fishery.
- Much like many commercial fisheries worldwide, large quantities of Namibian fisheries' by-products are left at sea in the form of heads, internal organs, skins and frames.
- Research from 2018 revealed that around 33% seafood was lost, and approximately 71,000 tonnes removed off the boat, due to the heading and eviscerating process, a practice commonly employed by industrial fisheries.

Collaborative industry action:

- For nearly three years the Namibia fishing industry has worked with the World Economic Forum's Ocean Action Agenda on a project, funded by the United Kingdom's Blue Planet Fund, to build globally applicable models that can help reduce seafood loss and waste and maximise socio-economic value.
- Now, the executive representatives of the Namibia Ocean Cluster Working Group convened to commit to the coalition's launch in January 2024. This Cluster is a multi-stakeholder organization that will provide a safe space to collaborate on operational and entrepreneurial solutions that address seafood loss and waste.
- The mission of the Cluster is to bring together the Namibian seafood sector and allied stakeholders, in a non-competitive, collaborative forum, which collectively believes in working towards maximizing viable utilization of all seafood post-harvest.
- This will lead to new product development, promotion of new economic models, research, methods, and markets.

Way Forward:

- The long-term impact of this industry shift will result in increased food production and nutrition security, higher value fish, increases in local employment and a more efficient use of marine resources, contributing to several of the Sustainable Development Goals.

RCS UDAN COMPLETES SIX SUCCESSFUL YEARS

Why in news?

- The Regional Connectivity Scheme (RCS) - UDAN (Ude Desh Ka Aam Nagrik), a government-backed initiative to improve infrastructure and connectivity in India, especially in remote and underserved regions, completes six years.

Details:

- It is a vital component of India's National Civil Aviation Policy (NCAP) 2016, launched by the Ministry of Civil Aviation (MoCA) on October 21, 2016, with a 10-year vision.
- The first RCS-UDAN flight was inaugurated by the Prime Minister on April 27, 2017, connecting Shimla to Delhi. The scheme focuses on improving unserved air routes in underserved regions of the country and fulfilling the aspirations of the common citizens.
- So far, RCS-UDAN has facilitated travel of more than 130 lakh passengers, demonstrating its success in enhancing air travel accessibility.

Various versions of UDAN Scheme launched so far:

a) UDAN 1.0: 5 airlines companies were awarded 128 flight routes to 70 airports (including 36 newly made operational airports)
b) UDAN 2.0: 73 underserved and unserved airports were announced and for the first time, helipads were also connected.
c) UDAN 3.0: In coordination with the Ministry of Tourism, Tourism Routes were included. In addition to Seaplanes for connecting Water Aerodromes, several routes in the North-East Region came under the ambit of the scheme.
d) UDAN 4.0: Gave impetus to North-Eastern Regions, Hilly States, and Islands. The operation of helicopters and seaplanes incorporated.
e) UDAN Version 5 – 5.0, 5.1 and 5.2: The Ministry of Civil Aviation launched the 5th version of RCS-UDAN with numerous improvements based on stakeholder feedback.

UDAN 5.0:

- UDAN 5.0 where the focus is on Category-2 (20-80 seats) and Category-3 (>80 seats) aircraft. Similarly, the cap of 600 km has been removed and there is no restriction on the distance between the origin and destination of the flight.
- This round prioritizes the routes that will connect the airports that are ready for operations or will be ready soon, which will lead to quicker operationalization of awarded routes.
- Consequently, Airlines would now be required to commence operations within 4 months of the award of the route, and they are welcoming this change as this helps them to better plan their operations.
- Additionally, if the average quarterly PLF of the route, for four continuous quarters, is higher than 85%, the exclusivity for that route would be withdrawn, allowing for other airlines to also provide connectivity on the route.

UDAN 5.1:

- This was soon followed by UDAN 5.1. This round of RCS-UDAN is designed specifically for helicopter routes by increasing the scope of operations for helicopter operators, enhancing VGF and reducing Airfare Caps.
- The Scheme will now allow operations on routes provided that at least one origin or destination is in a priority area and at least one origin or destination is a heliport, thereby enhancing the potential range of connectivity.
- VGF caps have been enhanced to improve viability for operators and airfare caps have been reduced to make flying more affordable for passengers respectively.

UDAN 5.2:

- Currently, bidding for UDAN 5.2 is underway to further enhance the connectivity to remote and regional areas of the country, achieve last-mile connectivity, and provide impetus to the tourism sector through small aircraft (<20 seats).
- The Scheme will provide greater operational flexibility to the small aircraft operators, by allowing them to operate a maximum of 40% of annually quoted RCS seats and a minimum of 10% of annually quoted RCS seats in any given quarter.

Fueling Growth in the Aviation Industry:

- RCS-UDAN is contributing to the growth of the civil aviation industry as four new & successful airlines have come up in the last 6 years.
- The scheme has helped airline operators to start up and develop a sustainable business model.

- Additionally, it's providing opportunities to small regional airlines FlyBig, Star Air, and IndiaOne Air to scale up their businesses and their successful run is evidence of the fact that the scheme is creating an amiable ecosystem conducive to airline business.

Demand for new aircraft of all sizes:

- The scheme's incremental expansion has generated an escalating demand for new aircraft, concurrently broadening the spectrum of aircraft deployed.
- This augmentation encompasses a comprehensive range of aircraft and encompasses helicopters, seaplanes, 3-seat propeller planes, and jet planes. Presently, a diversified fleet, including Airbus 320/321, Boeing 737, ATR 42 and 72, DHC Q400 and Twin Otter, Embraer 145 and 175, and Tecnam P2006T, is actively serving on the RCS routes.
- The heightened demand for aircraft is substantiated by Indian carriers' orders, which exceed 1,000 aircraft slated for delivery over the next 10-15 years, representing a significant augmentation of India's existing fleet, which currently comprises approximately 700 planes operated by various airlines.

Promoting tourism

- RCS-UDAN is not solely dedicated to offering last-mile connectivity to tier-2 and tier-3 cities; it also stands as a prominent contributor to the burgeoning tourism sector.
- UDAN 3.0 introduced tourism routes connecting several destinations in the Northeast region, while UDAN 5.1 is dedicated to expanding helicopter services in hilly regions to stimulate tourism, hospitality, and local economic growth.
- This initiative has successfully connected destinations such as Khajuraho, Deoghar, Amritsar, and Kishangarh (Ajmer), which have substantial relevance in religious tourism.
- The entire Northeast region's tourism industry is experiencing a considerable upsurge due to the introduction of Pasighat, Ziro, Hollongi, and Tezu airports, fostering greater accessibility.

Boosting air connectivity

- From Mundra (Gujarat) to Tezu in Arunachal Pradesh to Hubli in Karnataka, RCS-UDAN is connecting 30 States/ UTs across the length and breadth of the country.
- A total of 75 airports have been operationalized under UDAN. Eight airports have been operationalized in the Northeast region.
- Many airports that were operationalized under UDAN such as Darbhanga, Hubli, Kannur, Mysuru, etc. have become sustainable with many non-RCS commercial flights operating from these airports.

WHAT IN STORE FOR ECONOMY IN SECOND HALF?

Why in news?

- The Indian economy, measured in terms of the Gross Domestic Product (GDP) as well as Gross Value-Added (GVA), grew 7.8% between April and June (first quarter or Q1) 2023, a four quarter-high.

Details:

- The momentum of economic activity was carried forward in the July-September quarter, despite retail inflation hardening to 6.4% from 4.7% in Q1 thanks to a spike in food prices.
- Growth estimates for Q2 are yet to come, but the Reserve Bank of India (RBI) expects GDP growth to moderate to 6.5%.
- A week into the second half of the year, the Israel-Palestine conflict erupted and a spate of fresh dark clouds now hover over the economy.

How have experts reacted to recent events?

- Economists feel a prolonged conflict in West Asia could push crude oil prices beyond India's comfort zone and if other countries join the fray, critical sea routes could face disruptions and spike transport and insurance costs.
- The government may not pass on higher petroleum prices to consumers ahead of critical elections, but producers' costs may still rise. Airlines, for instance, have been hiking fares in line with aviation turbine fuel costs.
- Moreover, higher fuel import bills could pose implications on the exchequer as oil marketing companies may need support for under-recoveries.
- It has brought concerns about fuel, food security and supply chains back to the forefront. She flagged concerns about the impact of any disruptions on inflation in the near future.
- Among the new uncertainties, the spurt in U.S. bond yields hit a 16-year high this month and mixed global data points amid fears of "higher for longer" interest rates.

Is there a shift in the assessment of risks for the economy?

- The International Monetary Fund (IMF) raised its 2023-24 GDP growth estimate for India to 6.3% from 6.1% estimated earlier. This is just slightly below the 6.5% GDP uptick the Finance Ministry and the RBI have penned in for this year, following last year's 7.2% growth.
- In its monthly economic review report, the Department of Economic Affairs (DEA) in the Finance Ministry said it was comfortable with the 6.5% hopes "with symmetric risks".
- Bright spots of corporate profitability, private sector capital formation, bank credit growth and construction sector activity offset the risks at the time. These included steadily climbing crude oil prices and an overdue global stock market correction, which it termed "an ever-present risk".
- The RBI also asserted that risks from the uneven monsoon, geopolitical tensions, global market volatility and economic slowdown, were "evenly balanced".
- The RBI expects GDP growth to slow to 6% in the current quarter, and further to 5.7% in January to March 2024 before picking up to 6.6% in Q1 of 2024-25.

Caution by DEA's review report:

- Though domestic fundamentals are strong and improving, downside risks arise from global headwinds that have been compounded by recent developments in the Persian Gulf, and uncertainties in weather conditions due to El Niño effects.
- Depending on how the situation develops, crude oil prices may push higher. Further, the relentless supply of U.S. Treasuries and continued restrictive monetary policy in the U.S. (with further monetary policy tightening not ruled out) could cause financial conditions to be restrictive.
- It was also prescient about the U.S. stock markets having a greater correction risk, which would have spillover effects on other markets.
- The DEA has flagged a broader worry about fraught geopolitical conditions triggering a surge in risk aversion.

Inflation statics:

- Inflation had eased to 5% in September from a 15-month high of 7.4% in July and the department highlighted higher upticks in industrial capacity utilisation levels, private consumption and investment, retail loans extended for vehicles and housing as bright spots in its economic outlook.
- It also cited 'optimistic' findings from RBI's forwarding-looking surveys on manufacturing, consumer confidence, employment and inflation expectations to stress all is well.

WILL QR CODES IMPROVE ACCESS TO FOOD LABELS?

Why in news?

- The Food Safety and Standards Authority of India (FSSAI) has recommended the inclusion of a QR (quick response) code on food products for accessibility by visually impaired individuals stating that this will ensure access to safe food for all.

Why is the move important?

- The move is vital as India is one of the largest markets of packaged foods in the world and is currently witnessing a growing burden of non-communicable diseases (NCDs) which have seen an abrupt rise globally since the last two decades, according to the World Health Organization.
- Besides other factors, this trend is attributed to aggressively marketed, cheaper, and more easily available pre-packaged foods which is finding a growing preference among consumers.
- Every consumer has the right to know exactly what he is paying for and if he is getting what he is promised and advertised.
- The FSSAI should get the sequence right for labelling and QR code for visually impaired should be part of a mandate for front-of-pack labelling (FOPL) warning labels.

What information will the QR codes provide?

- The FSSAI has advised that these new QR codes should encompass comprehensive details about the product, including, but not limited to, ingredients, nutritional information, allergens, manufacturing date, best before/expiry/use by date, allergen warning, and contact information for customer enquiries.
- It adds that the inclusion of a QR code for the accessibility of information does not replace or negate the requirement to provide mandatory information on the product label, as prescribed by relevant regulations.
- The latest advisory caters to two important regulations:
  a) The FSSAI's Food Safety and Standards (Labelling and Display) Regulations, 2020 which outlines

the information to be included on labels of food products and

b) The Rights of Persons with Disabilities Act, 2016 which recognises the rights of individuals with disabilities and emphasises accessibility of health for persons with disabilities.

How did the QR code come into being?

- A QR code is a type of two-dimensional matrix barcode, invented in 1994, by the Japanese company Denso Wave for labelling automobile parts.
- According to market experts, for the food manufacturers, using QR codes on food products can help improve their brand image, customer loyalty, and operational efficiency.
- A recently published paper titled, 'Food literacy & food labelling laws—a legal analysis of India's food policy', noted that aggressively marketed, cheaper and more easily available pre-packaged foods, often considered as foods high in fat, salt, and sugar, is finding a growing preference amongst consumers in India.

Laws by FSSAI:

- To prevent or control further widespread of NCDs, the FSSAI has issued numerous food and packaging laws and acts to control their manufacture, storage, distribution, sale, and import so that a safe and wholesome food is available to consumers.
- The front-of-pack labelling (FOPL), proposed by FSSAI in 2019, is a key strategy to alert and educate consumers in making an informed choice.

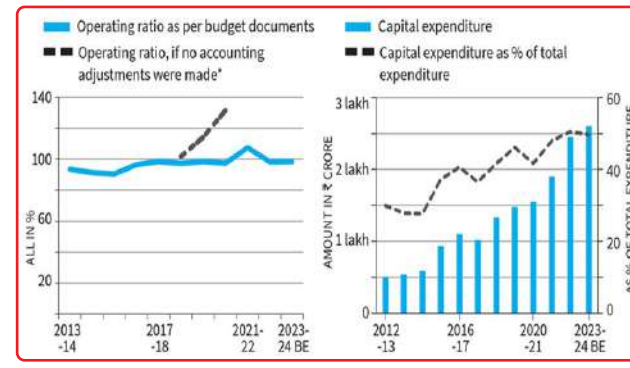
What are the trends in QR use worldwide?

- The U.S., India, France and the U.K. are among the top users of QR code.
- A research paper done on 'Evaluating the Use of QR Codes on Food Products' noted that the size of the global packaged food market is estimated at $303.26 billion in 2019, with a compound annual growth rate of 5.2% over this period.
- According to the results of a survey, 'QR Code Statistics 2022, the Latest Numbers and Use-Cases on Global Usage', 57% scanned a food QR code to get specific information about the product, 38.99% of respondents want to see QR codes used more and 67% of the respondents agreed that these codes make life easier.

THE INDIAN RAILWAYS REVENUE PROBLEM

Context:

- The Indian Railways (IR) has been on a spending spree with respect to capital expenditure (capex), particularly after the government merged its rail budget with the main budget.
- However, its operating ratio, which is the ratio of ordinary working expenses to the gross traffic receipts, has shown no improvement. A lower ratio implies better profitability and surplus for capital investment.



The trap of rising debt:

- Since the IR continues to have a total lack of surplus, it has been augmenting the funds raised through Gross Budgetary Support (GBS) and Extra Budgetary Resources (EBS). The merging of budgets helped this cause as GBS from the central government could be increased without much scrutiny. However, with respect to EBS, there is a price to pay.
- The IR's spending on repayment of principal and interest is pegged at ₹22,229 crore and ₹23,782 crore respectively, which together make it 17% of revenue receipts, a sharp rise from less than 10% till 2015-16.
- It appears that this debt liability was noticed as capex relied almost entirely on GBS in 2023 budget. Despite this, the unprecedented rise in capex appears to be predicated on the premise that the IR's operating and financial performance should not be viewed in isolation but along with its role as an engine for the growth of the country's economy.

Freight vs. passenger:

- The IR's freight segment is profitable whereas the passenger segment makes huge losses. The Comptroller and Auditor General of India (CAG) report presented in Parliament states that there was a loss of ₹68,269 crore in all classes of passenger services during 2021-22, with all the profit from freight traffic nullified in cross subsidising passenger services.
- The annual growth in freight volume and revenue of the IR in the period April-July 2023 stand at 1% and 3% respectively, while the economy grows at 7%. This is a dismal performance.
- The IR's modal share in India's freight business has steadily decreased to approx. 27% from upwards of 80% at the time of independence.

How the freight business of IR can be improved?

Categorization:

- The movement of cargo by the IR is artificially divided into goods and parcels. The division is not semantic but indicates a paradigmatic difference in approach with respect to tariff rules, handling, moving and monitoring.
- Shippers, however, are not interested in these differences as their concern is mainly about the safe

movement of their cargo from point A to B at the least cost and as fast as possible.

- The time has come for the IR to shed such an artificial divide so that cargo can be divided based on its characteristics as bulk and non-bulk (or value added).

Commodities:

- The 11 commodities in the IR's transport basket account for 90% of tonnage and revenue, of which coal is around 45% and iron ore and cement are around 10% each. Although these three still account for two thirds of the IR's total freight volume, the share of the IR in their transport has reduced over the years.
- For example, coal consumption was 602 and 978 million tonnes (MT) in 2011 and 2020 respectively while the rail transport share was 420 and 587 MT respectively; the rail share fell from around to 70% to 60% in a ten-year period. Though it improved to 64% in 2023 it is still lower than what it was in 2011.

Exim containers:

- Similarly, the share of exim containers moving in and out of ports hovered between 10% and 18% since its introduction in 2009-10, with the 2021-22 figure being 13%.
- The private container train operation policy, initiated in 2006 to boost the rail share of container movement, has not made any significant dent in improving the share.

Index of NTKM:

- Further adding to the woes of the IR is the constantly fluctuating key index of Net Tonne Kilometres (NTKM), which fell for two successive years in 2015-16 and 2016-17 by 4% and 5% over the preceding years, first time such a fall has happened for two consecutive years.
- Demonetisation perhaps had some effect in the fall as NTKM recovered in 2017-18 by 11% registering an increase of 1.6% in the three-year period starting 2015-18.
- However, NTKM continued to fluctuate as it fell again in 2019-20 by 4%. In the seven-year period ending 2021-22, NTKM grew annually at the rate of 3.5% much less than the road transport growth rate.

EASING THE TRANSPORT OF CARGO BY RAILWAYS

Context:

- The Railways has been one of the more cheaper modes of transportation for moving bulk cargo.
- The government has therefore realised that it needs to be supported with reduced overall logistics costs and schemes to improve green mobility.

Specific Policy:

- Identifying infrastructure investment in the sector as a key thrust area, the Government of India has formulated two policies
  a) the PM GatiShakti (PMGS) policy for a National Master Plan (NMP) and
  b) the National Logistics Policy (NLP).
- The PMGS aims to bring synergy to create a seamless multi-modal transport network in India, with the NMP employing technology and IT tools for coordinated planning of infrastructure.
- The NLP focuses on building a national logistics portal and integrating platforms of various ministries.

Other initiatives:

- In reference to the Indian Railways (IR), the Department for Promotion of Industry and Internal Trade's website mentions three things:
  a) integration of postal and railway networks,
  b) one station – one product and
  c) the introduction of 400 Vande Bharat trains without anything about increasing the IR share in moving cargo.

Focusing on bulk cargo:

- The IR has taken some initiatives in the bulk cargo arena. It relaxed block rake movement rules to provide a facility to load from/to multiple locations, permitted mini rakes, introduced private freight terminals (PFTs) and relaxed conditions in private sidings.
- The Gati Shakti Terminal (GCT) policy has eased the stipulations for the operation of these terminals and progressively all PFTs and private sidings are being converted into GCTs.
- The IR has also partnered with freight operators in recent years, encouraging them to invest in wagons for movement of their cargo thus helping in the induction of more than 16,000 privately-owned wagons to facilitate specialised traffic like automobiles and fly ash.

Challenges:

- While it is early to judge the impact of these initiatives, the IR's share in bulk cargo continues to decline. Some decline is expected as production becomes more decentralised and the IR's cost advantage diminishes. To offset this, IR should reduce non-price barriers and distribute transaction costs associated with it to as many customers as possible.
- A railway siding is a capital-intensive high-cost proposition and only large industries can manage

them with others having to cover large distances to load their cargo. This increases the logistics costs and hence the reluctance to patronise the IR.

- For example, in the cement sector in 2017-18, thirty-three plants with less than one million tonne (MT) annual capacity had a production share of 6.5% but their share in rail loading was 3.8% whereas plants with more than 2.5 MT annual capacity with a production share of 57%, the rail share was 69.5%. Similar is the picture for many private mines, mini steel plants, agricultural markets etc.

Role of state governments:

- There is an immediate need to develop common-user facilities at cargo aggregation and dispersal points in mining clusters, industrial clusters and large cities. The knowledge of these clusters rests with the States and not the IR or other central ministries, and thus collaboration with State governments is a sine qua non. The relationship of the IR with State governments has been a sort of patron-client relationship as many States regularly demand rail lines in their areas.
- A change in this attitude is necessary in order for the Railways to participate in the planning of industrial clusters and mines in cities/regions if it has to increase its share in the movement of cargo.

Environmental constraints:

- The Ministry of Environment and Forests (MoEF) started issuing notifications since 1999 for the complete utilisation of fly ash; in 2021 the production was 232 MT and utilisation was 214 MT.
- The IR never realised the potential and approved many power plant sidings without fly ash loading facilities rendering it to be a minor player in its transportation, and it must proactively correct this wrong.

Efficient loading:

- Another necessity is for the IR to encourage and liberalise the design of new wagons amenable to higher and efficient loading to deal with new commodities.
- Finally, environmental considerations are constraining loading by the IR. As per recent government regulations, environmental clearance for rail loading/unloading facilities has been made mandatory but the same has not been imposed on road loading/unloading facilities.
- These restrictions have made some users move cargo by road due to high transaction costs involved with environmental clearances.
- Such instructions should be mode-agnostic, based on the quantity of cargo loaded and the potential for environmental degradation. Otherwise rail loading will be hampered giving fillip to more environmentally polluting road transport.

SECURITY

IRON BEAM, ISRAEL'S 5TH LINE OF AERIAL DEFENCE

Why in news?

- Israel may now be considering fast-tracking the deployment of the Iron Beam missile defence system, developed by the Israeli company Rafael, to shore up its aerial defences.
- Once fully operational, the Iron Dome will become the fifth element of Israel's integrated missile defence system, joining Arrow 2, Arrow 3, David's Sling and the Iron Dome.

Iron Beam:

- Rafael's 100-kilowatt Iron Beam is designed to neutralise rockets, artillery, and mortars (RAM), besides unmanned aerial systems (UAS), counter-unmanned aerial systems (C-UAS) and anti-tank missiles.
- It can function by itself or be integrated with other, broader defence systems.
- Iron Beam can "neutralise a wide range of threats with pinpoint accuracy and protect military forces and civilian populations", as it is designed to ensure "limited collateral damage".

Complementary to Iron Dome:

- An air defence system operational since 2011, the Iron Dome has shielded the Israeli population from rockets for more than a decade, even clocking a success rate of up to 90 percent.
- Iron Beam is not a replacement for the Iron Dome but complementary to it since there are few scenarios where the laser-based missile defence system may face operational challenges. For instance, during foggy weather or when it's raining.
- In the ongoing conflict, Israel has relied on the Iron Dome to intercept the hundreds and sometimes thousands of missiles launched into Israeli territory by Hamas and Hezbollah.
- However, since the Iron Dome system requires interceptor missiles, Israel Defence Forces (IDF) have reportedly begun testing for the Iron Beam system,

which is a directed energy weapon (DEW) air defence system.

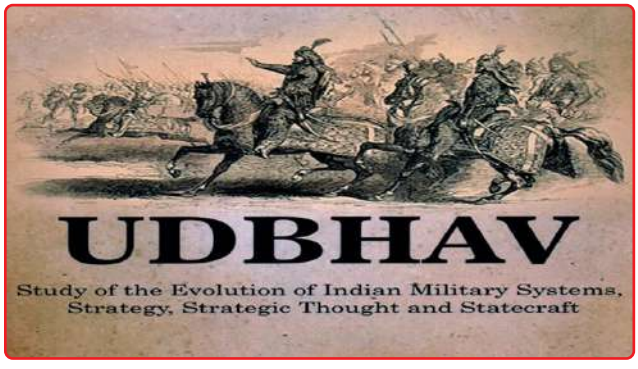
Key features of Iron Beam:

- The Iron Beam is "smaller and lighter than the Iron Dome, which makes it easier to move and to conceal".
- Since the laser-based missile defence system does not require ammunition, fluctuations in the global supply chain would not be of concern.
- It is cost-effective, since it does not require missiles to counter hit the incoming object. This system also requires lower operational costs and limited manpower to operate it.
- Iron Beam uses a fibre laser to generate a laser beam to destroy an airborne target.
- Its battery is reportedly composed of an air defence radar, a command and control (C2) unit, and two High Energy Laser (HEL) systems.
- The two laser guns can produce 100-150 kw of power in a single second.
- Further, the system has a range of up to 7 km and is designed to destroy a target within four seconds of the twin high-energy fibre optic lasers making contact with it.
- The high-energy laser focuses a beam or several beams of energy to blind, cut or inflict heat damage on the target.

Way Forward:

- Unveiled at the Singapore Airshow by Rafael in February 2014, the Iron Beam was slated to become operational by 2025, but Israel is now reportedly expediting its deployment to make it operational much sooner.

ARMY'S PROJECT UDBHAV TO TAP INDIGENOUS MILITARY KNOWLEDGE



Why in news?

- An ambitious effort for the integration of India's "ancient strategic acumen" into the contemporary military domain and develop an "indigenous strategic vocabulary", rooted in India's "philosophy and culture", was launched under Project Udbhav, by Defence Minister recently.
- The project's objective is to synthesise ancient wisdom with contemporary military practices, forging a unique and holistic approach to address modern security challenges.

Background:

- Project Udbhav, a collaboration between the Army and the United Service Institution of India (USI), a defence services think tank, was launched at the first Indian Military Heritage Festival (IMHF) being organised by the USI.
- Going forward, a series of events and workshops will dwell on various facets of our strategic culture and culminate in January next year, with a publication, to document and institutionalise such knowledge.
- An initiative in this research was earlier taken by the Army Training Command, which after delving into the ancient Indian treatises such as Arthashastra by Chanakya and Nitisara by Kamandaki and the Mahabharata, compiled the "compendium of 75 stratagems".
- Similarly, the College of Defence Management conducted a study to establish linkages between Indian culture and art of strategic thinking and these will also provide valuable inputs for the project.

The primary deliverables of Project Udbhav are to

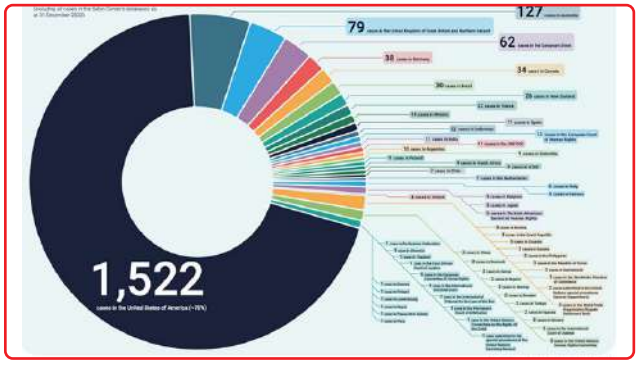
a) develop an understanding of ancient military system and indigenous strategic military culture through the study of evolution of Indian military system and strategic thoughts;
b) educating junior military leaders and informing senior military commanders and academia about the theories concepts and teachings available in classical texts; and
c) facilitating the creation of a knowledge pool for scholars and defence personnel for further studies, which will create an understanding of the relevance of these findings in a contemporary context.

Ancient Indian knowledge system:

- The objective of the IMHF is to acquaint future thought leaders with the dynamics of comprehensive national security with special emphasis on India's strategic culture, military heritage, education, modernisation of security forces and Atmanirbhar Bharat (self-reliant India).
- Ancient Indian knowledge system was rooted in a 5,000-year-old civilisational legacy, which has attached great value to knowledge, with a large body of intellectual texts, world's largest collection of manuscripts, thinkers and schools in so many domains of knowledge.
- To begin with, it is essential to understand the depth of knowledge systems and philosophies. It is only then one can comprehend their enduring connect, relevance and applicability in the modern day.

ENVIRONMENT

THE LARGEST CLIMATE ACTION LAWSUIT AGAINST 32 COUNTRIES



Why in news?

- September 27 marked the beginning of a historic legal battle in the climate action movement.
- Six young people from Portugal, aged 11 to 24, are suing 32 European governments (including the U.K., Russia and Turkey) at the European Court of Human Rights in France's Strasbourg.
- The plaintiffs began arguing before 17 judges that their governments have failed to take sufficient action against the climate crisis, thus violating their human rights and discriminating against young people globally.

What is the lawsuit?

- Duarte Agostinho and Others versus Portugal and Others was filed in September 2020, in the aftermath of the wildfires that consumed Portugal's Leiria in 2017. Over 60 people died, and 20,000 hectares of forests were lost.
- The recent spate of heatwaves and fires across Greece, Canada and other parts of Europe served as reminders that every increment beyond the 1.5°C temperature threshold would be catastrophic, intensifying "multiple and concurrent hazards.
- The Portuguese youths claim that European nations have faltered in their climate emission goals, blowing past their global carbon budgets consistent with the Paris Agreement target of limiting global warming under 1.5°C.
- The nations have thus violated people's fundamental rights protected under the European Convention on Human Rights, including the right to life, the right to be free from inhuman or degrading treatment, the right to privacy and family life and the right to be free from discrimination.

Emission reduction targets:

- The European Scientific Advisory Board on Climate Change (ESABCC), a body which provides scientific advice to EU countries, said countries will have to target an emissions reduction of 75% below 1990 levels (as opposed to the EU's current 55%).
- Under some of these principles, the EU has already exhausted its fair share of the global emissions budget and the European countries have overstated their carbon budget claims. The EU at present is the sixth largest emitter with 7.2 tonnes of CO_2 per capita, while the world averages 6.3 tonnes per capita.
- UNICEF has dubbed the climate crisis as a "child rights crisis", as unhindered carbon emissions and extreme weather threaten access to education, health, nutrition and the future.
- Research concurs, air pollution is already linked to poor birth outcomes and increased risk of cardiovascular and respiratory diseases. Heat waves are triggering mental health issues.

How have governments responded?

- It comes down to cause and effect: countries so far have rejected any relationship between climate change and its impact on human health.
- For instance, Greece, in its submissions, maintained that the effects of climate change "do not seem to directly affect human life or human health." This is even as the country witnessed devastating wildfires earlier this year and torrential rain and flooding in September.
- The Portuguese and Irish governments have dismissed these concerns as 'future fears', arguing that there is no evidence to show climate change poses an immediate risk to their lives.

MASS DEATH OF 120 DOLPHINS IN AMAZON LINKED TO DROUGHT, HEAT, LACK OF OXYGEN

Why in news?

- Carcasses of 120 river dolphins have been discovered floating in a tributary of the Amazon River recently. Experts believe that severe drought and heat may be the culprits behind this mass mortality.
- The Amazon River, currently experiencing low water levels due to an intense drought, has seen its waters heated to temperatures intolerable for the dolphins. This has led to a significant depletion of oxygen in the water, resulting in the death of thousands of fish.

Amazon River dolphins:

- The Amazon River dolphins, many of them strikingly pink, are a unique freshwater species found only in South American rivers.
- They are among the few remaining freshwater dolphin species in the world. Their slow reproductive cycles make their populations particularly vulnerable to threats.
- The boto and the gray river dolphin, or "tucuxi," are listed on the International Union for Conservation of Nature's red list of threatened species.

Climate Change:

- The situation turned critical when at least 70 carcasses surfaced as Lake Tefé's water temperature soared to 39 degrees Celsius, more than 10 degrees above the average for this time of year. Although the water temperature briefly declined, it rose again to 37 C, causing further concern among experts.
- Environmental activists have pointed fingers at climate change, which increases the likelihood and severity of droughts and heatwaves. However, the role of global warming in the current Amazon drought remains unclear, with factors like El Nino also potentially at play.
- Approximately 80% of the carcasses were pink dolphins, known as "botos" in Brazil. This could represent a staggering 10% loss of their estimated population in Lake Tefé.

What's next?

- In response to this crisis, aquatic mammal experts are rescuing any surviving dolphins in the lake.
- However, these dolphins cannot be relocated to cooler river waters until a bacteriological cause of death has been ruled out.

GLOF TRIGGERED SIKKIM DISASTER DAY AFTER NEPAL QUAKE

Why in news?

- Many people lost their lives in the aftermath of a cloudburst above Lhonak Lake in North Sikkim, which has subsequently induced a flash flood within the Teesta river basin.
- The flash floods are being said to be the result of the Glacial Lake Outburst in the South Lhonak Lake where water over an area of 105 hectares drained out, creating a flash flood downstream.

What is a Glacial Lake Outburst Flood?

- Glacial Lake Outburst Floods (GLOFs) are natural disasters that can be catastrophic, triggered by the sudden release of water from glacial lakes. Understanding the causes, mechanisms, and factors leading to GLOFs is crucial for safeguarding vulnerable regions and populations.
- These are flash floods of extreme magnitude that occur when the natural dams, made up of ice, rock debris, or moraine, hold back glacial lakes rupture or are breached. These glacial lakes typically form as a result of the melting of glaciers in high-altitude areas.
- The water accumulates in depressions, often trapped by glacial debris or ice dams, creating a potentially dangerous situation.

Factors responsible:

- Several factors contribute to the occurrence of GLOFs, the primary factor being the accelerated melting of glaciers due to rising global temperatures. As glaciers shrink, they feed water into the glacial lakes, increasing their volume.
- Ice Dam Failure is another factor as when the volume of water in these lakes surpasses the capacity of the natural dam (often composed of ice or moraine), the dam can weaken or break, unleashing a torrent of water downstream.
- Another factor remains a major trigger event that could lead to this condition. Various triggers, such as earthquakes, avalanches, or landslides, can induce ice dam failure. These events shake loose the ice or debris, weakening the dam and causing it to give way. There are speculations that the outburst could have been triggered by the Nepal Earthquake a day before, which was a magnitude 6.2.
- Once a GLOF is initiated, the release of water can be sudden and catastrophic. The immense volume of water flows rapidly down valleys, gaining destructive force as it descends.
- What makes the floods extremely dangerous is not just the speed factor, the surging floodwaters carry with them rocks, debris, and sediment, creating a destructive force capable of obliterating infrastructure, villages, and agricultural land downstream.

Increased occurrence:

Several factors have contributed to the increased occurrence of GLOFs in recent years:

- Climate Change: The warming of the Earth's climate accelerates glacier melting, leading to the growth and instability of glacial lakes.
- Glacier Retreat: As glaciers shrink and recede, they expose more rock and debris, which can accumulate

in the downstream areas, forming unstable natural dams.
- High-Risk Zones: Human settlements and infrastructure in proximity to glacial lakes are particularly vulnerable to GLOFs. Rapid urbanization and development in these regions exacerbate the risks.
- Monitoring and Early Warning: Inadequate monitoring and early warning systems in many affected areas limit the ability to predict and respond to potential GLOFs.

AMPHIBIANS AT RISK, 41 PERCENTAGE OF GLOBAL SPECIES THREATENED WITH EXTINCTION

Why in news?
- In a recent global assessment, it has been revealed that the world's amphibians are in grave danger, with 41% of species threatened with extinction.
- This alarming figure is an increase from the 39% reported in the last assessment conducted in 2004.

Threats:
- Amphibians, including frogs, salamanders, newts, and others, are considered the most threatened animals globally due to their unique biology and permeable skin, making them highly sensitive to environmental changes.
- The study identified habitat loss due to farming and ranching expansion as the primary threat to these creatures.
- However, novel diseases and climate change are increasingly pushing more amphibian species towards the brink of extinction.

Vulnerability:
- Amphibians' vulnerability stems from their distinct life stages, each requiring different habitats.
- Changes in either aquatic or land environments can disrupt their life cycle. Their delicate skin, which they use to absorb oxygen for breathing, leaves them unprotected against chemical pollution, bacterial and fungal infections.
- Additionally, they are significantly affected by temperature and moisture level fluctuations due to climate change.
- For instance, frogs, typically nocturnal creatures, may not emerge even at night if temperatures are too high, as they risk losing excessive water through their skin. However, staying in sheltered resting places restricts their feeding and breeding activities.
- The year 2023 is on track to be the second hottest globally, following 2016, further exacerbated the plight of these creatures.

Hotspots:
- The greatest concentrations of threatened amphibian species were identified in several biodiversity hotspots, including the Caribbean islands, the tropical Andes, Madagascar, and Sri Lanka.
- Other locations with large numbers of threatened amphibians include Brazil's Atlantic Forest, southern China, and the southeastern United States.

NOTIFICATION ISSUED FOR GREEN CREDIT PROGRAM (GCP) AND ECOMARK SCHEME UNDER LIFE INITIATIVE

Why in news?
- To take ahead the 'LiFE' - 'Lifestyle for Environment' movement announced by the Prime Minister in 2021, the Ministry of Environment, Forest and Climate Change has introduced two pioneering initiatives.
- These initiatives, the Green Credit Program (GCP) and the Ecomark Scheme, seek to encourage environmentally friendly practices rooted in tradition and conservation; reflecting the ideas of LiFE concept.

Green Credit Program (GCP):
- Incentivizing Environmental Actions Green Credit Program (GCP) is an innovative market-based mechanism designed to incentivize voluntary environmental actions across diverse sectors, by various stakeholders like individuals, communities, private sector industries, and companies.
- The GCP's governance framework is supported by an inter-ministerial Steering Committee and the Indian Council of Forestry Research and Education (ICFRE) serves as the GCP Administrator, responsible for program implementation, management, monitoring, and operation.
- In its initial phase, the GCP focuses on two key activities: water conservation and afforestation.

- Draft methodologies for awarding Green Credits have been developed and will be notified for stakeholder consultation. These methodologies set benchmarks for each activity/process, to ensure environmental impact and fungibility across sectors.
- A user-friendly digital platform will streamline the processes for registration of projects, its verification, and issuance of Green Credits.
- The Green Credit Registry and trading platform, being developed by ICFRE along with experts, would facilitate the registration and thereafter, the buying and selling of Green Credits.
- The Administrator will verify the activity through a designated agency, with self-verification for small projects.
- Once verification is complete, the Administrator will grant a Green Credit certificate which will be tradable on the green credit platform.

Ecomark Scheme:

- The philosophy behind LiFE, (Lifestyle for Environment) is nudging individual choices and behavior towards sustainability.
- In line with this approach, the MoEF&CC has recast its Ecomark notification so that consumers are able to make choices among products and thereby opt for those products that are eco-friendly in their design, process etc.
- The Ecomark Scheme replaces the previous Notification. It provides accreditation and labelling for household and consumer products that meet specific environmental criteria while maintaining quality standards as per Indian norms.
- Products accredited under the Ecomark Scheme will adhere to specific environmental criteria, ensuring minimal environmental impact. It will build consumer awareness of environmental issues and encourage eco-conscious choices.
- It will also motivate manufacturers to shift towards environmentally friendly production.
- The scheme seeks to ensure accurate labelling and prevent misleading information about products.

Implementation:

- The Central Pollution Control Board administers the Ecomark Scheme in partnership with Bureau of Indian Standards (BIS), which is the national body for standards and certification.

Way Forward:

- Both initiatives mark significant steps in promoting sustainable living, environmental conservation, and, through individual and collective choice, embody eco-friendly practices in India.
- They align with global sustainability goals and reflect the government's commitment to conservation and protection of the environment

INDIA AND SAUDI ARABIA SIGN MOU IN ELECTRICAL INTERCONNECTIONS, GREEN / CLEAN HYDROGEN AND SUPPLY CHAINS

Why in news?

- India and Saudi Arabia have signed a Memorandum of Understanding in Riyadh, in the fields of Electrical Interconnections, Green / Clean Hydrogen and Supply Chains.

Areas of cooperation:

- This MoU aims to establish a general framework for cooperation between the two countries in the field of electrical interconnection; exchange of electricity during peak times and emergencies; co-development of projects; co-production of green / clean hydrogen and renewable energy; and also establishing secure, reliable and resilient supply chains of materials used in green / clean hydrogen and the renewable energy sector.
- It was also decided between the two energy ministers that B2B Business Summits and regular B2B interactions between the two countries will be conducted to establish complete supply and value chains in the above-mentioned areas of energy sector cooperation.

MENA Climate Week 2023:

- Earlier, an Indian delegation led by the Union Minister for Power and New & Renewable Energy, participated in the High-Level Segment of the Middle East and North Africa (MENA) Climate Week 2023, held in Riyadh, Saudi Arabia.
- MENA Climate Week 2023 will discuss climate solutions ahead of COP28 and is being hosted by the government of the Kingdom of Saudi Arabia.
- This important event brings together a diverse group of stakeholders to discuss many topics, including the Global Stocktake, and the economic and energy security aspects of climate action in the context of the Paris Agreement.
- It provides a valuable opportunity to share insights and best practices, and to develop ambitious climate strategies for the rest of this critical decade.

Global Stocktake of Paris Agreement:

- The high-level GST (Global Stocktake of the Paris Agreement) regional dialogue at the Middle-East

and North Africa (MENA) Climate Week will bring together policy makers, key stakeholders and partners in the intergovernmental process to discuss key messages from the region with a view to shaping the GST outcome.

- The dialogue will further serve as a platform to discuss the challenges, barriers, solutions and opportunities for enhancing climate action and support within the context of MENA and for enhancing international cooperation.
- The GST allows countries to periodically take stock of the implementation of the Paris Agreement to assess the collective progress towards achieving the purpose of the Agreement and its long-term goals.
- It is done in a comprehensive and facilitative manner, considering mitigation, adaptation and the means of implementation and support, and in the light of equity and the best available science.
- The first GST started in Glasgow in 2021 and will conclude at the climate change conference in Dubai, UAE (at COP 28).
- The outcome of the GST shall inform Parties in updating and enhancing, in a nationally determined manner, their action and support, as well as in enhancing international cooperation for climate action.

Way Forward:

- The conclusion of the first global stocktake is an important political moment to highlight collective progress made globally towards the achievement of the Paris Agreement provisions and goals.
- It will also be critical to signal a positive message of unity and cooperation to the world, to enable ownership of the outcome and subsequent buy-in for effective implementation.

HOW A 6.3 MAGNITUDE QUAKE CAUSED ANOTHER OF SAME INTENSITY

Why in news?

- In what can be termed as unusual, a shallow focus (14 km depth) earthquake of 6.3 magnitude struck about 40 kms northwest of Herat in Afghanistan on October 7.
- The earthquake occurred as the result of thrust faulting near the far western terminus of the Hindu Kush Mountain range.
- Just 30 minutes after the first quake, Herat was struck by another shallow earthquake (about 13.5 km depth) of the same intensity, 6.3 magnitude.

Reverse faults:

- The first earthquake was followed by a second earthquake that occurred approximately 30 minutes later. Both earthquakes occurred on east-west striking fault planes that dip to either the north or south.
- The earthquakes occurred within the Eurasia plate in an intracontinental mountain belt. There were about a half-a-dozen aftershocks following the earthquakes.
- On October 11, Herat witnessed yet another shallow earthquake with the focus of the quake being just 9 km below the surface. It had the same intensity (6.3 magnitude) as the previous ones on October 7.
- All three earthquakes have been thrust faults, otherwise known as reverse faults.
- Thrustfaults form due to horizontal compressive stresses and so cause shortening of the crust. Here one block or wall (the hanging wall) moves up relative to the other (called the footwall).

Why was the second earthquake on October 7 that struck within 30 minutes called a fresh quake and not an aftershock?

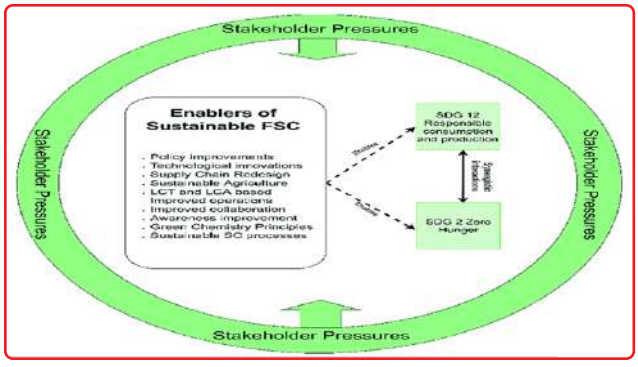
- Earthquakes are generally followed by aftershocks of relatively lesser magnitude.
- A quake of 6.3 magnitude was followed by another of the same magnitude. This can happen when a fault at one place ruptures resulting in an earthquake that releases the stress. The release of stress in one fault results in the loading of stress at another fault.
- The loading of stress can result in another earthquake which can be of similar magnitude or even higher magnitude. But the magnitude will not be smaller than the first quake.
- In the case of the October 7 earthquakes, the two quakes occurred in the same fault. Generally, in Afghanistan, the fault can be very long and wide.
- In subduction zones and in the Himalayas where there is interaction between two continental plates, the fault lengths can be very large and also very wide. That is the reason why an earthquake in the fault can trigger another in the same fault. The second earthquake occurred quite close to the first one (about 20 km distance) in the same fault.

Earthquakes in Afghanistan:

- Earthquakes are quite common in Afghanistan due to active interactions between three tectonic plates: the Arabia, Eurasia, and India plates.
- The earthquakes in western and central Afghanistan are "primarily influenced by the northward movement of the Arabia plate relative to the Eurasia plate."
- Beneath the Pamir-Hindu Kush Mountains of northern Afghanistan, earthquakes occur to depths as great as 200 km as a result of remnant lithospheric subduction.

- Shallower crustal earthquakes in the Pamir-Hindu Mountains occur primarily along the Main Pamir Thrust and other active Quaternary faults, which accommodate much of the region's crustal shortening.
- The western and eastern margins of the Main Pamir Thrust display a combination of thrust and strike-slip mechanisms.

HOW SYNERGISTIC BARRIERS ARE AFFECTING PROGRESS ON SDGS



Why in news?

- Lamenting the lack of progress on various Sustainable Development Goals (SDGs), world leaders at the SDG Summit in New York in September, once again reaffirmed their shared commitment to eradicate poverty and end hunger.
- They recognised that the world was on track to meet only 15% of its 169 targets that make up the 17 goals and have committed to an SDG stimulus of $500 billion annually.

Gaps:

- A 2023 report of the United Nations Conference on Trade and Development estimated the investment gap in SDGs in developing countries to be greater than $4 trillion.
- Of this, nearly $2 trillion needs to be directed towards energy transition alone. These staggering figures, representing the estimated sum of investment required by specialised agencies responsible for tracking each SDG, seem unachievable.

Lack of synergistic action:

- A fundamental statement in the Agenda 2030 document detailing the SDGs, recognises the indivisible and integrated nature of the 17 SDGs and their contribution to the three pillars of sustainable development.
- A lot of academic literature has also focussed on the 'synergies' and 'trade-offs' that exist in the pursuit of specific SDGs.
- One such paper, identified five types of (dis)synergies that can be estimated along the value chain of an SDG intervention; those arising from resource allocations; creation of enabling environments; co-benefits; cost-effectiveness; and saturation limits.
- A recently launched UN Expert Group Report, entitled 'Synergy Solutions for a World in Crisis: Tackling Climate and SDG Action Together', also laments the lack of synergistic action in the face of significant (modelled) evidence.

Barrier for small-scale applications:

- The policymaking processes are generally robust, with a clear view on synergistic outcomes, especially when multi-stakeholder approaches to policymaking are practised.
- For example, in India, the push for renewable energy started with both energy security and air pollution in focus, and received an impetus with climate commitments.
- However, it hasn't been able to leverage the health benefits arising from lower air pollution to strengthen arguments for greater incentives for renewables.
- At the same time, the ambitious renewable energy targets themselves became a barrier for small scale applications due to a misalignment of deliverables. While the energy departments had targets in gigawatts, primary health centres had needs in kilowatts, leading to their neglect in energisation, even though the health outcomes could have been significant.
- Therefore, simply recognising interlinks without a robust analysis and understanding of institutional barriers won't yield the outcomes India desires.

Way Forward:

- As such, there is merit in both assessing as well as addressing barriers identified in the UN report in Indian context.
- This in turn should prompt the country to strengthen the environment for synergistic action, and make transparent both the opportunities and limits to synergies arising from SDG interventions.
- Every new investment today leading to a high-carbon outcome will likely result in higher dis-synergies or trade-offs in our ability to achieve our energy and climate goals.
- On the other hand, investing in clean energy options could have a significant synergistic impact on air pollution and human health, increasing the attractiveness of such interventions.

WHY ARE EARTHQUAKES FREQUENT IN AFGHANISTAN?

Why in news?

- An earthquake of magnitude 6.3 struck western Afghanistan recently, barely a few days after multiple earthquakes of similar strength killed at least a thousand people in the Herat province. Multiple earthquakes have destroyed entire villages in the country.

Background:

- Afghanistan has faced widespread destruction from intense earthquakes over the years. In June 2022, more than 1,000 people were killed when an earthquake of magnitude 6.1 struck Khost and Paktika provinces.
- In 2015, a major earthquake that struck the country's northeast killed over 200 people in Afghanistan and neighbouring northern Pakistan.
- A 6.1-magnitude earthquake in 2002 killed about 1,000 people in northern Afghanistan.
- In 1998, another earthquake and subsequent tremors in northeast Afghanistan killed at least 4,500 people.

How do earthquakes occur?

- The earth is made up of chunks of solid rocks called tectonic plates. Discontinuities in these rock masses, along which they have moved, are called fault lines. These fractures are a result of tectonic forces and stress that builds up in the earth's lithosphere, causing the rocks to break and slip.
- An earthquake occurs when blocks of lithosphere suddenly slip past one another, releasing energy and sending seismic waves through the ground.
- The surface where the lithosphere chunks slip becomes a fault plane. The point within the earth where the fault rupture starts and produces an earthquake is called the focus or the hypocentre. The point on the surface of the earth directly above it is called the epicentre.
- Tectonic plates are slow moving but are always in motion, mostly due to the heat energy generated inside the earth. The edges of these plates are called plate boundaries and consist of faults— this is where most earthquakes occur.

Why do frequent earthquakes occur in Afghanistan?

- Afghanistan is located over multiple fault lines in the region where the Indian and the Eurasian tectonic plates meet. These plates collide often, leading to significant tectonic activity.
- Afghanistan is located on the Eurasian plate. Towards western Afghanistan, the Arabian plate subducts northward under Eurasia, and towards eastern Afghanistan the Indian plate does the same. In southern Afghanistan, the Arabian and Indian plates adjoin and both subduct northward under the Eurasian plate.
- The Hindu Kush mountain range and the Pamir Knot are geologically complex regions where tectonic plates meet.
- The collision and convergence of the Indian Plate and the Eurasian Plate result in the folding and faulting of the Earth's crust. This geological complexity contributes to the occurrence of earthquakes in the region.

Compression:

- The ongoing northward movement of the Indian Plate towards the Eurasian Plate also results in compression, leading to the uplift of the Himalayas and the transmission of tectonic stress across the entire region, including Afghanistan.
- The compression causes the crust to deform, and creates faults and fractures that can slip and generate earthquakes. These interactions at plate boundaries generate significant tectonic stresses and result in earthquakes.

Active fault systems:

- Afghanistan is also criss-crossed by various active fault systems like the Chaman Fault and the Main Pamir Thrust. These faults are the sources of many earthquakes in the region.

WILL THE SIKKIM FLOOD IMPACT HYDEL PROJECTS?

Why in news?

- During the early hours of October 4, a sudden surge in the Teesta river washed away habitations in Sikkim, the Chungthang Dam, several bridges and parts of National Highway 10, leaving scores of people dead and missing and thousands homeless.
- As experts debate the reasons for the collapse, including the failure of automated weather stations, at two high-risk glacial lakes South Lhonak and Shako Cho, the focus is also on the status of other dams and hydel power projects in the State.

What triggered the floods?

- Experts point out that the floods in the Teesta river in Sikkim and West Bengal was triggered by a

phenomenon called GLOF (Glacial Lake Outburst Flood).

- GLOF is a sudden release of water from a lake fed by glacier melt that has formed at the side, in front, within, beneath, or on the surface of a glacier. In case of the Sikkim floods, satellite images reveal a large chunk of ice may have fallen from the glacier into the lake creating waves that toppled the moraine dam leading to a GLOF and causing severe flash floods downstream in the Teesta.
- The South Lhonak lake is one of the most studied lakes for GLOF.
- The recent satellite images suggest the risk has not been eliminated despite the floods because the lake has not dewatered or drained substantially.

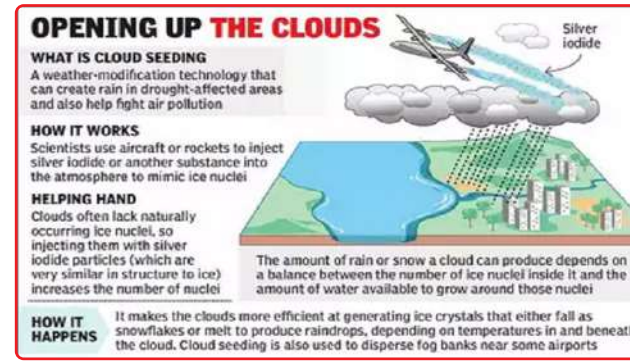
What is the status of hydel power projects?

- The collapse of the hydel power dam at Chungthang added to the devastation.
- The 1,200 MW Teesta Stage III hydro power project located at Chungthang village in Mangan district of north Sikkim was commissioned in February 2017 and in a little over six years, the dam collapsed.
- The Chief Minister of Sikkim raised the issue that the Central Water Commission while approving the project had said that it would be a concrete gravity dam whereas the dam constructed was a rock-filled dam that would not be able to withstand huge floods.
- The Chungthang dam, which has a majority stake of the State government under Sikkim Urja, has stopped generating electricity and has filed an insurance claim.
- After the floods, not only the Teesta Stage III hydro power project, but all the operational hydel power power projects on the Teesta river in Sikkim have practically become defunct.
- Electricity generation of about 1,806 MW from hydel power projects in Sikkim has come to a halt because of the floods.
- Along with the 1,200 MW Chungthang Teesta Stage III that was washed away by the floods, electricity generation at Teesta-V Power Station (510 MW), as well as Dikchu Hydroelectric Project (96 MW), has been stalled because of muck from the floods entering the power stations.

What lies ahead?

- After the GLOF-triggered Sikkim floods and widespread loss of lives and property, activists and scientists are calling for a rethink on proposed hydel power projects.
- 87 hydroelectricity projects (HEP) of installed capacity of 22,982 (MW) are operational across the Himalayan belt.
- Another 30 large HEPs (above 25 MW) with an installed capacity of 11,137 MW are being developed across the Himalayan belt. Five projects are proposed in Sikkim on the Teesta and other rivers.
- In Sikkim, the assessed hydro power potential is of 4,248 MW of which about 53.7 % (2,282 MW) has been developed and 24.4 % (1,037 MW) is being constructed.

CLOUD SEEDING EXPERIMENT OVER SOLAPUR LED TO 18PERCENT RISE IN RAINFALL, STUDY



Why in news?

- A cloud seeding experiment to artificially trigger rain over the Solapur region of southwest Maharashtra led to 18 per cent more rainfall than in normal conditions, a study has revealed.
- The scientists from the Pune-based Indian Institute of Tropical Meteorology and other institutes found that hygroscopic cloud seeding enhanced rainfall in a rain shadow area spanning 100 square kilometres in Solapur.

Hygroscopic seeding:

- Hygroscopic seeding is done in warm convective clouds with a cloud base height greater than zero degree Celsius.
- It uses hygroscopic flares of calcium chloride particles released at the convective cloud base.

Background:

- The cloud seeding experiment was carried out between 2017-19 with scientists evaluating 276 clouds to test the effectiveness of the procedure that was conducted using a specially fitted aircraft as part of a project of the Ministry of Earth Sciences.
- All measurements were done using a wide network of state-of-the-art equipment such as automatic rain gauges, radars, radiometers, and aircraft.

Glaciogenic seeding:

- The scientists also conducted the glaciogenic seeding method in cold clouds having both ice and water. The process uses ice-nucleating silver iodide particles inside clouds to enhance ice particle production and increase rain from the cold part of the cloud.
- Scientists found that the glaciogenic seeding did not cause significantly different rainfall between seeded and non-seeded clouds at the seeding location.
- However, a relative increase in rainfall was seen downwind of the seeded area, supported by the synoptic weather conditions.

Way Forward:

- The scientists have recommended using hygroscopic cloud seeding to enhance rainfall in rain-deficient and water-stressed areas in Indian settings under suitable conditions, backed by statistical, physical, and numerical evidence.

What is cloud seeding?

- Cloud seeding is a weather modification technique aimed at enhancing precipitation from clouds Cloud precipitation efficiency, defined as the ratio of the amount of rain reaching the ground to the amount of water vapor entering the cloud base, is often clearly below unity.
- The idea of cloud seeding, first conceived after World War II, is to increase the precipitation efficiency artificially, and despite many scientific uncertainties that still persist, it has become a much practiced activity at many arid regions of the world

Techniques:

There are two principal cloud seeding techniques.

- Hygroscopic cloud seeding aims at speeding up droplet coalescence in liquid clouds, leading to production of large droplets that start to precipitate. Cloud seeding material consists usually of large salt particles dispersed by some means to the cloud base.
- The idea of glaciogenic cloud seeding, is to trigger ice production in supercooled clouds, leading to precipitation. Glaciogenic cloud seeding is usually done by dispersing efficient ice nuclei, such as silver iodide particles or dry ice (solid carbon dioxide) into the cloud, causing heterogeneous ice nucleation.
- Another possibility is to use liquid carbon dioxide which cools the cloud sufficiently so that the supercooled water droplets freeze homogeneously.
- Glaciogenic cloud seeding is usually applied to convective clouds, or winter orographic clouds. The largest body of scientific research on cloud seeding has been done on AgI seeding on these two cloud types.

INDIA NEED TO RELOOK THE DAM SAFETY ACT?

Why in news?

- India has almost 6,000 large dams and about 80% of them are more than 25 years old and carry safety risks. A new Dam Safety Act (DSA) was passed in late 2021.
- Recently, a glacial lake outburst flood (GLOF) in North Sikkim's South Lhonak Lake washed away one of the biggest hydropower projects in India, the Teesta III dam at Chungthang.
- Reports have since revealed there were no early warning systems, no risk assessment or preventive measures in place as required under the Act.

What are the provisions of the Act?

- The Dam Safety Act was a response to deficient surveillance and maintenance causing dam failure-related disasters.
- The Act listed key responsibilities and mandated that national and State-level bodies be established for implementation.
- It said a National Committee on Dam Safety would oversee dam safety policies and regulations;
  a) a National Dam Safety Authority would be charged with implementation and resolving State-level disputes;
  b) the Chairman of the Central Water Commission (CWC) would head dam safety protocols at the national level;
  c) a State Committee on Dam Safety (SCDS) and State Dam Safety Organisation (SDSO) would be set up.
- Sikkim formed an SCDS on August 17 with nine members and experts in hydrology and dam design.

What do the States need to do?

- Provisions require States to classify dams based on hazard risk, conduct regular inspections, create emergency action plans, institute emergency flood warning systems, and undertake safety reviews and period risk assessment studies.
- States were asked to report and record incidents of dam failures. Until now, no statutory provision required systemic reporting of failures and no single agency was tasked with tracking this data.

Is any action taken for failing to comply?

- Failure to comply with any provision of the Act is punishable with imprisonment and/or fines, and if such obstruction or refusal to comply with directions results in loss of lives or imminent danger thereof, entity shall be punishable with imprisonment for a term which may extend to two years.
- For example, in February 2023, the Sikkim High Court ordered the Gati Hydropower Project company to pay ₹70 lakh to two widowed mothers, for non-compliance with the Dam Safety Act.

What are the challenges?

- Experts say the Sikkim incident exemplifies blind spots in both legislation and implementation.

- The DSA does not promote risk-based decision-making and fails to incentivise transparency.

How is dam safety undertaken?

- Dam safety is a function of many parts: designing and constructing dams that adhere to safety margins, maintaining and operating them per guidelines, recording data in real-time in an accessible format, forecasting hazardous events and instituting emergency plans, to name a few.
- The Sikkim GLOF reveals poor compliance at all levels, from the dam's design to the spillway capacity (which controls the release of water from a reservoir).
- Hazard profiling and regular assessment are also mandated by the Act. Hazard risk fluctuates at the slightest touch, responding to climate change, urbanisation, and the way people/companies use water or where they are located.
- Periodic reviews are expected to bring forth fresh inundation maps and new rule curves (which determine the capacity of dam reservoirs), all of which contribute towards the safety of the downstream areas.
- Spillway capacity and other metrics should be reviewed every five years or so.

Non-compliance:

- The Act requires dam builders to conduct comprehensive dam safety evaluations, but "there is no standardisation of how the failure is analysed and reported.
- The Himachal Pradesh government recently served notices to 21 hydroelectric projects, finding them guilty of non-compliance with the DSA during the July-August floods.

JAMRANI DAM MULTIPURPOSE PROJECT OF UTTARAKHAND UNDER PMKSY AIBP

Why in news?

- The Cabinet Committee on Economic Affairs (CCEA) has approved inclusion of Jamrani Dam Multipurpose Project of Uttarakhand under Pradhan Mantri Krishi Sinchayee Yojana-Accelerated Irrigation Benefit Programme (PMKSY-AIBP) of Department of Water Resources, River Development and Ganga Rejuvenation.
- The CCEA has approved central support of Rs.1,557.18 crore to Uttarakhand for completion of the project with estimated cost of Rs.2,584.10 crore by March, 2028.

Jamrani Dam Multipurpose Project:

- The project envisages construction of a dam near Jamrani village across river Gola, a tributary of river Ram Ganga, in Nainital district of Uttarakhand.
- The dam would feed the existing Gola barrage, through its 40.5 km length of canal system and 244 km long canal system, which was completed in 1981.
- The project envisages additional irrigation of 57,065 ha (9,458 ha in Uttarakhand and 47,607 ha in Uttar Pradesh) in Nainital & Udham Singh Nagar districts of Uttarakhand, and Rampur & Bareilly districts in Uttar Pradesh.
- Apart from construction of two new feeder canals, 207 km of existing canals are to be renovated and 278 km pucca field channels are also to be taken up under the project.
- In addition, the project also envisages hydro power generation of 14 MW, as well as provision of 42.70 million cubic metre (MCM) of drinking water to Haldwani and nearby areas benefitting more than 10.65 lakh population.
- A substantial part of irrigation benefits of the project would flow to the neighbouring state of Uttar Pradesh, and cost/ benefit sharing between the two States is to be done as per an MoU signed in 2017. However, drinking water and power benefits shall be available entirely to Uttarakhand

About PMKSY:

- Pradhan Mantri Krishi Sinchayee Yojana (PMKSY) was launched during the year 2015-16, with an aim to enhance physical access of water on farm and expand cultivable area under assured irrigation, improve on-farm water use efficiency, introduce sustainable water conservation practices, etc.
- Government of India has approved implementation of PMKSY during 2021-26 with an overall outlay of Rs.93,068.56 crore (central assistance of Rs. 37,454 crore).
- Accelerated Irrigation Benefits Programme (AIBP) component of PMKSY is for creation of irrigation potential through major and medium irrigation projects.
- So far 53 projects have been completed under PMKSY-AIBP and additional irrigation potential of 25.14 lakh hectare has been created.
- Six projects have been included after AIBP component of PMKSY 2.0 since 2021-22. Jamrani Dam Multipurpose Project is seventh project to be included in the list.

IITM PUNE DEMONSTRATES CLOUD SEEDING CAN PRODUCE RAINFALL

Why in news?

- A cloud seeding experiment carried out in Solapur city was able to achieve 18% relative enhancement in rainfall, which is approximately 8.67mm more rainfall.

Details:

- The relative enhancement of accumulated rainfall was seen over two hours after seeding the clouds.
- In all, the total enhancement of water availability through cloud seeding experiments was 867 million litres.
- Solapur city falls on the leeward side of the Western Ghats and hence gets low rainfall; 384 mm and 422 mm of total rainfall during the period June to September 2018 and 2019, respectively.

CAIPEEX phase-4:

- The experiment, Cloud Aerosol Interaction and Precipitation Enhancement Experiment (CAIPEEX phase-4) was a scientific investigation conducted in Solapur city during the summer monsoon period of 2018 and 2019.
- The primary objective was to investigate the efficacy of hygroscopic seeding in deep convective clouds and to develop a cloud seeding protocol. The experiment used two aircraft for studying various cloud parameters and for seeding the clouds.
- The study found that cloud seeding is an effective strategy for enhancing rainfall in a region under suitable conditions.

How experiment was conducted?

- A randomised seeding experiment was undertaken to study the effectiveness of cloud seeding in producing rainfall. In total 276 convective clouds were chosen, and 150 were seeded while the remaining 122 clouds were not seeded.
- Convective clouds with a depth of over one kilometre and likely to evolve into deep cumulus clouds were targeted.
- Calcium chloride flare was used for seeding the clouds. A cloud seeding flare releases these particles when triggered.

Convective cloud base:

- The seeding was done at the base of the warm convective clouds and at a time when the clouds were in their growing stage so that the seed particles could enter the clouds with minimum dispersion.
- The convective cloud bases are found at 500-1,500 metres altitude during the summer monsoon period and around 2,000 metres or more altitude during the monsoon break periods, which depends on the moisture content in the lower atmosphere.
- Since the clouds are found at lower heights, the base of the convective clouds is warm, around 15 degrees C.

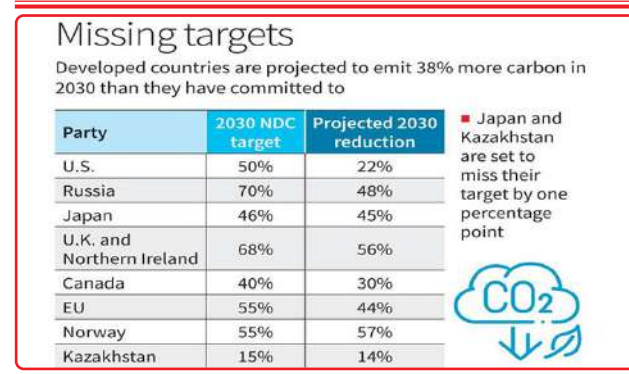
Key Observations:

- Cloud seeding alone cannot mitigate droughts but can help produce 18% more rainfall and partially address water requirements. Undertaking cloud seeding as catchment-scale projects can possibly help in managing drought conditions.
- One of the most important findings of the study was that not all cumulus clouds produce rainfall when cloud seeding is done.
- They found20-25% of cumulus clouds produce rainfall if cloud seeding is done correctly. Themicrophysics of clouds vary widely and so not all clouds produce rainfall through cloud seeding.

Significance:

- In places like Solapur where water is supplied only once in three days, the availability of additional water through cloud seeding will be immensely beneficial.

DEVELOPED COUNTRIES TO OVERSHOOT CARBON EMISSIONS GOAL, SAYS STUDY



Party	2030 NDC target	Projected 2030 reduction
U.S.	50%	22%
Russia	70%	48%
Japan	46%	45%
U.K. and Northern Ireland	68%	56%
Canada	40%	30%
EU	55%	44%
Norway	55%	57%
Kazakhstan	15%	14%

Why in news?

- Recently a study was published by the Delhi-based think tank Council for Energy Environment and Water (CEEW).
- As per this report, developed countries responsible for three-fourths of existing carbon emissions will end up emitting 38% more carbon in 2030 than they have committed to, going by current trajectories.
- It shows that 83% of this overshoot will be caused by the U.S., Russia, and the European Union.

NDCs:

- The study, which comes ahead of the 28th Conference of Parties (COP-28) of the UN Framework Convention on Climate Change to be held in Dubai in November and December, shows that 83% of this overshoot will be caused by the U.S., Russia, and the European Union.
- At COP-28, countries are expected to give an account of their Nationally Determined Contributions (NDCs), which are their commitments to the UN on emission cuts.
- The study noted that the NDCs of developed countries already fall short of the global average reduction of emissions to 43% below 2019 levels that is needed to keep temperatures from rising above 1.5 degrees Celsius. Instead, developed countries' collective NDCs only amount to a 36% cut.

Reducing emissions:

- For a fighting chance at keeping warming below critical tipping points, decades of negotiations have obliged developed countries to lead global efforts to reduce greenhouse gas emissions with legally binding targets.
- Collectively, developed countries were to reduce emissions by 5% from their 1990 levels between 2008 and 2012, and by 18% during 2013 to 2020.
- Several countries have committed to achieving net zero carbon emissions by 2050. Doing so would require steady measurable cuts every decade until that year.

Key observations:

- As an intermediate objective, countries presented data to the UN on their projected cuts until 2030. To keep temperatures below 1.5 degrees Celsius, developed countries need to cut emissions to 43% below their 2019 level.
- However, the CEEW study found that based on their current emissions trajectories, their cuts would likely amount to only 11% by 2030.
- Except for two countries, Belarus and Norway none of the developed countries seem to be on the path to meet their 2030 targets, though Japan and Kazakhastan are close, and are expected to miss their targets by only a single percentage point.

WAS TURKIYE EARTHQUAKE DUE TO INTERRUPTED CHAT BETWEEN FAULT LINES?

Why in news?

- On February 6, 2023, a pair of powerful earthquakes struck Turkiye and Syria, leaving destruction in their wake. The earthquakes weren't entirely unexpected given Turkey's seismic history, but scientists were startled by their unprecedented scale.
- A study unearthed the intricate union of tectonic forces that led to the disaster, advancing researchers' understanding of these quakes, their unexpected power, and what they portend for the way scientists are trying to forecast others like them.

How earthquakes occur?

- The earth's crust consists of tectonic plates. Fault lines form where these plates interact, as they collide, pull apart or slide past each other. When these plates abruptly grind and slip past each other, they release pent-up pressure, leading to earthquakes.
- The earthquakes in Turkey occurred along the East and North Anatolian Fault Lines, which run 700 km and 1,500 km long, respectively. And these geological behemoths, the new study found, were in constant dialogue.
- A seismic "cascade" broke through fault bends and step-overs, which are otherwise barriers to the propagation of an earthquake.
- Fault bends and step-overs are like curves and gaps in a road. For earthquakes, they are places where fault lines change direction or have a little gap. They affect how and where earthquakes happen.

Series of ruptures:

- The unusual interaction initiated a cascade of ruptures, resulting in a larger-than-usual total rupture length and a more tremendous potential for destruction. A testament to this is the fact that, in places where there were no buildings and/or where no people died, scientists observed craters after the earthquakes.
- The first earthquake (M7.8) struck near Gaziantep on a strike-slip fault, a type of tectonic plate boundary where two plates slide horizontally past each other.
- The next quake (M7.7) hit near Ekinözü, roughly 200 km north. They were Turkiye's strongest in more than 2,000 years and caused substantial damage along the East Anatolian Fault, which runs through eastern Turkiye, extending from near Turkiye's border with Syria to the northeastern region.
- The Narlı Fault and Çardak–Sürgü Fault Zone are also primarily located in eastern Turkiye. They extend from the southern part of Turkiye to the northeastern part, roughly parallel to the border with Armenia. They both experienced separate earthquakes.
- The ground near the coast some 200 km to the southwest began to move like a liquid. The Cyprian

geological survey department recorded a minor tsunami near the island in the eastern Mediterranean Sea.

Comparative analysis:

- Researchers received satellite data nine hours after the earthquake. While some researchers compared the 2023 quakes to historical records and GPS data to make sense of the numbers, they also used supercomputers to run simulations using the available data and compared them to GPS data and images of the earth before and after the events.
- Their work in Science was distinguished by two methods: kinematic slip inversion and fault-property modelling.
- Kinematic slip inversion is like rewinding an earthquake video to understand how fault surfaces moved, indicating what might have occurred underground.
- In fault-property modelling, researchers estimate the characteristics of the fault, like friction and material properties, to predict how an earthquake is likely to spread along it. These predictions are then compared to real earthquake data to gain insights.

Way Forward:

- The lessons from Turkey's quakes have far-reaching implications. They were revelations of the planet's oft-enigmatic inner workings, underscoring the unpredictable nature of seismic events.
- Then again, Turkey had been aware of the possibility of such an earthquake. Turkish law requires its buildings to adhere to building codes designed to prevent the sort of disaster following the events of February 6.

THE EXPANSION OF SETTLEMENTS INTO FLOOD PRONE AREAS

Why in news?

- India's urban areas have been flooding more and more often, destroying lives and livelihoods. Yet, according to a study led by the World Bank flood risk in many cities is rising because they are expanding into flood-prone areas.

Details:

- According to the paper, since 1985, human settlements in flood-prone areas have more than doubled. Experts say the findings spotlight the risk of unsustainable urbanisation in India.
- The study also found that middle-income countries like India have more urban settlements in flood-prone zones than low- and high-income countries.

How is India at risk?

- India isn't among the 20 countries whose settlements are most exposed to flood hazards, but it was the third highest contributor to global settlements, after China and the U.S., and also third after China and Vietnam among countries with new settlements expanding into flood-prone areas, all from 1985 to 2015.
- This means India is at significant risk of flood-related problems that could worsen in the coming years if the country wasn't careful.

Who are most affected?

- The risks are disproportionately higher for those living in informal structures.
- The geography of environmental risk is also the geography of informal low-income housing. Informal housing in cities is on "land that is vacant and less desirable, so that they are not immediately driven off. So they often lie in "low-lying, flood-prone areas".
- Urbanisation has expanded into flood-prone areas due to lack of governance processes. When environmental regulations are applied to new constructions, they are often applied only to big infrastructure projects and not to medium- and small-scale modifications of localities.
- This contradicts the notion that certain localities are more flood-prone and that flooding and flood-risk are locality-level issues.
- The people commonly violate existing government regulations. Examples include rise in eco-tourism resorts on forest land and the construction of large structures, including government buildings and even religious structures, on rivers' floodplains.

What is to be done?

- Some forms of adaptation are necessary and they need to differentiate between low-income residents and unauthorised structures erected for the elite.
- Every city needs to do a proper scientific mapping of the flood prone areas. The urban governments need to make housing in such areas more flood-resilient and protect low-income housing.

DISASTER RISK REDUCTION DAY 2023

Why in news?

- There has been a shocking lack of progress on government policies to protect people with disabilities during natural disasters in the last decade, according to a new global survey.

Details:

- The findings of the survey done by the United Nations Office for Disaster Risk Reduction (UNDRR) was particularly alarming because it showed that the vulnerable population group has been left out of disaster management planning despite the previous survey in 2013 stressing on the need for its inclusion.
- Moreover, the international law under the Convention on the Rights of Persons with Disabilities mandates that countries have defined mechanisms to provide safety to people with disabilities.
- Of the 6,000 people from 132 countries covered in the 2023 survey, around 84 per cent of the respondents said they were not aware of evacuation routes, shelter homes or that they should have a package of emergency supplies.

International Day for Disaster Risk Reduction 2023:

- The report was released just ahead of the International Day for Disaster Risk Reduction observed on October 13, 2023.
- The theme of UN International Day for Disaster Risk Reduction 2023 is "Fighting inequality for a resilient future."
- In 2023, UNDRR has highlighted the importance of removing inequalities to reduce disaster risk, which refers to the probability of death, injuries or damage due to natural disasters.
- It was first observed in the year 1989 at the United Nations General Assembly.

Why it matters?

- As much as 16 per cent of the world's people have some form of disability and are killed by disasters two-four times more often than the rest of the population.
- In the Great East Japan Earthquake of 2011, persons with disabilities were twice as likely to die, UNDRR noted citing Rehabilitation International, an international disability rights organisation.
- This becomes all the more important with the world projected to face some 560 disasters every year by 2030.

Global practices:

- The report also highlighted some practices being followed in various parts of the world that can be scaled up and replicated elsewhere.
  a) In Jordan, there is a dedicated line for deaf individuals to report emergencies;
  b) in Uganda, persons with disabilities participate in the legal frameworks on disaster and climate management; and
  c) in New South Wales, Australia, disability service providers identify individual requirements to feed into community emergency preparedness plans".

Future Roadmap:

- The Sendai Framework for Disaster Risk Reduction 2015-2030 also called for disability inclusion, the provision of accessible disaster risk information and establishing inclusive and end-to-end early warning systems.
- There is also a need to strengthen early warning systems, as half the countries lacked such mechanisms. If sufficient early warning is provided, 39 per cent of respondents reported they would have no difficulty evacuating, compared to 26 per cent, if there was no warning.
- They called for immediate action to address these challenges and meaningful inclusion of people with disabilities in community disaster risk reduction planning.

SCIENCE & TECHNOLOGY

HOW IMPORTANT IS THE FIRST ASTEROID SAMPLE?

Why in news?

- Recently, NASA's asteroid-hunting spacecraft OSIRIS-Rex, short for Origins-Spectral Interpretation-Resource Identification-Security-Regolith Explorer dropped a capsule containing a sample of rocks and dust that it had collected from the asteroid 101955 Bennu over the earth, which landed in the Utah desert.
- Going ahead, scientists will catalogue the capsule's contents, study its composition, and share pieces of it with their peers around the world. Many believe that along with comets, carbon-rich asteroids like Bennu may have seeded the earth with primordial life as they smashed into the young planet more than four billion years ago.

What was OSIRIS-REx's mission?

- Launched in 2016, the OSIRIS-REx spacecraft completed a series of complex manoeuvres to propel itself into orbit around Bennu two years later.
- After releasing its sample capsule, the spacecraft will fire its engines to shake free from the earth's gravity and begin a new journey, to study another asteroid, Apophis, in 2029.

Why do scientists want to study Bennu?

- The asteroid belt between Mars and Jupiter is inhabited by thousands of space rocks, ranging from pebbles to the 800-km-wide Ceres.
- A part of the orbits of some of these bring them closer to the sun than Mercury. Sometimes, such eccentric orbits also bring them quite close to the earth.
- Planetary defence experts are keen to know more about such near-earth asteroids (NEA), because it isn't improbable for the earth to be threatened with a collision someday.

Mining asteroids:

- Another reason, apart from planetary security and the origins of life on the earth, to study asteroids like Bennu is the possibility of mining them.
- NASA's Galileo (launched in 1989) and NEAR Shoemaker (1996) and Japan's Hayabusa 1 (2003) and Hayabusa 2 (2014) missions have found that many asteroids are solidified debris from supernovae, and are made of the same stuff as the solar system: dust, rocks, water ice, and an alloy of iron, nickel and cobalt, a sort of natural steel.
- This material can be extracted from asteroids; we can also tap the water present in them in the form of permafrost or saturated minerals as a resource in space.
- NEAs could be better pit stops than the moon where space missions can drop payloads off to be returned to the ground.

Challenges:

- The challenges like low gravity, lack of atmosphere, and radiation exposure need to be overcome first.

HOW GOVERNMENT AGENCIES USE COMMERCIAL SPYWARE TO TARGET OPPONENTS

Why in news?

- Between May and September, former Egyptian MP Ahmed Eltantawy was targeted with Cytrox's Predator spyware sent via links on SMS and WhatsApp. Apple has since released an update for its products fixing the bug used in the attack.
- The attack on Mr. Eltantawy came after he publicly stated plans to run for President in the 2024 Egyptian elections, which is especially concerning since Egypt is a known customer of Cytrox's Predator spyware.

Pegasus Project:

- In 2021, investigations under the Pegasus Project revealed the massive scale of potential targets of spyware.
- Reports shared that victims of the spyware attacks were in India, Azerbaijan, Bahrain, Hungary, Kazakhstan, Mexico, Morocco, Rwanda, Saudi Arabia and the UAE.
- The Pegasus spyware was also reportedly used by the Kingdom of Saudi Arabia to target journalist Jamal Khashoggi's wife months before his death.

What is spyware?

- Spyware is loosely defined as malicious software designed to enter a device, gather sensitive data, and forward it to a third party without the user's consent.
- While spyware may be used for commercial purposes like advertising, malicious spyware is used to profit from data stolen from a victim's device. Spyware is broadly categorised as trojan spyware, adware, tracking cookie, and system monitors.
- While each type of spyware gathers data for the author, system monitors and adware are more harmful as they may make modifications to a device's software and expose the device to further threats.

What is commercial spyware?

- Malicious spyware has been around since the 1990s. Earlier iterations of spyware were limited to being used by criminals to steal passwords or financial information.
- However, opportunities for governments and law enforcement agencies to use spyware as part of legal investigations led to the development of commercial spyware.
- Commercial spyware mainly targets mobile platforms and can legitimately be used against criminals and terrorists. However, the lack of global regulations for companies developing spyware has led to their use by authoritarian governments to spy on political opponents.

How are the devices targeted?

- Investigations by Citizen Lab and Google's Threat Analysis Group (TAG) revealed that spyware on the former Egyptian MP's device was delivered via

network injection from a device located physically inside Egypt.

- His device was infected when he visited certain websites without 'HTTPS' from his phone using his Vodafone Egypt mobile data connection. When he visited these sites, his device was silently redirected to a website, that matches the fingerprint for Cytrox's Predator spyware — this is where his device was injected with the spyware.
- In India, the Pegasus spyware was part of a $2-billion "package of sophisticated weapons and intelligence gear" transaction between India and Israel after Narendra Modi became the first Indian Prime Minister to visit Israel.
- The spyware in India was used against at least 40 journalists, Cabinet Ministers, and holders of constitutional positions. The spyware was delivered to the victim's phones by exploiting zero-day vulnerabilities, which means even the device manufacturer was unaware of these exploits.

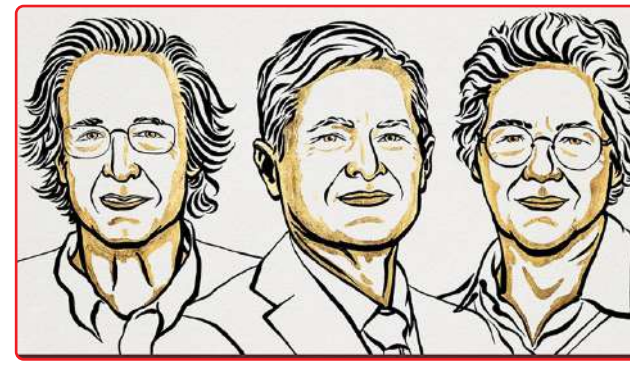
Is the use of spyware increasing?

- Between 2011 and 2023, at least 74 governments contracted with commercial firms to obtain spyware or digital forensics technology.
- Autocratic regimes are more likely to purchase commercial spyware or digital forensics than democracies, 44 regimes classified as closed autocracies or electoral autocracies are known to have procured targeted surveillance technologies.
- Earlier in 2023, an Indian defence agency was reportedly purchasing equipment from an Israeli spyware firm that is being billed as a potential Pegasus alternative. The firm in question is Cognyte Software Ltd, which faces a class action lawsuit in the U.S. from investors.
- In 2022, the FBI in the U.S. had bought a version of the Pegasus spyware and that Mexican authorities had deployed NSO products against journalists and political dissidents. Similar uses have also been reported in the UAE and Saudi Arabia.

How have tech companies reacted?

- Tech giants including Meta, Google, and Apple have taken concrete steps to address the problem of commercial spyware firms exploiting bugs in their software.
- Apple with its iOS 16 also released a 'Lockdown Mode', which the company called an "extreme protection" designed for high-risk individuals. While the Lockdown Mode in Apple's software limits the device's functionality, it has proven to be a viable option to protect against spyware attacks.
- Meta-owned WhatsApp has gone as far as pursuing a lawsuit accusing Israel's NSO Group of exploiting a bug in its software. The lawsuit filed in 2019 seeks an injunction and damages from the NSO Group.
- WhatsApp has alleged that the spyware firm accessed its servers without permission six months prior to installing the Pegasus software on victim's mobile devices.

NOBEL PRIZE IN PHYSICS 2023



Why in news?

- The Royal Swedish Academy of Sciences, Stockholm, announced Pierre Agostini, Ferenc Krausz, and Anne L'Huillier have been awarded the Nobel Prize in Physics for 2023.

Details:

- The award has been given for their experimental methods that generate attosecond pulses of light for the study of electron dynamics in matter.
- The three joint winners have given humanity new tools for exploring the world of electrons inside atoms and molecules.
- They demonstrated a way to create extremely short pulses of light that can be used to measure the rapid processes in which electrons move or change energy.
- While Anne L'Huillier discovered that many different overtones of light arose when she transmitted infrared laser light through a noble gas, Pierre Agostini succeeded in producing and investigating a series of consecutive light pulses, in which each pulse lasted just 250 attoseconds.
- Meanwhile, Ferenc Krausz experiment made it possible to isolate a single light pulse that lasted 650 attoseconds.
- An attosecond is an astonishingly short unit of time, equivalent to one quintillionth of a second, or 10^18 seconds (1 attosecond equals 0.000000000000000001 second).

What is Attosecond?

- An attosecond is an astonishingly short unit of time, equivalent to one quintillionth of a second, or 10 to the power of 18 seconds.
- If a second were stretched to cover the entire age of the universe, which is approximately 13.8 billion years, an attosecond would be just a fraction of a second.
- This incredibly brief timeframe is now being harnessed by physicists to probe and manipulate

some of the most fundamental aspects of our physical world.

Why it matters?

- At this timescale, researchers can now capture the dynamics of electrons within atoms and molecules, allowing them to witness the incredibly fast processes that govern chemical reactions and electronic behavior.
- One of the most groundbreaking applications of attosecond science is the ability to create and manipulate extreme ultraviolet (XUV) and X-ray pulses, which are vital for imaging ultrafast processes at the atomic and molecular scale. These pulses are produced using high-intensity laser systems that generate attosecond bursts of light.
- With these attosecond pulses, scientists can "freeze" the motion of electrons within atoms and molecules, providing a real-time view of electron movement during chemical reactions.

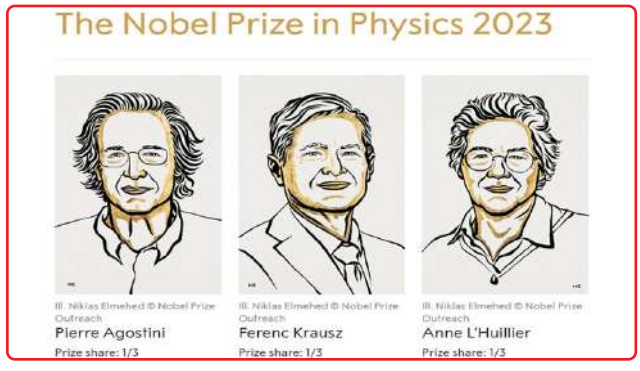
Applications:

- The fundamental significance of attoseconds in physics lies in their ability to shed light on phenomena that were previously hidden from our view.
- For instance, they allow scientists to observe the quantum mechanical nature of electrons and the intricate dance they perform when interacting with one another and with atomic nuclei.
- This knowledge has profound implications for fields such as chemistry, materials science, and even the development of new technologies.

About Nobel Prize in Physics:

- The Nobel Prize in Physics is a yearly award given by the Royal Swedish Academy of Sciences to those who have made the most outstanding contributions to humankind in the field of physics.
- The tradition has been ongoing since 1901, with the prize being awarded 116 times to 222 laureates between 1901 and 2022.
- John Bardeen is the only laureate who has received the Nobel Prize in Physics twice, in 1956 and 1972.

NOBEL IN CHEMISTRY 2023



Why in news?

- The Royal Swedish Academy of Sciences awarded the Nobel Prize in Chemistry for 2023 to Moungi G. Bawendi, Louis E. Brus and Alexei I. Ekimov for the discovery and synthesis of quantum dots.
- The nanoparticles are so tiny that their size determines their properties. These smallest components of nanotechnology now spread their light from televisions and LED lamps, and can also guide surgeons when they remove tumour tissue, among many other things.

Details:

- While Alexei Ekimov succeeded in creating size-dependent quantum effects in coloured glass, Columbia University's Louis Brus was the first scientist in the world to prove size-dependent quantum effects in particles floating freely in a fluid.
- Meanwhile, Moungi Bawendi of the Massachusetts Institute of Technology revolutionised the chemical production of quantum dots.
- The announcement is part of Alfred Nobel's will that specifically mentioned Chemistry as one of the key categories.

What are Quantum Dots?

- Quantum dots, often referred to as "artificial atoms," are semiconductor nanocrystals that exhibit remarkable quantum mechanical properties.
- Unlike traditional materials, the size of quantum dots plays a pivotal role in determining their electronic and optical characteristics. This size-dependent behaviour is a direct result of quantum confinement, a phenomenon that occurs at the nanoscale.
- Quantum dots are typically composed of elements from the periodic table's groups II-VI or III-V, such as cadmium selenide (CdSe) or indium arsenide (InAs). Their size can be precisely controlled during synthesis, allowing scientists to tailor their properties for various applications.

Applications:

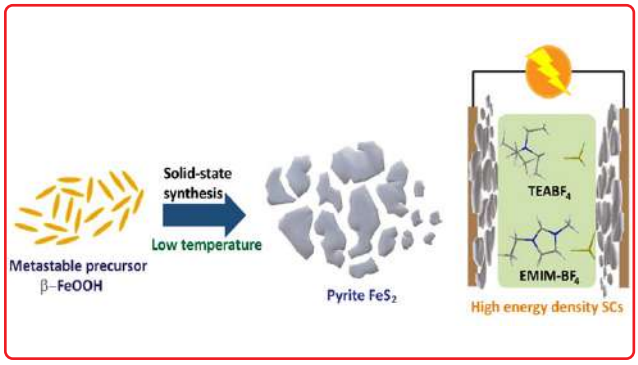
- Quantum dots have made significant strides in the field of chemistry. Their unique optical properties, including tunable fluorescence, make them invaluable tools for labeling and tracking molecules within biological systems.
- Researchers use quantum dots as fluorescent probes to visualize cellular processes at an unprecedented level of detail.
- Moreover, quantum dots have revolutionised the world of sensors and detection. Their sensitivity to changes in the surrounding environment, such as temperature or pH, has led to the development of highly accurate and responsive sensors. These sensors find applications in environmental monitoring, medical diagnostics, and industrial quality control, among others.
- The potential for quantum dots in quantum computing lies in their ability to trap and manipulate single electrons, enabling the creation of stable qubits.

- This development could lead to computing systems that far surpass the capabilities of classical computers, with applications ranging from cryptography to simulating complex quantum systems.
- Their use is also being explored in high-efficiency solar cells, enhancing the brightness and colour accuracy of displays, and even in the development of quantum dot-based LEDs for next-generation lighting solutions.

Nobel Prize in Chemistry:

- In 2022, the Nobel Prize in Chemistry was jointly awarded to Carolyn Bertozzi, Morten Meldal, and K. Barry Sharpless for their groundbreaking work in the development of click chemistry and bioorthogonal chemistry.
- Their contributions have significantly advanced the field of chemistry, demonstrating the transformative power of scientific innovation.
- Of the 191 laureates who have received the Nobel Prize in Chemistry, eight are women, reflecting a gradual increase in the recognition of female scientists' contributions to the field.
- The first woman to receive the award was Marie Curie in 1911, who did pioneering research on radioactivity.

RESEARCHERS SYNTHESIZE HIGHLY CRYSTALLINE PYRITE AT LOW TEMPERATURES USEFUL FOR FABRICATING HIGH ENERGY DENSITY SUPERCAPACITORS



Why in news?

- Researchers have synthesised highly crystalline pyrite FeS2at low temperatures and utilized them for fabricating electrochemical energy storage devices such as batteries and high energy density supercapacitors (SCs).

Transition metal sulfides (TMS):

- Transition metal sulfides (TMS) are an important class of inorganic materials and find applications in diverse fields including electrochemical energy storage devices such as batteries and supercapacitors (SCs).
- Solid-state synthetic methods are used to generate metal sulfides from the corresponding metal salts or their equivalent oxides usually by annealing at high temperatures.

Details:

- The Centre for Nano and Soft Matter Sciences, Bengaluru demonstrated the low-temperature synthesis of crystalline pyrite FeS2 through a solid-state synthesis route. They have utilized a metastable oxyhydroxide (FeOOH) precursor for this process.
- They reported stabilising this intermediate oxyhydroxide and utilizing it as a precursor for sulfidation, in the presence of H2S gas.
- Using a metastable precursor helped in lowering the annealing temperature, as FeOOH converted into pyrite FeS2 with fairly good crystallinity at a low temperature.
- This synthetic route of obtaining sulfides from their corresponding metastable oxyhydroxides can be extended to other transition metals to obtain crystalline materials in an energy intensive way.

Significance:

- Electrodes for high-energy density SCs were fabricated from the as-synthesized FeS2, resulting in superior performance in the presence of organic and ionic-liquid (IL)-based electrolytes.
- This could be attributed to the improved conductivity as a result of good crystallinity of the material as well as the significantly enhanced wettability of the FeS2 electrode in the presence of the organic and IL-based electrolytes.

Way Forward:

- The FeS2 electrode exhibited high energy and power densities, clearly highlighting the role of the synthetic procedure employed for enhancing electrochemical properties.

INDIA EXPANDING CENSORSHIP REGIME, CREATING UNEVEN PLAYING FIELD, STUDY

Internet freedom

The table lists scores on Internet freedom for select countries according to Freedom House's "Freedom on the Net" report. Rankings are on a scale of 100 to 0 with 100 being most free

Country	Status	Total score
Iceland	Free	94
U.K.	Free	79
Germany	Free	77
U.S	Free	76
Brazil	Partly free	64
Sri Lanka	Partly free	52
India	**Partly free**	**50**
Pakistan	Not free	26

■ Conditions for human rights online deteriorated in 29 countries while 20 countries saw gains

Why in news?

- According to a new report by Freedom House, a Washington-based non-profit organisation, global Internet freedom has declined for the 13th consecutive year.

- The environment for human rights online has deteriorated in 29 countries, with only 20 countries registering net gains.

About the report:

- The report, titled "Freedom on the Net 2023: The Repressive Power of Artificial Intelligence", has raised a red flag on the increasing use of artificial intelligence by governments for censorship and spread of disinformation.
- The report covers developments between June 2022 and May 2023. It evaluates Internet freedom in 70 countries.

Key Highlights:

- As per the report, the sharpest rise in digital repression was witnessed in Iran, where authorities shut down Internet service, blocked WhatsApp and Instagram, and increased surveillance in a bid to quell anti-government protests.
- China, for the ninth straight year, was ranked as the world's worst environment for Internet freedom, with Myanmar the world's second most repressive for online freedom.
- People faced legal repercussions for expressing themselves online in a record 55 countries, and the number of countries where authorities carry out widespread arrests and impose multi-year prison terms for online activity has risen sharply over the past decade, from 18 in 2014 to 31 in 2023.

India's status:

- India also figured among the list of countries that "blocked websites hosting political, social, or religious content", deliberately disrupted ICT networks, used pro-government commentators to manipulate online discussions, and conducted "technical attacks against government critics or human rights organisations".
- On a range of 1 to 100, where '100' represented highest digital freedom, India scored 50, while Iceland, with 94, has the best Internet freedom.

Digital repression in India:

- Detailing AI-enabled digital repression in India, the report said, Indian Prime Minister and his Bharatiya Janata Party (BJP) have incorporated censorship, including the use of automated systems, into India's legal framework.
- The Information Technology (Intermediary Guidelines and Digital Media Ethics Code) Rules require large social media platforms to use AI-based moderation tools for broadly defined types of content, such as speech that could undermine public order, decency, morality, or the country's sovereignty, integrity, and security, or content that officials had previously ordered removed.
- As the country prepares for general elections in 2024, the government's expanding censorship regime is creating an uneven playing field by silencing criticism of and independent reporting on the ruling party.

Censorship methods:

- The report evaluates countries on five censorship methods: Internet connectivity restrictions, blocks on social media platforms, blocks on websites, blocks on VPNs, and forced removal of content and India engaged in all of them except one (VPN blocking).

SIGNIFICANCE OF QUANTUM DOTS IN NANOTECHNOLOGY

Why in news?

- Alexei I. Ekimov, Louis E. Brus, and Moungi G. Bawendi have been awarded the 2023 Nobel Prize for chemistry "for the discovery and synthesis of quantum dots".

What is a quantum dot?

- A quantum dot is a really small assembly of atoms around a few nanometres wide.
- The 'quantum' in its name comes from the fact that the electrons in these atoms have very little space to move around, so the crystal as a whole displays the quirky effects of quantum mechanics.
- Quantum dots have also been called 'artificial atoms' because the dot as a whole behaves like an atom in some circumstances.

Why are they of interest?

- There are two broad types of materials: atomic and bulk. Atomic of course refers to individual atoms and their specific properties. Bulk refers to large assemblies of atoms and molecules.
- Quantum dots lie somewhere in between and behave in ways that neither atoms nor bulk materials do. One particular behaviour distinguishes them: the properties of a quantum dot change based on how big it is. Just by tweaking its size, scientists can change, say, the quantum dot's melting point or how readily it participates in a chemical reaction.
- When light is shined on a quantum dot, it absorbs and then re-emits it at a different frequency. Smaller dots emit bluer light and larger dots, redder light. This happens because light shone on the dot energises some electrons to jump from one energy level to a

higher one, before jumping back down and releasing the energy at a different frequency.

- So, quantum dots can be easily adapted for a variety of applications including surgical oncology, advanced electronics, and quantum computing.

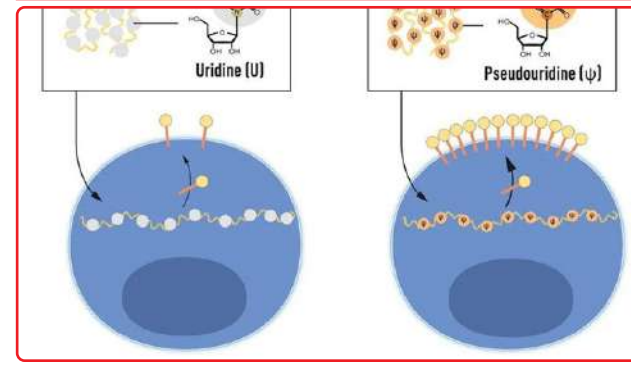
What did the Nobel laureates do?

- For centuries, people have been creating coloured glass by tinting it with a small amount of some compound. How much of the compound, or dopant, is added and how the glass is prepared changed which colour the glass finally had.
- By the late 1970s, scientists had developed techniques to deposit very thin films on other surfaces and observe quantum effects in the films. But they didn't have a material per se.
- In the early 1980s, Alexei Ekimov added different amounts of copper chloride to a glass before heating it to different temperatures for different durations, tracking the dopants' structure and properties.
- They found that the glass's colour changed depending on the size of the copper chloride nanocrystals (which depended on the preparation process).
- In 1983, a group led by Louis Brus in the U.S. succeeded in making quantum dots in a liquid, rather than trapped within glass.
- Both Dr. Brus and Dr. Ekimov further studied quantum dots, working out a mathematical description of their behaviour and how it related to their structure.
- A team led by Moungi Bawendi at the Massachusetts Institute of Technology achieved this in 1993, with the hot-injection method.
- A reagent is injected into a carefully chosen solvent (with a high boiling point) until it is saturated, and heated until the growth temperature, that is, when the reagent's atoms clump together to form nanocrystals in the solution.
- Larger crystals form if the solution is heated for longer. Their birth within a liquid makes their surfaces smooth. Finally, crystals of the desired size can simply be filtered out. This method accelerated the adoption of quantum dots in a variety of technologies.

What are quantum dots' applications?

- An array of quantum dots can be a TV screen by receiving electric signals and emitting light of different colours. Scientists can control the path of a chemical reaction by placing some quantum dots in the mix and making them release electrons by shining light on them.
- If one of the energy levels an electron jumps between in a quantum-dot atom is the conduction band, the dot can operate like a semiconductor.
- Also, solar cells made with quantum dots are expected to have a thermodynamic efficiency as high as 66%.
- A quantum dot can also highlight a tumour that a surgeon needs to remove, hasten chemical reactions that extract hydrogen from water, and as a multiplexer in telecommunications.

HOW WAS MRNA RESEARCH USED TO FIGHT COVID?



Why in news?

- Recently, the 2023 Prize in Physiology or Medicine was awarded to Katalin Karikó and Drew Weissman.
- They were awarded the prize for their "discoveries concerning nucleoside base modifications that enabled the development of effective mRNA vaccines against COVID-19".

What are mRNA vaccines?

- mRNA, which stands for messenger RNA, is a form of nucleic acid which carries genetic information. Like other vaccines, the mRNA vaccine also attempts to activate the immune system to produce antibodies that help counter an infection from a live virus.
- However, while most vaccines use weakened or dead bacteria or viruses to evoke a response from the immune system, mRNA vaccines only introduce a piece of the genetic material that corresponds to a viral protein.
- This is usually a protein found on the membrane of the virus called spike protein. Therefore, the mRNA vaccine does not expose individuals to the virus itself.

Why mRNA?

- RNA as a therapeutic was first promoted in 1989 after the development of a broadly applicable in vitro transfection technique. A couple of years later, mRNA was advocated as a vaccine platform.
- mRNA offers strong safety advantages. As the minimal genetic construct, it harbours only the elements directly required for expression of the encoded protein.
- A common approach by vaccine makers during the pandemic was to introduce a portion of the spike protein, the key part of the coronavirus, as part of a vaccine. Some makers wrapped the gene that codes for the spike protein into an inactivated virus that affects chimpanzees, called the chimpanzee adenovirus.
- The aim is to have the body use its own machinery to make spike proteins from the given genetic code. The

immune system, when it registers the spike protein, will create antibodies against it.

How are these vaccines different?

- A piece of DNA must be converted into RNA for a cell to be able to manufacture the spike protein. While an mRNA vaccine might look like a more direct approach to getting the cell to produce the necessary proteins, mRNA is very fragile and will be shred apart at room temperature or by the body's enzymes when injected.
- To preserve its integrity, the mRNA needs to be wrapped in a layer of oily lipids, or fat cells. One way to think of this is that an mRNA-lipid unit most closely mimics how a virus presents itself to the body, except that it cannot replicate like one.
- DNA is much more stable and can be more flexibly integrated into a vaccine-vector. In terms of performance, both are expected to be as effective.
- A challenge with mRNA vaccines is that they need to be frozen from -90 degree Celsius to -50 degree Celsius. They can be stored for up to two weeks in commercial freezers and need to be thawed at 2 degrees Celsius to 8 degrees Celsius at which they can remain for a month.

Advantages:

- But a major advantage of mRNA and DNA vaccines is that because they only need the genetic code, it is possible to update vaccines to emerging variants and use them for a variety of diseases.
- Viral vector vaccines, like Covishield, carry DNA wrapped in another virus, but mRNA are only a sheet of instructions to make spike proteins wrapped in a lipid (or a fat molecule) to keep it stable.
- In the case of COVID-19, mRNA vaccines developed by Moderna, Pfizer and Pune-based Gennova Biopharmaceuticals, these instructions alone are capable of producing the spike protein, which the immune system then uses to prepare a defence.

Outcome:

- In 2015, Dr. Weissman and Dr. Karikó figured how to deliver mRNA into mice using a fatty coating called "lipid nanoparticles" that protected the mRNA from degradation.
- Both her innovations were key to the development of COVID-19 vaccines developed by Pfizer and its German partner BioNTech.

HOW THE DIGITAL INDIA ACT WILL SHAPE THE FUTURE OF THE COUNTRY'S CYBER LANDSCAPE

Why in news?

- The recent announcement of the Digital India Act 2023 (DIA) represents a significant step towards establishing a future-ready legal framework for the country's burgeoning digital ecosystem.
- This move by the Ministry of Electronics and Information Technology (MEITY) signals a proactive approach to regulating and shaping the digital future of the nation.

Objective:

- The DIA, poised to replace the Information Technology Act of 2000 (IT Act), is designed to address the challenges and opportunities presented by the dramatic growth of the internet and emerging technologies.
- The primary motivation behind the DIA is to bring India's regulatory landscape in sync with the digital revolution of the 21st century.
- The IT Act of 2000, crafted during a time when the internet was in its infancy, has struggled to keep pace with the rapid changes in technology and user behaviour.

Key provisions

- The proposed DIA encompasses a spectrum of significant provisions aimed at addressing the ever-evolving digital landscape.
- It places a strong emphasis on online safety and trust, with a commitment to safeguarding citizen's rights in the digital realm while remaining adaptable to shifting market dynamics and international legal principles.
- Recognising the growing importance of new-age technologies such as artificial intelligence and blockchain, the DIA provides guidelines for their responsible utilisation. Through this, it aims to not only encourage the adoption of these technologies but also to ensure that their deployment is in line with ethical and legal principles.
- This means that the DIA does not just leave it to the market to dictate the course of these technologies but actively engages in shaping their development and use within a regulatory framework. It promotes ethical AI practices, data privacy in blockchain applications, and mechanisms for accountability in the use of these technologies.
- It upholds the concept of an open internet, striking a balance between accessibility and necessary regulations to maintain order and protect users.

- Additionally, the DIA mandates stringent Know Your Customer (KYC) requirements for wearable devices, accompanied by criminal law sanctions.
- It contemplates a review of the "safe harbour" principle, which presently shields online platforms from liability related to user-generated content, indicating a potential shift in online accountability standards. These provisions underscore the proposed DIA's commitment in addressing the complexities of the digital age.

Challenges:

- While the introduction of the DIA is a commendable step towards addressing the challenges of the digital age, there are certain aspects that warrant a critical evaluation.
- One key concern is the potential impact on innovation and the ease of doing business. Stricter regulations, particularly in emerging technologies, could inadvertently stifle entrepreneurial initiatives and deter foreign investments.
- Additionally, the review of the "safe harbour" principle, which shields online platforms from liability for user-generated content, could lead to a more cautious approach among these platforms, possibly impinging on freedom of expression.
- Furthermore, the DIA's success hinges on effective enforcement, which will require substantial resources, expertise, and infrastructure. Balancing the interests of various stakeholders, including tech giants, while ensuring the protection of citizen rights, poses a significant challenge.
- Therefore, while the DIA is a progressive move, its implementation and potential repercussions warrant vigilant monitoring and adaptability to avoid unintended consequences.

Way Forward:

- The DIA is a crucial step towards ensuring a secure, accountable, and innovative digital future for India.
- It represents a forward-looking approach to regulation in an age of constant change and has the potential to shape the country's digital landscape for generations to come.

WHAT IS MULTIMODAL ARTIFICIAL INTELLIGENCE AND WHY IS IT IMPORTANT?

Context:

- Recently, ChatGPT-maker OpenAI announced that it had enabled its GPT-3.5 and GPT-4 models to study images and analyse them in words, while its mobile apps will have speech synthesis so that people can have full-fledged conversations with the chatbot.

Background:

- The Microsoft-backed company had promised multimodality in March, during the release of GPT-4 and kept the addition on the backburner.

- However, the company has rushed the release after a report by revealed that Google's new yet-to-be-released multimodal large language model called Gemini, was already being tested in a bunch of companies.
- The Google had an easy advantage over competitors in the multimodal world because of its readily available bank of images and videos via its search engine and YouTube. But OpenAI is moving fast to make inroads.
- It is also reportedly working on a new project called Gobi which is expected to be a multimodal AI system from scratch, unlike the GPT models.

How does multimodality work?

- The past couple of years have seen a stream of multimodal AI systems being released. Like OpenAI's text-to-image model, DALL.E, upon which ChatGPT's vision capabilities are based, is a multimodal AI model that was released in 2021.
- DALL.E is built on another multimodal text-to-image model called CLIP that OpenAI released the same year.
- DALL.E is in fact the model which kickstarted the generative AI boom, and is underpinned with the same concept that runs other popular AI image generators like Stable Diffusion and Midjourney, linking together text and images in the training stage.
- The system looks for patterns in visual data that can connect with data of the image descriptions. This enables these systems to generate images according to the text prompts that users enter.
- GPT's voice processing capabilities are based on its own open-source speech-to-text translation model, called Whisper, which was released in September 2023. Whisper can recognise speech in audio and translate it into simple language text.

Applications of multimodal AI:

- Some of the earlier multimodal systems combined computer vision and natural language processing models or audio and text together to perform some of the simpler but rather important functions like automatic image caption generation etc.
- And even if these multimodal systems weren't an all-powerful model like GPT-4 gunning for the ultimate dream of artificial general intelligence (AGI), they

carried enough value to address very real-world problems.

- In 2020, Meta was working on a multimodal system to automatically detect hateful memes on Facebook. Meanwhile, Google researchers published a paper in 2021 about a multimodal system they had built to predict the next lines of dialogue in a video.

Upcoming models:

- In May, Meta announced a new open-source AI multimodal system called ImageBind that had many modes; text, visual data, audio, temperature and movement readings. Meta had speculated that future multimodal models could add other sensory data to them, like "touch, speech, smell, and brain fMRI signals."
- The idea behind this is to have future AI systems cross-reference this data in similar ways that current AI systems do for text inputs.

Other segments for multimodality:

- Other industries like medicine are "inherently multimodal". Processing CT scans, or identifying rare genetic variations all need AI systems that can analyse complex datasets of images, and then respond in plain words.
- Google Research's Health AI section has been working at this for some time now, having released papers around what the ideal method is to integrate multimodal AI systems in this field.
- AI models that perform speech translation are another obvious segment for multimodality.
- Google Translate uses multiple models as do others like Meta's SeamlessM4T model, which was released earlier. The model can perform text-to-speech, speech-to-text, speech-to-speech and text-to-text translations for around 100 languages.

NASA FINDS PROOF OF CARBON, WATER IN ASTEROID BENNU SAMPLES

Why in news?

- Samples collected from 4.5-billion-year-old asteroid Bennu could indicate the building blocks of life on Earth.
- Initial studies on the samples collected in space and recently brought back on earth have shown evidence of high-carbon content and water-bearing clay minerals.

Bennu:

- Bennu is a small near-Earth asteroid that passes close to Earth every six years. A 4.5 billion-year-old relic of our solar system's early days, asteroid Bennu has seen it all.
- Bennu's current composition was established within 10 million years of the formation of our solar system.
- The material collected from the asteroid acts as a time capsule from the earliest days of our solar system and can help us answer big questions about the origins of life and the nature of asteroids.

OSIRIS-Rex:

- The Origins, Spectral Interpretation, Resource Identification, and Security-Regolith Explorer, better known as OSIRIS-REx, is the first United States mission to collect a sample from an asteroid.
- The spacecraft was launched on September 8, 2016 and the sample was collected three years ago.
- OSIRIS-REx returned to Earth on September 24, 2023 to drop off material from asteroid Bennu. After dropping off the sample, it continued on to a new mission to explore the asteroid Apophis.
- The mission has provided an "abundance" of samples, the goal of the OSIRIS-REx sample collection was to collect 60 grams of asteroid material. But scientists disassembling the sample return hardware found bonus particles covering the outside of the collector head, canister lid and base. The total sample weight has been estimated at around 250 gms.

Key observations:

- Scientists have performed "quick-look" analyses of that initial material until now by collecting images from a scanning electron microscope, infrared measurements, X-ray diffraction, and chemical element analysis.
- Computed topography helped the team create a three-dimensional computer model of one of the particles, highlighting its diverse interior, which provided an early glimpse of evidence of abundant carbon and water.

Way Forward:

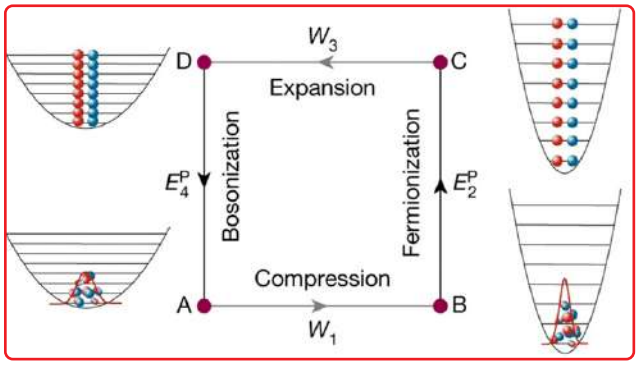
- For the next two years, the mission's science team will continue characterising the samples and conduct the analysis needed to meet the mission's science goals.
- NASA will preserve at least 70 per cent of the sample at Johnson Space Center in Houston for further research by scientists globally, including future generations.

NEW QUANTUM ENGINE DOES WORK BY FLIPPING THE IDENTITY OF ATOMS

Why in news?

- Physicists in Germany have come up with a way to convert the energy difference between two quantum states of a group of atoms into work.

- The device adapts the principles of the familiar classical engine to the subatomic realm, giving physicists a way to study the nascent field of quantum thermodynamics in more detail as well as, possibly, build better quantum computers.



Pauli's principle:

- All subatomic particles can be classified as either fermions or bosons. Fermions are the building blocks of matter; bosons are particles that carry the forces acting between them.
- Now, when a bunch of particles are cooled to very nearly absolute zero, so that their quantum nature comes to the fore, they would all like to have the lowest energy possible – but they can't. This is known as Pauli's exclusion principle.
- All particles in a system are distinguished by four quantum numbers. The values of the four numbers together tell something about how much energy a particle has.
- The exclusion principle states that, in a given system, no two particles can have the same four quantum numbers, that is, they can't occupy the same energy level. Fermions are particles that are bound by this rule. So they recursively occupy the lowest one available, until all possible energy levels are filled.
- Bosons are not bound by the exclusion principle principle: they can all occupy the same lowest energy level at a given low temperature. This is why, for example, superconductivity is possible.

Fermionic energy:

- So a system of fermions will have more energy at a low temperature than a system of bosons. For this to be the basis of an engine, physicists needed a simple way to convert some particles from being bosons to being fermions.
- A solution arrived in the early 2000s, when researchers found via multiple studies that if a collection of fermions were cooled almost to absolute zero and then prodded to interact with each other using a magnetic field, they could be made to behave like bosons.
- In the new study, researchers with institutes in Germany, Japan, and Argentina did just this with a gas of lithium-6 atoms.
- They cooled them to just millionths of a degree above absolute zero, and confined them in a trap of oscillating electric and magnetic fields.

Fermions to bosons and back:

- Classical engines convert heat into work. For example, the internal combustion engine in a car uses the heat released by the combustion of petrol or diesel to push a piston.
- Overall the engine has four steps: the fuel is compressed, ignition causes the fuel-air mix to expand and push the piston out, the mix cools and stops expanding, and the piston is brought back to the first step.
- The quantum engine, or a 'Pauli engine', has a similar set of four steps.
  a) First, the atoms collected in the trap are compressed and kept in a bosonic state.
  b) Second, the strength of a magnetic field applied on the atoms is increased by a small amount. Interactions between the atoms and the field cause the former to slip into a fermionic state: they are forced to move out of the lowest energy level and progressively occupy higher levels.
  c) Third, the compression applied in the first step is eased.
  d) Fourth: the magnetic field strength is reduced to its original value.
- The energy of the atoms increases during the third step and this can be converted to work. The efficiency of the quantum engine is based on how much more energy is released in the third step relative to the energy added to the system in the first step.
- Currently, the quantum engine is 25% efficient. The researchers expect to be able to increase this to 50% or more in future.

Way Forward:

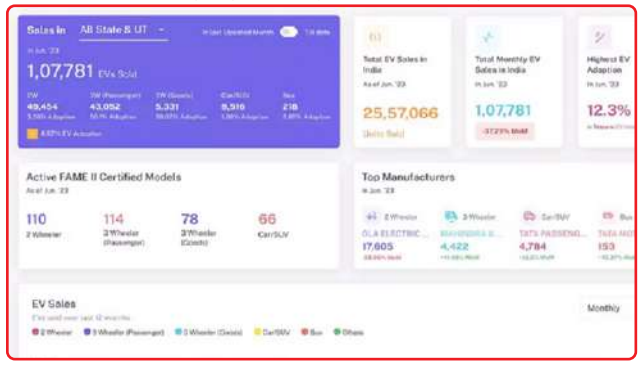
- There is a branch of physics called quantum thermodynamics, in which scientists study how thermodynamics 'emerges' in quantum-physical systems.
- The quantum engine is still a proof of concept. The researchers have demonstrated that their design can be used to force a bunch of atoms to cyclically release energy as they are switched between bosonic and fermionic states.
- The researchers need to figure out how this energy can be moved from inside the trap to a system on the outside.

DASHBOARD FOR DATA ON ADOPTION AND FORECASTS OF ELECTRIC VEHICLES LAUNCHED

Why in news?

- The Union Minister for Power and New & Renewable Energy launched a brand-new EV-Ready India Dashboard recently.

- Developed by policy and industry experts at thinktank OMI Foundation, the dashboard is a free digital platform focussed on near real-time Electric Vehicle adoption and forecasts, associated battery demand, charging density, and market growth trends.



Details:

- The dashboard is expected to facilitate greater inclusion across audiences, for the industry, policymakers and end users of electric vehicles.
- The platform leverages the power of data and AI and seeks to address the need for macroeconomic data and analysis on India's massively growing electric mobility segment.
- The EV-Ready India dashboard has forecast a 45.5% Compounded Annual Growth Rate (CAGR) in electric vehicles between calendar year (CY) 2022 and CY 2030, increasing from annual sales of 6,90,550 electric two-wheelers (E2Ws) in 2022 to 1,39,36,691 E2Ws in 2030.

EV-Ready India dashboard:

- EV-Ready India Dashboard is the only dashboard in India that compiles sales data across all Vahan states and Telangana, along with a direct view into the state of charging infrastructure, demand trends and comparisons of Total Cost of Ownership, making it useful for the EV buyers as well.
- Additionally, it tracks the current investment climate for EVs, and forecasts on market growth and EV hotspots for the country. It further measures emissions avoided, aiming to accelerate India's journey to Net Zero.

Key Findings:

- The dashboard estimates over 1.6 crore annual EV deployments in India by 2030.
- With this, it also cites Maharashtra and Delhi operating with the highest number of charging stations in India (2531 and 1815 respectively).
- Tamil Nadu emerges as the E2W manufacturing hub of the country, Telangana leads in E3W manufacturing, Maharashtra in E4W manufacturing, Gujarat in battery manufacturing, and Karnataka in R&D.
- Chandigarh reports the lowest public charging supply tariff at INR 3.6/kWh, 73% lower compared to the national average of INR 13.74/kWh.
- It also reports that India has avoided an estimated 5.18 million tonnes of CO_2 emissions in 2023 so far, equivalent to 85.47 million tree seedlings covering twice the cumulative area of Lakshadweep islands.

Key Features of the EV-Ready India Dashboard:

- For the policymakers and industry, the dashboard presents consolidated sales data for all 34 Vahan states and Union Territories, and the additional Telangana. The data is visualised for easy understanding of adoption rates and trends presented by time period, form factors, states, and more.
- The dashboard shows forecasts on EV adoption, and associated battery demand till 2030, allowing both policymakers and industry alike to strategize and execute their clean mobility goals. In addition to pan-India projections, the dashboard presents state-wise projections, in a first-of-its-kind approach.
- For the end user, i.e. the (potential) buyer of EVs, the dashboard shows financial benefits of EV ownership, including potential savings on upfront costs, operating and maintenance costs, etc. On the click of a button, the user can also review the list of EV models that are eligible for subsidies and the quantum of such subsidy.
- It also includes a comprehensive repository of all policies and regulations covering all value chains of the EV ecosystem. The policy module helps states compare their policies, update them based on their competitive advantages,
- For users, industry, and policymakers alike, the dashboard presents a comprehensive overview of charging infrastructure covering both charging stations and points across the country. Additionally, the dashboard shows the density of charging points with respect to EVs on the road. This module also shows charging tariffs allowing states to improve their rates vis-a-vis others,
- By tracking and benchmarking investments across EV value chains such as vehicle manufacturing, battery technology, battery recycling or urban mining, etc., and research and development, the dashboard maps the contributions to India's economic growth and job creation.
- The dashboard measures India's journey towards net zero by tracking emissions avoided due to accelerated EV adoption across the length and breadth of the country.
- Lastly, the dashboard presents news and blogs on EV adoption and data-driven decision-making pertaining to all value chains of the EV ecosystem in a single place.

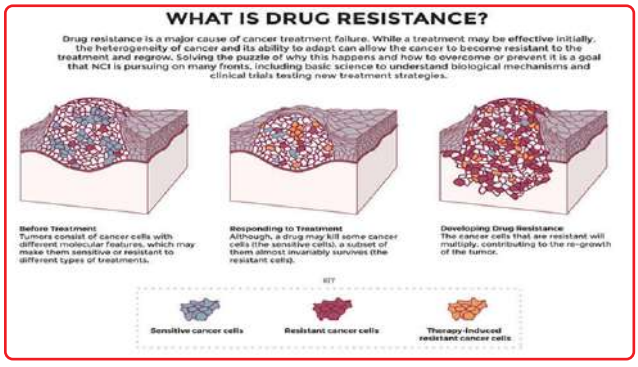
HOW DO SOME CANCER CELLS SURVIVE CHEMO?

Context:

- Sometimes, while an individual may have successfully forced a cancer into remission, there

may be a risk of relapse. One way this happens is when a few cancer cells are able to resist the drugs used to destroy them: they lie in wait and produce a show of strength later.

- In a new study, researchers from the Netherlands Cancer Institute investigated the resistance of some cancer cells to a drug called Taxol.
- They have reported that the culprit could be the location of a particular gene inside the cancer cells' nuclei.



How chemotherapeutic agents work?

- A characteristic feature of cancer cells is that they divide rapidly, in uncontrolled fashion. Anti-cancer drugs i.e. chemotherapeutic agents work by stalling or blocking this proliferation.
- When the division of a cancer cell is arrested, it generally responds by triggering a pathway of programmed cell death, called apoptosis. So in this way, chemotherapy eliminates the cancer cells without affecting other non-cancerous cells nearby that are not dividing.

Side-effects of chemotherapy:

- Any tissue with a significant number of normal cells that are also dividing such as cells in the digestive tract, the bone marrow, and hair follicles are also affected by chemotherapeutic agents and suffer apoptosis.
- This cell death underlies the unpleasant side-effects of chemotherapy, such as painful inflammation of the oral cavity and the gut, and nausea, diarrhoea, anaemia, and hair loss.

ADCs:

- An oncologist's challenge is to find the dose of a drug that effectively kills cancer cells but whose side-effects are not unbearable for the patient.
- One way researchers have tried to achieve this is by developing antibody-drug conjugates (ADCs) against some cancers. An ADC is a drug attached to an antibody that recognises a protein found only on, or at least preferentially on, the cancer cells.
- This way, the antibody guides the chemotherapeutic drug to the cancer cells, where the drug begins its work. And, of course, non-cancer cells are bypassed.

P-gp protein:

- A small subset of cancer cells can still escape confrontation with the anti-cancer drug. This happens when these cells express elevated levels of a protein called P-gp short for permeability glycoprotein. For a cell to produce P-gp, it uses information encoded in a gene called ABCB1.
- Inside the cell, P-gp works like a pump, moving toxic compoundsout. And in cells that make too much P-gp, the protein removes toxins well enough to flush the chemotherapeutic agents out as well.
- So the latter can't accumulate to levels that arrest cell division and trigger apoptosis, allowing the cancer cell to live another day.
- In fact, these surviving cells can allow the cancer to return after a period of remission.

Recent study:

- In recent study, the researchers used cells from the human eye retinal pigment epithelium as a model to explore a small subset that expressed the P-gp protein and thus became resistant to the anti-cancer drug Taxol.
- They found that a cell's sensitivity to Taxol, including its ability to resist Taxol's anti-cancer effects, was related to the location of the ABCB1 gene inside the cell's nucleus.
- The nucleus is the part of the cell that houses the DNA and the associated proteins. A membrane called the nuclear envelope separates it from the rest of the cell.
- Genes are segments of a DNA molecule; when a gene is expressed, it means the cell can use it as a template to form molecules called RNA.
- DNA and RNA share many chemical properties. The DNA contains the archival copy of a gene whereas the cell uses the RNA as the working copy.
- But only the RNA, and not the DNA, enters the cytoplasm where it 'instructs' the cellular machinery on the way to link different amino acids to form theprotein encodedby a gene.

Observations made:

- In those retinal pigment epithelium cells that were sensitive to Taxol, the ABCB1 gene was found to be located close to the nuclear envelope.
- In cells that could resist the effects of Taxol, the gene had detached from the nuclear envelope and had moved further inside the nucleus.
- As a result, resistant cells exhibiteda 100-fold increase in the amount of RNA corresponding to the ABCB1 gene compared to cells that remained sensitive to Taxol.
- The P-gp efflux pump made from this RNAwas responsible for Taxol-resistance.

Resisting the resistance:

- To identify what tethered the ABCB1 gene to the nuclear envelope in sensitive cells, the researchers

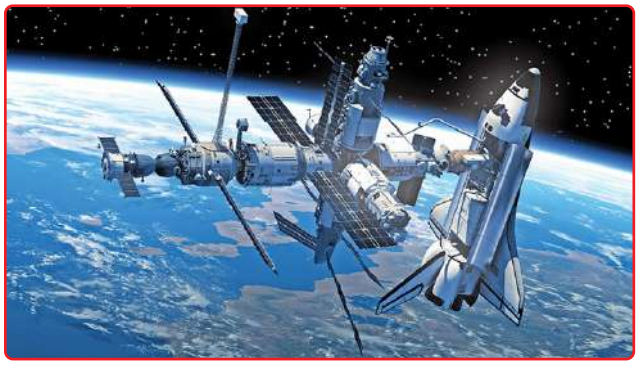
turned different genes 'off' to see which one affected the proteins that the cell uses to make the envelope.

- They zeroed in on a protein called lamin B receptor (LBR). According to the researchers, when the LBR protein was absent, a cell could activate the ABCB1 gene when it was exposed to Taxol.
- But when they deleted the gene used to make LBR, the cells didn't increase ABCB1 expression right away; they had to be exposed to Taxol as well. So additional factors, instead of just LBR, help silence ABCB1 in the bulk population.
- They ralso studied the effect of depleting LBR from breast, head and neck, and lung cancer cells. Lung cancer cells expressed the RNA corresponding to ABCB1 to a high degree, and depleting LBR proteins didn't further increase the fraction of Taxol-resistant cells.
- On the other hand, among breast cancer cells, depleting LBR increased the Taxol-resistant fraction – but not in the head and neck cancer cells.

Way Forward:

- These findings highlight the need for more research to uncover the different ways in which cancer cells express or silence genes.
- By revealing how some cells develop Taxol-resistance, the study also opens the door for researchers to develop new ways to ensure anti-cancer drugs remain potent and patients recover faster.

INDIA TO BUILD BHARTIYA SPACE STATION BY 2035



Why in news?

- Prime Minister a high-level meeting recently told the Department of Space to build a Bharatiya Antariksha Station (Indian Space Station) by 2035.
- The new directive comes after India made history by successfully landing a spacecraft on the Moon and launching another to study the Sun, the two big celestial bodies that guide Earth's future.
- While India continues to grow leaps and bounds beyond the boundaries of the planet, the challenges are immense to make this 2035 target a reality.

Technology involved:

- Building a space station is a colossal undertaking that demands cutting-edge technology and expertise.
- India has shown its prowess in satellite development, but constructing and maintaining a space station requires a completely different set of skills.
- It involves life support systems, radiation protection, and long-term structural integrity. India will need to significantly upgrade its technological capabilities to meet these demands.
- With private companies stepping up, the research and technological development is set to go up and ISRO is assisting aerospace startups in the process.

Financial aspect:

- A space station is a costly endeavour, and India must secure a substantial budget. Financial constraints could potentially limit the pace of the project and the range of experiments it can accommodate.
- India will have to seek international collaborations and explore private-sector involvement to ensure adequate funding.
- There has been a constant urge from the science community to enhance the budgetary allocations to the department to push for bigger missions.

Human Spaceflight:

- While India has achieved significant success with robotic missions, it lacks experience in human spaceflight.
- To build and operate a space station, a well-trained team of astronauts is indispensable. India must invest in human spaceflight programs, astronaut training, and the development of necessary infrastructure for crewed missions.
- It will all hinge on the success and learning of the ambitious Gaganyaan Mission. ISRO is prepping for the maiden test flight of the program on October 21 from Sriharikota.
- India is targeting to launch Indian astronauts into space by 2025 onboard its indigenously developed mission.

International Cooperation:

- India's space station project should also be seen in the context of international cooperation. Collaboration with established spacefaring nations can provide valuable insights and reduce costs.
- Establishing partnerships, especially with nations possessing space station experience, can be mutually beneficial in terms of knowledge sharing and resource sharing.
- India could look towards the US, Canada, and even China to gain knowledge from their operations of the Space Station.
- While NASA, the Russian space agency, Roscosmos, European Space Agency have been operating the ISS for over two decades, China has recently joined the

list with its Tiangong space station and India will have to look at these models.

Geopolitics Manuvering:

- The development of a space station has geopolitical implications. India's space station project could lead to concerns from other nations, which might view it as a strategic move.
- India will need to navigate diplomatic waters carefully to ensure that its space station ambitions do not lead to conflict or regional tensions.

Long-Term Sustainability:

- Maintaining a space station is not a one-time endeavor; it's a long-term commitment. Ensuring the sustainability of the station for decades will be a formidable challenge.
- India must develop a clear plan for regular maintenance, resupply missions, and upgrades to ensure its space station remains operational.
- It will also have to devise plans to tackle space debris and its potential impact on the environment, which is a growing concern. India needs to address these issues by adopting best practices for space debris mitigation and disposal.

MEITY SIGNS MOU WITH IBM ON QUANTUM, AI & SEMICONDUCTOR

Why in news?

- IBM recently announced the signing of three MoU with three entities engaged with the Ministry of Electronics and Information Technology (MeitY) to advance and accelerate innovation in AI, Semiconductor and quantum technology for India.
- This body of work will aim to accelerate India's comprehensive national strategy for AI, strengthen efforts to be self-reliant in Semiconductors and advance its National Quantum Mission.
- These MoUs will help MeitY access IBM's expertise to build and advance India's Competency and scale its growth mission in the AI, semiconductor and quantum industries.

Key Highlights:

IBM and IndiaAI

- Digital India Corporation intend to collaborate to establish a world-class national AI Innovation Platform (AIIP) for India that will focus on AI skilling, ecosystem development, and integrating advanced foundation models and generative AI capabilities to support India's scientific, commercial, and human-capital development in this technology.
- AIIP will serve as an accelerator for incubation and competency development in AI technologies and their applications for use cases of national importance.
- AIIP would have access to relevant capabilities of IBM's watsonx platform including the ability to use models in language, code and geospatial science with the intent to train models for other domains as needed.

India Semiconductor Mission (ISM):

- IBM would be a knowledge partner of India Semiconductor Mission (ISM) for a semiconductor research center.
- IBM may share its experience with ISM on intellectual property, tools, initiatives, and skills development, aimed at promoting innovation in semiconductor technologies such as logic, advanced packaging and heterogeneous integration, and advanced chip design technologies, using modernized infrastructure.

IBM & C-DAC:

- IBM and Centre for Development of Advanced Computing (C-DAC) will also explore opportunities for working together to support the advancement of India's National Quantum Mission by building competency in quantum computing technology, applications in areas of national interest, and a skilled quantum workforce.
- Activities would broadly focus on: workforce enablement; development of industries and startups; R&D; and quantum services and infrastructure.

Way Forward:

- The plans under which IBM would work with IndiaAI, ISM and C-DAC to focus on skill Development, engaging the ecosystems and accelerating R&D efforts in semiconductors, AI and quantum are envisioned to advance and accelerate India's innovation in these areas.

SEEING THE MAGIC OF AI APPLICATIONS IN OPHTHALMOLOGY

Context:

- A computer can perform better than a human brain particularly in the field of ophthalmology.

AI:

- Artificial Intelligence (AI) is a branch of computer science that focuses on creating computer systems and software that can perform tasks like problem-solving, learning, reasoning, understanding natural language, and perceiving the environment.
- The aim of AI is to develop systems that can mimic and replicate various aspects of human intelligence

or cognitive functions, and thereby automate and enhance processes, make predictions, assist in decision-making, and improve the efficiency and capabilities of systems and devices.

- There are certain aspects of artificial intelligence that make it particularly useful in medicine.

Potential uses in ophthalmology

- Retinal disease diagnosis: AI algorithms can analyse retinal images, such as fundus photographs and optical coherence tomography (OCT) scans, to detect and classify various retinal diseases, including diabetic retinopathy, age-related macular degeneration (AMD), and glaucoma. These AI systems can help identify diseases at an early stage, allowing for timely treatment and reducing the risk of vision loss.
- Automated screening: AI-powered screening programmes can assist in the early identification of eye diseases by analysing large datasets of retinal images. This can be particularly useful in regions with limited access to ophthalmologists, and in mobile medical camps.
- Glaucoma diagnosis and management: AI can aid in monitoring glaucoma progression by analysing visual field tests and OCT scans. It helps ophthalmologists in making more informed decisions about the treatment and management of glaucoma patients.
- Customised treatment plans: AI can recommend personalised treatment plans for patients with conditions like AMD. By analysing patient data and clinical information, AI can assist in tailoring treatment strategies to maximise effectiveness
- AI is also being used regularly by ophthalmologists in surgical assistance. During eye surgeries, AI can provide real-time guidance to surgeons by tracking eye movements, enhancing precision, and reducing the risk of complications.
- AI is also used to diagnose and stage Retinopathy of Prematurity (ROP) , a blinding disease affecting premature& low birth weight babies and in telemedicine.

Discovering new drugs:

- Besides these regular areas, AI is also being used to discover new drugs for ophthalmic conditions by analysing vast datasets to identify potential therapeutic targets and compounds and in predicting whether individuals may develop eye diseases, based on their health records, lifestyle factors, and genetic data. This can help in early intervention and preventive care.
- Besides this, there is the rather well-known deployment of AI in managing and analysing electronic health records and keeping them secure.
- AI is being used in ophthalmic research to model disease pathways, thus speeding up the development of new treatments and technologies.

Deployment of AI:

- In ophthalmology, as perhaps any other crucial field, deployment of AI involves a systematic procedure that includes data acquisition, preprocessing, model development, validation, and deployment.
- The first step is to gather a large and diverse dataset of relevant ophthalmic images and patient records. These datasets may include fundus photographs, OCT scans, visual field tests, and other types of eye-related data. The data is appropriately de-identified and anonymised to maintain patient privacy.
- It is standardised and normalised to ensure consistency in terms of format, resolution, and colour. It is then annotated, and labelled with relevant information (e.g., disease diagnosis, severity levels, patient demographics).
- The data must be divided into three subsets: training, validation, and testing data. A common split is 70% for training, 15% for validation, and 15% for testing.
- The training dataset is used to teach the AI model, the validation dataset is used to fine-tune the model and optimise hyperparameters, and the testing dataset is used to evaluate the model's performance.

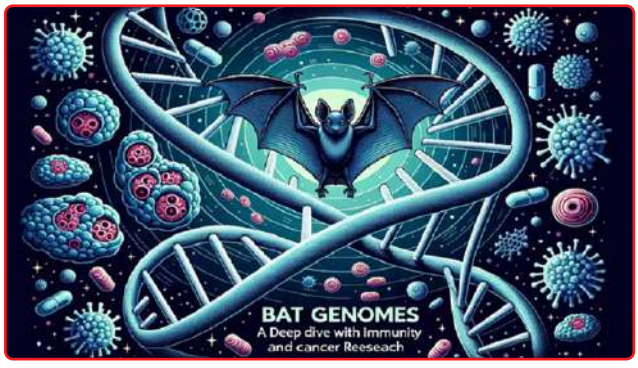
Feature extraction:

- There is also need to extract relevant features from the images or data. For ophthalmic images, this could involve detecting blood vessels, optic discs, or lesions. Feature extraction is particularly important for traditional machine-learning approaches.
- Post that, it is time to focus on model development. Convolutional Neural Networks (CNNs) are commonly used for image-based ophthalmic applications. The model has to be taught to recognise patterns and make predictions based on the provided data.
- It is fine-tuned using the validation dataset and parameters are adjusted as needed until it reaches an acceptable level of performance.
- Common evaluation metrics include accuracy, sensitivity, specificity, and area under the receiver operating characteristic curve. Only when the AI model demonstrates sufficient accuracy and reliability, can it be integrated into clinical practice. After deployment, it is important to continue to monitor the AI system's performance, especially in real-world clinical settings.

Smart vision glasses:

- An innovation that has come to really benefit people with vision impairments is the smart vision glasses. These glasses incorporate a combination of hardware, software, and artificial intelligence (AI) to provide a range of features aimed at improving the visual experience for those with vision challenges.
- Smart glasses are equipped with cameras and sensors to capture the user's surroundings. Advanced image recognition algorithms and AI are employed to identify and describe objects, text, people, and more within the wearer's field of vision.
- This information is then conveyed to the user, often through audio feedback. Smart glasses can also convert printed text into audible speech, allowing users to "read" signs, documents, labels, and other text-based content. This helps individuals navigate and understand their environment.
- The glasses can offer real-time directions, guiding users through indoor and outdoor spaces using GPS and mapping data.

HOW BAT GENOMES PROVIDE INSIGHTS INTO IMMUNITY AND CANCER



Context:

- Bats have grabbed the headlines of late for the wrong reasons. Their notoriety stems from the fact that many deadly viruses use bats as a reservoir host, including coronaviruses, Nipah, Ebola, Marburg virus, and Hendra virus, among others.
- The COVID-19 pandemic also cast a bright spotlight on the habits of bats.
- Bats do host a wide variety of pathogens, including ones deadly to other mammals, but they themselves don't get infected. Scientists have been curious about the source of this protection.

How bats are extraordinary organisms?

- They are the only mammals on the earth that can maintain sustained flight.
- They also have relatively long life-spans and are relatively more protected from a variety of diseases, including cancer.
- They also have a unique ability in echolocation, whereby they use sound to navigate and locate objects, freeing them from being constrained by the availability of light like humans are.
- By population, bats make up 20% of all mammals. There are more than 1,400 species of bats today around the world; more than 60 are endangered and 170-odd are classified as vulnerable.
- The bumblebee bat weighs only 2 grams whereas the flying foxes, which have a wingspan of 1.5 metres, weigh up to 1.6 kg.
- In all, bats play crucial roles in maintaining the ecological balance, and are essential for pollination, insect control, etc.

Bat genomes:

- Over the years, researchers have unearthed significant insights by sequencing the genomes of many bat species. Bats are also unique because they have a relatively small genome, around 2 billion bases.
- Earlier scientists compared the genomes of a fruit-eating and an insect-eating species and found that genes involved in metabolism and immune response had been positively selected. That is, these bats had evolved by improving these two biological domains.
- In the following decade, scientists sequenced a large number of bat genomes. The ambitious Bat1K global genome consortium to sequence all the 1,400 or so species' genomes is also currently underway.
- By analysing bat genomes, scientists have found the natural selection of a protein called prestin, which is involved in echolocation (dolphins have the same protein).

Immune insights:

- Immunity-related genes have been one of the more well-studied gene classes in bats. The fraction of these genes is also unique in bats: some 2.7-3.5% of the bat genome versus roughly 7% of the human genome.
- Emerging evidence also suggests that a set of immune-related genes have been undergoing positive selection in bats, adapting them to control the spread of viruses while mitigating the antiviral inflammatory response.
- As a result, the bats are shielded from the effects of the clinical response of their bodies to these viruses.

Pro-inflammatory genes:

- The heightened pro-inflammatory activity is what makes these viruses deadly in humans.
- One of the first Bat1K genome consortium papers described six high-quality bat species genomes.
- It suggested that echolocation, loss of pro-inflammatory genes, and expansion of antiviral genes are ancestral traits of bats. This suggests that bats have molecular mechanisms that allow them to host a range of deadly viruses but evade clinical disease.
- The bats can harbour multiple viruses at the same time, i.e. in a state of co-infection, without themselves falling ill.

Long reads sequencing:

- Long-read sequencing technologies are those that can 'read' thousands to tens of thousands of bases of a genome at a time.
- With their advent, it has become possible today for scientists to quickly assemble the nearly complete whole-genomes of organisms.
- Another benefit to them is that they no longer had to use more complex, time-consuming, and expensive molecular technologies in the pursuit of building complete genomes.

Interferons (IFN):

- A recent report by researchers from the Cold Spring Harbor Laboratory, New York, used a long-read technology to sequence two bat genomes as well as compared the genomes of 15 species that were already available.
- They reported that subsets of genes involved in mounting an immune response which encode proteins called interferons (IFN) had contracted significantly. This in turn changed the relative proportions of two subsets, interferon-alpha (IFN-) and interferon-omega (IFN-), relative to each other.
- The researchers attributed bats' immune properties to these changes. By shedding the genes for IFN-, bats can dampen the pro-inflammatory response against a number of viruses, thus protecting themselves from clinical disease.

Way Forward:

- With rapid deforestation, ecological degradation, and more and more unfavourable human-animal interactions, we should expect significantly enhanced outbreaks of zoonotic diseases in future.
- The Nipah outbreaks in Kerala over the last few years is an example, as are outbreaks of Marburg disease and the Ebola virus in some African countries.

TWO EXPERIMENTS CONDUCTED BY ISRO PAVED WAY FOR GAGANYAAN TEST MISSION

Why in news?

- There were two important forerunners to the success of the Test Vehicle Abort Mission (TV-D1) flight that the Indian Space Research Organisation (ISRO) conducted recently.
- During the test, an unmanned crew module was brought back safely to earth after launching it on a small rocket and simulating an emergency abort command.
- The test and its forerunners are the ISRO's first major steps towards launching humans to orbit as part of its Gaganyaan mission.

SRE-1:

- The TV-D1 test was carried out smoothly, especially given that the ISRO had to overcome a glitch five seconds before lift-off, when the ground computer, called the Automatic Launch Sequence, halted the lift-off.
- The first forerunner to the TV-D1 mission was the ISRO's Space Capsule Recovery Experiment (SRE-1). An orbiting satellite called the SRE was brought back to earth on January 22, 2007, after a Polar Satellite Launch Vehicle (PSLV) placed it in orbit on January 10.
- In a series of manoeuvres, the shuttlecock-shaped SRE came down from an altitude of 635 km to splash down into the Bay of Bengal, 140 km from Sriharikota, where the Coast Guard recovered it. India, thus, successfully brought back an orbiting satellite in its first attempt.
- The descent manoeuvres included sophisticated braking systems, deceleration techniques, and the deployment of parachutes. Overall, the SRE-1 mission showcased the ISRO's mastery of re-entry technology.
- The SRE-1 was India's first big step towards sending an Indian astronaut into space and bringing them back safely.

LVM-3:

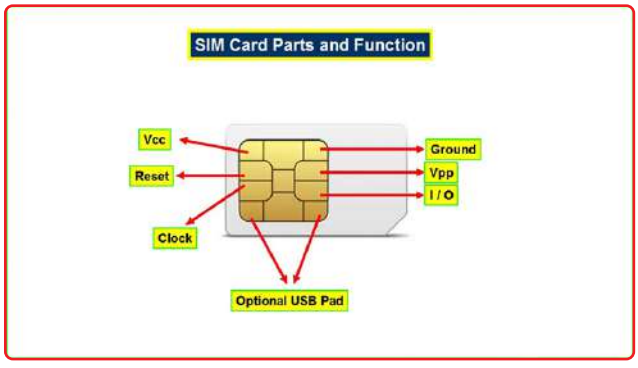
- The second forerunner to the TV-D1 mission happened on December 18, 2014, when the Launch Vehicle Mark 3 (LVM-3) placed the 3.75-tonne unmanned crew module in a sub-orbital altitude of 126 km, and left it to descend.
- The module knifed through the earth's atmosphere and also survived re-entry. Its parachutes deployed and soon it was bobbing in the Bay of Bengal, about 700 km from Port Blair.
- This test, called Crew Module Atmospheric Re-entry Experiment (CARE), marked India's second step towards sending its astronauts into space and getting them back.

Outcome:

- While the SRE weighed about 555 kg, the unmanned crew module in CARE weighed nearly seven times as much. In TV-D1, the module weighed 200 kg more, a full four tonnes.
- The TV-D1 also had three other highlights. They were a) a standalone liquid booster rocket launching for the first time from Indian soil;

b) the successful performance of the Crew Escape System that pulled the crew module away from the launch vehicle; and the crew module reorienting itself before landing in the Bay.

UNDERSTANDING THE COMPONENTS OF A SIM CARD, ITS FUNCTIONS AND WORKING



- In 2021, there were more than 14 billion cellular devices in the world even though there were only seven billion people. The ubiquity of these devices has come to define the contemporary era together with climate change, antimicrobial resistance, and war.
- But for smartphones' outsize mark on history, one essential component of theirs, the SIM card has flown somewhat under the radar.

What is a SIM card?

- 'SIM' stands for 'subscriber identification module'. Specifically, it is an integrated circuit, or a microchip, that identifies the subscriber on a given network.
- In order for a mobile phone to connect to any cellular network that follows the Global System for Mobile Communications (GSM) standard, a SIM card is mandatory. This relationship is established using a unique authentication key.
- Every SIM card stores this data and it is designed such that the user can't access it through their phone. Instead, signals sent by the phone into the network are 'signed' by the key, and the network uses the signature to understand whether the phone's connection is legitimate. It is possible to duplicate a SIM card by accessing its key and storing it in multiple cards.
- SIM cards also store information about its
  - own ID number (the integrated circuit card identifier),
  - the IMSI, the subscriber's location area identity (their current location),
  - a list of preferred networks (to whom the subscriber can connect when roaming),
  - emergency numbers, and
  - the subscriber's contacts and SMS messages.

How does a SIM card work?

- SIM cards are designed according to the ISO/IEC 7816 international standard maintained by the International Organisation for Standardisation and the International Electrotechnical Commission. It applies to electronic identification cards, including smart cards.
- In this standard, the card itself consists of the integrated circuit, which is glued to a silicon substrate on the top side. On the other side of the substrate are metal contacts, which form the gold-coloured side of the SIM card.
- Wires connect the integrated circuit from its bottom side to the metal contacts on the top side, and the contacts interface with the phone's data connectors.

PIN:

- The metal contacts have a segmented appearance. Each segment is called a pin and has a specific purpose.
- For example, pin 1 collects the operating voltage that gives it the power to operate.
- Pin 3 is to access the SIM's clock and pin 5 is the grounding.
- Pin 7 transmits data in and out of the SIM.
- These pin-wise roles are specified by the ISO/IEC 7816-2 standard; others, numbered 1 through 15, specify various functions of a SIM card and how they are to be implemented, from their "transmission protocols" to "cryptographic information applications". This is the hardware side (minus the phone's inner workings).

How have SIM cards changed?

- SIM cards are a type of smart card, and the history of smart cards begin in the late 1960s, when West German engineer Helmut Gröttrup first had the idea to stick an integrated circuit in a plastic panel the size of a credit card.
- The size and architecture of this microchip evolved in leaps and bounds in the subsequent decades, following Moore's law.

GSM:

- The European Telecommunications Standards Institute (ETSI) prepared the GSM Technical Specification 11.11 regarding the SIM card.
- The July 1996 edition says it defines the interface between the SIM and the Mobile Equipment (ME) for use during the network operation phase of GSM as well as those aspects of the internal organisation of the SIM which are related to the network operation phase, within the digital cellular telecommunications system.
- GSM concerns the second generation of cellular networks. After developing the 11.11 standard, ETSI transferred some of its responsibilities to an international consortium of seven organisations called 3GPP (the Telecommunications Standards Development Society in India is one).
- 3GPP subsequently developed the standards for the third (3G), fourth (4G), and fifth generation (5G) of networks.

UICC:

- Until 2G networks, the term 'SIM card' denoted both the hardware and the corresponding software. This changed with the advent of the Universal Mobile Telecommunications System with 3G networks, when 'SIM' became only the software; the hardware was called the Universal Integrated Circuit Card (UICC).
- The software was also upgraded to an application called Universal SIM, or USIM, which could be modified to be compatible with the identification and security requirements of 3G, 4G, and 5G networks.
- As a result, a UICC loaded with both SIM and USIM applications can work with networks of all generations.

What is an eSIM?

- Over the years, the SIM card has shrunk from the SIM to the mini SIM to the micro SIM to the nano SIM. The latest on this path is the eSIM, with specifications defined by the GSM Association.
- In the eSIM paradigm, the SIM software is loaded on to a UICC that is permanently installed in the mobile equipment in the factory itself, that it can't be removed.
- Users using mobile equipment with this capability such as the Google Pixels 2, 3, and 4 or the iPhone 14 series don't have to bother with physically replacing their SIM cards when they join or switch networks. Instead, the network operator simply has to reprogram the eSIM, which can also be done remotely.

Advantages of eSIM:

- It is considered to be environmentally friendlier than a physical SIM: its reprogrammability means no need for more plastic and metal for a new SIM.
- If a malicious person gains access to your phone, they won't be able to separately access the SIM application nor be able to duplicate it.

Disadvantages:

- In some countries, including the U.S., eSIMs can be programmed by subscribers themselves. But this process might be difficult for those with low digital literacy, such as the elderly.
- An eSIM can in theory allow network operators to track subscribers' data, including inside apps on the device, especially in the absence of data privacy laws.

CHANDRAYAAN 3 BLASTED AWAY 2.06 TONNES OF LUNAR SOIL AS IT LANDED ON MOON

Why in news?

- The Indian Space Research Organisation recently revealed that lander Vikram displaced approximately 2.06 tonnes of lunar regolith (rocks and soil) as it landed on the surface of the Moon.

Chandrayaan-3 mission:

- Chandrayaan-3 made a historic landing on the moon on August 23. The lander module, named Vikram, and the rover, Pragyan, touched down on the Shiva Shakti Point in the South Polar Region of the Moon.
- The Chandrayaan-3 mission is a follow-up to the Chandrayaan-2 mission and aims to demonstrate end-to-end capability in safe landing and roving on the lunar surface.
- The mission objectives include achieving a safe and soft landing on the lunar surface, demonstrating the rover's mobility on the Moon, and conducting in-situ scientific experiments.
- The successful landing of Chandrayaan-3 near the moon's south pole makes India the first country to achieve this feat.

Ejecta halo:

- As it descended, the Chandrayaan-3 Lander Module generated a spectacular 'ejecta halo' of lunar material. This phenomenon was captured and analyzed by scientists from the National Remote Sensing Centre (NRSC), a part of ISRO.
- According to their findings, approximately 2.06 tonnes of lunar epiregolith, or surface material, were ejected and displaced over an area of 108.4 square meters around the landing site.
- Scientists compared the pre- and post-landing high-resolution imagery from the Orbiter High-Resolution Camera (OHRC) of the Chandrayaan-2 orbiter.
- The images were acquired hours before and after the landing event, which characterised this 'ejecta halo' appearing as an irregular bright patch surrounding the lander.

Significance:

- The study, titled "Characterisation of Ejecta Halo on the Lunar Surface Around Chandrayaan-3 Vikram Lander Using OHRC Imagery", provides valuable insights into the impact of lunar landings on the moon's surface.
- ISRO had to wait for some time for the lunar soil kicked off by the thrusters to settle down before they could roll out the Pragyan rover on the surface of the Moon.

THE ACT OF PHOTOCOPYING, ITS ORIGINS, WORKING AND WIDE RANGING IMPACT

Context:

- Xerographic machines are in ubiquitous use around the world today to quickly and cheaply reproduce printed material.

What is photocopying?

- Broadly, photocopying is a set of techniques used to duplicate content using, among other things, light. However, the contemporary colloquial use of the word 'photocopying' refers almost exclusively to xerography.
- Both the word 'xerography' and the name 'Xerox' come from the Greek root-word 'xero', meaning 'dry'. This is because xerography is a type of photocopying method where the process doesn't involve messy liquid chemicals.

How does xerography work?

Photoconductive surface:

- The first is the photoconductive surface, a surface coated with a photoconductive material. Such a material, when exposed to light, allows electrons to flow through it (that is it conducts electricity) but blocks them when it's dark. This surface is negatively charged by placing a thin negatively charged wire with a high voltage next to it.
- Then, the sheet of paper to be copied is illuminated with a bright light. The darker parts of the paper don't reflect the light whereas the unmarked parts do.
- This reflected light is carried by lenses and mirrors to fall on the photoconductive surface. In the parts of the surface where light falls, the photoconducting material will become conductive and allow the electrons near its surface to dissipate downwards (into a grounding).
- So the parts that remain negatively charged at the end of this step will correspond to parts of the paper-to-be-copied (TBC) where something was printed.

Toner:

- Next, a powdery substance called toner is applied to the surface. The toner is positively charged, so it will settle where negative charge persists on the surface.
- The surface then transfers the pattern of the toner on it to a sheet of paper. The paper has a stronger negative charge that causes the toner to jump.
- Finally, the toner is heated so that it melts and fuses with the paper. This is the paper that rolls out of the photocopying machine, the whole process having been completed in a few seconds. In practice, a rotating drum is used instead of a flat surface, and the paper TBC is illuminated by a flashing or stroboscopic light or a moving scanner.

Who invented xerography?

- Inspired by the work of the Hungarian engineer Paul Selenyi, an American attorney named Chester F. Carlson came up with a rudimentary version of xerography by 1938.
- Seven years later, he sold his idea to a non-profit organisation called the Battelle Memorial Institute in Ohio, where researchers refined the technique.
- In 1946, the small New York-based Haloid Photographic Company purchased a licence from Battelle to build a machine based on the technique. The company trademarked the name for this machine as the "Xerox machine" in 1948 and availed the first model for sale in 1949. Haloid's managers were responsible for coining the word 'xerography', replacing Carlson's 'electrophotography'.
- About a decade later, Xerox also introduced the laser-based photocopier. Instead of using a lamp to reflect light off the document to be copied to the drum, the data to be copied was encoded as a bitmap that was fed to a laser, which then inscribed the requisite shapes onto the drum.

Xerography's wide-ranging impact:

Counterfeiting:

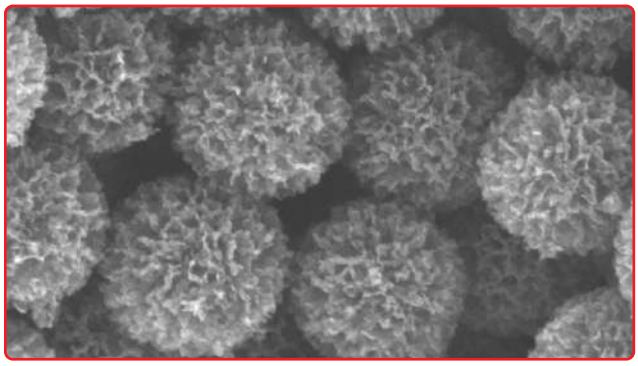
- In 2002, people discovered that Xerox machines refused to copy banknotes that included a particular marking, of five small rings positioned like stars in the Orion constellation. Similar markings have since been found on the banknotes of at least 35 national banks.
- A 2005 statement from the Reserve Bank of India, accompanying the release of new ₹50 notes, called it the "Omron anti-photocopying feature", suggesting that a Japanese corporation named Omron was responsible for designing the rings to prevent counterfeiters from duplicating or printing currency notes using xerographic machines.

Copyright & surveillance:

- In 2012, a raft of academic publishers, including the Oxford University Press, filed a suit alleging copyright infringement against a photocopy shop and the University of Delhi.
- The suit claimed that teachers at the university had picked pages from books by the publishers to be copied and bound together at the shop, and sold to university students at ₹0.50 per page.

- The matter famously concluded in the university's favour, highlighting the rights that attend to and the benefits that accrue from being able to make numerous copies of educational material at a low cost.

IIT TEAM FINDS CARBON FLOWERS EXCELLING AT TURNING LIGHT TO HEAT



Why in news?

- Scientists at the Indian Institute of Technology, Bombay, (IIT Bombay) have developed a new material that can convert sunlight into heat energy with unprecedented efficiency.
- Due to their appearance like tiny marigold flowers, made only of carbon. They called the material carbon nanoflorets.
- The nanoflorets also didn't easily dissipate the heat generated into the environment, making the material a good candidate to heat other materials, like water, using solar energy.

How it was made?

- They heated a special form of silicon dust called DFNS (for dendritic fibrous nanosilica) in a furnace. Once heated, they introduced acetylene gas into the chamber. The white powder turned black – a sign that carbon had been deposited on the DFNS.
- Then she collected the black powder and treated it with a strong chemical that dissolved the DFNS away, leaving carbon particles behind.
- The structure of the silicon particles – 50-1,200 nanometers in size – resembled spikes arranged around a sphere.
- With the silicon filling taken away, what was left behind were little carbon beads whose surfaces were pocked with cone-shaped pits. In effect, the beads were spherical nanostructures composed of carbon cones.

Two different techniques:

- In 2018, his own group had reported identical structures that it dubbed "carbon nanospheres with wrinkled cages".
- But, the work differed in the techniques used to deposit carbon on the DFNS template.
- Earlier team used formaldehyde-phenol polymerisation chemistry whereas now they used chemical vapour deposition (CVD). In CVD, volatile compounds like acetylene are used to deposit a thin carbon film on the silicon-dust template.

Efficiency:

- The team conducted experiments to demonstrate that the nanoflorets converted the light energy they absorbed into thermal energy a process called solar-thermal conversion with a remarkable efficiency of 87%.

The carbon nanoflorets' high efficiency comes from three properties.

- The nanoflorets absorb three frequencies in sunlight – infrared, visible light, and ultraviolet. Other common materials for solar-thermal conversion, like photovoltaic materials used in solar panels, absorb only visible and ultraviolet light.
- More than half of the energy in sunlight arrives to the earth as infrared radiation. So the nanoflorets can absorb much more energy from the sun.
- The other two properties responsible for the material's high light-heat conversion efficiency are a result of its shape.
- As light falls on the material, the carbon cones ensure that very little is reflected back. Instead, most light is reflected internally.
- One risk with a material that can convert sunlight into heat is that it can also lose it to its environment.
- The carbon nanoflorets don't, however, due to long-range disorder: parts of the structure at some distance from each other possess different physical properties.
- As a result, heat waves in the material aren't carried over long distances, reducing the amount of heat dissipated away.

Way Forward:

- India is a country that is blessed with a lot of light, but also has areas that have low temperatures. In such regions, the nanofloret coatings can help heat up housing and sterilise surfaces in hospitals.
- The researchers are also studying the nanoflorets' other physical and chemical properties and potential applications.

SOCIAL ISSUE

BAIGA TRIBAL GROUP GETS HABITAT RIGHTS IN CHHATTISGARH

Why in news?

- The Baiga Particularly Vulnerable Tribal Group (PVTG) recently became the second to get habitat rights in the state, after the Kamar PVTG.

Population of Baiga PVTGs:

- A total of 19 Baiga villages with a population of 6,483 people (2,085 families) have been given the habitat

rights. These villages/para/tola of Gaurela block received the rights in a special event organised by the district administration of Gaurela-Pendra-Marwahi (GPM).

- The Baiga community primarily resides in Rajnandgaon, Kawardha, Mungeli, Gaurela-Pendra-Marwahi (GPM), Manendra-Bharatpur-Chirmiri, and Bilaspur districts of the state. The community also lives in the adjacent districts of Madhya Pradesh.

What are habitat rights?

- Habitat rights recognition provides the community concerned rights over their customary territory of habitation, socio-cultural practices, economic and livelihood means, intellectual knowledge of biodiversity and ecology, traditional knowledge of use of natural resources, as well as protection and conservation of their natural and cultural heritage.
- Habitat rights safeguard and promote traditional livelihood and ecological knowledge passed down through generations.
- They also help converge different government schemes and initiatives from various departments to empower PVTG communities to develop their habitats.

What does 'habitat' mean, under what law are such rights granted?

- Habitat rights are given to PVTGs under section 3(1) (e) [rights including community tenures of habitat and habitation for primitive tribal groups and pre-agricultural communities] of The Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006 also known as the Forest Rights Act (FRA).
- According to Section 2(h) of FRA, "Habitat includes the area comprising the customary habitat and such other habitats in reserved forests and protected forests of primitive tribal groups and pre-agricultural communities and other forest dwelling Scheduled Tribes."

Can habitat rights be used to stop activities like mining?

- The habitat rights will help the PVTG protect their habitat from developmental activities harmful to them. The title may not be an ownership title in the nature of a private property owner, but consent and consultation of the Gram Sabha will be needed for any developmental activity.
- Forest Rights have legal protection under the Forest Conservation Act, the Land Acquisition law of 2013, and even the SC/ST Prevention of Atrocities. Act. Grant of habitat rights under the Forest Rights Act provide an additional layer of legal protection.
- If any kind of development activity is hampering their habitat rights, the tribal group concerned can take up the matter with the administration under the Forest Rights Act, and if not resolved, the matter can be taken to court.

Which tribes are termed PVTG?

- The tribal communities who are technologically backward, who have stagnant or declining population growth, extremely low level of literacy, and a subsistence level of economy are declared as PVTG.
- PVTGs have low health indices and largely reside in isolated, remote, and difficult areas in small and scattered hamlets/habitats.
- The Ministry has identified 75 PVGTs in 18 states and one Union Territory. In 2019, the MoTA started a scheme for their protection and improvement in terms of social indicators like livelihood, health, nutrition and education to decrease their vulnerability.

How many states have recognised habitat rights?

- Out of 75 PVTG in India, only three have habitat rights. The Bharia PVTG in Madhya Pradesh was the first, followed by the Kamar tribe and now the Baiga tribe in Chhattisgarh.

How many PVTGs does Chhattisgarh have?

- There are seven PVTGs in Chhattisgarh, who live in 17 of the state's 33 districts. These are Kamar, Baiga, Pahadi Korba, Abujhmadiya, Birhor, Pando and Bhujia.
- The total population of PVTG tribes in Chhattisgarh as per the 2015-2016 survey is 2.50 lakh while the population of tribals in Chhattisgarh as per the 2011 census is 78.22 lakh.
- While the first five tribes have been declared PVTG by the central government, the remaining two, Pando and Bhujia, have been given the tag by the state government.
- The seven tribes by population are Kamar tribe with 26,622 people, Abujhmadiya tribe with 23,330 people, Baigas with 88,317 people, Pahadi Korba with 44,026, Birhor with 3490 people, Pando with 32,000 people and Bhujia with 8,000 people.

SC MARRIAGE EQUALITY JUDGMENT UNPACKED, TWO VIEWS ON FOUR KEY ISSUES

Why in news?

- A five-judge Constitution Bench of the Supreme Court headed by Chief Justice of India refused to grant legal status to same-sex marriages.

- While two judges; the CJI and Justice Sanjay Kishan Kaul recognised that queer couples can form "civil unions", they were in the minority. The majority of three judges said that the issue lay exclusively in the domain of the legislature.

The fundamental right to marry:

- The petitioners had argued that there exists a fundamental right to marry a person of one's own choice under the Constitution, and that the court must address the denial of that right.
- If the court recognised this as a fundamental right (like it did in the case of privacy in the 2017 Aadhaar ruling), then it would cast an obligation on the state to protect this right.

Minority View:

- CJI Chandrachud did not agree with the petitioners' argument that marriage is an inherent right that the state only regulates. The minority view stated that marriage may not have attained the social and legal significance it currently has, if the state had not regulated it through law.
- Thus, while marriage is not fundamental in itself, it may have attained significance because of the benefits which are realised through regulation.

Majority View:

- Agreeing with the CJI on this issue, the majority view differentiated between what is "fundamentally important to an individual" from an enforceable fundamental right.
- The fundamental importance of marriage remains that it is based on personal preference and confers social status. Importance of something to an individual does not per se justify considering it a fundamental right, even if that preference enjoys popular acceptance or support.
- The majority opinion also noted that the logic in many decisions by courts in the US that have underlined the rationale for declaring the right to marry a fundamental right as "being essential to the orderly pursuit of Happiness (as it appears in their Declaration of Independence) by free persons" may not be sound.

Interpretation of Special Marriage Act:

- The key framing of how the court can recognise same-sex marriage was by allowing a gender-neutral interpretation of the legislation that governs a civil marriage in which the state, rather than religion, sanctions the marriage.
- The SMA was enacted in 1954 to enable marriage between inter-faith or inter-caste couples without them giving up their religious identity or resorting to conversion.
- The petitioners had asked the SC to interpret the word marriage as between "spouses" instead of "man and woman". Alternatively, the petitioners had asked for striking down provisions of the SMA that are gender-restrictive.

Minority View:

- On the expansive reading, CJI Chandrachud said the court could not allow that, because it would "in effect be entering into the realm of the legislature".
- If the court were to instead grant the second option to read down the SMA to the extent that it is gender restrictive, "it would take India back to the pre-Independence era where two persons of different religions and caste were unable to celebrate love in the form of marriage."

Majority View:

- While arriving at the same conclusion, Justice Bhat stated that the court could not interpret the SMA to include same-sex couples since the objective of the legislation is not to include same-sex couples within the realm of marriage.
- The provisions and the objects of the SMA clearly point to the circumstance that Parliament intended only one kind of couples, i.e., heterosexual couples belonging to different faiths, to be given the facility of a civil marriage.

Queer couples' right to adopt a child

- The petitioners had argued that the guidelines of the Central Adoption Resource Authority (CARA), which does not allow unmarried couples to jointly adopt children, is discriminatory against queer couples who cannot legally marry.
- The guidelines allow only a couple who have been in at least two years of a stable marital relationship to be eligible to adopt.
- Individually, queer persons can adopt as single people. However, a single male is not eligible to adopt a girl child, even though a single female is eligible to adopt a child of any gender.

Minority View:

- The CJI in his opinion struck down certain CARA regulations on the grounds that the legislation's object is not to preclude unmarried couples from adopting a child.

- The minority view added that the exclusion of same-sex couples from adopting has the effect of "reinforcing the disadvantage already faced by the queer community. Law cannot make an assumption on good and bad parenting based on the sexuality of individuals".

Majority View:

- The majority view largely agreed with the discriminatory aspects of preventing queer couples from adopting children.
- Justice Bhat termed this as having the "most visible" discriminatory impact on queer couples, and in principle agreed that a couple "tied together in marriage are not a 'morally superior choice', or per se make better parents".
- Yet, the majority view said that this change cannot be "achieved by the judicial pen".

Civil unions for queer couples

- The halfway approach of recognising civil unions for queer couples was debated during the hearing. Before full marriage rights were recognised for same-sex couples by the US Supreme Court, several states had allowed civil unions.
- However, the petitioners argued that civil unions are not an equal alternative to the legal and social institution of marriage, and "relegating non-heterosexual relationships to civil unions would send the queer community a message that their relationships were inferior to those of heterosexual couples.

Minority View:

- The CJI located the right to form intimate associations within the fundamental right to freedom of speech and expression.
- The CJI stated that for this right to have "real meaning", the state must recognise "a bouquet of entitlements which flow from an abiding relationship of this kind".
- The minority view noted Solicitor General Tushar Mehta's statement that a committee chaired by the Cabinet Secretary would be constituted to set out the rights which would be available to queer couples in unions.

Majority View:

- Justice Bhat disagreed with the view that the court can prescribe a "choice" of civil unions to queer couples.
- The majority opinion said that the state should facilitate this choice for those who wish to exercise it, is an outcome that the community may agree upon.

THE T.N. EXPERIENCE ON CASTE SURVEY

Why in news?

- The Bihar caste-based survey has spurred nationwide calls for a similar census and discussions about exceeding the 50% reservation limit.
- However, looking at Tamil Nadu's past, a caste census alone may not lead to increased other backward class (OBC) reservations.

Background:

- The Second Backward Classes Commission (1982-85) in Tamil Nadu even recommended a reduction in reservation percentages.
- The First BC panel (1969-70), led by A.N. Sattanathan, suggested raising BC reservations, but the idea of a creamy layer hasn't gained political backing.

How did the Second BC Commission come into being?

- In January 1980, the then AIADMK regime, headed by M.G. Ramachandran, announced the hike in the share of reservation for BCs from 31% to 50%, taking the total quantum to 68% that included 18% for Scheduled Castes (SC) & Scheduled Tribes (ST). (After STs got one per cent exclusive reservation in June 1990, the overall tally went up to 69%).
- Once the decision became a subject matter of litigation in the Supreme Court, the State government gave an undertaking in October 1982 that it would set up a panel to review the existing enumeration and classification of BCs.
- The panel was constituted with the former Chairman of the Tamil Nadu Public Services Commission, J.A. Ambasankar, as the head. The BC panel submitted its report to the government in February 1985.

What was the highlight of the Commission's work?

- The Socio-Educational-cum-Economic Survey was conducted in two stages during 1983-84.
- In the first stage, a cent per cent door-to-door enumeration was conducted for the enumeration and classification of BCs.
- This was decided as the Ambasankar Commission found that the previous panel headed by Sattanathan took into account only the 1921 Census, when 88 communities were enumerated as against 31 in 1931, and projected it over 50 years to arrive at the caste-wise population.
- Estimating the total population of the State as 4,99,90,743 , the Second BC panel drew up a list of 298 communities, classified under main groups such as

BCs, Most BCs, Denotified Communities (DNCs), SCs, STs and others. The panel confined itself essentially to the BCs, without giving an exhaustive break-up of all the communities.

- The Commission had worked out that the population of the BCs was 3,35,70,805, accounting for 67.15% of the State's overall population. In respect of SCs, the figure was 92,08,917; STs - 5,54,918 and others - 66,56,103. In March 1989, an exclusive quota - 20% - was provided for MBCs and DNCs within the total share of BCs of 50%.
- Based on the Ambasankar panel's workings, the State Backward Classes Commission, in May 2012, arrived at the figure of 1,23,17,745 as the population of the MBCs and DNCs.
- The Commission held a 5 per cent random sample survey of students in 37,000 schools along with a survey of students in all 232 colleges and seven universities. Finally, to ascertain the representation of BCs in public services, it arranged a full-scale survey of 'public servants' in each grade as of July 1, 1983.

What were the recommendations of the Commission?

- Even as the panel was in the last leg of its work, differences erupted between a majority of members and the Chairman, Ambasankar.
- While the latter wanted the quantum of reservation for BCs to be brought down to 32% so that the overall figure did not exceed the 50% ceiling, the dissenting members had argued that as the population of BCs was about 67%, the quantum should be at least 50%.

Difference was the coverage of reservations:

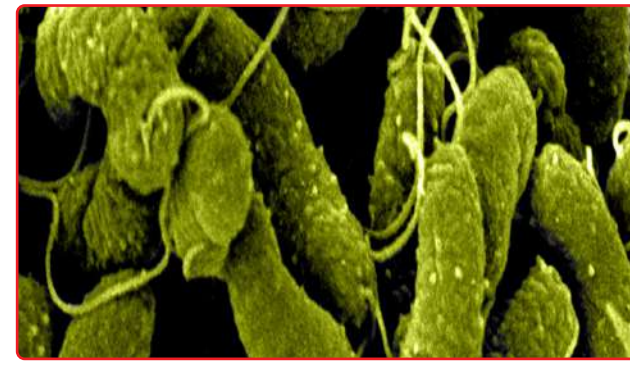
- The Chairman had insisted that all those found eligible for quota under Article 15(4) "will not be automatically entitled" to reservation in appointments under Article 16 (4).
- Article 15(4) deals with special provision for the advancement of any socially and educationally backward classes of citizens or for the SCs and STs.
- Article 16 (4) talks of making reservation in jobs for any backward class that is "not adequately represented" in public services.
- So, he was for two separate lists of BCs, one under Article 15(4) and another under Article 16(4). But, the members had all favoured only one list.
- Two sets of recommendations, one from the Chairman and another from the members, were furnished to the government, which, however, chose not to disturb the status quo with regard to the quantum of reservation - 50% for BCs.
- The government also did not agree with the recommendation of deletion of 24 communities even though it toed the line of the panel for the inclusion of 29 communities.

How did the 1992 Supreme Court judgment affect State reservations?

- In the wake of the Supreme Court's judgment in the Mandal Commission case in 1992, the State was forced to enact a law to safeguard the 69% quota and have it placed under the Ninth Schedule.
- During 2007-09, the DMK government had exclusively provided 3.5% each for Muslims and Christians within the quota of BCs. Subsequently, the separate quota for Christians was withdrawn.
- In May 2009, Arunthathiyars, a constituent of SCs, were given 3% within the 18% quota for the SCs.
- In February 2021, the AIADMK regime got a bill adopted by the Assembly for 10.5% reservation for Vanniyars or Vanniyakula Kshatriyas in education and employment within the overall quantum of 20% for the MBCs.
- However, the Supreme Court, a year later, struck down the law on the ground that the data of the Ambasankar panel were not contemporaneous.

HEALTH

GENES FUEL ANTIBIOTIC RESISTANCE IN YEMEN CHOLERA EPIDEMIC



Why in news?

- Genes imparting resistance to multiple antibiotics emerged in the Vibrio cholerae bacterial strains responsible for the ongoing Yemen cholera epidemic around 2018, following changes in antibiotic treatment.
- These findings emphasise the importance of tracking pathogen genomes to monitor the emergence of multidrug-resistant strains that increase human morbidity and mortality.

Details:

- The cholera outbreak in Yemen, which began in 2016, is the largest in modern history and antibiotic resistance has become widespread among V. cholerae bacteria since 2018.
- Drug resistance in bacteria may develop and spread via spontaneous mutations or by the acquisition of resistance-conferring genes.

New plasmid:

- Researchers analysed 260 epidemicV. choleraegenomic DNA samples collected in Yemen between 2018 and 2019. They report the presence of a new plasmid in V.cholerae from late 2018 to the bacterial strains behind the epidemic.
- This plasmid introduced genes encoding resistance to multiple clinically used antibiotics, including macrolides (such as azithromycin).
- The plasmid became widely spread and was found in all epidemic V.choleraesamples tested by 2019, coinciding with macrolide antibiotics being used to treat pregnant women and children with severe cholera.
- They also found the multidrug-resistance plasmid in less pathogenic, endemic cholera strains, suggesting that epidemic and endemic V.cholerae strains might exchange plasmids and antibiotic-resistance capabilities.

Conclusion:

- They conclude that clinical macrolide use and genetic exchange may have contributed to multidrug-resistance spread among Yemeni V.cholerae lineages.
- They argue that the emergence of the multidrug-resistant pathogen demonstrates the importance of continuing genomic surveillance of the Yemen cholera outbreak.

INDIA NEEDS YOUTH MENTAL HEALTH FOCUS TO STRIKE DEMOGRAPHIC GOLD

Context:

- India's adolescent population, aged 10-19 years, accounts for a substantial portion of the national total, some 253 million. This demographic segment is a significant part of what economists and demographers have come to call the 'demographic dividend'.
- It hold the promise of economic prosperity and development but few also acknowledge that this potential actually hinges on these young men's and women's physical as well as mental well-being.

Lacking focus on youth mental health:

- Adolescent health and well-being have become important in public health discourses worldwide.
- Acknowledging the adolescent cohort's pivotal role in society, the governments of both the States and the nation have introduced numerous policies and programmes to protect and respond to the health-wise needs of these young individuals. However, a closer look reveals that mental health does not figure as predominantly as warranted in many of these policies.
- Adolescence is a time of profound transformation. It marks the transition from childhood to adulthood, and is laden with challenges – including those related to the perception of one's body and body image issues.
- Society's expectations regarding the 'ideal' behaviour and body types can significantly affect physical and mental health. The weight of academic expectations, peer pressure, and concerns about the future also take a toll on mental health at this time.

Rashtriya Kishor Swasthya Karyakram (RKSK):

- The Rashtriya Kishor Swasthya Karyakram (RKSK) is a Government of India policy that deals exclusively with adolescent health. It was rolled out on January 7, 2014. But despite having been in operation for nearly a decade, the mental health strategies under this policy have been implemented painfully slowly.
- Under the purview of the National Health Mission, State governments were responsible for implementing the RKSK policy, including setting up 'Adolescent Friendly Health Clinics' as part of its facility-based strategies.
- But to this day, the RKSK has not shared data on its critical components, including (but not limited to) mental health, violence, injuries, and substance misuse. It has also initiated few discussions on the curative aspect of mental health.
- And despite having recruited and trained numerous counsellors (both male and female) dedicated to adolescent health within the first three years of RKSK, many district-level vacancies persist.

Other policies:

- Other policies like the Sarva Shiksha Yojana (focused on learning disabilities), the National Youth Policy (substance abuse), the National Mental Health Policy, the Yuva Spandana Yojana (only in Karnataka) address various immediate and underlying factors that affect mental health.
- However, most policies that are centred on adolescents have regarded mental health as a secondary concern.

Burden & lack of data:

- Adolescents in India are particularly vulnerable to mental health problems like anxiety disorders and depression. Official reports have stated that among Indians aged 13-17 years, the prevalence of severe mental illness was 7.3% (as of 2015-2016).
- Even three years after the onset of the COVID-19 pandemic, mental health disorders among

adolescents continue to become more common and have their effects felt.

- An informal survey revealed little awareness of RKSK among school-going adolescents, parents, and teachers in the urban slums of Mumbai and less so of the digital interventions of RKSK, a mobile app called 'Saathiya Salah' and an e-counselling within that app.
- Further, during a focused group discussion, students attending a school that facilitated access to a school-based counsellor said that they had negatively labelled the counsellor as a "tension teacher", and that they were reluctant to share their concerns with this individual, fearing that they might be reported and have their privacy violated.
- In India, mental health disorders are underreported due to poor awareness, lack of help-seeking behaviour (stemming from stigma), a desire and/or expectations to be self-reliant, and insufficient prioritisation in the policy framework.

Future roadmap:

- The policymakers should endeavour to shift from the current "medical model" of mental health to the convergent model of mental health: the latter recognises the complex interplay of behavioural, environmental, biological, and genetic factors throughout an individual's life, especially during the crucial stages of childhood and adolescence.
- To this end, well-meaning programs like RKSK can learn from the experiences of other countries to better implement its vision.
- For example, the successful implementation of the 'Whole School, Whole Community, Whole Child' model in the U.S. embraces a holistic approach to children's well-being by considering factors such as nutrition, physical activity, and emotional health within the school environment.
- Initiatives like establishing peer support groups in schools and colleges and community-based interventions leveraging technology can also encourage help-seeking behaviour.

Multi-sector approach:

- A multi-sector approach that includes underlying factors like education and nutrition should be at the core of policies to realise the full potential of adolescents.
- India's youth is aspirational and deserves a good education. A good education empowers youngsters to access resources, assert their rights, and tackle societal and family issues better.

Way Forward:

- There is need to recognise that a healthy mind thrives within a healthy body. The government should continue to make the improvement of school environments and health-promoting conditions a priority in parallel with efforts to combat pressing health concerns like malnutrition and anaemia.
- Our nation's future is banking on evidence-based policy-making and unwavering political commitment to be able to move mountains.

WHAT IS FOETAL VIABILITY IN ABORTION

Why in news?

- The Supreme Court has been hearing a married woman's request for ending her 26-week pregnancy. The case has travelled to two different Benches of the SC, and raised crucial questions on the decisional autonomy of a woman to abort, and the legislative framework.
- Two specific ideas have come up during the hearings, which are not usually taken up in India: "foetal viability", and the rights of the unborn child.

What is this case about?

- A 27-year-old married woman, who already has two sons, has pleaded that the current pregnancy was unplanned. She has said that her family income is insufficient to support another child, and that she is herself not in the right mental frame, having been under medication for post partum depression after the birth of her second child.
- On October 9, a two-judge Bench of Justices Hima Kohli and B V Nagarathna, after interacting with the petitioner through video conferencing, allowed the termination of the pregnancy. The court reasoned that an unwanted pregnancy due to failure of contraceptive methods is the same as a forced pregnancy for which termination is allowed up to 24 weeks.
- However, a doctor from AIIMS, Delhi, the hospital where the woman was to go for the procedure, emailed the counsel for the Centre saying that a directive would be needed from the SC on whether a foeticide (stopping the foetal heart) can be done before the termination of the pregnancy, since the foetus is "currently viable" and presents a "strong possibility of survival".
- After the AIIMS report, the same SC Bench was split on allowing the abortion. Justice Nagarathna said the petitioner's decision to abort must be respected, while Justice Kohli said her "judicial conscience" did not permit her to accept the request.

- The case then went before a three-judge Bench headed by Chief Justice of India (CJI). Bench called for a fresh medical report to indicate the foetal health and medical condition of the woman. The case will come up again before the court on October 16.

What is India's law on abortion?

- The Medical Termination of Pregnancy Act (MTP Act) allows termination of pregnancy in three stages:
  a) Termination of pregnancy up to 20 weeks is allowed on the advice of one doctor.
  b) If a pregnancy is 20-24 weeks, the right to seek abortion is determined by two registered medical practitioners as an exception, but only under certain categories. Section 3B of the Rules under the MTP Act lists seven categories of forced pregnancies, including statutory rape in case of minors or sexual assault; women with disabilities; or when there is a change in marital status of women during pregnancy.
  c) After 24 weeks, the MTP Act requires a medical board to be set up in "approved facilities", which may "allow or deny termination of pregnancy" only if there is substantial foetal abnormality.

Has the court allowed termination beyond 26 weeks?

- Yes, in several cases. On August 21, a Bench headed by Justice Nagarathna held a special sitting to allow termination of pregnancy of a rape survivor whose pregnancy was at 27 weeks and three days.
- However, the difference in the current case seems to be the marital status of the woman, which indicates that the conception is consensual and not a "forced" pregnancy in the way it is usually understood.
- In September 2022, a Bench led by Justice Chandrachud allowed abortion for an unmarried woman who was 24 weeks pregnant, and was in a consensual relationship.
- The Bench cited "transformative constitutionalism" that promotes and engenders societal change, and said that "the law must remain cognizant of the fact that changes in society have ushered in significant changes in family structures".
- There are also instances in which a court has overruled the decision of the medical board to allow termination. In 'Bhatou Boro v. State of Assam' (2017), Gauhati High Court overruled the medical board's refusal to give an opinion for termination of pregnancy of over 26 weeks of a minor rape survivor.

Where do the ideas of the rights of an unborn child, and foetal viability come in?

Foetal viability:

- The observations by the CJI-led Bench oscillated between the rights of a woman "must trump" when it comes to abortion, and the need to "balance out the rights of the unborn child".
- While courts have read the MTP Act liberally, the test of "foetal viability" as a benchmark to allow abortion is new in India. The landmark 1973 US Supreme Court verdict in 'Roe v Wade' that made abortion a constitutional right allowed abortion up to the point of foetal viability, that is, the time after which a foetus can survive outside the womb.
- Foetal viability in 1973 was pegged at 28 weeks (7 months), which is now with scientific advancement lower at 23-24 weeks (6 months).
- It has been argued, therefore, that foetal viability is an arbitrary standard.
- The criticism of India's law is that the decision to terminate after 20 weeks is shifted to doctors and not the woman. While this aspect is not challenged in court, frequent cases of women approaching the court at the eleventh hour point to a legislative gap.

Rights of the unborn child:

- The Indian legal framework on reproductive rights tilts to the side of the woman's autonomy to decide and choose more than towards the rights of the unborn child.
- In 2005, Rajasthan High Court in 'Nand Kishore Sharma versus Union of India' rejected a challenge to the constitutional validity of the MTP Act on the grounds that it violates the fundamental right to life of an unborn child.
- The right of an unborn child has, however, formed the basis of legislation that deal with succession or the law banning sex-determination of foetus. Section 416 of the Code of Criminal Procedure also provides for postponement of the death sentence awarded to a pregnant woman.

MISCELLANEOUS

NOBEL PEACE PRIZE 2023

Why in news?

- Imprisoned Iranian activist Narges Mohammadi won the Nobel Peace Prize in recognition of her tireless campaigning for women's rights and democracy, and against the death penalty.

Contribution of Narges Mohammadi:

- She has kept up her activism despite numerous arrests by Iranian authorities and spending years behind bars.
- She is currently in Iran's Evin House of Detention, serving a 16-year sentence that began in 2015 over charges that include spreading propaganda against the state.
- She has remained a leading light for nationwide, women-led protests, sparked by the death last year of a 22-year-old woman (Mahsa Amini) in police custody.
- The protests' motto 'Zan –Zendegi – Azadi' (Woman – Life – Freedom) "suitably expresses the dedication and work of Narges Mohammadi".

On women, prisoners' rights

- In the 1990s, as a student, Mohammadi was already "distinguishing herself as an advocate for equality and women's rights." She began working as an engineer but also wrote articles for newspapers.
- In 2003, she became associated with the Defenders of Human Rights Center in Tehran, an organisation founded by Shirin Ebadi – the first Iranian woman to win the Nobel Peace Prize back in 2003.
- Mohammadi's activism has centred on Iranian women's rights and she has campaigned against the death penalty and other harsh sentences meted out to prisoners in the country.
- In 2022, her book 'White Torture' was published while she was briefly at home after a heart attack and surgery. It focused on solitary confinement and included interviews with other Iranian women who had experienced the punishment.
- Altogether, the regime has arrested her 13 times, convicted her five times and sentenced her to a total of 31 years in prison and 154 lashes.

Previous awards and the Nobel legacy

- Mohammadi has also been awarded other prominent prizes in the West for her work, such as the PEN/Barbey Freedom to Write Award in May 2023 and the 2023 UNESCO/Guillermo Cano World Press Freedom Prize.
- In 2022, she was featured in the BBC's list of 100 inspirational and influential women from around the world.

Nobel Peace Prize 2022:

- In 2022, prize was awarded to human rights advocate Ales Bialiatski from Belarus, the Russian human rights organisation Memorial, and the Ukrainian human rights organisation Center for Civil Liberties.

PRELIMS FACT

POLITY & GOVERNANCE

CABINET APPROVES ESTABLISHMENT OF AN AUTONOMOUS BODY MERA YUVA BHARAT

Why in news?

- The Union Cabinet has approved establishment of an autonomous body Mera Yuva Bharat (MY Bharat).
- It aims to serve as an overarching enabling mechanism powered by technology for youth development and youth led development and provide equitable access to youth to actualize their aspirations and build Viksit Bharat across the entire spectrum of the Government.

Impact:

- The primary objective of Mera Yuva Bharat (MY Bharat) is to make it a whole of Government platform for youth development.
- Under the new arrangement, with access to resources & connection to opportunities, youth would become community change agents and nation builders allowing them to act as the Yuva Setu between the Government and the citizens.
- It seeks to harness the immense youth energy for nation-building.

Details:

- Mera Yuva Bharat (MY Bharat), an autonomous body will benefit the youth in the age-group of 15-29 years, in line with the definition of 'Youth' in the National Youth Policy.
- In case of programme components specifically meant for the adolescents, the beneficiaries will be in the age-group of 10-19 years.

The establishment of Mera Yuva Bharat (MY Bharat) would lead to:

Leadership Development in the Youth:

- Improve the leadership skills through experiential learning by shifting from isolated physical interaction to programmatic skills.
- Investing more in youth to make them social innovators, leaders in the communities.
- Setting the focus of the Government on Youth Led development and to make the Youth "active drivers" of development and not merely "passive recipients".
  - Better alignment between youth aspirations and community needs.
  - Enhanced efficiency through Convergence of existing programmes.
  - Act as a one stop shop for young people and Ministries.
  - Create a centralized youth data base.
  - Improved two-way communication to connect youth government initiatives and activities of other stakeholder that engage with youth.
- Ensuring accessibility by creating a phygital ecosystem.

INTENSIFIED MISSION INDRADHANUSH 5.0 (IMI 5.0) CAMPAIGN

Why in news?

- Intensified Mission Indradhanush (IMI 5.0), the flagship routine immunization campaign of the Union Ministry of Health and Family Welfare will conclude all 3 rounds on 14th October 2023.

Key Highlights of IMI 5.0:

- IMI 5.0 ensures that routine immunization services reach the missed-out and dropped out children and pregnant women across the country.
- In 2023, for the first time the campaign is being conducted across all the districts in the country and includes children up to 5 years of age (Previous campaigns included children up to 2 years of age).

- IMI 5.0 campaign aims to enhance immunization coverage for all vaccines provided under the Universal Immunization Programme (UIP) as per the National Immunization Schedule (NIS).
- Special focus is on improvement of Measles and Rubella vaccination coverage with the aim of Measles & Rubella elimination by 2023 and use of U-WIN digital platform for Routine Immunization in pilot mode across all districts in the country.

Three phases:

- IMI 5.0 is being conducted in three rounds i.e., 7 -12 August, 11-16 September, and 9-14 October 2023 i.e., 6 days in a month with the inclusion of a Routine Immunization Day.
- All States/UTs except Bihar, Chhattisgarh, Odisha and Punjab would conclude all the three rounds of IMI 5.0 campaign by 14th October 2023. These four states could not start the IMI 5.0 campaign in August due to some inevitable circumstances. These states have concluded 1st round and are currently conducting the 2nd round. They plan to conduct the 3rd round of IMI 5.0 campaign in the month of November 2023.

About Mission Indradhanush (MI):

- Mission Indradhanush (MI) was launched by the Ministry of Health and Family Welfare (MoHFW) on 25th December 2014.
- It is a special catch-up campaign under the Universal Immunization Program (UIP), conducted in the areas of low immunization coverage to vaccinate all the children and pregnant women left out or dropped out from Routine Immunization.
- Since 2014, 11 phases of Mission Indradhanush have been completed across the country. 12th phase is currently ongoing, a total of 5.06 crore children and 1.25 crore pregnant women have been cumulatively vaccinated till date under the campaign.

CENTRE TO INTRODUCE DNA, FACE MATCHING SYSTEMS AT POLICE STATIONS

Why in news?

- More than a year after the Criminal Procedure Identification Act was passed by Parliament, the Centre is all set to roll out "DNA and face-matching" systems at 1,300 police stations across the country.
- The law enables the police and the Central investigating agencies to collect, store, and analyse physical and biological samples, including retina and iris scans of arrested persons.
- The law was passed by Parliament in April 2022 and the rules were notified in September 2022.

Details:

- The National Crime Records Bureau (NCRB), a Central organisation tasked with rolling out the Act, was assigned the task of finalising the standard operating procedures (SOP) to be followed by police officials.
- Though the Act and rules do not explicitly mention the collection of DNA samples and face-matching procedure, the NCRB said measures would be rolled out in around 1,300 locations spread across police districts, commissionerates, and special investigation units at State headquarters.

Implementation:

- The Union Home Ministry has constituted a Domain Committee for the successful implementation of the Act with representatives from the State Police, Central law enforcement agencies, and other key stakeholders.
- A technical sub-committee for preparing the SOPs for capturing DNA as a measurement has also been constituted.
- The States have been asked to identify the locations and prepare the sites where the measurement collection unit (MCU) may be established as suggested by the NCRB. The Central body under the Home Ministry will be the repository of the database at the national level.

NAFIS:

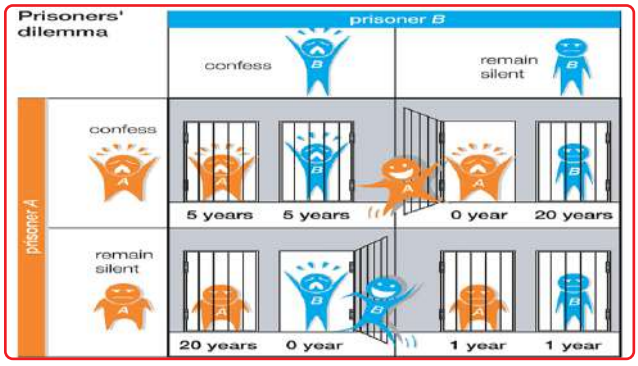
- Under the National Automated Fingerprint Identification System (NAFIS), another project maintained and managed by NCRB, workstations and scanners have been put up at around 1,300 police stations.
- It has fingerprint details, a unique 10-digit number of more than one crore people, accused and convicts, across the country. This database is also being integrated with the Criminal Procedure Identification Act.
- The Act replaced the 100-year-old Identification of Prisoners Act, 1920 whose scope was limited to capturing finger impressions, footprints, and photographs of convicted prisoners and a specific category of arrested and non-convicted persons under the orders of a Magistrate.

Misuse of Database:

- NCRB has cautioned against the misuse of databases by ensuring identification and deployment of appropriate safeguards, adding that only designated officials must have access in real time.

- The NCRB has said the tools and systems used by the police should be technologically, legally, and forensically sound and accredited.

PRISONER DILEMMA IN INTERNATIONAL RELATIONS



Why in news?

- Giving his keynote address at the Goa Maritime Conclave, Defence Minister referred to the concept of "Prisoner's Dilemma" to underscore the need for countries to collaborate with each other instead of working at cross purposes.

What is Prisoner's Dilemma?

- Prisoner's Dilemma refers to one of the most popular "games" in Game Theory, which is itself a branch of science that helps understand how people/entities behave under different circumstances. By simulating a game, Game Theory also shows how to achieve the best outcome.
- For instance, it may appear straight-forward that a person or a country must always do what appears to provide them with the best pay-off. However, real life is complex and filled with uncertainty. Moreover, the final outcome depends on the actions of other people/countries as well. To be sure, the final outcome could change if the other party/parties act in conflict.

Illustration:

- For instance, if in a bid to secure one's borders, a country starts hoarding more and more arms then it may start an arms race with the other country. Prisoner's Dilemma is a game that brings out this paradox clearly.
- Suppose two people; Aand B are brought in for questioning about a crime. However, the evidence with the police is circumstantial and the best that they can hope to achieve is to put both A and B in jail for a year each. Unless, of course, they get more credible evidence. One way to do this is to get the prisoners to rat out each other.
- So the police officer puts both A and B in separate rooms and provides both of them with a simple choice: If one prisoner says the other is involved in the crime, he can go scot-free while the other will be given a 15-year jail term.
- Of course, if neither prisoner confesses, they both will only get one year's jail time.
- What if both confess? In that case, their jail times will be 10 years each. The prisoner's dilemma is whether to confess or stay silent.

What should the prisoners do, then?

- On the face of it, staying silent appears like the right course of action. If both prisoners stay silent, they get away with the best pay-off that is, just serving one year in prison.
- The fact is that if either of the prisoners stays silent, they run the risk of facing the maximum prison time (15 years).However, if both confess, they condemn each other to 10 years of jail time.
- If one cannot be sure of the other prisoner's behaviour, then confessing is the way forward.
- The best outcome, of course, lies in co-operation. If both prisoners co-operate, they can achieve the best outcome and get away with just a year in prison.
- This dilemma (and its answers) has many real life applications both in international law as well as in business.
- Similarly, should countries set some ground rules in geopolitics to ensure they don't enter an arms race that will eventually prove ruinous for their own economies and people?

INTERNATIONAL RELATIONS

INDIA REELECTED AS PRESIDENT OF ASIA PACIFIC INSTITUTE FOR BROADCASTING DEVELOPMENT (AIBD)

Why in news?

- In an unprecedented development where India had already served two terms as President, Asia- Pacific Institute for Broadcasting Development (AIBD) General Conference (GC) from 2018 – 2021 and 2021 – 2023, India has been elected as President of AIBD GC for the 3rd successive term to lead the prestigious international organisation.

Details:

- The 21st General Conference & Associated Meetings 2023 (GC 2023) of Asia- Pacific Institute for

Broadcasting Development (AIBD) was chaired by its President Gaurav Dwivedi, CEO Prasar Bharati and concluded successfully in Port Louis, Mauritius.

- The two-day Conference is mandated to achieve a vibrant and cohesive electronic media environment in the Asia- Pacific region through policy and resource development.

About AIBD:

- AIBD, established in 1977 under the auspices of UNESCO, is a unique regional inter-governmental organisation, currently has 92 member organisations from across 44 countries, including 26 Government Members (countries) represented by 48 broadcasting authorities and broadcasters, and 44 Affiliates (organisations) of which represented by 28 countries and regions in Asia, Pacific, Europe, Africa, Arab States and North America.
- India is one of the founding members of AIBD and Prasar Bharati, India's public service broadcaster is the representative body of the Ministry of Information & Broadcasting, Govt. of India at AIBD.

INDIA, FRANCE FORGE DEEPER TIES IN SPACE SECTOR AT INDIAN SPACE CONCLAVE

Why in news?

- Recently, the Indian Space Association (ISpA) and the French Aerospace Industries Association (GIFAS) signed a significant MoU aiming to enhance the understanding of space industry capabilities and increase awareness of business opportunities in France and India at the second chapter of Indian Space Conclave 2023 in New Delhi.

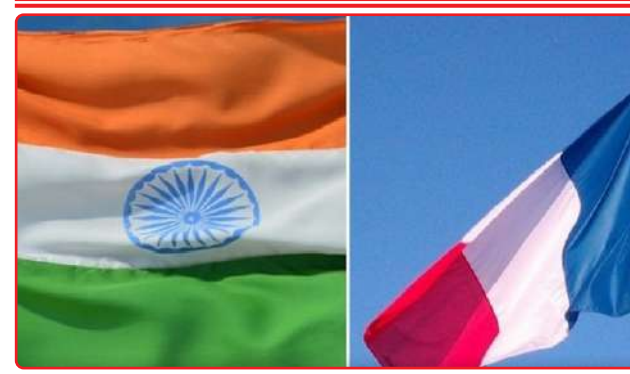
Key Highlights:

- The collaboration will help foster sustainable growth, promote innovation and advocate the adoption of new technologies in France and India's space industries.
- The MoU will act as an extension to the already flourishing Indo-French relationship in the space sector and augment the individual and collective membership bases of the organizations through the benefit of greater international linkages for the members.
- As the interest towards the space sector increases among students across the world, the partnership will also help facilitate academic and educational program exchanges between both organizations that encompass training at all levels.

Indo-French space collaboration:

- The Indo-French space collaboration has achieved significant milestones in recent years.
- Both nations have joined forces for India's ambitious human spaceflight initiative named Gaganyaan, with France contributing to areas like space medicine and astronaut health as well as supplying CNES flight systems.
- Also, France's participation in ISRO's upcoming Venus mission in 2025 marks another significant leap, opening new avenues for international cooperation in space exploration.
- Both countries also pledged to enhance collaboration between their startup ecosystems, fostering innovation in the space sector.

CABINET APPROVES MOU BETWEEN INDIA AND FRANCE ON COOPERATION IN THE FIELD OF DIGITAL TECHNOLOGIES



Why in news?

- The Union Cabinet has approved the signing of the MoU between India and France.

Details:

- The MoU intends to promote closer cooperation and exchange of information pertaining to the digital technologies.
- It will mutually support each Participant's goal to promote access to digital Technology in their country in accordance with the MoU.

Major Impact:

- Both G2G and B2B bilateral Cooperation in the field of Digital technologies will be enhanced.
- MoU envisages improved collaboration leading to employment opportunities in the field of IT.

Background:

- MeitY has been mandated to promote international cooperation in the emerging and frontier areas of information Technology under bilateral and regional framework of cooperation.

- In its endeavour to foster international cooperation in the field of digital technologies, MeitY has entered into MoUs/Agreements with counterpart organizations/agencies of various countries on bilateral or multilateral for a.
- In this changing paradigm, there is an imminent need for exploring business opportunities and attracting investment in the digital sector through such mutual cooperation.

Indo-French cooperation:

- India and France are long-standing strategic partners in the Indo-European region. India and France are committed to nurture a thriving digital eco system and building collaboration that empower their citizens and ensure their full participation in the digital century.
- Based on the Indo-French Road map on Cyber security and Digital Technology announced on 2019, India and France are pursuing an ambitious bilateral cooperation on advanced digital technologies, particularly in the fields of supercomputing, cloud computing, Artificial Intelligence and quantum technologies, including in the framework of the Global Partnership on Artificial Intelligence (GPAI).

P20 SUMMIT UNANIMOUSLY ADOPTS JOINT STATEMENT

Why in news?

- Indian Prime Minister inaugurated the 9th G20 Parliamentary Speakers' Summit (P20) at Yashobhoomi, New Delhi recently.
- The summit was hosted by the Parliament of India.

Details:

- In line with the theme of India's G20 Presidency, the theme of the 9th P20 Summit is 'Parliaments for One Earth, One Family, One Future'.
- Speakers of Parliaments of G20 members and invitee countries attended the event.
- The Pan-African Parliament also took part in the P20 Summit for the first time after the African Union became a member of G20 at the New Delhi G20 Leaders' Summit on 9-10 September 2023.
- The thematic sessions during this P20 Summit focused on the following four subjects –
  a) Transformation in People's Lives through Public Digital Platforms;
  b) Women-led development;
  c) Accelerating SDGs; and
  d) Sustainable Energy Transition.

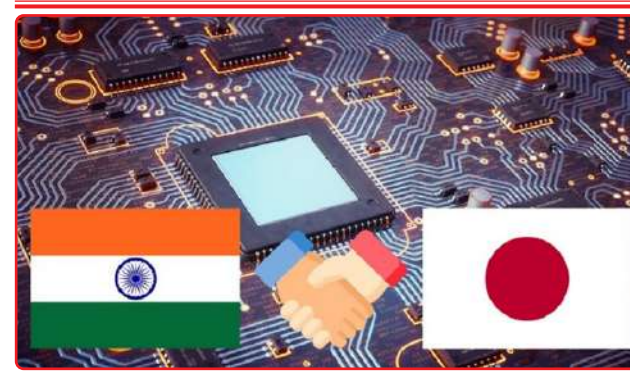
Joint Statement:

- The Presiding Officers unanimously adopted a Joint Statement under the Chairmanship of Lok Sabha Speaker.
- The Presiding Officers welcomed the comprehensive and constructive dialogue held during the G20 Leaders' Summit and India's G20 Presidency, focusing on the issues related to accelerating progress on Sustainable Development Goals (SDGs), technological transformation and inclusive digital economy, global economic recovery, food and energy security, addressing climate change, inclusive energy transition, promotion of sustainable production and consumption patterns, reinvigorating multilateralism, peace-building, counter-terrorism, global skill mapping, disaster risk reduction, and strengthening global health architecture.
- The Presiding Officers congratulated Parliament of India for passage of the 'Nari Shakti Vandan Adhiniyam', ensuring reservation of one-third seats in Lok Sabha and in State legislatures.

Way Forward:

- The Parliaments will continue to engage in parliamentary diplomacy and dialogue in relevant fora as a catalyst for promoting international peace, prosperity and harmony, including supporting the peaceful resolution of conflicts and disputes

MOU BETWEEN INDIA AND JAPAN ON JAPAN INDIA SEMICONDUCTOR SUPPLY CHAIN PARTNERSHIP



Why in news?

- The Union Cabinet was recently apprised of a Memorandum of Cooperation (MoC) signed in July, 2023 between the India and Japan on Japan-India Semiconductor Supply Chain Partnership.

Key Highlights:

- The MoC intends to strengthen cooperation between India and Japan towards enhancement

of semiconductor supply chain, recognizing the importance of semiconductor for the advancement of industries and digital technologies.

- The MoC shall come into effect from the date of signature of the Parties and shall be remain in force for a period of five years.
- Both G2G and B2B bilateral Cooperation on opportunities to advance resilient semiconductor supply chain and leverage complementary strengths.
- MoC envisages improved collaboration leading to employment opportunities in the field of IT.

Background:

- The Ministry of Electronics and Information Technology (MeitY) has been actively working to create a conducive environment for electronics manufacturing.
- Programme for Development of Semiconductor and Display Manufacturing Ecosystem in India was introduced with a view to ensure the development of a robust and sustainable semiconductor and display ecosystem in India.
- It aims to extend fiscal support for establishment the Semiconductor Fabs, Display Fabs, Fabs for Compound Semiconductors/Silicon Photonics/Sensors/Discrete Semiconductors and Semiconductor Assembly, Testing, Marking, and Packaging (ATMP)/Outsourced Semiconductor Assembly and Test (OSAT) facilities. Further, India Semiconductor Mission (ISM) has been established under Digital India Corporation (DIC) to drive India's strategies for development of semiconductor and display manufacturing ecosystem in the country.
- MeitY has also been mandated to promote international cooperation in the emerging and frontier areas of Information Technology under bilateral and regional frameworks.
- With this objective, MeitY has entered into MoUs/MoCs/Agreements with counterpart organizations/agencies of various countries to promote bilateral cooperation and exchange of information and also to ensure supply chain resilience enabling India emerge as trusted partner.

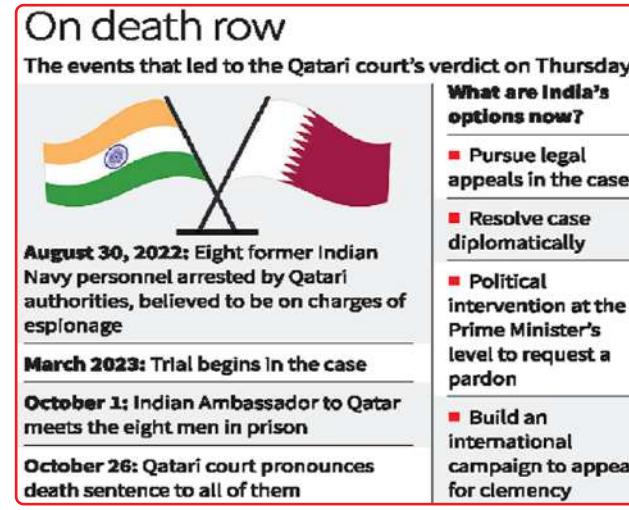
Way Forward:

- Recognizing the importance of semiconductor for the advancement of industries and digital technologies, this MoC would provide for the enhancement of semiconductor supply chain resilience.

EIGHT FORMER NAVY OFFICERS GET DEATH PENALTY IN QATAR

Why in news?

- Eight former Indian Navy personnel, who had been employed by a company in Doha, were handed the death penalty by a local court in Doha in an alleged case of espionage.
- The Indian government expressed shock at the verdict, and said all legal options were being explored.



Details:

- The eight men: Captain Navtej Singh Gill, Captain Saurabh Vashisht, Commander Purnendu Tiwari, Captain Birendra Kumar Verma, Commander Sugunakar Pakala, Commander Sanjeev Gupta, Commander Amit Nagpal and Sailor Ragesh have been in the custody of Qatari authorities since August 2022.
- The Court of First Instance of Qatar passed the judgment against them.

What is the case against these officials?

- The Indian nationals were employed by Dahra Global Technologies and Consultant Services in Doha, and were allegedly accused of breaching sensitive secrets. They were reportedly involved in training various security-related service providers of the State of Qatar.
- The company was also involved in producing high-tech Italian-origin submarines that are known for stealth capabilities.
- The owner of the firm, reportedly a retired squadron leader of the Royal Omani Air Force, was arrested along with the Indian officers, but he was released in November 2022.
- The first trial in the case was held in March 2022, followed by another in June. The men were granted consular access on multiple occasions and the Indian ambassador to Qatar met them as recently as October 1.
- Both sides, however, have maintained a veil of secrecy over the case in view of the sensitivities involved.

India-Qatar relationship:

- Qatar is home to about 7 lakh Indian nationals, making up the largest expatriate community in Qatar.
- Purnendu Tiwari, who was managing director of the company, received the Pravasi Bharatiya Samman in 2019 for his services in furthering the bilateral relationship between India and Qatar.

- The verdict is the first major crisis to hit the India-Qatar relationship, which has generally remained steady so far.
- Indian Prime Minister Narendra Modi visited Doha in 2016, followed by his meeting with the Emir of Qatar on the sidelines of the UN General Assembly in New York in 2019.
- External Affairs Minister also visited Qatar in February 2022.

Bilateral relations:

- Qatar is the largest supplier of LNG to India, which accounts for over 48% of India's global LNG imports. India also imports ethylene, propylene, ammonia, urea, and polyethylene from Qatar.

ECONOMY

KASHMIR BAT INDUSTRY HITS ITS SWEET SPOT AFTER 102 YEARS

Why in news?

- For the first time in the 102 years of its manufacturing history in the Valley, the Kashmir bat will be used in 50-over World Cup matches.
- At the International Cricket Council (ICC) Men's Cricket World Cup 2023, hosted by India and which begins on Oct 5, the Afghan team will be wielding the Kashmir willow.

Achievements:

- In November 2022, the bats tasted success when UAE player Junaid Siddique hit Sri Lankan bowler Dushmantha Chameera to a 109-metre six, making it the longest six in the T20 World Cup, and bringing the bats manufactured by their company into international focus.

Kashmir's bat industry:

- Kashmir's bat industry is mainly concentrated in south Kashmir's Pulwama and Anantnag districts, with willow groves growing in the wet highlands nearby.
- Around 200 bat manufacturing units engage around 50,000 people for production. The female cultivar of white willow is considered the best for bats.
- Each cleft is expertly shaped, especially the middle spot and the toe blade. A bat weighing around 2 pounds and 7 ounces (a little over 1 kg) remains the most preferred bat globally.

Background:

- It was industrialist Allah Baksh from Pakistan who established the first cricket bat unit in Bijbehara's Halmulla area in the 19th Century.
- It achieved the status of small scale industry by 1922.
- Bat clefts would be ferried through the Jhelum Valley road, getting its finishing touch at Sialkot in Pakistan. Then, they were used by the British, who introduced the game to India.

Way Forward:

- Around 75,000 willow trees are cut annually to keep the bat industry in the State ticking. A tree that attains a girth of 58 inches (147 cm or so) is felled for the bat industry. Manufacturers say the raw material is depleting now.
- The government needs to promote organised willow farming and maintain the supply as per the demand.

CENTRE ESTABLISHES NATIONAL TURMERIC BOARD, EXPECTED TO REACH $1 BN BY 2030

Why in news?

- The Government of India has officially announced the establishment of the National Turmeric Board.
- This dedicated body will concentrate on developing and expanding turmeric and its related products within the country.

Objective:

- It will play a pivotal role in leading efforts related to turmeric, fostering collaboration with entities such as the Spices Board and other government agencies.
- Its primary objectives include enhancing awareness and consumption of turmeric globally, exploring new international markets to boost exports, encouraging research and development of innovative turmeric products, and promoting traditional knowledge for value-added turmeric items.
- It will empower turmeric growers through capacity building, skill development, and ensuring adherence to quality and food safety standards.

Composition:

- The newly formed National Turmeric Board will consist of representatives from the Ministry of Ayush, Departments of Pharmaceuticals, Agriculture & Farmers Welfare, Commerce & Industry of the Union Government, senior State Government representatives from three states (on rotation basis), select national/state institutions involved in research, representatives of turmeric farmers and exporters, and have a secretary to be appointed by the Department of Commerce.
- The Centre will appoint the chairperson of the board.

Status of India:

- India, being the largest producer, consumer, and exporter of turmeric worldwide, possesses a strong foothold in the global turmeric market.
- In the year 2022-23, India cultivated turmeric across 324,000 hectares, yielding over 1.1 million tonnes, contributing to over 75 per cent of the global turmeric production.
- More than 30 diverse varieties of turmeric are cultivated across 20 states in the country. Key turmeric-producing states include Maharashtra, Telangana, Karnataka, and Tamil Nadu.
- India presently commands 62 per cent share of the global turmeric trade. In the financial year 2022-23, the country exported around 153,400 tonnes of turmeric and turmeric products valued at $207.45 million through over 380 exporters.
- Bangladesh, UAE, USA, and Malaysia are among the prominent markets for Indian turmeric.

Way Forward:

- The Centre expects turmeric exports to reach $1 Billion by 2030, and establish India as the leading global turmeric exporter.

NATIONAL INVESTMENT AND INFRASTRUCTURE FUND (NIIF) LAUNCHES 600 MILLION DOLLAR INDIA JAPAN FUND (IJF)

Why in news?

- The National Investment and Infrastructure Fund (NIIF) has entered into a collaboration with the Japan Bank for International Cooperation (JBIC) to launch a $600 million India-Japan Fund (IJF) with JBIC and Government of India (GoI) as anchor investors.
- This joint initiative signals a key dimension of collaboration between the two countries in an area that is a shared priority viz. climate and environment.

Key Highlights:

- The announcement marks NIIF's first bi-lateral fund, with the GoI contributing 49% of the target corpus and the remaining 51% contributed by JBIC.
- The Fund will be managed by NIIF Limited (NIIFL) and JBIC IG (a subsidiary of JBIC) will support NIIFL in promoting Japanese investments in India.
- India Japan Fund will focus on investing in environmental sustainability and low carbon emission strategies and aims to play the role of being a 'partner of choice' to further enhance Japanese investments into India.

Way Forward:

- The setting up of India Japan Fund represents a key milestone in the strategic and economic partnership between the Government of Japan and Government of India.

REC LAUNCHES SUGAM REC, A MOBILE APP FOR 54EC BONDS INVESTORS

Why in news?

- REC Limited, the Maharatna Central Public Sector Enterprise under the Ministry of Power, has launched a mobile application, exclusively for current and future investors in REC's 54EC Capital Gain Tax Exemption Bonds.
- Named 'SUGAM REC', the mobile app will offer investors with complete details of their investment in REC 54EC Bonds.
- 'SUGAM REC' is amongst one of REC's many digital initiatives.

What are Section 54EC Bonds?

- Section 54EC Bonds are a type of fixed income financial instruments which provide tax exemption under capital gains to investors, under Section 54EC of the Income Tax Act.

About REC Limited:

- REC Limited is an NBFC focusing on Power Sector Financing and Development across India. Established

in 1969, REC Limited has completed over fifty years of operations.

- It provides financial assistance to state electricity boards, state governments, central/state power utilities, independent power producers, rural electric cooperatives and private sector utilities.
- Its business activities involve financing projects in the complete power sector value chain; for various types of projects including Generation, Transmission, Distribution and Renewable Energy. REC's funding illuminates every fourth bulb in India.
- REC has recently diversified into financing infrastructure and logistics sector as well.

URBAN UNEMPLOYMENT RATE DROPS TO 6.6 PERCENTAGE IN Q1

Why in news?

- The Periodic Labour Force Survey (PLFS), carried out by the National Sample Survey Office (NSSO), has reported that unemployment rate in urban areas of the country has shown a decrease during the period April-June 2023.
- Similarly, the labour force participation rate (LFPR) for persons aged 15 and above and the worker-population ratio (WPR) have also improved during the period.

Key Highlights:

- The LFPR in urban areas increased from 47.5% in April-June 2022 to 48.8% in April-June 2023. While it hovered around 73.5% for men during this period, for women, the LFPR increased from 20.9% to 23.2% during this period.
- The WPR in urban areas increased from 43.9% in April-June 2022 to 45.5% for persons aged 15 and above. For men, it increased from 68.3% to 69.2% and for women, it increased from 18.9% to 21.1% during this period.

Decreasing trend:

- The PLFS claimed a decreasing trend in unemployment rate (UR) for persons aged 15 and above.
- UR in urban areas decreased from 7.6% in April-June 2022 to 6.6% in April-June 2023 for persons of age 15 years and above.
- For men, it decreased from 7.1% to 5.9% during this period and for women, it decreased from 9.5% to 9.1%.

Key indicators:

- The Centre also claimed improvement in key labour market indicators in urban areas compared with those in pre-pandemic period (April-June 2018 to October–December 2019).
- The LFPR ranged from 46.2% to 47.8% during the pre-pandemic period and in the latest report it was 48.8%.
- The WPR was between 41.8% and 44.1% before the pandemic and now it is 45.5%.
- The unemployment rate ranged between 7.8% and 9.7% during the pre-pandemic period and at the latest survey it was 6.6%, which is lower than the unemployment rates observed in the quarters covered in the pre-pandemic period.

STATUS HOLDER CERTIFICATES UNDER FOREIGN TRADE POLICY 2023

Why in news?

- Recently, the Union Minister of Commerce & Industry, unveiled a significant initiative to issue system based automatic 'Status Holder' certificates under the Foreign Trade Policy (FTP) 2023.

Details:

- Now the exporter will not be required to apply to the office of Directorate General of Foreign Trade (DGFT) for a Status Certificate and the export recognition will be provided by the IT system based on available Directorate General of Commercial Intelligence and Statistics (DGCIS) merchandise export electronic data and other risk parameters.
- This perspective is a paradigm shift in doing things as it not only reduces compliance burden and promotes ease of doing business but also recognizes the need and importance of collaboration within the Government.
- At present, the exporter is required to file an online application along with an export certificate from a Chartered Accountant for grant of Status.
- The DGFT Regional Offices are supposed to issue the certificate in 3 days. The new arrangement will lead to a simplified regime where no applications are

invited from exporters and the certification is granted every year in August based on annual export figures available with the partner government agency i.e. DGCIS.

- Exporters who are eligible for a higher status based on additional export data relating to services export, deemed exports or double weightage to some entities like MSME etc., which is not getting captured in disaggregated form presently, can apply online for a Status modification also at a later date.

Status Holder certification program:

- The Status Holder certification program provides credibility to the Indian exporters in the international markets.
- In addition, it provides certain other privileges including simplified procedures under FTP 2023 and priority custom clearances on self-declaration basis, exemption from compulsory negotiation of documents through banks, exemption from filing Bank Guarantee for FTP schemes etc.

Significance:

- With the launch of this new system, the Department of Commerce, Ministry of Commerce and Industry will be recognizing about 20,000 exporters under FTP 2023 as Status Holders which will be a quantum jump from the earlier number of 12,518 exporters.
- The biggest increase in Status certification is seen in the 1 Star category, which is the lowest category and requires an export performance of at least US$ 3 Million in the last 3 preceding financial years plus the 3 months of the current financial year.

Way Forward:

- This will enable the Government to hand hold a larger number of small exporting entities and create a vibrant export ecosystem and help reach our export target of US$ 2 Trillion by 2030.

CABINET APPROVES ROYALTY RATES FOR MINING OF THREE CRITICAL AND STRATEGIC MINERALS- LITHIUM, NIOBIUM AND RARE EARTH ELEMENTS (REES)

Why in news?

- The Union Cabinet recently approved amendment of Second Schedule of the Mines and Minerals (Development and Regulation) Act, 1957 ('MMDR Act') for specifying rate of royalty in respect of 3 critical and strategic minerals, namely, Lithium, Niobium and Rare Earth Elements (REEs).

Delisted minerals:

- Recently, the Mines and Minerals (Development and Regulation) Amendment Act, 2023 was passed by the Parliament, which has come into force from 17th August, 2023.
- The Amendment delisted six minerals, including Lithium and Niobium, from the list of atomic minerals, thereby allowing grant of concessions for these minerals to private sector through auction.
- It provided that mining lease and composite license of 24 critical and strategic minerals (which are listed in Part D of the First Schedule of the Act), including Lithium, Niobium and REEs (not containing Uranium and Thorium), shall be auctioned by the Central Government.
- It will enable the Central Government to auction blocks for Lithium, Niobium and REEs for the first time in the country. Royalty rate on minerals is an important financial consideration for the bidders in auction of blocks.
- Further, manner for calculation of Average Sale Price (ASP) of these minerals has also been prepared by the Ministry of Mines which will enable determination of bid parameters.

Second Schedule of the MMDR Act:

- The Second Schedule of the MMDR Act provides royalty rates for various minerals. Item No.55 of the Second Schedule provides that royalty rate for the minerals whose royalty rate is not specifically provided therein shall be 12% of the Average Sale Price (ASP).
- Thus, if the royalty rate for Lithium, Niobium and REE is not specifically provided, then their default royalty rate would be 12% of ASP, which is considerably high as compared to other critical and strategic minerals.
- Also, this royalty rate of 12% is not comparable with other mineral producing countries. Thus, it is decided to specify a reasonable royalty rate of Lithium, Niobium and REE as below:
  a) Lithium – 3% of London Metal Exchange price,
  b) Niobium –3% of Average Sale Price (both for primary and secondary sources),
  c) REE- 1% of Average Sale Price of Rare Earth Oxide

Significance of Critical minerals:

- Critical minerals have become essential for economic development and national security in the country. Critical minerals such as Lithium and REEs have gained significance in view of India's commitment towards energy transition and achieving net-zero emission by 2070.
- Lithium, Niobium and REEs have also emerged as strategic elements due their usages and geo-political scenario.

- Encouraging indigenous mining would lead to reduction in imports and setting up of related industries and infrastructure projects. The proposal is also expected to increase generation of employment in the mining sector.

Way Forward:

- Geological Survey of India (GSI) has recently handed over the exploration report of REE and Lithium blocks. Further, GSI and other exploration agencies are conducting exploration for critical and strategic minerals in the country.
- The Central Government is working to launch the first tranche of the auction of critical and strategic minerals such as Lithium, REE, Nickel, Platinum Group of Elements, Potash, Glauconite, Phosphorite, Graphite, Molybdenum, etc. shortly.

NTPC IN FORBES WORLD BEST EMPLOYERS 2023 LIST

Why in news?

- India's largest integrated energy conglomerate, NTPC Limited, has been recognized as one of the "World's Best Employers 2023" in the Forbes World's Best Employers list 2023.
- It ranked 261st out of top 700 companies in the World ranking and is the only Indian PSU to figure in the list.

About World's Best Employers List:

- Every year Forbes publishes the World's Best Employers List through independent market research to identify top 700 companies which offer exciting working and a positive environment, opportunities for training and career advancement, employee benefits, employee centric and workplace diversity.
- Forbes partnered with market research firm Statista to create the seventh annual list of the World's Best Employers this year.

About NTPC:

- National Thermal Power Corporation Limited (NTPC Ltd.) is a central Public Sector Undertaking (PSU) under the Ministry of Power.
- It is India's largest energy conglomerate with roots planted way back in 1975 to accelerate power development in India.
- It became a Maharatna company in May 2010.

REC INKS MOU WITH NICSI FOR ICT AND DIGITAL TRANSFORMATION

Why in news?

- The REC (formerly Rural Electrification Corporation Limited), a 'Maharatna' company under the Ministry of Power, has signed a Memorandum of Understanding (MoU) with National Informatics Centre Services Inc. (NICSI) under National Informatics Centre (NIC), for various Information & Communications Technology (ICT) and Digital Transformation Services.
- This MoU will benefit the REC ecosystem by facilitating exploration of latest technology in evolving areas like IoT, Artificial Intelligence, Machine Learning, Data Analytics, Blockchain, Cyber Security etc.

About REC Limited:

- REC Limited is an NBFC focusing on Power Sector Financing and Development across India.
- Established in 1969, REC Limited has completed over fifty years in the area of its operations.
- It provides financial assistance throughout the complete power sector value chain; for various types of projects including Generation, Transmission, Distribution and Renewable Energy. REC's funding illuminates every fourth bulb in India.

Way Forward:

- This collaboration with NICSI will enable REC in providing one-stop end-to-end NIC/NICSI Software products deployment, hosting, core roll-out, technical support, security, services, system administration, etc.

NHAI UPGRADES ATMS STANDARDS FOR ENHANCED ROAD SAFETY AND DIGITAL ENFORCEMENT

Why in news?

- Recently, the National Highways Authority of India, NHAI has released its updated policy to implement upgraded and forward-looking Advanced Traffic Management System (ATMS) Standards and Specifications 2023.

- Harnessing latest advancements in AI technology, the initiative will enhance road safety and digital enforcement on National Highways and Expressways.

VIDES:

- The enhancements include replacing previous VIDS cameras with the newly introduced Video Incident Detection and Enforcement System (VIDES) to emphasize the digital enforcement of traffic rules.
- VIDES has capability to identify 14 distinct incidents including
  - triple riding,
  - helmet and seatbelt violations,
  - wrong lane or direction driving,
  - presence of animals on the highway, and
  - pedestrian crossings.

Key features:

- Depending on the detected incident, VIDES will alert route patrol vehicles or ambulances, generate e-challans, relay alerts to nearby Variable Messaging Boards, or send notifications through 'Rajmargyatra' mobile app to nearby travellers.
- For comprehensive coverage, these cameras are slated for installation every 10 km along National Highways, with state-of-the-art Command & Control Centres at every 100 km integrating various camera feeds.
- Apart from this, Vehicle Speed Detection System (VSDS) is now integrated into VIDES, optimizing use of Automatic Number Plate Recognition (ANPR) cameras.
- In addition, the Traffic Monitoring Camera System (TMCS) will also be upgraded. Positioned every 1 km on the National Highway, these cameras have been endowed with advanced capabilities like automated detection of accidents and stalled vehicles.
- Strengthening collaboration with local traffic agencies, NHAI will allocate dedicated workstations in the Command & Control Centre for traffic police representatives. Moreover, provisions have been made to share camera feeds over the network to enhance real-time coordination and response.
- ATMS deployment may also play an active role in disaster management by providing inputs for effective planning and implementation.
- It will also provide online sharing of highway status and other important information that will help both the agencies and the highway users.

OFC infrastructure:

- The policy also provisions implementation of Digital Highways by developing integrated utility corridors along the National Highways to develop Optic Fibre Cables (OFC) infrastructure.
- While the ATMS equipment will use OFC to communicate with Command & Control Centre, there are provisions in the policy for 5G based communication too in the future as the coverage increases.

Way Forward:

- In line with modern requirements, NHAI's new standards have updated both hardware and software components.
- In implementing these pivotal changes, NHAI remains steadfast in its mission to develop safer, more efficient, and accident-free highways for the benefit of all travellers across the country.

KASTURI COTTON BHARAT

Why in news?

- Recently, the Union Minister of Textile, launched website of Kasturi Cotton Bharat.
- This website provide a digital platform for necessary information and updates on this initiatives and highlights the registration process for ginners to produce Kasturi Cotton Bharat Brand and its processes that make the branded Indian cotton unique.

About Kasturi Cotton Bharat:

- The Kasturi Cotton Bharat is a joint initiative by the Ministry of Textiles, the Cotton Corporation of India, Trade Bodies & Industry to work on the principle of self-regulation by owning complete responsibility of Branding, Traceability and Certification of Indian Cotton to enhance its' competitiveness in the global market and create a sustainable ecosystem for all stakeholders involved.
- Earlier, on the eve of World Cotton Day on 7th October, Ministry of Textiles announced the "Kasturi Cotton Bharat" brand of cotton by which Indian cotton has

been endowed with a brand and a logo that represents Whiteness, Softness, Purity, Lustre and Indianness.
- Thereafter, an MoU has been signed between CCI on behalf of Govt. of India and TEXPROCIL on behalf of the Textile Industry for a mission-mode approach in positioning of Kasturi Cotton Bharat brand.

Significance:
- All the ginners in the country have been empowered to produce Kasturi Cotton Bharat brand as per stipulated protocol.
- Besides this, to provide complete traceability of Kasturi Cotton Bharat across the supply chain, QR based certification technology will be used at each stage of the processing and a blockchain based software platform will provide end to end traceability and transaction certificate.

Way Forward:
- In an era of global competition, this initiative will strategically position Indian cotton on the world map for its quality standards and commitment to best practices.

TO CURB EVASION, EU REPORT CALLS FOR 2% GLOBAL WEALTH TAX ON BILLIONAIRES

Why in news?
- Recently, the European Union Tax Observatory released its 'Global Tax Evasion Report 2024'.

Details:
- Pointing out that tax evasion is enabling billionaires to enjoy effective tax rates equivalent to 0% to 0.5% of their wealth, it has called for a global minimum tax on billionaires equal to 2% of their wealth.
- This would both address evasion and "generate nearly $250 billion from less than 3,000 individuals.
- The report justified the proposal by noting that while the number of taxpayers affected by it would be miniscule, the tax rate for them (2%) "would still be very modest" given that the wealth of billionaires has grown at 7% a year annually on average since 1995 (net of inflation).

Automatic exchange of bank information:
- Assessing the impact of international efforts made so far to curb tax evasion, it highlighted the success of the automatic exchange of bank information in reducing offshore tax evasion by a factor of three over the past 10 years.
- It observed that before this measure came into effect, "households owned the equivalent of 10% of world GDP in financial wealth in tax havens globally, the bulk of which was undeclared to tax authorities and belonged to high net worth individuals".

Reasons for offshore tax evasion:
- It is still possible to own financial assets that escape being reported on because not all offshore financial institutions comply with the requirement of automatic exchange of bank information, for fear of losing their customer base while facing no real threat or penalty from foreign tax authorities for non-compliance.
- The wealthy individuals who used to hide financial assets in offshore banks have started shifting their holdings to asset classes not covered under this agreement, especially real estate.
- The report, therefore, calls for expanding the range of assets brought under the system of automatic exchange of information.

Gaps & loopholes:
- The other major measure, the global minimum tax of 15% on MNCs, adopted in 2012 by 140 countries and territories has been a disappointment. While it was expected to increase global tax revenues by 10%, a growing list of loopholes has reduced expected revenues by a factor of two.
- The report red-flagged the trend of "greenwashing the global minimum tax" wherein MNCs can use 'green' tax credits for low carbon transition to reduce their tax rates way below the minimum of 15%.
- The report also flags emerging forms of aggressive tax competition that are severely affecting government revenues.
- It notes with concern the rise of preferential tax regimes targeting wealthy foreign individuals, their number having grown from five to 28 in the EU and the U.K.

FOOD LABELS TO HAVE QR CODE TO HELP THE VISUALLY DISABLED

Why in news?

- The Food Safety and Standards Authority of India (FSSAI) has recommended the use of quick response (QR) codes on food products for accessibility by persons with visual disabilities.
- It would ensure access to safe food for all, including those with special needs.

FSSAI guidelines:

- The FSSAI under its Food Safety and Standards (Labelling and Display) Regulations, 2020 has comprehensively outlined the information to be included on the labels of food products.
- This includes product name, shelf life, nutrition facts, vegetarian/non-vegetarian logos, ingredient lists, allergen warnings, and other product-specific labelling requirements.
- The information is aimed at empowering consumers to make informed choices when selecting food products.

Rights of Persons with Disabilities:

- The Rights of Persons with Disabilities Act, 2016 recognises the rights and needs of individuals with disabilities, which emphasise accessibility and the promotion of health for persons with disabilities.
- The FSSAI said that to enhance accessibility, food business operators were encouraged to incorporate provisions that facilitate easy access to nutritional information for visually impaired individuals.

Why QR codes?

- One effective means to achieve this is by incorporating Quick Response (QR) codes on product labels.
- These QR codes should encompass comprehensive details about the product, including, but not limited to, ingredients, nutritional information, allergens, manufacturing date, best before/expiry/use by date, allergen warning, and contact information for customer inquiries.
- The inclusion of QR code for the accessibility of information did not replace or negate the requirement to provide mandatory information on the product label, as prescribed by relevant regulations.

About FSSAI:

- Food Safety and Standards Authority of India (FSSAI) was established in 2008 with the purpose of monitoring the food quality and hygiene in India.
- The Ministry of Health & Family Welfare administers FSSAI.
- The FSSAI has been functioning since 2011, and ever since, it has been responsible for the management of food safety in India.
- The headquarters of FSSAI is located in New Delhi, and it has 6 regional offices as well in Mumbai, Cochin, Kolkata, Delhi, Guwahati, and Chennai.

FINMIN NOTIFIES RULES FOR APPOINTMENT OF PRESIDENT, MEMBERS IN GSTAT

Why in news?

- Recently, the Finance Ministry has notified the rules for the appointment of the president and members of GST appellate tribunals.

Details:

- The GST council, chaired by the Union Finance Minister and comprising state counterparts, in its 52nd meeting decided that the maximum age limit for the president and members of the GST Appellate Tribunal (GSTAT) would be 70 years and 67 years, respectively.
- Goods and Services Tax Appellate Tribunal (Appointment and Conditions of Service of President and Members) Rules, 2023, defines the rule for appointment and removal of the president and members of the appellate tribunals, their salary, allowances, pension, provident fund, gratuity and leave.
- In September, the finance ministry had notified 31 benches of GSTAT, which will be set up in 28 states and 8 Union Territories.

Benches of GSTAT:

- Gujarat and UTs; Dadra and Nagar Haveli and Daman and Diu will have two benches of the GSTAT; Goa and Maharashtra together will have three benches.
- Karnataka and Rajasthan will have two benches each, while Uttar Pradesh will have three benches.
- West Bengal, Sikkim, Andaman and Nicobar Islands, Tamil Nadu and Puducherry will together have two GSTAT benches each, while Kerala and Lakshadweep will have one bench.
- The seven northeastern states; Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram, Nagaland and Tripura will have one bench each.
- All other states will have one bench of the GSTAT.

Way Forward:

- Setting up state-level benches of GSTAT would help businesses by way of faster dispute resolution.
- Currently, taxpayers aggrieved with the ruling of tax authorities are required to move to the respective High Courts.

- The resolution process takes longer time as High Courts are already burdened with a backlog of cases and do not have a specialised bench to deal with GST cases.

INDIAN MANGOES SHIPMENT EXPANDS ITS FOOTPRINTS

Why in news?

- India has registered a significant growth in the export of mangoes in the first five months of the current fiscal (2023-24) by exporting mangoes to the tune of USD 47.98 million, which is 19 percent higher than the previous years' value of USD 40.33 million in the same period.

Details:

- With the collaboration of Ministry of Agriculture and Farmers Welfare and APEDA, India exported 22,963.78 MT of mangoes worth USD 48.53 million in 2022-23, while in the current year 2023-24 (April-August), India has exported 27,330.02 MT of mangoes worth USD 47.98 million.

Export destination:

- India has achieved grand success in the export of Indian mangoes to the USA by registering a growth of 19 percent in comparison to the previous fiscal year. India has exported 2043.60MT of Indian mangoes to the USA in the first five months of the current fiscal.
- Besides the USA, with continuous efforts of the concerned authorities, India has exported 43.08 MT of mangoes to Japan, 110.99 MT of mangoes to New Zealand, 58.42MT of mangoes to Australia and 4.44MT of mangoes to South Africa – a new destination.
- In the season 2023, India has exported mangoes to 41 countries by exploring new destinations such as Iran, Mauritius, Czech Republic and Nigeria.

Initiatives by APEDA:

- In order to commemorate the 75 years of Independence of India (Azadi ka Amrit Mahotsav), APEDA facilitated the export of 75 eastern varieties of mangoes to Bahrain. The consignment included 5 GI-tagged varieties from the eastern region of India.
- Additionally, APEDA organized a mango promotion programme or festival in active collaboration with the Missions of India of the respective countries to promote and increase the export of Indian mangoes.

About APEDA:

- Agricultural and Processed Food Products Export Development Authority (APEDA) was established by the Government of India under the Agricultural and Processed Food Products Export Development Authority Act of 1985.
- It works under the Ministry of Commerce and Industry.
- Its objective is to develop and promote the export of scheduled products.
- The products specified under the APEDA ACT are called scheduled products, and exporters of such scheduled products are required to register under APEDA.
- It provides financial assistance, information, and guidelines for the development of scheduled products.

7.5 PERCENT DIP IN ACTIVE WORKFORCE UNDER MGNREGS, SAYS STUDY

Why in news?

- LibTech's MGNREGS tracker for April-September 2023 provides a comparative analysis of data from preceding financial years (2021-22 and 2022-23) during the same time frame using the data available with the Union Rural Development Ministry.
- The data, read along with a net deletion of 80 lakh workers in the current financial year, paint a bleak picture for the scheme.

Details:

- The number of active workers under the Mahatma Gandhi National Rural Employment Guarantee Scheme (MGNREGS) has dipped by 7.5%, according to a data analysis for the period April to September 2023 by LibTech India.
- The workforce has reduced from 15.49 crore in the previous financial year to 14.33 crore, as per data available till October 6, 2023.

Key findings:

- While the workforce is shrinking, there is an increased demand for work under the scheme. The report shows a 9% rise in person days (the total

number of work days by a person registered under the rural jobs scheme in a financial year) in comparison with the previous financial year.
- In 2022-23, April to September, 172.24 crore person days were generated. During the same period this fiscal year, 188 crore days were generated.
- The report points out that this "intriguing trend" unfolds despite a reduction in the number of active job cards, workers, and a significant number of deletions.

State-level variations:
- The report has also noted State-level variations in employment trends. Fourteen States reported an increase, while there has been a decline in six States.
- A notable drop was observed in West Bengal (99.5%), where the scheme has been suspended by the Union government alleging large-scale corruption in its implementation.

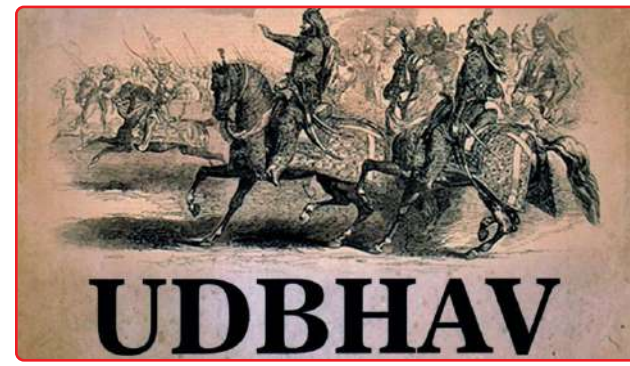
Way Forward:
- These statistics indicate a significant contraction in the MGNREGS workforce, emphasising the need for a comprehensive analysis to identify the factors contributing to this decline and to formulate strategies for revitalising the programme's participation.

About MGNREGS:
- The National Rural Employment Guarantee Act (NREGA) was notified in September, 2005.
- In 2009, an amendment was made in the Act to change the name to Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA).
- Its objective is to provide at least 100 days of guaranteed wage employment in a financial year to every rural household whose adult members volunteer to do unskilled manual work.
- The Mahatma Gandhi National Rural Employment Guarantee Scheme (Mahatma Gandhi NREGS) was created as directed in Mahatma Gandhi NREGA and the means to implement the Act so that the guarantee comes into effect.
- MGNREGS is a Centrally-Sponsored Scheme i.e., the scheme is jointly funded by the Central government and the State governments.

SECURITY

ARMY PROJECT UDBHAV TO REDISCOVER INDIC HERITAGE OF STATECRAFT FROM ANCIENT TEXTS

Why in news?
- The Indian Army has started an initiative, named Project Udbhav.
- It aims to rediscover the "profound Indic heritage of statecraft and strategic thoughts" derived from ancient Indian texts of "statecraft, warcraft, diplomacy and grand strategy" in collaboration with the United Service Institution of India (USI), a defence think-tank.



Military Heritage Festival:
- In connection with this, USI will conduct a Military Heritage Festival on October 21 and 22, to acquaint future thought leaders with the dynamics of comprehensive national security with special emphasis on India's strategic culture, military heritage, education, modernisation of security forces and Atmanirbhar Bharat.

Key Highlights:
- The project endeavours to explore India's rich historical narratives in the realms of statecraft and strategic thoughts.
- It focuses on a broad spectrum including indigenous military systems, historical texts, regional texts and kingdoms, thematic studies, and intricate Kautilya Studies.
- The initiative stands testimony to the Army's recognition of India's age-old wisdom in statecraft, strategy, diplomacy, and warfare. It seeks to bridge the historical and the contemporary.
- The aim of Project Udbhav is not limited to just rediscovering these narratives, but also to develop an "indigenous strategic vocabulary".

Way Forward:
- The overall aim is to integrate age-old wisdom with modern military pedagogy.

SAMPRITI XI EXERCISE

Why in news?
- India and Bangladesh commenced the 11th edition of annual joint military exercise, SAMPRITI recently in Umroi, Meghalaya.

About SAMPRITI:

- This exercise, alternatingly organised by both countries, signifies strong bilateral defence cooperation initiatives.
- With its inception in Jorhat, Assam in 2009, the exercise has witnessed ten successful editions till 2022.

Key Highlights:

- SAMPRITI-XI, scheduled for 14 days, will engage approximately 350 personnel from both sides. The exercise underscores the importance of enhancing interoperability between the two armies, sharing tactical drills, and promoting best practices.
- Centered on the conduct of Sub-Conventional Operations as per Chapter VII of the UN mandate, SAMPRITI-XI will include a Command Post Exercise (CPX) and a Field Training Exercise (FTX), culminating in a Validation Exercise.
- 20 Officers from each contingent will participate in the CPX, focusing on decision-making after thorough deliberations. This will be followed by FTX wherein grassroots-level operations will be validated.
- The FTX will include a series of joint tactical drills for counter-terrorist operations such as hostage rescue, crowd control measures, and use of helicopters in counter-terrorist operations.
- The Validation Exercise will be conducted on 14th and 15th October 2023 in Darranga Field Firing Range, Assam. During the course of the exercise, the participants will also get to witness the prowess of 'Atmanirbhar Bharat' Equipment Display.

Way Forward:

- SAMPRITI-XI promises to further enhance defence cooperation between India and Bangladesh, fostering deeper bilateral relations, cultural understanding, and mutual benefits from shared experiences in Sub Conventional Operations.

NEW DEFENCE INDIGENISATION LIST HAS FUTURISTIC WEAPONS, SYSTEMS

Why in news?

- Defence Minister recently released the fifth Positive Indigenisation List of 98 items to be procured by the three Services from domestic sources in a staggered manner on specified timelines.
- He also released the Navy's updated indigenisation road map, "Swavlamban 2.0".

Swavlamban 2.0:

- At the plenary session of "Swavlamban 2.0", the two-day seminar of the Naval Innovation and Indigenisation Organisation (NIIO), he launched 76 challenges for the industry under the "10th Defence India Start-up Challenges (DISC-10) and DISC 10 PRIME of Innovations for Defence Excellence (iDEX) and five problem statements under iDEX for Fauji".
- In addition, two INDUS X challenges under "INDUS-X Mutual Promotion of Advanced Collaborative Technologies" (IMPACT) challenges jointly finalised by iDEX and the U.S. Department of Defence were launched.

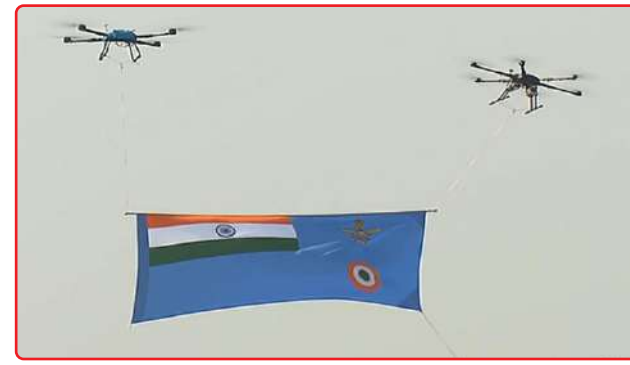
Indigenization list:

- The items on the indigenisation list include futuristic infantry combat vehicle, articulated all-terrain vehicles, several types of unmanned aerial vehicles, medium-range precision kill system for artillery, test equipment for guided weapon system for T-90 S/SK tanks, radars, armour plates for cabin nose section for Mi-17 helicopter, automated mobile test system for OSA-AK-M air defence system, gravity rollers for Mi-17V5 helicopter and flares of P-8I and MiG 29-K aircraft.
- The department had earlier promulgated four such lists of 411 military items. This is in addition to the four lists for defence public sector undertakings.

Way Forward:

- It lays special focus on import substitution of components of major systems, besides important platforms, weapon systems, sensors and munitions which are being developed and likely to translate into firm orders in the next five to 10 years.

INDIAN AIR FORCE UNVEILS NEW ENSIGN AS IT MARKS ITS 91ST ANNIVERSARY



Why in news?

- The Chief of the Air Staff, recently unveiled a new Ensign for the force, as it marked its 91st anniversary, by the inclusion of the Air Force Crest in the top right corner of the Ensign, towards the fly side.

- In 2023, the Air Force Day parade was held at the Air Force Station, Bamrauli in Prayagraj.

New Ensign:

- The IAF Crest has the national symbol, the Ashoka lion, on the top with the words Satyameva Jayate in Devanagari below it.
- Below the Ashoka lion is a Himalayan eagle with its wings spread, denoting the fighting qualities of the IAF.
- A ring in light blue colour encircles the Himalayan eagle with the words 'Bharatiya Vayu Sena' and the motto of the IAF is inscribed below Himalayan eagle in golden Devanagari.

About Air Force Day:

- The Indian Air Force, also known as Bharatiya Vayu Sena' was established in the country on October 8, 1932, by the British Empire.
- The first operational squadron came into being on April 1, 1933, with six RAF-trained officers and 19 Havai Sepoys (air soldiers).
- The aircraft inventory consisted of four Westland Wapiti IIA army co-operation biplanes at Drigh Road as the "A" Flight nucleus of the planned No.1 (Army Co-operation) Squadron.
- In January 1950, India became a Republic within the British Commonwealth and the Indian Air Force dropped its "Royal" prefix.

Air Force Day 2023:

- The theme for Air Force Day was "IAF — air power beyond boundaries", which reflected the "inherent global reach of air power and how air power will prove decisive in future conflicts".
- This is the first Air Force Day Parade to be commanded by a woman officer, Group Captain Shaliza Dhami. She is also the first woman officer of the IAF to command a combat unit.
- The parade had an all-woman contingent of newly inducted Agniveer Vayu personnel. The parade also included a flight of Garud Commandos of the IAF for the first time, as the they completed 20 years of service.
- The Air chief presented Unit Citations to four IAF Units — 16 Squadron, 142 Helicopter Unit, 901 Signal Unit and 3 Base Repair Depot for their contribution to the service.

AMENDMENT TO AIRCRAFT RULES, 1937

Why in news?

- Recently, the Ministry of Civil Aviation officially notified the amendment to Aircraft Rules, 1937.
- This is a significant step towards strengthening aviation safety and ease of doing business in aviation regulation with the amendment to the Aircraft Rules, 1937.

Details:

- These amendments align India's aviation regulations with the International Civil Aviation Organization's (ICAO) Standards and Recommended Practices (SARPs) and international best practices.
- A portion of these reforms have been already notified with Amendment to the Aircraft (Demolition of Obstructions caused by Building and Trees, etc.) Rules, 1994.

Key Highlights:

- One of the key highlights of the Amendment to the Aircraft Rules, 1937 is the revision of Rule 39C.
- Under this amendment, the validity of licenses in relation to Airline Transport Pilot License (ATPL) and Commercial Pilot License (CPL) holders has been increased from five years to ten years.
- This change is expected to reduce administrative burden on pilots and aviation authorities like DGCA, promoting a more streamlined and efficient licensing process.

False lights:

- The Amendment to Aircraft Rules, 1937 introduces key changes under Rule 66, addressing concerns related to the display of "false lights" in the vicinity of an aerodrome. This update clarifies that the term "light" encompasses lantern lights, wish kites, and laser lights.
- The government's jurisdiction over those exhibiting such lights has been extended from 5 kilometres to 5 nautical miles around an aerodrome.
- Furthermore, it is made explicit that the government possesses the authority to take action against individuals displaying lights that disrupt the safe operation of aircraft or pose hazards to the operating crew.
- Should such lights remain unattended for 24 hours, the government is empowered to enter the location and extinguish them. Simultaneously, the matter shall be reported to the relevant police station for legal action under the Indian Penal Code (IPC).
- When the source of the observed light is unidentifiable or if it shifts locations, the airport or airline operator is obligated to promptly report the incident to the local police station, initiating potential criminal proceedings.

Other amendments:

- Rule 118 for validation of foreign licenses has been removed as being redundant. This change signifies

aligning the regulations with the evolving needs of the aviation sector.

- Additionally, a clause to liberalise the recency and competency requirements while ensuring continued competence for Air Traffic Controller License holders has been added under Schedule III.
- This change offers increased flexibility to accommodate situations with limited movements or watch hours, Air Traffic Controller license holders must complete a minimum of ten hours of simulated exercises, including emergencies.
- Subsequently, they must undergo a skill assessment for their respective rating within ten consecutive days of commencing these exercises.

Way Forward:

- These amendments to the Aircraft Rules, 1937 represent a significant step towards strengthening aviation safety, security, and the ease of doing business within the aviation sector in India.
- These reforms will enhance the growth and sustainability of the aviation industry, ensuring it remains at the forefront of global aviation standards.

ARMY TO START PHASING OUT CHEETAH, CHETAK HELICOPTERS FROM 2027

Why in news?

- The Army will start phasing out Cheetah and Chetak helicopters from 2027 on completion of their total technical life, as it looks to induct the indigenous light utility helicopters (LUHs) to replace them.
- The armed forces have been attempting to replace the Cheetah and Chetak helicopters for well over a decade.

New additions:

- In November 2021, the Defence Acquisition Council approved the procurement of 12 limited series production (LSP) variants of the LUH at a cost of around ₹1,500 crore, six each for the Army and the Air Force.
- The choppers have been designed and developed by Hindustan Aeronautics Ltd. (HAL), but the project was delayed due to issues with the autopilot.
- The six LSP LUHs are expected to be delivered to the Army between December 2024 and June 2025.
- The bigger contract for LUHs is expected to be concluded by January 2024 and deliveries expected by 2026 onwards.
- In the interim, the Army is also looking to lease 20 utility helicopters to address the shortage.

Current stock:

- The Army currently has 190 Cheetah, Chetak, and Cheetal helicopters of the original 246.
- Of these, at any given time, around 25 are at the HAL for maintenance, which is a deficiency of around 37% in this segment, the source said. Close to 130 of the 190 choppers are between 30 and 50 years old.
- Of the 190 Cheetah and Chetak in service, around 134 helicopters, or over 70%, are over 30 years old.
- In addition to the Army, the Navy and the Air Force operate these helicopters. For instance, the Air Force has around 120 Cheetah and Chetak helicopters and 18 of the more recent Cheetals.
- The light helicopter fleet is the lifeline in transporting supplies and for evacuations in high-altitude areas such as the Siachen glacier. The commitments on the northern borders have significantly gone up since the 2020 stand-off.
- The Army also operates around 145 indigenous advanced light helicopters (ALHs), 75 of which are the Rudra-weaponised variants. Another 25 ALH Mk-III are on order.

Focus on LUH:

- In all, the Army and the Air Force together have a requirement of over 400 helicopters of this class. The LUH is a 3-tonne class helicopter with glass cockpit for reconnaissance and surveillance roles and as a light transport helicopter.
- The helicopter will be capable of flying at 220 kmph, with a service ceiling of 6.5 km and a range of 350 km with 400 kg payload, according to the HAL.

EXERCISE HARIMAU SHAKTI 2023

Why in news?

- Joint bilateral training exercise "Exercise Harimau Shakti 2023", between Indian & Malaysian Army commenced in Umroi Cantonment recently.

Background:

- Last edition of the Exercise was conducted in Pulai, Kluang, Malaysia in November 2022.

Focus:

- The training will focus primarily on high degree of physical fitness, conduct of drills at tactical level and sharing of best practices with each other.
- The Exercise will culminate with a 48-hour long validation exercise in a semi-urban area.

Key Highlights:

- Ex Harimau Shakti, scheduled till 5th November 2023, will engage approximately 120 personnel from both sides.
- It is aimed at enhancing military capability for conduct of Multi Domain Operations in a sub conventional scenario.
- During the exercise, both contingents will establish a Joint Command Post & establish an integrated surveillance grid along with a Joint Surveillance Centre.
- Both sides will rehearse employment of joint forces in jungle/ semi urban / urban environment. In addition, intelligence collection, collation and dissemination drills will also be rehearsed.
- The Exercise will also witness employment of Drones/ UAVs & Helicopters.

Way Forward:

- Exercise Harimau Shakti is aimed to enhance the level of defence co-operation between Indian Army and the Malaysian Army, which will also foster the bilateral relations between the two nations.

EXERCISE KAZIND 2023

Why in news?

- Indian Army and Indian Air Force contingent comprising 120 personnel departed for Kazakhstan to take part in the 7th edition of Joint Military 'Exercise KAZIND-2023'.
- The Exercise will be conducted at Otar, Kazakhstan from 30th October to 11th November 2023.

About Exercise KAZIND:

- The Joint Exercise between India and Kazakhstan was instituted as 'Exercise PRABAL DOSTYK' in the year 2016.
- After the second edition, the Exercise was upgraded to a company-level exercise and renamed as 'Exercise KAZIND'.
- The Exercise has been further upgraded as a Bi-service Exercise this year by including the Air Force component.

Key Highlights:

- In this edition of the Exercise, both sides will practice conduct of Counter Terrorism operations in a sub-conventional environment under United Nations mandate.
- The contingents will jointly rehearse various tactical drills to include Raid, Search and Destroy Operations, Small Team Insertion and Extraction Operations etc. The scope of the Exercise also includes conduct of Counter Unmanned Aerial System Operations.
- 'Exercise KAZIND-2023' will provide an opportunity for both sides to gain an insight into the tactics, battle drills and procedures of each other, which is a prerequisite while operating under the ambit of the United Nations.
- The joint training will develop the necessary skills, resilience and coordination to conduct joint military operations in Semi-Urban and Urban environments.

Way Forward:

- The Exercise will provide an opportunity for the contingents to exchange views and share the best practices. 'Exercise KAZIND-2023' will further strengthen the bond between the two armies.

ENVIRONMENT

CHENNAI TOP NODE IN TORTOISE TRAFFICKING NETWORK

Why in news?

- Chennai is the highest-ranked node in the tortoise and hard-shell turtle trafficking network, fuelling the global pet trade, a new study has found.

Details:

- Mumbai, Kolkata, Bengaluru, Anantapur in Andhra Pradesh, Agra, and North 24 Parganas and Howrah in West Bengal also rank high.
- The trafficking of soft-shell turtles for meat was predominantly domestic in nature, with the international trafficking of the reptile from or to India almost restricted to Bangladesh.

Key Findings:

- The researchers conducted a systematic online search for media reports on seizures of tortoises and freshwater turtles originating from India from January 1, 2013, to December 31, 2019.
- The identified nodes in the network represented districts (for locations within India) or cities (for locations outside India), and each link represented a trafficking connection between the nodes.
- Chennai was identified as the most central node in the tortoise/hard-shell turtle trafficking network. Kuala Lumpur (Malaysia), Bangkok (Thailand), and unspecified districts in Bangladesh were identified as the most important importing nodes.

Asian turtle crisis:

- "Asian turtle crisis" is a term often used to describe the current state of tortoises and freshwater turtles (TFTs) on the largest continent on earth.
- Wild populations of TFTs have suffered immensely due to the onslaught of habitat destruction and illegal and unsustainable harvest, the researchers said.
- The TFTs are under tremendous pressure from illegal trade, as pets, food, and medicines across the world. In India, at least 15 of the 30 TFT species, including those threatened by extinction, are illegally traded. Tens of thousands of TFTs are seized across India annually by law enforcement agencies.
- The study was aimed at examining the similarities and differences in the operation of illegal trade in tortoises and freshwater turtles that are in demand for different illegal markets, towards designing targeted interventions.

NEWLY DISCOVERED FISH CAN CHANGE ITS COLOUR LIKE A CHAMELEON

Why in news?

- Scientists have recently discovered a new fish species from the Milak River, Nagaland.
- The newly discovered species Badis limaakumi has been named after Limaakum, assistant professor and head of the zoology department at Fazl Ali College, Nagaland.

Key characteristics:

- The new species discovered in the state's Mokokchung district has a distinct opercular blotch at the base of its opercular spine (a bone series that serves as a facial support structure and a protective covering for the gills).
- The spots on the sides and cleithrum (a membrane bone) and more lateral line scales are absent in this species.
- It belongs to the family of Badidae, a small freshwater fish found in streams with slow or moderate water flow.
- Apart from channels of rivers, the edible fish are found in ditches and stagnant water bodies across India, Bangladesh, Nepal, Pakistan, Thailand and Myanmar. There are 26 recognised fish species in this family.
- Limaakum found the fish during the project Integrated Taxonomic Studies on The Fishes Found in The Rivers of Nagaland.

Species of Badis:

- Badis assamensis and B. blosyrus can be distinguished from B. limaakumi by the presence of two rows of irregular blackish blotches on the sides, which are absent in B. limaakumi. Along with B. assamensis, B limaakumi is also one of the largest species in the genus, attaining a size of 66.8 mm SL, Jayasimhan added.
- The new fish species differs from other members of the Badis badis SG (B. badis, B. kanabos, B. chittagongis, B. ferrarisi, B. soraya, B. rhabdotus, B. pallidus, B. dibruensis, B. tuivaiei and B. kaladanensis) due to its larger size and other physical characterises.
- Fourteen species of Badis; six from the Brahmaputra in West Bengal and B. badis found in Pakistan, Bangladesh, Nepal and Bhutan; seven species from Brahmaputra and Kaladan river and one species B. britzi from Sharavati river of the Western Ghats were already been identified. The new fish species adds the number to 15.
- Fish from the Badis family are also known as chameleon fish for their ability to change colour. This helps them blend with the surroundings when under stress.

Way Forward:

- The research noted rivers in Nagaland are poorly explored compared to other Northeastern states. Discoveries highlight the need to increase efforts to identify more unknown fish species.

INDIAN ORIGIN PROFESSOR RECEIVES DUTCH PRIZE FOR CLIMATE CHANGE WORK

Why in news?

- Indian-origin professor Dr Joyeeta Gupta has received the Spinoza Prize, the highest distinction in Dutch

science, in the Netherlands for her work in the field of climate change.

- She is the Professor of Environment and Development in the Global South at the University of Amsterdam (UvA).

Why she was awarded?

- She investigates how the distributional issues arising from climate change can be solved through good governance. She argues that the consequences of climate change have a direct impact on the relationship between rich and poor.
- Central to her research is understanding the connection between the climate crisis, possible solutions and justice. To do so, she brings together various scientific disciplines, from international law and economics to political science and environmental studies.

About Dr Joyeeta Gupta:

- Gupta studied at Delhi University, Gujarat University and Harvard Law School, and obtained her PhD from Vrije Universiteit Amsterdam.
- She has been a Professor of Environment and Development in the Global South at the UvA since 2013. She is also a professor at the IHE Delft Institute for Water Education.

About Spinoza award:

- The Spinoza Prize has been awarded annually since 1995 and Gupta is the twelfth UvA researcher to receive the award.
- The Dutch Research Council (NWO) prize is worth 1.5 million euros.

GANGA GHAGRA BASIN CANALS POSE A THREAT TO DOLPHINS, STUDY

Why in news?

- A recent publication has revealed that 19 Gangetic river dolphins had been rescued from the irrigation canals of the Ganga-Ghagra basin in Uttar Pradesh between 2013 and 2020.

Details:

- The publication, "Rescuing Ganges river dolphins (Platanista gangetica) from irrigation canals in Uttar Pradesh, North India, 2013-2020", not only highlights the capture and relocation methods but also describes the behavioural and demographic details of rescued animals and locations of the canals where the animals had been trapped.
- It points out that 24 rescue operations had been conducted from 2013 to 2020 and five dolphins had died.

Threats:

- It said dams and barrages had severely affected this habitat as dolphins moved into irrigation canals where they were at a risk of injury or death from a multiple factors, such as rapidly receding waters, heat stroke and human interferences.

Key Observations:

- Though the species is not known to be gregarious, the researchers observed and handled at least one adult male and female together on five occasions.
- The observations suggest that they may prefer to live and/or hunt in the pod. The dolphins may either stray into the canal while following prey upstream or get flushed into the canal by a sudden discharge of water from the barrage gates.
- The researchers also pointed out the higher proportion of females to males, and said larger animals and pregnant females look for an easier prey base in the canal system.
- Over 70% of entrapments were reported either post monsoon or during peak winter. This suggests straying incidents are directly related to the release of water into canals during or after the monsoon.
- The other 30% of dolphins were rescued during peak summer when water levels fall and the minimum water flow is maintained. Among the rescued dolphins, females were found trapped between September and May with maximum occurrence during peak winter (December to February).
- In contrast, males were mostly recorded post monsoon and during the summer season, with least occurrence in peak winter.

Concerns:

- Considering that the dolphins are found in the Ganga-Brahmaputra-Meghna delta, this is a huge problem to monitor this huge area and canal system.

IUCN Status:

- The Ganges river dolphin is in Schedule 1 of the Indian Wildlife (Protection) Act 1972, Appendix 1 of the Convention on International Trade in Endangered Species (CITES) and Appendix 1 of the Convention on Migratory Species (CMS).
- The species, also considered the national aquatic animal, is listed as "endangered" on the IUCN Red List.

PREY BASE, HABITAT DICTATE ASIATIC WILD DOG-TIGER COEXISTENCE, STUDY

Why in news?

- Recently, a study titled "Do dholes segregate themselves from their sympatrids? Habitat use and carnivore co-existence in the tropical forest", was published.
- The dhole or Asiatic wild dog (Cuon alpinus) is the only endangered wild pack-living canid in the tropical Indian forests and is considered at high risk of extinction.

Details:

- It found that overlapping prey availability or habitat suitability could dictate a positive association between dholes and tigers, facilitating coexistence or even cooperative behaviours between the two species of carnivores.
- The study also revealed that the diurnal activity of the dholes had the highest temporal overlap with leopards and the lowest with clouded leopards.
- Sympatric refers to animals, plant species, and populations within the same or overlapping geographical areas.
- The scientists studied the dholes in three phases from April 2017 to May 2019 in the 500-sq.km Manas National Park.

Fragmented population:

- Operating in packs of five to 10, larger groups of more than 30 were observed in 2004 dholes were once widespread across southern and eastern Asia.
- Factors such as habitat loss, declining prey availability, persecution, disease, and interspecific competition have contributed to the ongoing fragmentation of its populations.

IUCN Status:

- The global population of adult dholes, now classified as endangered on the International Union for Conservation of Nature's Red List, is estimated to be between 949 and 2,215.

Key findings:

- They aimed to assess the relative abundance index, habitat use and factors (space and time) influencing dhole co-existence with other sympatric carnivores in Manas National Park.
- The hypotheses included conflict with humans on the periphery of protected areas as the primary threat to dholes, higher habitat utilisation where small-medium prey species such as rodents, hares, and rhesus macaques are found, and a negative relationship between dhole habitat use and other large carnivores.
- However, the study findings revealed a surprising positive relationship between dhole habitat use and tiger, rejecting the habitat exclusivity hypothesis.

Way Forward:

- This unexpected result challenges the assumption of antagonistic interactions between these two species and suggests a more complex ecological dynamic.

SBSTTA 25 TO GAUGE PROGRESS ON KUNMING MONTREAL GLOBAL BIODIVERSITY FRAMEWORK

Why in news?

- Governments and biodiversity experts are gathered in Nairobi, Kenya to guide the implementation of the Kunming-Montreal Global Biodiversity Framework, which was adopted in December at 15th Conference of Parties (COP15) to the Convention on Biological Diversity (CBD).
- The Subsidiary Body on Scientific, Technical and Technological Advice (SBSTTA-25) is taking place between October 15-October 19, 2023.

Details:

- The 25th meeting is the first time the group has met since the Framework was adopted in December 2022. Some 670 participants from 135 countries are in Nairobi for the meeting.

- Discussions are expected on the monitoring framework needed to support implementation of the framework.

About SBSTTA:

- Since its inception in 1995 in Paris, France, SBSTTA has produced a total of 250 recommendations to the Conference of the Parties.
- SBSTTA, established under CBD Article 25, convenes regularly to fulfill its mandate, which includes providing expert advice and recommendations related to the scientific, technical, and technological aspects of biodiversity conservation.

Focus:

- The primary focus of SBSTTA 25 will be on facilitating the implementation of the Kunming-Montreal Global Biodiversity Framework and monitoring its progress.
- The Global Biodiversity Framework, which supports the achievement of the Sustainable Development Goals and builds on the Convention's previous Strategic Plans, sets out an ambitious pathway to reach the global vision of a world living in harmony with nature by 2050.

Aspects of implementation under consideration include:

a) Monitoring Framework for the Global Biodiversity Framework.
b) Mechanisms for Planning, Monitoring, Reporting, and Review.
c) Approaches to identifying scientific and technical needs to support the Framework's implementation and its implications for the CBD's work programmes.
d) Plant conservation.

Way Forward:

- The recommendations made by SBSTTA-25 at this meeting will be sent for agreement at COP16, scheduled to be held in 2024.

MICROALGAE ARE ADAPTING TO WARMING CLIMATE WITH NOVEL STRATEGY

Why in news?

- Microalgae, which form the base of the food chain in the ocean and capture carbon dioxide from the atmosphere, appear to rely on a unique strategy to cope with global warming, according to a new study.

Microbial rhodopsins:

- As climate change reduces the availability of nutrients in the sea, marine microalgae or eukaryotic phytoplankton fire up a protein called rhodopsin.
- It is related to the protein in the human eye responsible for vision in dim light. This light-responsive protein is helping the microalgae flourish with the help of sunlight in place of traditional chlorophyll.
- Microbial rhodopsins are proposed to be major light capturers in the ocean.
- Estimates suggested they may absorb as much light as chlorophyll-based photosynthesis in the sea, which also captures light to generate energy and food.

Role of rhodopsins:

- To understand the role of rhodopsins, researchers cloned them in the lab and confirmed that they capture light to generate energy (Adenosine triphosphate or ATP — the energy currency of all cells).
- They also tested the abundances of rhodopsin transcripts (a molecule of ribonucleic acid or RNA that contains genetic information copied from deoxyribonucleic acid or DNA).
- Rhodopsins were found to be more concentrated in low latitudes, where there is less mixing of ocean waters and lower concentrations of nutrients, including dissolved iron.
- This is particularly relevant for the Southern Ocean, which is the largest iron-limited aquatic ecosystem. But they are home to the largest populations of consumers such as krill, fish, penguins and whales, which depend on primary producers such as microalgae.

Way Forward:

- These findings have the potential to reduce the negative effects of changing environmental conditions, such as ocean warming and even the reduction in the productivity of crops.
- The same mechanism could be deployed to enhance the activity of microbes that cannot use light, such as yeast.

BUTTERFLY MAKES A RARE CALL IN HIMACHAL

Why in news?

- A butterfly that is rare in the western Himalayas, the paintbrush swift has been photographed and documented for the first time in Himachal Pradesh's Chamba district.
- The State is home to about 25% of the total number of butterfly species found in India.

Details:

- The paintbrush swift(Baoris farri), a butterfly species of the Hesperiidae family, was sighted under the Wild Bhattiyat Project initiated by the Bhattiyat Forest Range of the Dalhousie Forest Division of the Himachal Pradesh Forest Department in 2022.
- The species has never been photographed in Himachal Pradesh since its discovery in 1878.
- It was first described by lepidopterist Frederic Moore, more than 145 years ago, from the eastern Himalayas.

Key characteristics:

- The paintbrush swift is identified based on two separated spots in the upper forewing cell.
- Other closely related species like the blank swift have no cell spot while the figure-of-eight swift has two conjoined cell spots.
- The species' larvae feed on bamboo and some other grass species.
- Till now, there is only one record of the paintbrush swift mentioned from the Shivalik mountain range in the State, but that record is doubtful as no photographic or specimen pieces of evidence were provided in the study.

Way Forward:

- Since the launch of the project, the department has so far documented 120 butterfly species.
- It's an encouraging indication of flourishing biodiversity.

INDIA CAN REDUCE FOSSIL FUEL DEPENDENCE, CUT IMPORT BILLS BY $29 BILLION THROUGH BIOGAS ADOPTION, REPORT

Why in news?

- Replacing natural gas consumption with biogas and biomethane incrementally to 20 per cent by 2030 can help India cut liquefied natural gas import bills by USD 29 billion between financial years 2025 and 2030, according to a new report.
- The report from the Institute for Energy Economics and Financial Analysis (IEEFA), underscores the environmental advantages of expanding biogas projects, including waste management, reduction of greenhouse gas (GHG) emissions, and enhanced renewable energy production.

Potential of biogas:

- Biogas has the potential to replace natural gas and other high-emission fossil fuels. By eliminating carbon dioxide (CO2) and impurities like hydrogen sulfide, its methane content can be upgraded to 90 per cent, making it calorifically equivalent to natural gas.
- This upgraded biogas, known as biomethane, is pipeline-ready and can be integrated into gas grids as a non-fossil gas.
- By adopting appropriate production methods and addressing methane leaks during production, upgrading, and supply stages, biogas can offer India a cleaner alternative to its reliance on imported natural gas.

Challenges:

- Despite its clear advantages, the biogas sector has struggled to gain traction in India.
- The report identifies several reasons for this, including the absence of a comprehensive market ecosystem, pricing challenges, complex approval processes, and fragmented government support.

Initiatives:

- The government has begun to address these issues. In 2021, various types of support were consolidated under the National Bioenergy Scheme.
- The introduction of the GOBARdhan (Galvanizing Organic Bio-Agro Resources Dhan) scheme as an umbrella initiative of the government will help in this consolidation. It covers the entire gamut of schemes/ policies promoting organic waste conversion to biogas or compressed biogas (CBG).
- It highlights recent policy developments, such as revising the compressed biogas rate in response to global gas price increases and plans to mandate natural gas marketing companies to procure five per cent compressed biogas.
- These measures have reignited private sector interest in compressed biogas, with companies like Reliance Industries Limited and the Adani Group showing strong enthusiasm.

Way Forward:

- The report emphasises that the government must do more to fully unlock biogas's potential in India.
- This includes encouraging increased investments and private sector involvement, improving market viability for CBG and biogas slurry, increasing financial access for biogas plant development, and promoting feedstock mapping for input availability.

- Additionally, it is crucial to ensure that energy crops are not used for biogas, as this can lead to indirect land use changes, as seen with ethanol and biodiesel in Brazil, which can have a detrimental impact on climate and the environment through increased carbon emissions.

UN REPORT WARNS INDIA HEADING TOWARDS GROUNDWATER DEPLETION TIPPING POINT

Why in news?

- Recently, a report titled 'Interconnected Disaster Risks Report 2023' was published by the United Nations University Institute for Environment and Human Security (UNU-EHS).
- As per the report, some areas in the Indo-Gangetic basin in India have already passed the groundwater depletion tipping point and its entire northwestern region is predicted to experience critically low groundwater availability by 2025.

Six environmental tipping points:

- Environmental tipping points are critical thresholds in the Earth's systems, beyond which abrupt and often irreversible changes occur, leading to profound and sometimes catastrophic shifts in ecosystems, climate patterns and the overall environment.

It highlights that the world is approaching six environmental tipping points:

a) accelerating extinctions,
b) groundwater depletion,
c) mountain glacier melting,
d) space debris,
e) unbearable heat and
f) an uninsurable future.

Overexploitation of groundwater:

- Around 70 per cent of groundwater withdrawals are used for agriculture, often when above-ground water sources are insufficient. Aquifers play a crucial role in mitigating agricultural losses caused by drought, a challenge expected to worsen due to climate change.
- However, the report warns that the aquifers themselves are approaching a tipping point. More than half of the world's major aquifers are depleting faster than they can naturally replenish.
- When the water table falls below a level accessible by existing wells, farmers may lose access to water, posing a risk to entire food production systems.
- Some countries, like Saudi Arabia, have already exceeded the groundwater risk tipping point, while others, including India, are not far from it."India is the world's largest user of groundwater, exceeding the use of the United States and China combined.

Status in India:

- The northwestern region of India serves as the bread basket for the nation's growing 1.4 billion people, with the states of Punjab and Haryana producing 50 per cent of the country's rice supply and 85 per cent of its wheat stocks.
- However, 78 per cent of wells in Punjab are considered overexploited and the northwestern region as a whole is predicted to experience critically low groundwater availability by 2025.

FIRST CASES OF AVIAN FLU FOUND IN ANTARCTIC REGION

Why in news?

- Scientists have detected the presence of avian flu for the first time in the Antarctic region, raising concerns for remote populations of penguins and seals.

Details:

- The findings by researchers from the British Antarctic Survey (BAS) followed reports of several "potentially symptomatic birds and unexplained mortality" and further tests confirmed the presence of Highly Pathogenic Avian Influence (HPAI).
- The HPAI was detected in brown skua (a predatory seabird) populations on Bird Island, South Georgia, making it the first known case in the Antarctic region.

Key Highlights:

- The malaise had possibly reached the region from South America.
- Based on trends observed in Europe, North America and South Africa, scientists fear HPAI may lead to a decline in the breeding populations of vulnerable fragile wildlife residing in the region.
- The viral disease HPIA or avian influenza, especially the H5 and H7 strains, mostly affects birds. These

strains are highly pathogenic and have been reported in domestic poultry, resulting in high mortality if they manage to reach wild bird populations.

- The virus is known to spread among birds and mammals due to predators and scavengers feeding on infected birds. In recent cases, marine mammals have also been found to be infected.

Ongoing outbreak of HPAI H5N1:

- The ongoing outbreak of HPAI H5N1 was first reported in 2022. The scientists stated in the report that in July 2022, outbreaks were reported in the Northern Hemisphere's wildlife, especially seabirds. This heightened fears that the pestilence might spread to Southern Ocean seabird populations as well.
- In 2022 and 2023, HPAI H5N1 spread rapidly in South America. Fears regarding southern birds came true when a team from the Antarctic Wildlife Health Network investigated and found the infection had spread in the Antarctic and sub-Antarctic region.
- In 2022, the virus spread along the Pacific coast of South America, affecting populations in Peru and Chile.
- It travelled 6,000 kilometres towards the continent's southernmost tip in three months, impacting 500,000 seabirds. It also caused significant outbreaks in marine mammals, leading to the deaths of 20,000 South American sea lions.

Risk assessment:

- According to the researchers' risk assessment, the most threatened avian group are gulls and skuas. They are followed by birds of prey such as hawks and caracaras, terns and shorebirds.
- Among marine mammals, fur seals and sea lions are reportedly most vulnerable, followed by southern elephant seals and dolphins.
- The researchers also found that, "sub-Antarctic slands between southernmost tip of South America and the Antarctic Peninsula with the Falkland Islands are at most risk." The risks are significantly high due to the presence of other vulnerable wildlife groups.

A NEW MUSHROOM SPECIES FROM THE WESTERN GHATS

Why in news?

- A tiny, fragile-looking mushroom sporting a honey-yellow 'cap' found on the campus of the Jawaharlal Nehru Tropical Botanic Garden and Research Institute (JNTBGRI) at Palode in Thiruvananthapuram has been identified as a new species.

Key Characteristics:

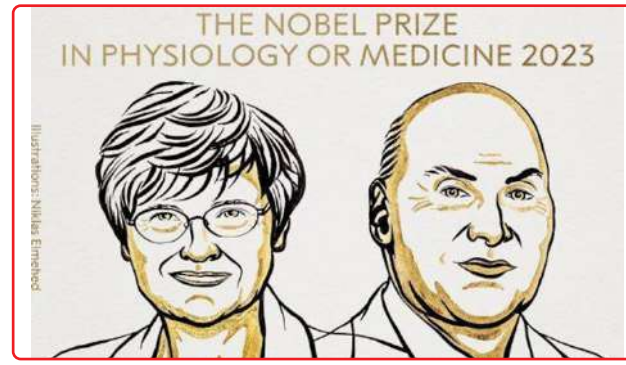
- The new species belong to the genus Candolleomyces.
- The new species has been named Candolleomyces albosquamosus - 'albosquamosus' for the white woolly scale-like structures on its pileus or cap.
- Delicate in build, the mushroom grows to a height of just about 58 mm.

Significance:

- Seven species of the genus Psathyrella reported earlier from India are now recognised as Candolleomyces.
- The discovery of a new species of the genus Candolleomyces in India is special given that there are only 35 species in this genus worldwide.

SCIENCE & TECHNOLOGY

NOBEL PRIZE 2023 IN MEDICINE



Why in news?

- The Nobel Prize in Physiology or Medicine for 2023 has been awarded to Katalin Kariko, and Drew Weissman for their discoveries concerning nucleoside base modifications that enabled the development of effective mRNA vaccines against Covid-19.

Details:

- Katalin Karik, who was born in 1955 in Szolnok, is Professor at Szeged University and an Adjunct Professor at Perelman School of Medicine at the University of Pennsylvania.
- Meanwhile, Drew Weissman is a Roberts Family Professor in Vaccine Research and Director of the Penn Institute for RNA Innovations.

What are mRNA vaccines?

- mRNA or messenger RNA, is a type of genetic molecule that plays a crucial role in the process of protein synthesis in cells. It serves as an intermediary between the DNA in a cell's nucleus and the ribosomes,

which are cellular structures responsible for building proteins.

- It is also a crucial component of the central dogma of molecular biology, which describes the flow of genetic information in cells from DNA to RNA to protein. This makes it critical in delivering and activating antibodies against a viral infection.
- Messenger RNA (mRNA) vaccines, unlike traditional ones, do not use weakened or inactivated germs.
- They work by leveraging a small piece of synthetic mRNA to instruct cells in the human body to produce a harmless portion of the target pathogen (in this case, the spike protein of the SARS-CoV-2 virus, which causes Covid-19).
- Scientists employ lab-created mRNA to instruct our cells to produce a protein or a fragment of it, which triggers an immune response. This response, characterised by the production of antibodies, is what protects us from future infections.

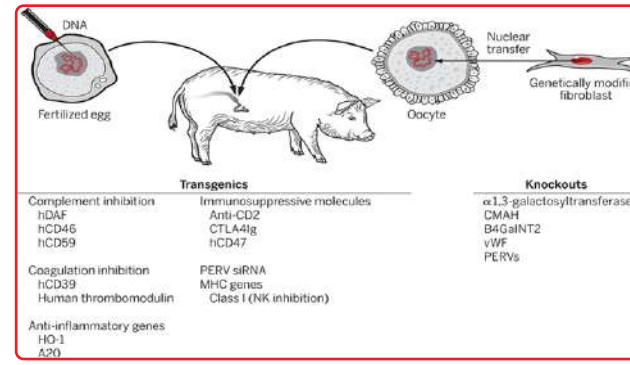
Their discovery:

- Kariko and Weissman faced numerous challenges, including skepticism from the scientific community and a lack of funding when they started, they remained steadfast in their belief in the potential of mRNA as a therapeutic tool.
- Their perseverance paid off in 2005 when they made a key discovery: mRNA could be modified and effectively delivered into the body to activate the immune system.
- This breakthrough laid the foundation for the development of the Pfizer-BioNTech and Moderna's Covid-19 vaccines, which have proven to be safe and effective in preventing serious complications from the virus.
- Despite the success of mRNA vaccines, challenges remain, such as ensuring stability, translation efficiency, and the immunostimulatory potential of exogenous mRNA. However, the rapid development and large-scale production of mRNA vaccines during the Covid-19 pandemic have demonstrated their immense potential.

About 113 Nobel Prizes in Physiology or Medicine:

- So far, 113 Nobel Prizes in Physiology or Medicine have been awarded since 1901 of which 12 have been given to women.
- The youngest medicine laureate ever is Frederick G. Banting, who was awarded the 1923 Medicine Prize for the discovery of insulin at the age of 32.
- The 2022 Nobel Prize in Physiology or Medicine was awarded to Swedish geneticist Svante Paabo. Paabo, who directs the Max Planck Institute for Evolutionary Anthropology in Leipzig, Germany, was recognised for his groundbreaking work in extracting and analysing DNA from ancient bones, particularly those of Neanderthals.

IMPROVING THE COMPATIBILITY OF PIG ORGANS FOR TRANSPLANTATION



Why in news?

- The design and successful transplantation of kidney grafts from genetically modified pigs into non-human primates has been described in a recent study.

Details:

- Modifying the pig genomes to remove antigen coding genes, add human genes and eliminate pig viruses, resulted in long-term survival of the monkey recipients, up to around two years.
- This preclinical work may move the field a step closer to clinical testing of genetically modified pig kidneys for human transplantation.

Why pigs in xenotransplantation?

- The transplantation of animal organs into humans (xenotransplantation) may offer a solution to the worldwide organ shortage.
- Pigs are promising donor animals but several obstacles first require overcoming before they can be considered clinically viable, notably organ rejection and risk of zoonosis (transmission of animal viruses to humans).
- Previous work has identified three glycan antigens expressed in pigs that are recognised by human antibodies and attacked, leading to rejection of the organ.
- The porcine endogenous retrovirus has also been identified as a risk for transmission into humans.

Key Highlights:

- They build on this by introducing alterations into the genome of a donor pig and achieve successful transplantation of kidney grafts from a genetically engineered pig into a cynomolgus monkey model (a non-human primate with several human-like traits).
- The researchers introduced 69 genomic edits into the porcine donor (a Yucatan miniature pig), knocking out three glycan antigens thought to induce rejection, overexpressing seven human transgenes (to reduce hostility of primate immune system) and inactivating all copies of the porcine retrovirus gene.

- These kidney grafts survived substantially longer than grafts with only the glycan antigen knockouts (176 days versus 24 days), suggesting that the expression of these human transgenes offers some protection against rejection.
- Combined with immunosuppressive treatment, the transplant provided long-term primate survival of up to 758 days. These results demonstrate the promise of pig organs in future human transplantations and bring the technique a step closer to clinical testing.

Way Forward:

- These results show that preclinical studies of renal xenotransplantation could be successfully conducted in nonhuman primates and bring us closer to clinical trials of genetically engineered porcine renal grafts.

EARTH'S SMALLEST FLOWERING PLANT MAY BECOME FOOD, OXYGEN SOURCE FOR ASTRONAUTS

Why in news?

- Scientists from Mahidol University in Thailand have been exploring the potential of watermeal, the smallest flowering plant on Earth, as a source of nutrition and oxygen for astronauts.

Details:

- The research, conducted at the European Space Agency's (ESA) ESTEC technical centre in the Netherlands, involved subjecting the tiny aquatic plants to hypergravity conditions aboard ESA's Large Diameter Centrifuge (LDC).
- The LDC, an 8-meter diameter four-arm centrifuge, allows researchers to simulate gravity levels up to 20 times that of Earth for extended periods.
- This unique facility was accessed through HyperGES, a part of the Access to Space for All initiative sponsored by ESA and the United Nations Office of Outer Space Affairs (UNOOSA).

About Watermeal:

- Watermeal, even smaller than its relative duckweed, is a rootless, stemless plant that floats on bodies of water, particularly in Thailand and other Asian countries.
- Its simplicity and rapid growth rate make it an ideal candidate for studying the effects of changing gravity levels on plant development.
- Because watermeal doesn't have any roots, stems or leaves, it is basically just a sphere floating on a body of water.
- It is a prolific producer of oxygen through photosynthesis and a rich source of protein.
- It has long been a part of the local diet in Thailand, consumed in various forms from soups to salads.

Key Highlights:

- They placed watermeal samples in boxes equipped with LEDs that mimic natural sunlight and left them to grow while spinning at 20 g in the centrifuge.
- After two weeks of experimentation, the researchers will examine the plants and conduct detailed chemical analysis on solid pellet extracts to understand watermeal's response to hypergravity.

Way Forward:

- The study is expected to provide valuable insights into how plants adapt to different gravity environments, potentially paving the way for sustainable agriculture in space.

WORLD HYDROGEN AND FUEL CELL DAY

Why in news?

- On the eve of World Hydrogen and Fuel Cell Day, celebrated annually on October 8th, the Government of India held a half-day event.
- The event, organized in New Delhi by the Ministry of New & Renewable Energy, in association with Solar Energy Corporation of India Limited, brought together hydrogen experts from the industry, academia and government.

R&D Roadmap:

- On the occasion, the R&D Roadmap for the National Green Hydrogen Mission was unveiled by the Ministry of New & Renewable Energy.
- The roadmap, which provides for a budget of Rs. 400 crores, seeks to provide guidance for developing a vibrant research and development ecosystem which can help commercialize Green Hydrogen and contribute to India's ambitious climate and energy goals.

- It focuses on developing new materials, technologies, and infrastructure to improve the efficiency, reliability, and cost-effectiveness of green hydrogen production, storage, and transportation.
- The R&D program will also prioritize safety and address technical barriers and challenges in developing a hydrogen economy.

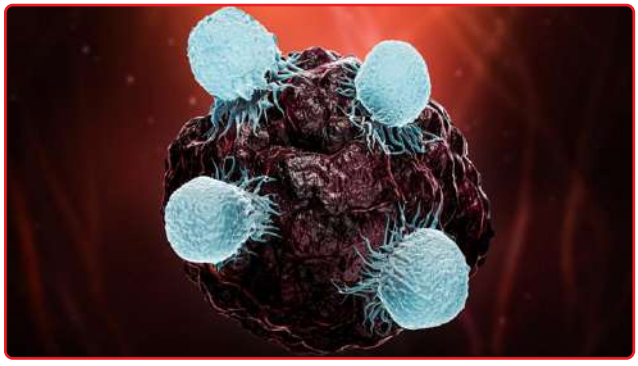
National Single Window System:

- Besides the R&D roadmap, the Green Hydrogen page on Tthe National Single Window System (NSWS) of Government of India was unveiled, which will provide a single window to industry for obtaining all approvals related to projects under the National Green Hydrogen Mission.

About World Hydrogen and Fuel Cell Day:

- The date October 8 was aptly chosen for the atomic weight of hydrogen (1.008).
- World Hydrogen and Fuel Cell Day is a global initiative aimed at promoting awareness and understanding of hydrogen as a clean and sustainable energy source, along with the versatile technology of fuel cells.
- This day serves as a platform to acknowledge the potential of hydrogen and fuel cells in addressing the pressing challenges of climate change, energy security, and environmental sustainability.

INDIA HOMEGROWN CAR T CELL THERAPY, A FORM OF IMMUNOTHERAPY, GETS MARKET AUTHORISATION



Why in news?

- For treating relapsed-refractory B-cell lymphoma and leukemia, Mumbai-based Immunoadoptive Cell Therapy Private Limited (ImmunoACT) announced the approval of India's first chimeric antigen receptor (CAR) T-cell therapy by the Central Drugs Standard Control Organization (CDSCO) recently.

Details:

- Called NexCAR19, it is an indigenously developed CD19-targeted CAR-T cell therapy.
- CD-19 is biomarker for B lymphocytes and can be utilised as a target for leukemia immunotherapies.
- ImmunoACT is an IIT Bombay-incubated company founded in 2018 and works on converting research into pharmaceutical products.

How does the treatment work?

- For CAR-T-cell therapy, a type of cancer immunotherapy treatment, blood is first drawn from the patient.
- Then, immune cells called T-cells are genetically modified in a laboratory and are injected back into the patient to enable the cells to locate and destroy cancer cells more effectively.
- It is a major breakthrough as the therapy is not available in India outside of clinical trials.
- The multi-centre Phase I and II clinical trials were conducted with 60 patients with r / r B-cell lymphomas and leukemia. The clinical data indicated a 70 per cent overall response rate.

Side effects:

- CAR T-cell therapy is generally accompanied by some side effects. One of them, according to the American Cancer Society, is cytokine release syndrome (CRS).
- It is when CAR T-cells multiply, they can release large amounts of chemicals called cytokines into the blood, which can ramp up the immune system.
- In comparison to other CAR T-cell therapies, the safety profile of CRS and the absence of neurotoxicity indicates a significant improvement.

Way Forward:

- NexCAR19 has shown an excellent balance of efficacy and low toxicity, which is a significant advantage in clinical management (post-infusion) of the patients in our resource-constrained settings.
- Priorly, CAR-T cell therapy cost around $400,000 or over Rs 3.3 crore and patients could avail of it in the United States.
- With this development, the therapy will be accessible at 20 Indian government and private hospitals treating cancer across major cities at around Rs 30-35 lakh per patient.

RAILWAYS DEVELOPS ANTI-FREEZE FLUSHES AND FUEL TANKS FOR JOURNEYS IN J&K

Why in news?

- The process of linking Kashmir to Kanniyakumari, through the new Udhampur-Srinagar-Baramulla Rail Link (USBRL) project, poses a unique challenge to

the Railways in maintaining water and fuel in liquid form in sub-zero temperatures during the winters.

- To circumvent the problem of water freezing in toilets and fuel tanks, engineers at the Rail Coach Factory (RCF) in Kapurthala have designed and implemented indigenous innovations.

Water in water tanks:

- While the LHB coach design is prominently used by the Railways, it did not have temperature control systems. In winter, temperatures in the J&K region plummet to minus-eight to minus-12 degrees Celsius.
- The RCF had designed double-walled composite insulated water tanks of capacities ranging between 450 litres and 685 litres.
- The water tank mimics thermoplastic bottles with two walls and an insulation layer of foam in the middle, which traps the air. This will maintain water in liquid form in sub-zero conditions from 16 to 20 hours. The water may remain cold but it won't freeze.

Supply pipelines:

- In another innovation, the RCF has borrowed technology from the defence services to tackle the problem of freezing water in the supply pipelines.
- They are using heated pipes with a distributed heating system covered by insulation. The water will remain cold at five to eight degrees Celsius in liquid form.
- To contain energy loss, geysers will be deployed at the point of use in toilets, where only as much water as is needed by the users will be heated.
- A similar technology is being deployed in the fuel tanks for locomotives by the RCF.

Way Forward:

- The 111-km-long railway stretch from Katra in Jammu to Banihal in Kashmir is slated to be functional before March 2023.

WEBB FINDS TINY QUARTZ CRYSTALS PRESENT ON EXOPLANET

Why in news?

- Researchers using NASA's James Webb Space Telescope have detected quartz nanocrystals in the high-altitude clouds of WASP-17 b, a hot Jupiter exoplanet located 1,300 light-years from Earth.
- This marks the first time silica (SiO_2) particles have been identified in an exoplanet atmosphere.
- They made this unexpected discovery while studying the atmospheric composition of WASP-17 b.

Why it matters?

- Silicates, minerals rich in silicon and oxygen, are common across the galaxy and form the bulk of Earth, the Moon, and other rocky objects in our solar system.
- However, the silicate grains previously detected in the atmospheres of exoplanets and brown dwarfs were typically magnesium-rich silicates like olivine and pyroxene, not pure SiO_2 or quartz.
- This discovery challenges existing theories on how exoplanet clouds form and evolve.

How research was conducted?

- WASP-17 b, one of the largest and puffiest known exoplanets, was observed by the Webb telescope for nearly 10 hours.
- They collected over 1,275 brightness measurements of mid-infrared light as the planet crossed its star.
- An unexpected bump at 8.6 microns emerged in the data, a feature that would not be expected if the clouds were made of magnesium silicates or other possible high-temperature aerosols like aluminum oxide, but which aligns with the presence of quartz.
- The quartz crystals detected are similar in shape to the hexagonal prisms found in geodes on Earth, but each one is only about 10 nanometers across.
- Unlike mineral particles found in Earth's clouds, these quartz crystals originate in the atmosphere itself, forming directly from gas under the extreme conditions of WASP-17b's atmosphere.
- Understanding the composition of these clouds is crucial for understanding the planet as a whole. Hot Jupiters like WASP-17 b are primarily composed of hydrogen and helium, with small amounts of other gases like water vapor and carbon dioxide.

Way Forward:

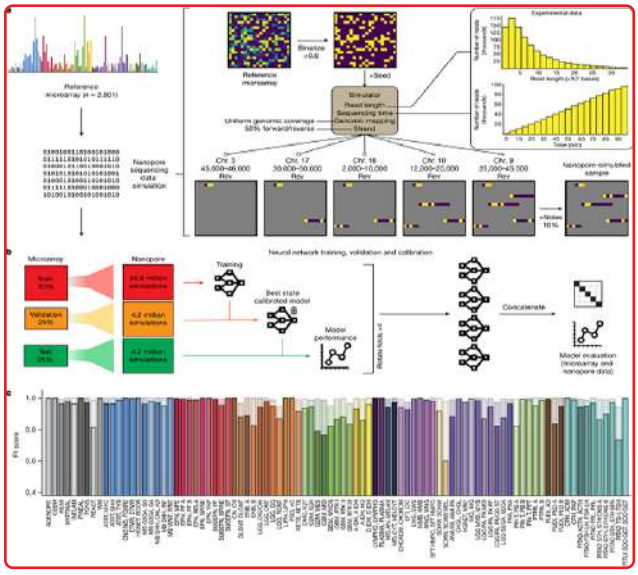
- The discovery of silica crystals provides valuable insights into the inventory of different materials shaping the environment of this planet.
- The exact quantity of quartz and the extent of its distribution in the clouds remain uncertain. However, the researchers believe that the clouds likely circulate around the planet, vaporizing when they reach the hotter day side.

DEEP LEARNING HELPS CLASSIFICATION OF TUMOURS DURING SURGERY

Why in news?

- A method to quickly classify central nervous system (CNS) tumours, combining rapid sequencing and deep-learned AI models, may enable molecular diagnosis in less than 90 minutes, according to a study.

- The findings demonstrate the potential feasibility of obtaining molecular diagnosis of tumours during surgery to assist surgical decision making.



Sequencing DNA:

- Primary treatment of CNS tumours involves surgical removal of the tumours, which requires careful consideration to strike a balance between maximising the removal of tumorous tissue while minimising the risk of neurological damage and other complications.
- The standard practice relies on preoperative imaging and histological analysis during surgery, but these methods are not always conclusive.
- Sequencing DNA to uncover methylation profiles could reveal information about the origin and prognosis of a tumour, but it takes days to get the results.

Nanopore sequencing:

- To obtain DNA methylation profiles quickly enough to provide a diagnosis during surgery, Jeroen de Ridder from Oncode Institute, Utrecht, The Netherlands and others used a technology called nanopore sequencing.
- This method is faster, but the data generated has much less coverage of genetic sites.
- To enable molecular classification of CNS tumours with such sparse data, the researchers developed a neural network tool named 'Sturgeon'.

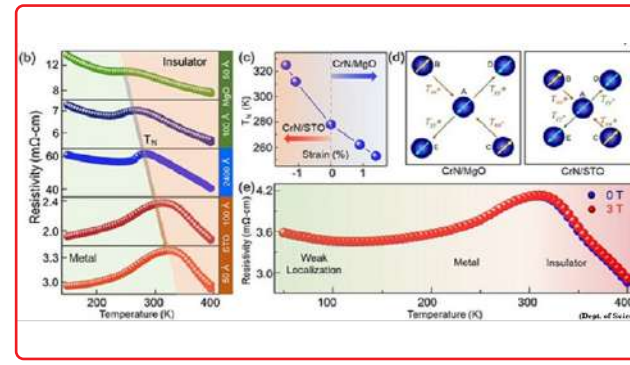
Outcome:

- After validating the tool with simulated data, they tested Sturgeon on data from CNS tumour samples. Sturgeon correctly classified 45 out of 50 samples based on data equivalent to 20-40 minutes of sequencing.
- They also demonstrated Sturgeon's performance and applicability in real time during 25 surgeries, achieving a diagnostic turnaround time of less than 90minutes.
- Of these, 18 (72%) diagnoses were correct and seven did not reach the required confidence threshold.

Way Forward:

- The findings demonstrate that deep-learned diagnosis based on fast sequencing during surgery may be able to assist neurosurgical decision making and potentially improve prognosis of patients.

MAGNETIC-STRESS AS A NEW CHAUFFEUR OF METAL-INSULATOR TRANSITION



Why in news?

- The mystery behind the peculiar metal-insulator transition exhibited by certain materials under external stimuli such as temperature, pressure, electric fields has been decoded by scientists, paving the way towards designing functional materials and devices like sensors and actuators.

Transition ability:

- Materials primarily exist in one of the two fundamental electronic states: metallic or insulating. However, certain materials exhibit the remarkable ability to transition between these two states under external stimuli such as temperature, pressure, electric fields, and more.
- Since the initial discovery of this phenomenon in magnetite in 1939, the transition between the metal-insulator phases (MIT) has continued to captivate generations of scientists and engineers.
- Their foray into this area has offered critical scientific insights and applications in various devices and at the same time brought in the necessity of new materials that can exhibit metal-insulator phase transition for industrial applications.
- Chromium nitride (CrN) is an example of such a material, wherein the metal-insulator transition is anticipated to be instigated by an unconventional force arising from the anisotropic magnetic stress.
- However, the mechanism remained experimentally unverified even with the theoretical prediction for nearly two decades.

Latest research:

- A team from the Jawaharlal Nehru Centre for Advanced Scientific Research (JNCASR) has experimentally demonstrated that magnetic stress that stems from the peculiar arrangement of atomic

spin drives the simultaneous structural, magnetic, and metal-insulator transition.
- They experimentally demonstrated the presence of magnetic stress as a driving force behind the metal-insulator transition in CrN and illuminated pathways for its manipulation.
- The magnetic stress within CrN emerges from the interplay between two distinct magnetic orderings along mutually perpendicular directions directly tied to the magnetic exchange interaction between two neighboring Cr atoms.

Key Highlights:
- They employed a technique that involves altering the equilibrium atomic spacing within CrN ultrathin films, to fine-tune the magnetic exchange interactions (epitaxial strain engineering).
- When subjected to compressive strain, the magnetic stress increases, resulting in metal-insulator transition at elevated temperatures compared to bulk values.
- Conversely, when the film is under tensile stress, the magnetic stress diminishes, prompting a metal-insulator transition at a significantly lower temperature than the bulk value.
- The structural symmetry also changes from rocksalt at high temperatures to orthorhombic at low temperatures simultaneously.
- Their observation affirms the pivotal role of magnetic stress in the metal-insulator transition of CrN.

Way Forward:
- The new mechanism of metal-insulator phase transition can lead to better understanding on how spin, charge and lattice degrees of freedom are coupled in materials and will also result in new classes of materials that exhibit metal-insulator phase transition.

NASA HAS RECEIVED CLEAREST IMAGE OF IO, THE MOST VOLCANIC WORLD IN SOLAR SYSTEM

Why in news?
- NASA's Juno spacecraft has recently unveiled breathtaking images of Jupiter's moon Io, showcasing its lava-scarred surface in unprecedented detail.
- The images were captured during a flyby as Juno passed near Io, the most volcanically active body in our solar system.

Key observations:
- Io's surface, marred by volcanic activity, is now vividly depicted in the newly released photos.
- The volcanic activity on Io has led to the formation of lakes of molten silicate lava on its surface. These dark, molten-red patches are clearly visible in the new detailed images from Juno.
- These images were processed by citizen scientists who used the raw data captured by the spacecraft, contributing significantly to our understanding of this enigmatic celestial body.
- Io is renowned for its intense volcanic activity, boasting hundreds of volcanoes that regularly erupt with molten lava. These eruptions spew sulfurous gas plumes that extend hundreds of miles into the atmosphere. These gas plumes are so vast that they can be observed from Earth through large telescopes.

Further R&D:
- The JunoCam instrument collected data during the encounter offering scientists and space enthusiasts a unique perspective on the dynamic nature of Io's landscape.
- These images and data have been made accessible to the public through NASA's online platforms.
- NASA has encouraged citizen scientists to download and process the raw data, contributing to the study of Jupiter and its moons.
- Their efforts in colour enhancement, reconstruction, and collages could reveal new and fascinating details about the gas-giant planet and its celestial companions.

About Juno mission:
- The Juno mission, launched in 2011, continues to unravel the mysteries of our solar system, providing invaluable insights into the formation and evolution of Jupiter and its moons.
- The mission is expected to continue until 2025.

SCIENTISTS ARE WORKING ON PLANS TO BUILD ROADS ON THE MOON

Why in news?

- The European Space Agency (ESA) has embarked on an ambitious project to create roadworthy surfaces on the Moon.
- The initiative, known as PAVER, aims to pave over areas of activity on the Moon, including roads and landing pads, by melting lunar dust into a glassy solid surface using a powerful laser.

Why it matters?

- The need for such an undertaking stems from the challenges posed by lunar dust, which is ultra-fine, abrasive, and clingy.
- During the Apollo era, this dust proved to be a significant hindrance, clogging equipment and eroding spacesuits.
- When the Apollo 17 lunar rover lost its rear fender, the vehicle became so coated in dust that it threatened to overheat.
- Similarly, the Soviet Union's Lunokhod 2 rover perished due to overheating when its radiator got covered in dust.

PAVER project:

- The PAVER project, led by Germany's BAM Institute of Materials Research and Testing, Aalen University, LIQUIFER Systems Group in Austria, and Germany's Clausthal University of Technology, with support from the Institute of Materials Physics in Space of the German Aerospace Center, DLR, is a response to these challenges.

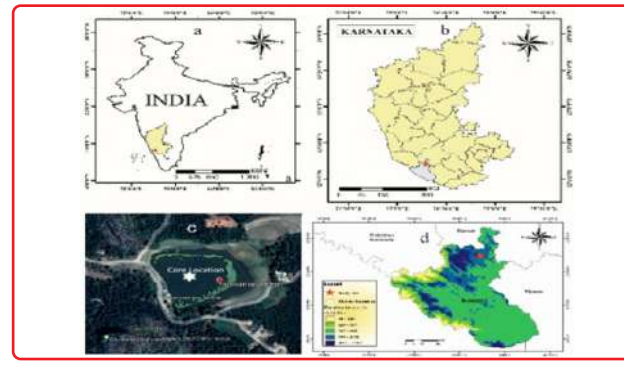
How it will work?

- They used a 12-kilowatt carbon dioxide laser to melt simulated moondust into a solid surface, creating a potential solution for constructing paved surfaces on the Moon.
- The process involves using a laser beam to produce triangular, hollow-centred geometric shapes approximately 20 cm across. These shapes can be interlocked to create solid surfaces across large areas of lunar soil, potentially serving as roads or landing pads.
- The resulting material is glasslike and brittle but can withstand downward compression forces. Even if it breaks, it can still be used and repaired as necessary.
- The team estimates that a 100 square meter landing pad with a thickness of two centimeters of dense material might be constructed in 115 days.

Way Forward:

- The initiative has been hailed as an effective investment, opening up multiple promising tracks for follow-up investigation.
- As astronauts prepare to return to the lunar surface, the creation of roadworthy surfaces could prove instrumental in making lunar exploration safer and more efficient.

LITTLE ICE AGE (LIA) WAS WET (MOIST) AND WAS NOT UNIFORMLY COLD AND DRY



Why in news?

- A new study of the Little Ice Age (LIA), a global climatic event, between CE 1671-1942, which shows significant variations of rainfall patterns during that age, challenges the conventional notion of a uniformly cold and dry climate with reduced monsoon rainfall during the LIA.

Dynamics in Western Ghats:

- The Western Ghats experiences both the southwest summer monsoon (SWM) during June to September and the northeast winter monsoon (NEM) during October to December.
- Understanding the vegetation dynamics and corresponding hydro-climate variability from such an area, which was influenced by the both the SWM and NEM, could be crucial in understanding the monsoonal variability during the last millennium.

How study was conducted?

- A study of pollen-based vegetation dynamics and contemporary climate change and monsoonal variability between CE 1219-1942 was reconstructed from the Western Ghats by the Birbal Sahni Institute of Palaeosciences (BSIP). It showed the record of moist (wet) LIA.
- The scientists scouted core sediment samples from the Honnamanakere Lake in Karnataka and analysed pollen accumulated in them to reconstruct the vegetation-based climate change and monsoonal variability during CE 1219-1942 from the Western Ghats.

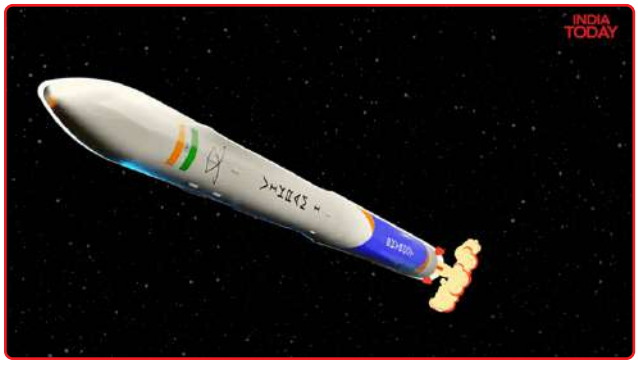
Key observations:

- Moist/semi-evergreen–dry tropical deciduous forests were mainly recorded from the study area.
- Their study showed that record of the signature of moist conditions during Little Ice Age (LIA) from the Western Ghats, India, probably due to the increased NEM. The moist (wet) LIA, moreover, shows the hydro-climatic contrast.
- They suggested that northward movement of the Inter Tropical Convergence Zone (ITCZ), positive

temperature anomalies, increased sunspot numbers and high solar activity could be driving the climate change and increased SWM.
- They attributed the weakest phase of the ISM across the Indian subcontinent during the LIA, in general, to the southward shift of the ITCZ, resulting from increased northward energy flux across the equator, during a cold northern hemisphere.

Way Forward:
- The high-resolution palaeoclimatic records generated in the present study could be helpful in developing paleoclimatic models for future climatic predictions and also for a scientifically sound policy planning.
- Knowledge and understanding of the climate change and the Indian Summer Monsoon (ISM) variability during the Holocene could be of immense interest to strengthen the understanding of the present ISM-influenced climatic conditions, as well as of possible future climatic trends and projections.

VIKRAM I



Why in news?
- Skyroot Aerospace, an Indian startup aerospace company, has unveiled, Vikram-I, a seven-storey-high multi-stage rocket with orbital satellite deployment capabilities.
- This marks a significant milestone in India's space sector, as Vikram-I is among the few private rockets globally that possess such advanced capabilities.

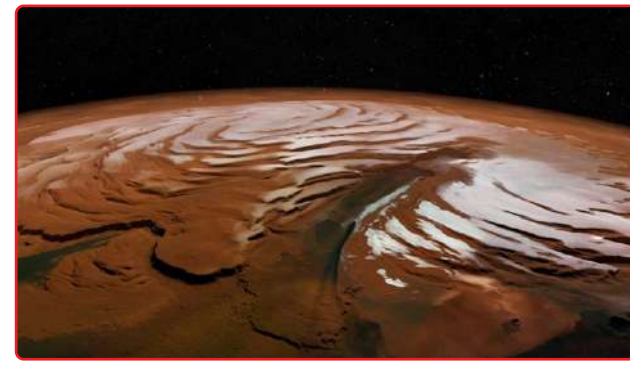
What is Vikram-I?
- Vikram-I is a technological marvel, designed to carry payloads of around 300 kg to Low Earth Orbit (LEO). It boasts an all-carbon-fiber body, a feature that sets it apart from other rockets in its class.
- The Vikrams series is named for Dr. Vikram Sarabhai, founder of the Indian Space Program, and is in development to capture the multi-million-dollar small satellite launch market.
- The rockets are developed with the aim of providing multi-orbit insertion and interplanetary mission capability to not just India but also foreign customers.
- This lightweight yet robust material allows the rocket to withstand the harsh conditions of space travel while maintaining optimal performance.

Key features:
- One of the most notable features of Vikram-I is its ability to place multiple satellites into orbit simultaneously. This capability is a first for India's space sector and places the country among the global leaders in satellite deployment technology.
- The rocket also features 3D-printed liquid engines, a testament to Skyroot Aerospace's commitment to leveraging cutting-edge technology in its designs.
- The launch vehicle's orbital adjustment module with re-start capability enables multi-orbit insertions.
- It can be assembled and launched within 24 hours from any launch site.

When will Vikram-I Launch?
- The launch of Vikram-I is planned for early 2024, marking it as Skyroot's second rocket launch following the successful deployment of the Vikram-S rocket on November 18, 2022.
- The Vikram-S launch was a historic event for the Indian space sector, marking the first such mission by a private company in the country.

MAX-Q Campus:
- In addition to unveiling Vikram-I, Skyroot Aerospace also inaugurated its new headquarters, named 'The MAX-Q Campus'.
- Located at the GMR Aerospace and Industrial Park in South Hyderabad, the facility spans 60,000 sq ft and is touted as the country's largest private rocket development facility under one roof.
- The MAX-Q Campus houses integrated design, manufacturing, and testing facilities for building space launch vehicles, providing a comprehensive solution for the company's ambitious space exploration plans.

NEW MAP HELPING LOCATE ICE ON MARS



Why in news?
- NASA's Subsurface Water Ice Mapping (SWIM) project has released its fourth set of maps, providing the most detailed view of Mars' subsurface ice since the project's inception in 2017.
- The maps are crucial for future Mars missions as they identify the most likely locations to find Martian ice that can be accessed from the surface.

- This ice will serve as a vital resource for astronauts, providing drinking water and a key ingredient for rocket fuel.

SWIM project:

- The SWIM project, led by the Planetary Science Institute in Tucson, Arizona, and managed by NASA's Jet Propulsion Laboratory in Southern California, combines data from several NASA missions, including the Mars Reconnaissance Orbiter (MRO), 2001 Mars Odyssey, and the now-inactive Mars Global Surveyor.
- The instruments on these spacecraft have detected what appear to be masses of subsurface frozen water along Mars' mid-latitudes.

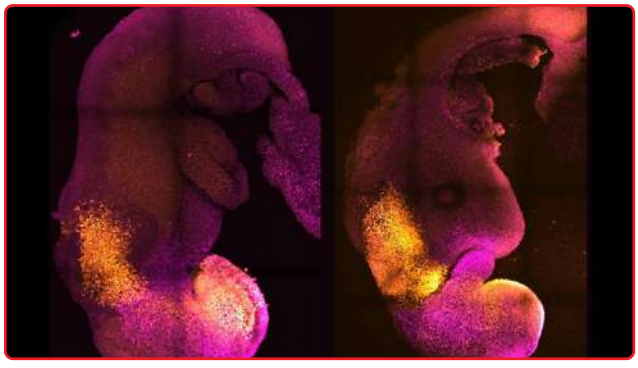
New map:

- The latest SWIM map was created using two higher-resolution cameras aboard MRO, providing a more detailed perspective of the ice's boundary line as close to the equator as possible.
- Scientists use HiRISE (High-Resolution Imaging Science Experiment) to study fresh impact craters caused by meteoroids that may have excavated chunks of ice.
- The new map also includes sightings of so-called "polygon terrain," where the seasonal expansion and contraction of subsurface ice causes the ground to form polygonal cracks, indicating more ice hidden beneath the surface.

Way Forward:

- The SWIM project is expected to serve as a foundation for a proposed Mars Ice Mapper mission, an orbiter equipped with a powerful radar custom-designed to search for near-surface ice beyond where HiRISE has confirmed its presence.

SCIENTISTS GROW MOUSE EMBRYOS IN SPACE



Context:

- The study was initiated with the extraction of early two-cell stage embryos from pregnant mice, which were then frozen and transported to the ISS aboard a SpaceX rocket launched from Florida in August 2021.
- This research, led by Professor Teruhiko Wakayama of the University of Yamanashi in Japan, aims to explore the feasibility of human reproduction in space.

How the experiment was conducted?

- The embryos were stored in specially designed devices that allowed astronauts to thaw and culture them easily. After four days, the embryos were chemically preserved and returned to Earth.
- The four-day cultivation period was determined by the fact that embryos can only survive outside a uterus for this duration.
- Upon their return, the team examined the embryos to assess whether their development had been impacted by the higher radiation and low gravity, or microgravity, conditions in space.

Key observations:

- Contrary to expectations, the embryos showed no signs of DNA damage from radiation exposure, likely due to their short stay in space.
- They also exhibited normal structural development, including differentiation into two groups of cells that form the fetus and placenta.
- This finding is particularly significant as it was previously believed that microgravity could hinder the ability of embryos to separate into these two different cell types.
- While it remains uncertain whether later stages of embryo development would be disrupted in space, previous studies involving pregnant rats sent on NASA spaceflights suggest that normal development is possible.
- These rats gave birth to pups of typical weight upon their return to Earth, indicating normal development during their gestation in space.

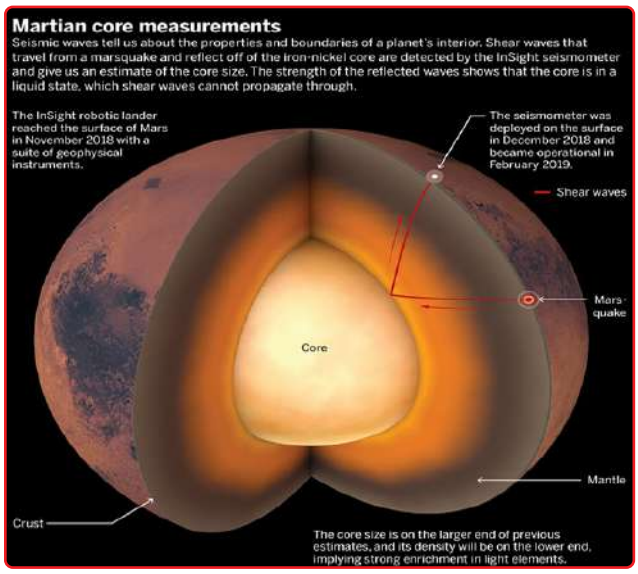
What's next?

- They now plans to test whether mouse embryos that have been sent to the ISS and then returned to Earth can implant in female mice and develop into healthy offspring.
- This will provide further insights into the viability of embryos exposed to space radiation and microgravity.
- The researchers also intend to explore whether mouse sperm and eggs sent to the ISS can be used to create embryos via in-vitro fertilization (IVF) in space.

STUDIES PROVIDE INSIGHT INTO THE INTERNAL STRUCTURE OF MARS

Why in news?

- Mars's liquid iron core is likely to be surrounded by a fully molten silicate layer, according to a pair of studies.
- These results offer a new interpretation of the interior of Mars, suggesting its core is smaller and denser than previously proposed.



Background:

- Seismological study of Mars to understand the interior of the red plant was carried out in 2019. The InSight Mars Lander used an instrument called the Seismic Experiment for Interior Structure (SEIS) to record seismic waves passing through Mars's interior.
- Data from three years of quakes in Mars, including two seismic events caused by meteorite impacts, were used for the study.

Measurement analysis

- The analysis of measurements from the NASA InSight lander's Seismic Experiment for Interior Structure (SEIS) project in 2021 suggested the presence of a large but low-density core, composed of liquid iron and lighter elements such as sulphur, carbon, oxygen and hydrogen.

Key findings:

- The new studies suggest that the core has a higher proportion of lighter elements than is feasible according to estimates of the abundances of these elements early in Mars's formation history.
- They examined the latest batch of seismic signals in combination with first principles simulations and geophysical models to produce their estimates for the size and composition of the Martian core.
- The two studies found that the liquid iron-nickel core of Mars is surrounded by an approximately 150 km-thick layer of near-molten silicate rock, the top of which was previously misinterpreted as the surface of the core.
- This decrease in core radius implies a higher density than estimated in the earlier InSight study.
- These estimates can more easily be reconciled with our existing knowledge of chemical abundance on Mars.

Temperature

- The molten state of core suggests that its temperature must be at least 2,000Kelvin.
- This could be a sign that Mars had a turbulent interior following its formation, rather than a calmer one that more gently transported and shed heat to interplanetary space.

SOCIAL ISSUES

INDIA FIRST HIGH TECH SPORTS TRAINING CENTRE FOR DIVYANGJAN

Why in news?

- On the occasion of Mahatma Gandhi's birthday, Prime Minister inaugurated the country's first high-tech sports training centre for Divyangjan, in Gwalior, Madhya Pradesh.
- It is named after former Prime Minister Atal Bihari Vajpayee.

Key Highlights:

- This initiative aims to provide equal opportunities in sports, enhance talent, and encourage participation in various sports disciplines.
- Divyangjan from all over the country can practice and train in the Atal Bihari Training Center for Divyang Sports.

Way Forward:

- This inauguration program serves as a platform to demonstrate commitment to an inclusive and accessible sports ecosystem, emphasizing the power of sports in inspiring individuals to overcome obstacles without worrying about their physical abilities.

AT 36 PERCENT, EBCS LARGEST GROUP IN BIHAR, SHOWS CASTE STUDY

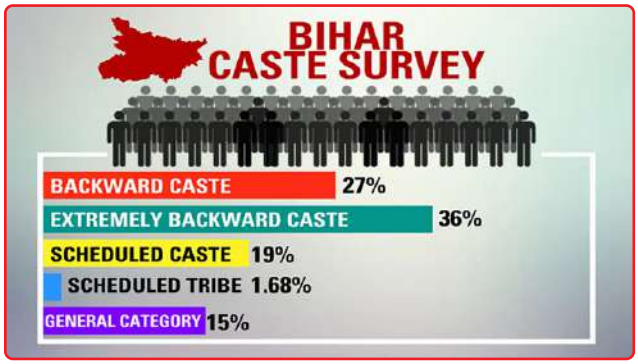
Why in news?

- Recently, the Bihar government released the report of a caste survey conducted in the State.

Key Highlights:

a) The Other Backward Classes (OBCs) make up 27.1286% of the population of the State;
b) the Extremely Backward Classes (EBCs) 36.0148%;
c) the Scheduled Castes 19.6518%; and
d) the Scheduled Tribes 1.6824%.

- The upper castes make up 15.5224%.
- Hindus form 81.9986% of the population and Muslims 17.7088%.
- The total population is over 13 crore.



Caste-wise:

- The survey report 'Bihar Jaati Adharit Ganana, 2022 (Bihar caste-based survey, 2022) says the Yadavs make up 14.26% of the State population; Kushwahas 4.27%; and and Kurmis 2.87%.
- The Musahar caste makes up 3% of the State population and Brahmins 3.66%.
- The upper-caste Kasha community comes to 0.68% population of the State.

HEALTH

WHO APPROVES USE OF MALARIA VACCINE WITH ADJUVANT TECH

Why in news?

- The R21/Matrix-M malaria vaccine developed by the University of Oxford and the Serum Institute of India, leveraging Novavax's adjuvant technology, was recommended for use by the World Health Organization (WHO) recently.

Details:

- Following a detailed scientific review by the WHO's independent advisory body, the Strategic Advisory Group of Experts (SAGE), and the Malaria Policy Advisory Group (MPAG), the R21/Matrix-M malaria vaccine has been recommended for use.
- With the approval and recommendations by the WHO, additional regulatory approvals are expected to follow shortly and vaccine doses could be ready to begin wider roll-out as early as next year.

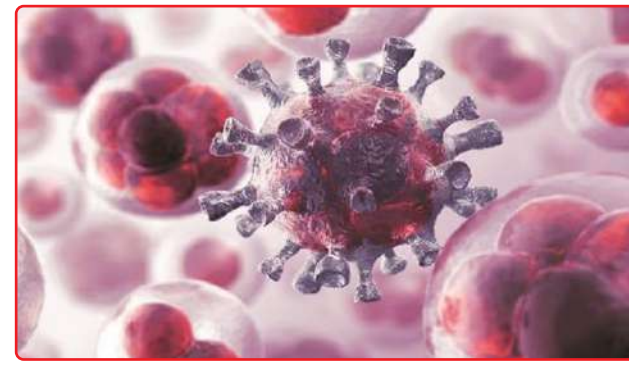
Matrix-M component:

- The Matrix-M component is a proprietary saponin-based adjuvant from Novavax, which is licensed to the Serum Institute for use in endemic countries, while Novavax retains commercial rights in non-endemic countries.
- The vaccine was developed by the Jenner Institute at Oxford University and the Serum Institute of India with support from the European and Developing Countries Clinical Trials Partnership (EDCTP), the Wellcome Trust, and the European Investment Bank (EIB).

Way Forward:

- The Serum Institute has already established production capacity for 100 million doses a year, which will be doubled over the next two years.
- This scale of production is critical because vaccinating those at high risk of malaria will be important in stemming the spread of disease, as well as protecting the vaccinated.

JHARKHAND GOVT GIVES NOD TO DECLARE CANCER, RABIES AS NOTIFIABLE DISEASES



Why in news?

- The Jharkhand cabinet recently approved a proposal to declare cancer and rabies as notifiable diseases, which will pave the way for a database for such ailments.
- With the declaration of cancer and rabies as notifiable diseases, private and state-run hospitals, which are treating patients of such diseases, will have to inform the government so that a database can be created. It would also help draft long-term policy in future.

Scheme for Panchayats:

- The council of ministers also gave its nod to the Mukhyamantri Panchayat Protsahan Yojana and Swachh and Swasthya Panchayat Protsahan Yojana, under which 24 best gram panchayats from over 4,300 such institutions in 24 districts would be selected and honoured with Rs 10 lakh each.

- The five block panchayats from five divisions of Jharkhand would also be selected and would be given Rs 15 lakh each as a reward.
- Under Gram Sabha Protsaha Purashkar, Rs 4 lakh will be given to 48 gram sabhas. Besides, two zila parishad will also be selected and awarded Rs 20 lakh each.
- The district and state-level award review committees have also been constituted for the purpose.
- As many as 32 agendas were cleared during the meeting, including approval of Rs 463 crore for installing 43,510 tube wells in 4,351 gram panchayats to deal with water crisis during summer.

Other sanctions:

- The Information Security Policy and Data Privacy Policy for Aadhaar Ecosystem 2023 got the cabinet nod, which would help ensure data protection.
- Five new police stations, three new outposts and the proposal to upgrade two outposts to full-fledged police stations were approved.

FSSAI CLARIFIES ADDITION OF PROTEIN BINDERS NOT PERMITTED IN MILK, PRODUCTS

Why in news?

- The Food Safety and Standards Authority of India (FSSAI) clarified that the addition of protein binders or any other additives was not permitted in milk and milk products.
- It added that only additives, which are specified for milk and milk products in Appendix A of the Food Safety and Standards (Food Products Standards and Food Additives) Regulation, 2011, can be used for these products.

Binding agents:

- Binding agents have emerged as an important and required class of ingredients to manufacture a wide range of new food products, especially semi-solid or solid foods.
- However, such application is known to affect the digestibility of the protein bound and thus can affect the biological and nutritive value of milk proteins. Protein binding also influences the bioavailability and distribution of active compounds.

Milk protein:

- Milk protein has a high biological value as it is a good source of essential amino acids.
- Moreover, milk proteins are easily digestible and do not contain any anti-nutritional factors, unlike many plant-based proteins.
- In addition, milk and milk products contain an array of proteins with biological activities ranging from antimicrobial to those facilitating the absorption of nutrients as well as acting as growth factors, hormones, enzymes, antibodies, and immune stimulants.

Way Forward:

- The clarification is a welcome step, which will ensure that only pure products are sold in the market.
- The dairy industry uses only FSSAI-specified emulsifiers. This will, however, impact the nutraceuticals industry that has been promoting the use of alternative protein.

ICMR TO CONDUCT STUDY TO DEVELOP SOLUTIONS TO REMEDY CHILDHOOD UNDERNUTRITION

Why in news?

- The Indian Council of Medical Research (ICMR) is constituting a team to start a multi-centre research study to assess the effects of providing appropriate take home foods in combination with behaviour change intervention to ensure good complementary feeding practice that is nutritionally optimum to meet young children's nutrient needs.

Complementary feeding:

- Time between six and 24 months is a critical age-window that influences subsequent growth trajectory and heightens the risk of wasting, stunting and undernutrition if the diet and care environment of children is not optimal. The period, typically, determines a child's growth, development, and future potential.
- Complementary feeding is defined as the process starting when breast milk alone is no longer sufficient to meet infants' nutritional requirements, resulting in the need for other foods and liquids along with breast milk.

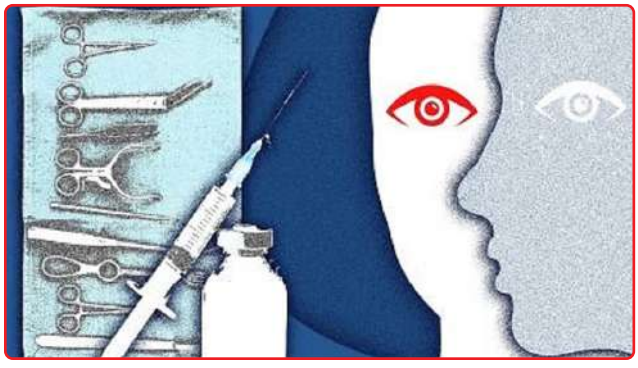
Challenges:

- Listing out the challenges in complementary feeding, the ICMR maintained that there are often suboptimal practices, including inadequate quality or quantity of foods, poor feeding practices, complementary feeding being initiated too early or too late, or being provided in quantities that are too small or infrequent.
- The 'Take Home Ration (THR)' programme aims to play a critical role in improving the nutritional intake of children.
- However, continued poor complementary feeding practices suggest that there is a need to re-look at the programme and make strategic adaptations to increase its impact and reach through improving quality and nutritional content of THR.

Way Forward:

- It suggested that apart from providing the right food, ensuring that an infant or a young child is actually eating it is equally critical.
- As part of the project, the selected researchers will be invited to join the research team. They will collaborate to develop a full research proposal and roll out the multi-centre research project which will be coordinated by ICMR.

GOVT SETS OUT TO DEFINE MINIMUM STANDARDS FOR SKIN, HAIR AND COSMETOLOGY CLINICS



Why in news?

- The Union government has set in motion an effort to prescribe minimum standards of services for skin, hair, cosmetology and dental cosmetology clinics across India.
- The initiative comes amid concerns that many such clinics are carrying out procedures without medical supervision, through staff who lack the requisite training.

Background:

- The sub-committees had been set up for each of these specialisations in order to define minimum standards of services and standards for them under the Clinical Establishment (Registration and Regulation) Act, 2010.
- The Act provides for the introduction of rules to govern all public and private therapeutic and diagnostic centres, including single-doctor clinics.
- While a total of 19 states and Union territories have adopted the Act; which seeks to prescribe mandatory minimum standards for infrastructure and equipment, personnel, patient safety and treatment protocols to ensure that patients receive quality healthcare, none of them has notified rules under the law so far.

Delhi High Court directives:

- The panels had been formed following instructions from the Delhi High Court. In May 2022, a petition was filed in the court after a 35-year-old Delhi man died following a botched hair transplantation procedure.
- The directive issued to the ministry said the "government should ensure that such mushrooming salons carrying out hair transplantation procedures under unprofessional hands without requisite qualification and in absence of medical supervision are checked".
- It also said that requisite safeguards need to be ensured for the safety of persons who undertake these treatments, and that the public at large needs to be made aware that such hair transplantation procedures or aesthetic surgeries can be fatal if performed by unqualified professionals, and require strict medical supervision.
- In case any such medical protocols have not been established for guidance of medical practitioners, the same need to be framed at the national level.

Conclusion:

- According to an estimate by the Federation of Indian Chambers of Commerce and Industry (FICCI), the 'Medical Value Travel' industry in India gets maximum patients for heart surgery, knee transplant, cosmetic surgery and dental care.
- The absence of regulation allows for the proliferation of untested procedures, putting consumers at risk of financial exploitation and bodily harm.

A HELP PROGRAMME LAUNCHED IN JHARKHAND

Why in news?

- The Department of Animal Husbandry and Dairying, Government of India launched the 'A-HELP'

(Accredited Agent for Health and Extension of Livestock Production) programme in the State of Jharkhand.

Key Highlights:

- The 'A-HELP' program aims to empower women by engaging them as Accredited Agent who contribute significantly to disease control, animal tagging, and livestock insurance.
- The new scheme would enhance access to veterinary services at the farmer's doorstep and empower Pashu Sakhis.
- This new band of community-based functionaries, named Accredited Agent for Health and Extension of Livestock Production (A-HELP) has been formulated to fill the void between local veterinary institutions and livestock owners and provide primary health services and will serve as Livestock Resource Persons and Primary Service Providers.

About A-HELP:

- The Department of Animal Husbandry and Dairying (DAHD) is embarking on a novel initiative named as "A-HELP" (Accredited Agent for Health and Extension of Livestock Production) and has already initiated across different States/UTs including Bihar, Gujarat, Jammu and Kashmir, Karnataka, Madhya Pradesh, Uttarakhand, and Jharkhand.
- It has launched the novel initiative through an MoU signed between DAHD and the National Rural Livelihoods Mission (NRLM) under the Ministry of Rural Development (MoRD).
- A-HELP Kits were distributed to Pashu Sakhis, and the event witnessed substantial participation, with more than 500 attendees, including progressive farmers and Pashu Sakhis.

Way Forward:

- This initiative signifies a significant step forward in promoting livestock health, extension services, and women's empowerment in the region, potentially leading to improved livestock productivity and rural development.

EGYPT IS RACING TO ELIMINATE HEPATITIS C

Why in news?

- Recently, the WHO announced that Egypt had made "unprecedented progress" towards eliminating hepatitis C.
- According to the WHO, Egypt became the first country to achieve "gold tier" status on the path to elimination of hepatitis C as per the global health body criteria.

Gold tier status:

- The "gold tier" status to reach the stated goal of eliminating hepatitis C includes meeting specific criteria such as
  - ensuring 100% blood and injection safety,
  - maintaining a minimum of 150 needles/syringes per year for people who inject drugs (PWID),
  - diagnosis of over 80% of people living with chronic hepatitis C virus (HCV),
  - treating of over 70% of individuals diagnosed with HCV, and
  - the establishing of a sentinel surveillance programme for hepatitis sequelae, including liver cancer.

Progress in Egypt:

- Egypt has diagnosed 87% of people living with hepatitis C and has provided 93% of those diagnosed with curative treatment, exceeding the WHO gold tier targets of diagnosing at least 80% of people living with hepatitis C and providing treatment to at least 70% of diagnosed people.
- Egypt had undertaken the "100 Million Healthy Lives" initiative. Through this initiative, Egypt "significantly reduced the prevalence of hepatitis C from 10% in 2016 to 5% in 2018 and an estimated less than 1% in 2019".
- With its commitment to eliminate hepatitis C, Egypt has succeeded in testing virtually the whole of the eligible population and has treated almost all those who are living with the virus. This represents one third of the 12 million people living with hepatitis C in the Eastern Mediterranean Region.

How it achieved success?

- Egypt was able to achieve huge success with hepatitis C due to key interventions undertaken including population-based surveys to understand the hepatitis C epidemic (who is affected and where) and developing an investment case to highlight the economic burden of HCV.
- Egypt also customised the elimination programme by involving generalist doctors to community healthcare workers and using telemedicine for hard-to-reach areas.
- But the biggest boost came from reducing the cost of medical treatment per patient to less than $50 through local manufacturing.

Global burden of Hepatitis C:

- Hepatitis C infection is unevenly distributed globally, with these regions accounting for the most

– European (22%), South-East Asia (20%) and the Eastern Mediterranean (17%).

- According to a 2023 WHO document,in 2019, there were 1.5 million new infections, with one third of new HCV infections occurring in the Eastern Mediterranean Region. The prevalence of hepatitis C across the world in 2019 was 58 million.
- Though unscreened blood and blood products and inadequate sterilisation of medical equipment in health-care settings are two important routes of virus transmission, the most common route of virus spread is through unsafe injection practices.
- The use of safe injections has however reduced new hepatitis C infections.

CENTRE SEEKS INCLUSION OF TRADITIONAL MEDICINE ON WHO'S LIST

Why in news?

- The Union government has sought the inclusion of Ayurveda and related systems in the 11th revision of the World Health Organization's International Classification of Diseases (ICD), as the second module of a supplementary chapter on traditional medicine conditions.

Details:

- The ICD provides a common language that allows health professionals to share standardised information across the world.
- The traditional medicine module of the 11th revision provides a list of diagnostics categories to collect and report on medicine conditions in a standardised and internationally comparable manner.

Why it matters?

- Ayurveda and related Indian traditional health care systems are a formally recognised and widely practised health care systems in India, which is making a strong and valid point for its inclusion.
- The efforts to effectively regulate traditional medicine as an integral part of the health system require standardised and evidence-based information.
- The ICD-11 is a formative step for the integration of such forms of medicine into a classification standard used in conventional medicine. It also provides the means for doing research and evaluation to establish its efficacy.

Module-1:

- After a decade of repeated consultations, ICD-11 had facilitated the inclusion of Module-1, which covers traditional medicine conditions originating in ancient China, which are now commonly used in China, Japan, Korea, and elsewhere around the world.
- The 11th revision contains around 17,000 unique codes and more than 1,20,000 codable terms, which are now entirely digital.

Significance:

- The joint use of ICD-11's chapter on traditional medicine along with other chapters on neoplasm, patient safety, and injuries, can enhance the reporting of adverse events.
- It will enable the integration of traditional medicine into insurance coverage and reimbursement systems, in line with larger WHO objectives relating to universal health coverage.
- It will also link traditional medicine practices with global conventional medicine's norms and standard development.

Way Forward:

- The development of Module-2 for Ayurveda-related diagnostic systems is being actively supported by the Ministry of Ayush.
- It banks on the implementation experience gained on the ground by the National Ayush Morbidity and Standardised Terminologies Electronic portal, and the Ayush Health Information Management System.

LAO PDR BECOMES SECOND COUNTRY IN 2023 TO ELIMINATE LYMPHATIC FILARIASIS

Why in news?

- Lao People's Democratic Republic has eliminated lymphatic filariasis (LF), a disease that has significant social and economic impact on the affected communities according to the World Health Organization (WHO).
- This is the country's second neglected tropical disease (NTD) to be eliminated in six years, following the elimination of trachoma as a public health hazard in 2017.

Elimination of lymphatic filariasis (LF):

- Lao PDR is now the second country after Bangladesh to eliminate lymphatic filariasis (LF) in 2023. Nineteen countries have been able to eliminate LF.
- Of the 19 countries, 11 belong to the WHO Western Pacific Region (WPR). Lao PDR is 11th country in the WPR region to successfully eliminate LF.
- Four countries in the WHO South-East Asia region have also eliminated LF: Bangladesh, the Maldives, Sri Lanka and Thailand.
- In WHO Africa region, two countries; Malawi and Togo have eliminated the disease. The disease has been eliminated in the WHO Eastern Mediterranean's Yemen too.

Tackling LF:

- The most cost-effective method for treating all affected residents of LF-endemic areas and stopping future transmission is mass drug administration (MDA).
- WHO recommends the triple therapy combination of ivermectin (I), diethylcarbamazine (D) and albendazole (A), for MDA against LF. Multiple rounds of MDA, covering over 65 per cent of the population, are required.
- Over the last 15 years, the global population requiring LF interventions has decreased by 53 per cent.
- According to WHO, this is due to concerted efforts by governments and partners under the Global Programme to Eliminate Lymphatic Filariasis launched in 2000.

Transmission:

- LF, also known as elephantiasis, is a preventable mosquito-borne infectious disease targeted for global elimination as a public health problem.
- It occurs when one of the filarial parasites; Wuchereria bancrofti, Brugia malayi and B. timori — are transmitted to humans through mosquito bites.
- The parasites nest in the lymph vessels, damaging them. This leads to hydrocele, lymphedema, and elephantiasis.

Ongoing progress:

- According to the WHO report, 10 countries stopped MDA nationally, which means these are on the right track to eliminating LF.
- These include -- Benin, Cameroon, Eritrea, Mali, Sao Tome and Principe, Uganda, Brazil, Dominican Republic, Timor-Leste and Brunei Darussalam. But these countries are yet to meet the criteria for validation.
- Kenya too is progressing in its efforts towards eliminating LF and may no longer need MDA.

Need for MDA:

- Some 794 million people required MDA for the treatment of LF globally in 2022. More than half of those in need of MDA during the year were from India.
- However, just 152.2 million people, or about 34 per cent, were reported to have received treatment in the country. According to WHO, Gabon in Africa has not yet begun MDA.
- Only 326 million people or 41 per cent of the 794 million people who needed MDA in 2022, were treated globally.

Way Forward:

- The Road Map for NTDs 2021-2030 had a target to eliminate LF from 23 countries by 2023.
- The elimination of NTDs by 2030 is one of the primary objectives of the United Nations-mandated global sustainable development goal of "health for all" (SDG 3).

A DRAFT MENSTRUAL HYGIENE POLICY IS FINALLY OUT

Why in news?

- The Centre's Menstrual Hygeine Policy was recently hosted online for comments from the public.
- The Menstrual Hygiene Policy officially aims at addressing the long-standing challenges associated with menstruation in our country.

Why this policy?

- Historically, this biological phenomenon has been overlooked, resulting in negative impact on girls, women, families and the environment.
- India, with its vast and diverse population, acknowledges the critical importance of this issue and places great emphasis on framing a comprehensive menstrual hygiene policy.
- This policy is essential for effectively addressing the needs of all who menstruate and promote a positive transformation within society.

Why it matters?

- Indeed, given the population figures, any problem is bound to be daunting, because of the sheer number of people it affects.
- The number of women who have no access to the restroom, access to napkins, or other menstrual products is staggering. It is a reality.
- First and foremost it affects the mental health of the women, impacts on their confidence, development and So, if there is a policy that will be seriously

implemented, and improve women's access to hygiene and privacy, then it is a welcome measure.

Approach:

- The policy will adopt a "life cycle" approach and attempt to provide comprehensive support throughout the menstrual journey; from menarche to menopause. So, when and if, fully implemented, it might just break down the barriers that women and girls face today.
- The Menstrual Hygiene Policy document online reiterates its commitment to align with India's aspirations to achieving the Sustainable Development Goalsparticularly in relation to good health and well-being, quality education, gender equality, and clean water and sanitation.
- It has also pledged to make menstrual products more accessible and affordable, in addition to creating hygienic toilets in public areas, workplaces, and schools.

Way Forward:

- The policy vows to serve as a catalyst to raise awareness, challenge societal norms and foster a society that embraces menstrual hygiene as a natural and normal part of life.

FIRST BLOODLESS HEART TRANSPLANT IN ASIA

Why in news?

- Recently, doctors at Marengo CIMS Hospital in Ahmedabad successfully performed Asia's first bloodless heart transplant.
- The patient, 52-year-old Chandraprakash Garg, who was suffering from Ischemic Dilated Cardiomyopathy and end-stage heart failure, underwent this innovative procedure.

Why it matters?

- Bloodless heart transplant surgeries are exceptionally intricate and require extensive expertise.
- They involve meticulous assessment and control of blood loss, ultimately eliminating the need for blood transfusions.
- This is a significant advancement as blood transfusions can lead to potential risks and complications.
- During high-end surgery, blood transfusion can lead to potential risks and complications. Blood is also an organ and transfusion is considered to be an organ transplant in itself, to be completely monitored and controlled.

Recovery phase:

- The patient was discharged in just nine days, a stark contrast to the typical 21 to 24 days of hospital stay for conventional heart transplant patients.
- This zero-transfusion approach significantly reduces short- and long-term complications associated with transfusions, shortens hospital stays, and enhances overall clinical outcomes.

Way Forward:

- Because there was no blood transfusion, many of its deterrent effects were not seen in the postoperative period, leading to a smooth recovery for the patient.

FIRST EVER PILL AGAINST DENGUE TESTED ON HUMANS

Why in news?

- In a significant breakthrough in the fight against dengue fever, Johnson & Johnson has developed an experimental pill that has shown promising results in a small human challenge trial.
- The pill, which is the first to demonstrate antiviral activity against dengue, was able to protect against a form of the virus in several patients.

Significance:

- Dengue fever, often asymptomatic but known for causing severe joint pain and spasms, affects millions of people each year, particularly in Asia and Latin America.
- With no specific treatments currently available, this development represents a major step forward in combating the disease.

How trial was conducted?

- The trial, conducted in collaboration with Johns Hopkins Bloomberg School of Public Health, involved 10 volunteers who were administered a high dose of the pill five days before being injected with a type of dengue.
- They continued taking the pill for 21 days afterwards.

Outcome:

- Six out of the ten participants showed no detectable dengue virus in their blood after exposure to the pathogen, nor any signs of an immune response to the infection over 85 days of monitoring.
- The drug works by blocking the action of two viral proteins, thereby preventing the virus from replicating. It was well-tolerated by all trial participants.
- These encouraging early results support the ongoing Phase II trials of the pill, aimed at preventing the four different types of dengue in real-world settings where the disease is prevalent.

Challenges:

- However, a key challenge is ensuring access to the new drug, if proven effective on a larger scale, especially in low- and middle-income countries where it is most needed.
- This echoes the challenge faced by the World Health Organization-backed dengue vaccine earlier.

Way Forward:

- The next step will be testing it as a treatment.

SC ALLOWS SURROGACY, STRIKES DOWN RULE BANNING USE OF DONOR GAMETES

Why in news?

- The Supreme Court has protected the right of parenthood of a woman, suffering from a rare medical condition, by staying the operation of a law which threatened to wreck her hopes to become a mother through surrogacy.

Details:

- The woman has the Mayer Rokitansky Kuster Hauser syndrome.
- Medical board records showed she has "absent ovaries and absent uterus, hence she cannot produce her own eggs/oocytes". The couple had begun the process of gestational surrogacy on December 7, 2022.

Petition Amendment in March 2023:

- The petition was filed in the Supreme Court challenging the amendment as a violation of a woman's right to parenthood.
- Gametes are reproductive cells. In animals, the male gametes are sperms and the female gamete is the ovum or egg cells.
- On March 14, 2023, the Ministry of Health and Family Welfare published General Statutory Rules (GSR) 179 (E) which stated,
  1. a couple undergoing surrogacy must have both gametes from the intending couple and donor gametes are not allowed
  2. single women (widow/divorcee) undergoing surrogacy must use self-eggs and donor sperms to avail surrogacy procedure.
- Section 2(h) of the Assisted Reproductive Technology Regulation Act, 2021 defines "gamete donor" as a person who provides sperm or oocyte with the objective of enabling an infertile couple or woman to have a child.

Gestational surrogacy:

- The plea claimed the said GSR has the effect of frustrating the provisions of the Surrogacy (Regulations) Act, 2021 which is a welfare legislation giving right of parenthood to infertile couples.
- It contradicted Sections 2(r) and 4 of the Surrogacy Act, 2021, which recognised the situation when a medical condition would require a couple to opt for gestational surrogacy in order to become parents.
- Rule 14(a) of the Surrogacy Rules which listed the medical or congenital conditions owing to which a woman could choose to become a mother through gestational surrogacy.
- They included "having no uterus or missing uterus or abnormal uterus (like hypoplastic uterus or intrauterine adhesions or thin endometrium or small unicornuate uterus, T-shaped uterus) or if the uterus is surgically removed due to any medical condition such as gynaecological cancer.

SC judgement:

- In the case before SC, the woman had begun the surrogacy process months before the amendment, which cannot be implemented retrospectively.
- In an 11-page order, the SC court agreed that the law permitting gestational surrogacy was "woman-centric". The decision to have a surrogate child was entirely based on the woman's inability to become a mother owing to her medical or congenital condition.
- Such a condition included the "absence of a uterus or repeatedly failed pregnancies, multiple pregnancies or an illness which makes it impossible for her to carry a pregnancy to term or would make the pregnancy life-threatening".
- The amendment cannot contradict Rule 14(a) which specifically recognises the absence of a uterus or any allied condition as a medical indication necessitating gestational surrogacy.
- Addressing the government's contention that the surrogate child should be "genetically related" to the couple, the court said the child would be related to the husband.

- The expression 'genetically' related to the intending couple has to be read as being related to the husband when Rule 14(a) applies, the court said.

BHUTAN BECOMES FIRST COUNTRY TO STERILISE ALL STRAY DOGS

Why in news?

- Bhutan has declared itself the first country in the world to have completely sterilised and vaccinated its entire stray dog population, following a 14-year dog population control programme.

Why it matters?

- There are about 300 million stray dogs across Asia who struggle with starvation, parasitic infections, untreated diseases, injuries from road traffic accidents and transmissible cancers.
- These dogs often fall prey to direct persecution and inhumane culling.

The project:

- The National Dog Population Management and Rabies Control Project successfully sterilised and vaccinated over 150,000 strays since its inception.
- The project, which began in 2009, also included microchipping 32,000 pet dogs.

Rabies:

- If effective sterilisation and vaccination are not carried out, the stray dog population increases, leading to an increase in dog bites and the spread of rabies.
- The World Health Organization (WHO) estimates that around 59,000 people a year die of rabies globally, and most rabies cases in humans are the result of a dog bite. Governments across Asia routinely resort to inhumane methods of managing street dogs by culling and mass sheltering.
- Meanwhile, the United Nations organisations Food and Agriculture Organisation (FAO), WHO and World Organisation for Animal Health (WOAH) have pressed the recommendations on oral vaccination of dogs against rabies.
- Apart from traditional injectable vaccines, which are primarily used for mass dog vaccinations, oral rabies vaccination (ORV) could prove to be more effective in targeted elimination efforts that have been used among regional wildlife populations.

Recommendations:

- The UN has recommended the implementation of ORV in combination with injectable vaccines to increase vaccination targeting, especially "free-roaming and poorly supervised dogs.
- It suggested the new documents accommodate the country's circumstances, such as its resource capacity and socio-cultural aspects that will help customise the ORV programme.
- By embracing the recommendations in this document, countries can enhance their dog rabies control programmes and work towards achieving the global goal of zero dog-mediated human rabies deaths by 2030.

CULTURE

DOGRA ARCHITECTURE GETS A REVIVAL AT J&K'S MAHARAJ GUNJ

Why in news?

- A project that recreates the past glory of Srinagar's Maharaj Gunj market, which has disappeared from sight with encroachment and deviations for several decades, throws new light on rare architectural elements introduced in Kashmir by Dogra Hindu kings between 1846 and 1947.

Collaboration:

- Now, Srinagar Smart City Ltd. and the Kashmir chapter of the Indian National Trust for Art and Cultural Heritage (INTACH) have joined hands to conserve vernacular elements of Kashmiri architecture, including colonnaded walkways, decorative pilasters, and exposed moulded brickwork, in an effort to bring that past to life again.

Cultural aspect:

- The Maharaj Gunj market area has a rich mix of vernacular and colonial architecture. Most residential buildings lining the streets are of mixed use, with shops on the ground floor and living quarters on the upper floors, constructed in the taq or dhajji dewari styles.

- Some of the houses going up four floors still bear testament to the rich architectural legacy of Srinagar, with highly ornate exteriors and interiors.
- One of the approach roads from the beautiful 607-year-old Budshah Tomb has already been uplifted with a subtle colour palette, including lime for the walls and brown for the windows.

Historical aspect:

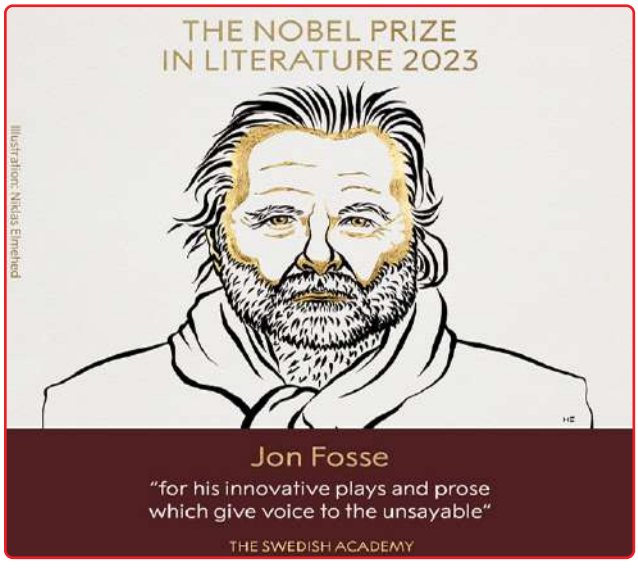
- Located in the heart of Shehar-e-Khaas, the interior of Srinagar's old city, the Maharaj Gunj market was established by Maharaja Ranbir Singh to provide a fillip to Kashmir's trade and commerce.
- In the pre-1947 era, Maharaj Gunj transcended regional boundaries, attracting traders from prominent cities such as Amritsar, Lahore, Karachi, Rawalpindi, and even parts of Central Asia, who embarked on journeys to this bustling hub in their pursuit of expanding commercial prospects.

Srinagar Smart City Mission's revival programme:

- The Srinagar Smart City Mission's revival programme is likely to throw a spotlight on the city's rich cultural heritage, including old shrines, tombs, mosques, temples, and a gurdwara.
- Those buildings that are in structural distress will be strengthened before proceeding with any interventions.

MISCELLANEOUS

NOBEL PRIZE FOR LITERATURE 2023



Why in news?

- The Nobel Prize for Literature 2023 has been awarded to Norwegian author Jon Olav Fosse, for his innovative plays and prose which give voice to the unsayable.

Details:

- Fosse writes in Norwegian Nynorsk, the least common of the two official versions of Norwegian.
- His "A New Name: Septology VI-VII", about two painters, both named Asle but with different lives and demons and preoccupations, was a finalist for the International Booker Prize in 2022.

About Jon Fosse:

- He grew up in Norway's Strandebarm, and currently divides his time between Norway and Austria.
- His literary career began with a novel, Red Black, published in 1983. His subsequent novels included Melancholy I (1995) and Melancholy II (1996), on the life and death of 19th century Norwegian landscape artist Lars Hertervig. Over the next few years, he turned towards playwriting.
- Some of his most notable plays include 'Someone is Going to Come', 'And Never Shall We Part', 'The Name', 'Winter', and 'A Summer's Day.' The last volume of his three-part novel Septology was shortlisted for the International Booker Prize last year.
- A proponent of "slow prose", Fosse's work is often compared to that of his predecessor Henrik Ibsen for its modernist concerns, and to Jacques Derrida for his ability to tap into the unspoken.

Nobel Prize in Literature 2022:

- In 2022, the Nobel Prize in Literature was bestowed upon Annie Ernaux, for her "courage and clinical acuity with which she uncovers the roots, estrangements and collective restraints of personal memory."

Nobel in Medicine 2023

- The Nobel Prize in Physiology or Medicine for 2023 was jointly awarded to Katalin Karikó and Drew Weissman for their pioneering work on mRNA technology which was highly helpful in COVID-19 vaccine development.

Nobel in Physics 2023:

- The Nobel Prize in Physics for 2023 was presented to Pierre Agostini, Ferenc Krausz, and Anne L'Huillier.
- They were honoured for their groundbreaking experimental methods that generate attosecond pulses of light, allowing a profound study of electron dynamics within matter, particularly in atoms and molecules.

Nobel in Chemistry 2023

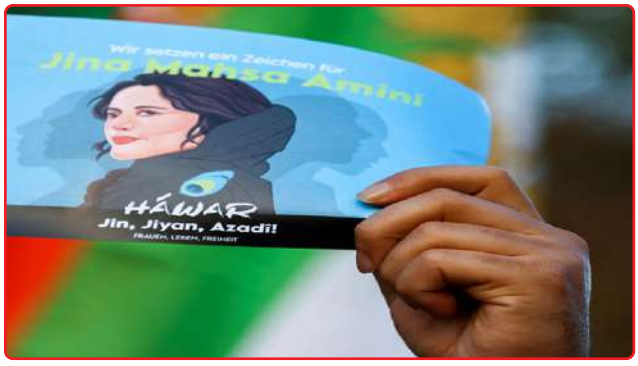
- The 2023 Nobel Prize in Chemistry recognized the work of Moungi G Bawendi, Louis E Brus, and Alexei I Ekimov.
- Their contribution lies in the discovery and synthesis of quantum dots, minuscule nanoparticles whose properties are determined by their size.

EU HUMAN RIGHTS PRIZE

Why in news?

- Mahsa Amini, the 22-year-old Kurdish-Iranian woman was awarded the European Union's top human rights prize recently.

- She died in police custody in Iran in 2022, sparking worldwide protests against the country's conservative Islamic theocracy.



About the prize:

- The EU award, named for Soviet dissident Andrei Sakharov, was created in 1988 to honour individuals or groups who defend human rights and fundamental freedoms.
- Sakharov, a Nobel Peace Prize laureate, died in 1989.

Other finalists:

- Other finalists in 2023 included Vilma Núñez de Escorcia and Roman Catholic Bishop Rolando Álvarez; two emblematic figures in the fight for the defence of human rights in Nicaragua and a trio of women from Poland, El Salvador and the United States leading a fight for "free, safe and legal abortion".

Sanctions imposed:

- Amini died on September 16, 2022, after she was arrested for allegedly violating Iran's mandatory headscarf law.
- Women have played a leading role in the protests, with many publicly removing the compulsory Islamic headscarf, known as the hijab.
- The EU has imposed sanctions on Iranian officials and organisations including ministers, military officers and Iran's morality police for human rights abuses over the protests.

Way Forward:

- The award ceremony will take place on December 13.

PRACTICE QUESTION FOR UPSC PRELIMS EXAM

1. Consider the following statement regarding Staghorn coral:
   1. It is one of the most important corals in the Caribbean.
   2. These provide important habitat for other reef animals, especially fish
   3. They can form dense groups in very dense water.

   Choose the correct option from the codes given below:
   a) 1 and 2 b) 2 and 3
   c) 1 and 3 d) 1, 2 and 3
2. Consider the following statement regarding Pygmy hog:
   1. These mammals does not build its own home, or nest.
   2. It is the smallest and rarest species of wild pig in the world.
   3. They are found in the Manas Tiger Reserve in Assam.

   Choose the correct option from the codes given below:
   a) 1 and 2 b) 2 and 3
   c) 1 and 3 d) 1, 2 and 3
3. Consider the following statement regarding Macrophages:
   1. They are a type of white blood cell that plays an important role in the human immune system.
   2. They are essential for the maintenance and defence of host tissues.

   Choose the correct option from the codes given below:
   a) 1 Only b) 2 Only
   c) 1 and 2 d) None of the above
4. Consider the following statement regarding Sela Tunnel Project:
   1. It is located in Arunachal Pradesh.
   2. It is being built by the Border Roads Organisation (BRO) under Project Vartak.
   3. It will ensure all-weather connectivity between Guwahati in Assam and Tawang in Arunachal Pradesh.

   Choose the correct option from the codes given below:
   a) 1 and 2 b) 2 and 3
   c) 1 and 3 d) 1, 2 and 3
5. Consider the following statement regarding Financial Stability Board (FSB):
   1. It was created expressly to coordinate at the international level the work of national financial authorities.
   2. The FSB's decisions are not legally binding on its members.
   3. FSB was established by the World Bank

   Choose the correct option from the codes given below:
   a) 1 and 2 b) 2 and 3
   c) 1 and 3 d) 1, 2 and 3
6. Consider the following statements with respect to Messenger RNA (mRNA) Vaccines:
   1. mRNA is a type of single-stranded RNA involved in protein synthesis.
   2. mRNA vaccines are made by using a protein DNA of the virus.
   3. Gemcovac-Om is the only mRNA vaccine currently approved in India

   How many of the above statement(s) is/are correct?
   a) All three b) Only two
   c) Only one d) None of the above
7. Consider the following statements:
   1. TRAFFIC is an organization established by WWF and IUCN to administer wildlife trade.
   2. Kolkata is the highest-ranked node in the tortoise and hard-shell turtle trafficking network.

   Which of the above statement(s) is/are incorrect?
   a) 1 only b) 2 only
   c) Both 1 and 2 d) Neither 1 nor 2
8. Consider the following statements:
   1. Bonn declaration aims to reduce environmental risks from chemicals and waste.
   2. Industries also pledged to manage chemicals in order to reduce pollution and its adverse impacts.

   Which of the above statement(s) is/are correct?
   a) 1 only b) 2 only
   c) Both 1 and 2 d) Neither 1 nor 2
9. Consider the following statements:
   1. The Moscow format is one of the several dialogue platforms on Afghanistan before the Taliban takeover of Kabul.
   2. Both China and India are part of the Moscow Format.

3. The Kazan Declaration deals with the well-being of the Afghan People.

How many of the above statement(s) is/are incorrect?

a) Only one b) Only two
c) All three d) None of the above

10. Consider the following statements with respect to Project Udbhav:
    1. The project is carried out by Indian army in collaboration with the United Service Institution (USI) of India.
    2. It is an initiative of the Ministry of Ports, Shipping and Waterways.
    3. This initiative is in synergy with the Ministry of Culture's Project Mausam.

    How many of the above statement(s) is/are correct?

    a) Only one b) Only two
    c) All three d) None of the above

11. Consider the following statement regarding R21/ Matrix-M Vaccine and choose the incorrect option:
    a) It was developed by the University of Oxford only.
    b) It is a new vaccine approved for the prevention of malaria in children.
    c) It has already been approved for use in Burkina Faso, Ghana, and Nigeria.
    d) It is the first malaria vaccine to reach the WHO's target of 75% efficacy.

12. Consider the following statement regarding Sanwariya Seth Temple:
    1. It is a Hindu temple dedicated to Lord Shiva.
    2. The temple follows the traditional architecture of Rajasthan.
    3. The temple features multiple domes that are adorned with decorative elements.

    Choose the correct option from the codes given below:

    a) 1 and 2 b) 2 and 3
    c) 1 and 3 d) 1, 2 and 3

13. Consider the following statement regarding United Nations Conference on Trade and Development (UNCTAD):
    1. It is the UN's leading institution dealing with trade and development.
    2. It supports developing countries to access the benefits of a globalised economy more fairly and effectively.

    Choose the correct option from the codes given below:

    a) 1 Only b) 2 Only
    c) 1 and 2 d) None of the above

14. Consider the following statement regarding Green Ammonia:
    1. It is produced by using hydrogen from water electrolysis and nitrogen separated from the air.
    2. Green ammonia production is where the process of making ammonia is 100% renewable and carbon-free.
    3. It can be used in fuel for engines such as locomotives and shipping, replacing diesel and marine fuel oil.

    Choose the correct option from the codes given below:

    a) 1 and 2 b) 2 and 3
    c) 1 and 3 d) 1, 2 and 3

15. Consider the following statement regarding Kaimur Wildlife Sanctuary:
    1. Durgawati river systems is an important part of this sanctuary.
    2. It is connected with Chandraprabha Wildlife Sanctuary.
    3. It is the largest sanctuary located Jharkhand.

    Choose the correct option from the codes given below:

    a) 1 and 2 b) 2 and 3
    c) 1 and 3 d) 1, 2 and 3

16. Consider the following statement regarding Swamp deer:
    1. It also called as barasingha is a deer species distributed in the Indian subcontinent.
    2. Conservation status by IUCN Red List is Vulnerable.
    3. It is now extinct in India.

    Choose the correct option from the codes given below:

    a) 1 and 2 b) 2 and 3
    c) 1 and 3 d) 1, 2 and 3

17. Consider the following statement regarding International Coral Reef Initiative:
    1. India is not a member of this initiative.
    2. It was launched by Australia, France, Japan, Jamaica, the Philippines, Sweden, Britain and the United States.
    3. It is a global partnership between Nations and organizations which strives to preserve coral reefs.

    Choose the correct option from the codes given below:

    a) 1 and 2 b) 2 and 3
    c) 1 and 3 d) 1, 2 and 3

18. Consider the following statement regarding United Nations Convention against Transnational Organised Crime:
    1. It is a multinational treaty against transnational organized crime that was established by the United Nations.
    2. It is often known as the Palermo Convention

    Choose the correct option from the codes given below:

    a) 1 Only b) 2 Only
    c) 1 and 2 d) None of the above

19. Consider the following statement regarding Basohli Pashmina:
    1. It refers to a fine variant of spun cashmere that is derived from the downy undercoat of the Changthangi.
    2. It is obtained from a breed of mountain goats found on the Changthang Plateau in Tibet.
    3. A traditional producer of pashmina wool in the Ladakh region are a people known as the Changpa.

    Choose the correct option from the codes given below:
    a) 1 and 2 b) 2 and 3
    c) 1 and 3 d) 1, 2 and 3

20. Consider the following statement regarding Exercise SAMPRITI:
    1. The exercise underscores the importance of enhancing interoperability.
    2. It was started in Jorhat, Assam in 2009.
    3. It is an annual joint military exercise between India and Sri Lanka.

    Choose the correct option from the codes given below:
    a) 1 and 2 b) 2 and 3
    c) 1 and 3 d) 1, 2 and 3

21. Consider the following statement regarding Chenab Bridge:
    1. It is part of the Udhampur-Srinagar-Baramulla Rail Link project.
    2. It is capable of withstanding the nation's maximum intensity zone-V earthquake forces.
    3. It is the second highest single-arch railway bridge in the world.

    Choose the correct option from the codes given below:
    a) 1 and 2 b) 2 and 3
    c) 1 and 3 d) 1, 2 and 3

22. Consider the following statement regarding Non-Alcoholic Fatty Liver Disease (NAFLD):
    1. This buildup of fat is caused by heavy alcohol use.
    2. NASH is the form of NAFLD in which you have inflammation of the liver and liver damage.
    3. The inflammation and liver damage of NASH can cause fibrosis.

    Choose the correct option from the codes given below:
    a) 1 and 2 b) 2 and 3
    c) 1 and 3 d) 1, 2 and 3

23. Consider the following statement regarding Very Short-Range Air Defence (VSHORAD) missile system:
    1. It is a Man Portable Air Defence System (MANPAD) specially designed to counter low-altitude aerial threats.
    2. These are short-range, lightweight, and portable surface-to-air missiles.

    Choose the correct option from the codes given below:
    a) 1 Only b) 2 Only
    c) 1 and 2 d) None of the above

24. Consider the following statement regarding Quantum Dots (QDs):
    1. They are often referred to as "artificial atoms".
    2. Semiconductor substance, have the properties of a QD.
    3. The smallest quantum dots emit higher energy waves and produce blue light.

    Choose the correct option from the codes given below:
    a) 1 and 2 b) 2 and 3
    c) 1 and 3 d) 1, 2 and 3

25. Consider the following statement regarding Glacial Lake Outburst Flood:
    1. Glacial lakes are mostly dammed by unstable ice or sediment composed of loose rock and debris.
    2. South Lhonak Lake in northern Sikkim is formed due to the melting of the glacier.
    3. It can be triggered by extremely heavy rains only.

    Choose the correct option from the codes given below:
    a) 1 and 2 b) 2 and 3
    c) 1 and 3 d) 1, 2 and 3

26. Consider the following statement regarding Shivaji:
    1. He was known as the Father of the Indian Navy.
    2. He was called the 'Mountain Rat'.
    3. He was not a secular ruler.

    Choose the correct option from the codes given below:
    a) 1 and 2 b) 2 and 3
    c) 1 and 3 d) 1, 2 and 3

27. Consider the following statement regarding Burevestnik Missile:
    1. The Burevestnik is one of the strategic weapons of USA.
    2. Its nuclear propulsion gives the missile much longer range.
    3. The missile is also designed to fly at low altitudes.

    Choose the correct option from the codes given below:
    a) 1 and 2 b) 2 and 3
    c) 1 and 3 d) 1, 2 and 3

28. Consider the following statement regarding Teesta River:
    1. The River flows through the Indian states of Sikkim and West Bengal and, Rangpur in Bangladesh.
    2. Its main tributary is Rangeet River.

    Choose the correct option from the codes given below:
    a) 1 Only b) 2 Only
    c) 1 and 2 d) None of the above

29. Consider the following statement regarding Hakki Pikkis tribes:
    1. It is one of the major tribal communities in Karnataka.
    2. They are recognized as a Scheduled Tribe in India.
    3. Their mother tongue was designated as 'Vaagri' by scholars.

    Choose the correct option from the codes given below:
    a) 1 and 2 b) 2 and 3
    c) 1 and 3 d) 1, 2 and 3

30. Consider the following statement regarding Kolleru Wildlife Sanctuary:
    1. It is a crucial wetland ecosystem.
    2. It is located in the West Godavari and Krishna districts.
    3. It is not listed in Wildlife Protection Act of 1972.

    Choose the correct option from the codes given below:
    a) 1 and 2 b) 2 and 3
    c) 1 and 3 d) 1, 2 and 3

31. Consider the following statement regarding Constitutional Bench:
    1. Article 145(3) of the India Constitution makes it clear for the formation of Constitutional Bench.
    2. The largest-ever Constitution Bench was that of 13 judges in the case Kesavananda Bharati v. State of Kerala.
    3. It will have minimum three judges of Supreme Court.

    Choose the correct option from the codes given below:
    a) 1 and 2 b) 2 and 3
    c) 1 and 3 d) 1, 2 and 3

32. Consider the following statement regarding Declaration of Scheduled Areas:
    1. The criteria for declaration of schedule area is mention in the Indian Constitution.
    2. Under article 244 (1), The President of India is empowered to declare an area a Scheduled Area.
    3. The President can increase or decrease the area of any Scheduled Area in a State after consultation with the Governor.

    Choose the correct option from the codes given below:
    a) 1 and 2 b) 2 and 3
    c) 1 and 3 d) 1, 2 and 3

33. Consider the following statement regarding PM SVANidhi Scheme:
    1. It aims is to empower street vendors by extending loans and for their holistic development and economic upliftment.
    2. Nodal Ministry for this scheme is Ministry of Housing and Urban Affairs.

    Choose the correct option from the codes given below:
    a) 1 Only b) 2 Only
    c) 1 and 2 d) None of the above.

34. Consider the following statement regarding Fischer – Tropsch (FT) process:
    1. It is the process where synthesis gas is converted into a mixture of hydrocarbons, oxygenates, water, and carbon dioxide.
    2. It involves the reaction of carbon monoxide (CO) and hydrogen (H2) gases.
    3. These gases are derived from coal, natural gas, or biomass, through the process of gasification.

    Choose the correct option from the codes given below:
    a) 1 and 2 b) 2 and 3
    c) 1 and 3 d) 1, 2 and 3

35. Consider the following statement regarding Asia-Pacific Institute for Broadcasting Development (AIBD):
    1. It was established under the auspices of UNESCO.
    2. India is one of the founding members of this organization.
    3. The AIBD currently has 192 member.

    Choose the correct option from the codes given below:
    a) 1 and 2 b) 2 and 3
    c) 1 and 3 d) 1, 2 and 3

36. Consider the following statement regarding Udangudi Panangarupatti:
    1. The karupatti prepared from the palm sap from the region in Tamil Nadu.
    2. Recently it has received a Geographical Indication (GI) tag.
    3. This is due to the presence of black soil and soil holds more groundwater.

    Choose the correct option from the codes given below:
    a) 1 and 2 b) 2 and 3
    c) 1 and 3 d) 1, 2 and 3

37. Consider the following statement regarding Titanosaur species
    1. They are only found in Antarctica.
    2. They were herbivorous quadrupeds.
    3. They also possessed vertebrae with a honeycomb-like internal structure.

    Choose the correct option from the codes given below:
    a) 1 and 2 b) 2 and 3
    c) 1 and 3 d) 1, 2 and 3

38. Consider the following statement regarding Alps:
    1. They are young fold mountains with rugged relief and high conical peaks.
    2. They arose as a result of the collision of the African and Eurasian tectonic plates.

Choose the correct option from the codes given below:

a) 1 Only b) 2 Only
c) 1 and 2 d) None of the above

39. Consider the following statement regarding Gangetic river dolphin:
    1. It is one of the few river dolphins found in the world.
    2. It inhabits the Ganges-Brahmaputra-Meghna and Karnaphuli-Sangu river systems of Nepal, India, and Bangladesh.
    3. They have a highly developed bio-sonar system that facilitates them to hunt for fish even in murky waters.

    Choose the correct option from the codes given below:

    a) 1 and 2 b) 2 and 3
    c) 1 and 3 d) 1, 2 and 3

40. Consider the following statement regarding Watermeal:
    1. It is an aquatic plant in the Araceae family.
    2. It flourishes in temperate, sub-tropical, and tropical locations.
    3. It is many branches and also has lots of leaves.

    Choose the correct option from the codes given below:

    a) 1 and 2 b) 2 and 3
    c) 1 and 3 d) 1, 2 and 3

41. Consider the following statement regarding Curative Petition:
    1. It is the last resort to the highest court that can be petitioned for redressal of grievances in court.
    2. Article 137 of the Indian Constitution broadly supports the idea of a curative petition.
    3. The concept evolved in the Golaknath case.

    Choose the correct option from the codes given below:

    a) 1 and 2 b) 2 and 3
    c) 1 and 3 d) 1, 2 and 3

42. Consider the following:
    1. Mount Kun is the highest peak of the Nun Kun massif in Ladakh.
    2. Nun and Kun peaks are separated by a snow plateau.
    3. The Zanskar Range is situated in the Ladakh region of northern India.

    Choose the correct option from the codes given below:

    a) 1 and 2 b) 2 and 3
    c) 1 and 3 d) 1, 2 and 3

43. Consider the following statement regarding 2023 Economics Nobel Prize:
    1. It has been awarded to economist Claudia Goldin.
    2. She provided the first comprehensive account of women's earnings and labour market participation.

    Choose the correct option from the codes given below:

    a) 1 Only b) 2 Only
    c) 1 and 2 d) None of the above

44. Consider the following statement regarding Accredited Social Health Activist (ASHA):
    1. It is a trained female community health activist.
    2. They are a core part of the National Rural Health Mission.
    3. One of the function is to advocate for female health and hygiene standards.

    Choose the correct option from the codes given below:

    a) 1 and 2 b) 2 and 3
    c) 1 and 3 d) 1, 2 and 3

45. Consider the following statement regarding Ruddy Shelduk:
    1. It is also known as the Brahminy duck.
    2. It is a mainly nocturnal bird.
    3. These ducks are non-migratory birds.

    Choose the correct option from the codes given below:

    a) 1 and 2 b) 2 and 3
    c) 1 and 3 d) 1, 2 and 3

46. Consider the following statement regarding Labour Force Participation Rate (LFPR):
    1. The LFPR in urban areas increased for persons of age 15 years and above.
    2. Worker-Population Ratio (WPR) in urban areas increased for persons of age 15 years and above.
    3. NITI Aayog launched Periodic Labour Force Survey.

    Choose the correct option from the codes given below:

    a) 1 and 2 b) 2 and 3
    c) 1 and 3 d) 1, 2 and 3

47. Consider the following statement regarding Hemochromatosis:
    1. It is an inherited condition where calcium levels in the body slowly build up over many years.
    2. Hereditary hemochromatosis is driven by a mutation in the HFE gene.
    3. Secondary hemochromatosis is typically caused by external factors like frequent blood transfusions.

    Choose the correct option from the codes given below:

    a) 1 and 2 b) 2 and 3
    c) 1 and 3 d) 1, 2 and 3

48. Consider the following statement regarding Reticulated python:
    1. These tropical snakes are classically associated with lowland rainforests and wetlands.
    2. Conservation status by IUCN is least concern.

Choose the correct option from the codes given below:

a) 1 Only b) 2 Only
c) 1 and 2 d) None of the above

49. Consider the following statement regarding Exercise CHAKRAVAT:
1. It is an Annual Joint Humanitarian Assistance and Disaster Relief HADR Exercise.
2. This is a multi-agency effort involving all three Services, Paramilitary Forces, as well as several disaster response organisations, NGOs, academic institutions and international organisations.
3. The 2023 edition of the exercise is being hosted by the Indian Navy at Goa.

Choose the correct option from the codes given below:

a) 1 and 2 b) 2 and 3
c) 1 and 3 d) 1, 2 and 3

50. Consider the following statement regarding International Big Cat Alliance (IBCA):
1. It was launched by India, for the conservation of seven big cats.
2. IBCA will also assist existing species-specific inter-governmental platforms to boost conservation efforts.
3. Jaguar, and Puma are not part of the big cat conservation.

Choose the correct option from the codes given below:

a) 1 and 2 b) 2 and 3
c) 1 and 3 d) 1, 2 and 3

51. Consider the following statement regarding Atlantic Puffin:
1. It is a species of small seabird in the auk family.
2. It is a migratory species.
3. It's the only puffin species found in Atlantic Ocean and Pacific Ocean.

Choose the correct option from the codes given below:

a) 1 and 2 b) 2 and 3
c) 1 and 3 d) 1, 2 and 3

52. Consider the following statement regarding Gaza Strip:
1. It is bordered by Jordan to the north and Syria to the south.
2. It is a self-governing Palestinian territory located on the eastern coast of the Mediterranean Sea.
3. The population is predominantly Palestinian, with the majority being Sunni Muslims.

Choose the correct option from the codes given below:

a) 1 and 2 b) 2 and 3
c) 1 and 3 d) 1, 2 and 3

53. Consider the following statement:
1. White goods are large home appliances.
2. Brown goods are relatively light electronic consumer durables.

Choose the correct option from the codes given below:

a) 1 Only b) 2 Only
c) 1 and 2 d) None of the above

54. Consider the following statement regarding Lakhpati Didi Initiative:
1. Its objective is to encourage women to start micro-enterprises within their villages.
2. The programme is aimed at training women in self-help groups (SHGs).
3. The initiative has been initiated by DAY-NRLM.

Choose the correct option from the codes given below:

a) 1 and 2 b) 2 and 3
c) 1 and 3 d) 1, 2 and 3

55. Consider the following statement regarding Dancing Frog:
1. It is also the fifth most threatened genus in the world.
2. The species was found to prefer habitats in areas with thick canopy cover of at least 70-80 per cent.
3. These are endemic to the Eastern Ghats.

Choose the correct option from the codes given below:

a) 1 and 2 b) 2 and 3
c) 1 and 3 d) 1, 2 and 3

56. Consider the following statement regarding Goan cashew:
1. It is one of the most important plantation crops in India.
2. Cashew was native to northeast Brazil in Latin America.
3. Black soils are the best for growing cashew in India.

Choose the correct option from the codes given below:

a) 1 and 2 b) 2 and 3
c) 1 and 3 d) 1, 2 and 3

57. Consider the following statement regarding Egyptian Vulture:
1. It is a native bird of Egypt.
2. It inhabits open, arid areas near humans.
3. Conservation status by IUCN is listed as Endangered

Choose the correct option from the codes given below:

a) 1 and 2 b) 2 and 3
c) 1 and 3 d) 1, 2 and 3

58. Consider the following statement regarding Chilika Lake:
    1. It is a brackish water lake and a shallow lagoon.
    2. It is located at the mouth of the Daya River.

    Choose the correct option from the codes given below:
    a) 1 Only b) 2 Only
    c) 1 and 2 d) None of the above

59. Consider the following statement regarding Rasmussen's encephalitis:
    1. It is a very rare, chronic inflammatory neurological disease.
    2. It most often occurs in children under the age of 10.
    3. Progressive loss of neurological functions including motor skills, speech, and eventual paralysis.

    Choose the correct option from the codes given below:
    a) 1 and 2 b) 2 and 3
    c) 1 and 3 d) 1, 2 and 3

60. Consider the following statement regarding White Phosphorous Bombs:
    1. It is a highly combustible chemical that burns quickly and brightly when exposed to air.
    2. It burns at a temperature of 800°C and spontaneously ignites at up to 1,300 degrees Celsius when it is exposed to oxygen.
    3. White phosphorus munitions are banned under international law.

    Choose the correct option from the codes given below:
    a) 1 and 2 b) 2 and 3
    c) 1 and 3 d) 1, 2 and 3

61. Consider the following statement regarding Global Hunger Index:
    1. It is a tool for comprehensively measuring and tracking hunger at global, regional, and national levels.
    2. It is prepared jointly by Irish aid agency Concern Worldwide and German organisation Welt Hunger Hilfe.
    3. India's score in GHI is better than GHI score for the world.

    Choose the correct option from the codes given below:
    a) 1 and 2 b) 2 and 3
    c) 1 and 3 d) 1, 2 and 3

62. Consider the following statement regarding Prosopis juliflora:
    1. It is native to India.
    2. It is a shrub or small tree in the family Fabaceae.
    3. It is one of the most invasive species in arid and semi-arid areas.

    Choose the correct option from the codes given below:
    a) 1 and 2 b) 2 and 3
    c) 1 and 3 d) 1, 2 and 3

63. Consider the following statement regarding Dampa tiger reserve:
    1. It is located in the western flank (Lushai Hills) of Mizoram.
    2. The vegetation of the reserve ranges from tropical evergreen to semi-evergreen forests.

    Choose the correct option from the codes given below:
    a) 1 Only b) 2 Only
    c) 1 and 2 d) None of the above

64. Consider the following statement regarding Nilgiri Tahr:
    1. It is an endangered mountain ungulate endemic to the southern part of the Western Ghats.
    2. Locally, the animal is called 'Varayaadu'.
    3. Eravikulam National Park in Kerala has the highest density and largest surviving population of Nilgiri tahr.

    Choose the correct option from the codes given below:
    a) 1 and 2 b) 2 and 3
    c) 1 and 3 d) 1, 2 and 3

65. Consider the following statement regarding Aerosols:
    1. They are tiny solid or liquid particles suspended in air or as a gas.
    2. Visible forms of atmospheric aerosol plumes include smoke, smog, haze and dust.
    3. Aerosol particles are not emitted directly to the atmosphere.

    Choose the correct option from the codes given below:
    a) 1 and 2 b) 2 and 3
    c) 1 and 3 d) 1, 2 and 3

66. Consider the following statement regarding Special Leave Petition (SLP):
    1. Under Article 136 of the Constitution, Supreme Court can grant special leave to appeal from any judgment, decree, determination, sentence or order in any cause or matter.
    2. It can only be exercised when a substantial question of law or gross injustice has been committed.
    3. The aggrieved party can affirm a special leave to offer under Article 136 as a right.

    Choose the correct option from the codes given below:
    a) 1 and 2 b) 2 and 3
    c) 1 and 3 d) 1, 2 and 3

67. Consider the following statement regarding benefit of Navratna status:
    1. They have been granted financial independence to invest up to Rs 1,000 crore by seeking approval from the Union government.
    2. The status gives the Board of Directors of these CPSEs the power to allow mergers and acquisitions in India and abroad.
    3. They need an approval from the Cabinet Committee on Economic Affairs (CCEA) to make investments abroad.

    Choose the correct option from the codes given below:
    a) 1 and 2 b) 2 and 3
    c) 1 and 3 d) 1, 2 and 3

68. Consider the following statement regarding Airports Economic Regulatory Authority (AERA):
    1. It is a statutory body.
    2. The AERA regulates tariffs and other charges for aeronautical services at major airports.

    Choose the correct option from the codes given below:
    a) 1 Only b) 2 Only
    c) 1 and 2 d) None of the above

69. Consider the following statement regarding Kanwar Lake:
    1. It is Asia's largest freshwater oxbow lake.
    2. It is Bihar's only Ramsar site.
    3. It is a residual oxbow lake, formed due to the meandering of Gandak River.

    Choose the correct option from the codes given below:
    a) 1 and 2 b) 2 and 3
    c) 1 and 3 d) 1, 2 and 3

70. Consider the following statement regarding CAR-T cell therapy:
    1. The therapy represents a quantum leap in cancer treatment.
    2. They are modified in the laboratory to activate T-cells, a component of immune cells, to attack tumours.
    3. CAR T-cell therapy has not been approved so far.

    Choose the correct option from the codes given below:
    a) 1 and 2 b) 2 and 3
    c) 1 and 3 d) 1, 2 and 3

71. Consider the following statement regarding Saraswati Samman Award:
    1. It is given annually for outstanding literary works in 22 Indian languages in the last 10 years.
    2. It is among the highest recognitions in the field of Indian literature.
    3. It carries a prize money of 50 lakh rupees.

    Choose the correct option from the codes given below:
    a) 1 and 2 b) 2 and 3
    c) 1 and 3 d) 1, 2 and 3

72. Consider the following statement regarding Amur falcon:
    1. According to IUCN, it is listed as critically endangered.
    2. It is a small raptor of the falcon family.
    3. It is protected under the Wildlife Protection Act 1972 and included under its Schedule IV.

    Choose the correct option from the codes given below:
    a) 1 and 2 b) 2 and 3
    c) 1 and 3 d) 1, 2 and 3

73. Consider the following statement regarding INS Sagardhwani:
    1. It is a marine acoustic research ship designed and developed by Naval Physical & Oceanographic Laboratory (NPOL).
    2. The NPOL is involved in studying the ocean environment and other related fields.

    Choose the correct option from the codes given below:
    a) 1 Only b) 2 Only
    c) 1 and 2 d) None of the above

74. Consider the following statement regarding Grey whales:
    1. They have a hump and a ridge of sharp bumps along their backs, instead of a dorsal fin.
    2. They stay close to shore and feed in shallow water.
    3. They are found mainly in shallow coastal waters in the North Pacific Ocean.

    Choose the correct option from the codes given below:
    a) 1 and 2 b) 2 and 3
    c) 1 and 3 d) 1, 2 and 3

75. Consider the following statement regarding Hepatitis C:
    1. It is a viral infection that affects the liver.
    2. It is spread through contact with infected blood.
    3. It can cause chronic illness only.

    Choose the correct option from the codes given below:
    a) 1 and 2 b) 2 and 3
    c) 1 and 3 d) 1, 2 and 3

76. Consider the following statement regarding Jaderi namakatti:
    1. These are clay sticks that are white in colour.
    2. Namakatti is made up of the rich deposit of hydrous silicate minerals.
    3. The production of namakatti does not depends upon sunlight.

Choose the correct option from the codes given below:

a) 1 and 2 b) 2 and 3
c) 1 and 3 d) 1, 2 and 3

77. Consider the following statement regarding Kaziranga National Park:
1. Alpine forest is the important features.
2. It is part of the Eastern Himalayan biodiversity hotspots.
3. It is home to the One-horned rhinoceros.

Choose the correct option from the codes given below:

a) 1 and 2 b) 2 and 3
c) 1 and 3 d) 1, 2 and 3

78. Consider the following statement regarding Tilapia parvovirus:
1. It is a single-stranded DNA virus.
2. This virus was localized in the gills, heart, brain, liver and muscles of tilapia.

Choose the correct option from the codes given below:

a) 1 Only b) 2 Only
c) 1 and 2 d) None of the above

79. Consider the following statement regarding Pallikaranai marshland:
1. It is a freshwater marsh and partly saline wetland.
2. The site is threatened by invasive and non-native species.
3. It is one of the Ramsar sites from India.

Choose the correct option from the codes given below:

a) 1 and 2 b) 2 and 3
c) 1 and 3 d) 1, 2 and 3

80. Consider the following statement regarding Hailstorm:
1. Hail is a type of solid rain made up of balls or lumps of ice.
2. They are most common in the midlatitudes.
3. Highly developed Cirrus clouds need to be present.

Choose the correct option from the codes given below:

a) 1and 2 b) 2 and 3
c) 1 and 3 d) 1, 2 and 3

81. Consider the following statement regarding Central Road and Infrastructure Fund:
1. It was established under the Central Road Fund Act, 2000.
2. It was previously known as Central Road Fund.
3. Its subject matter belongs to the Ministry of Road and Transport.

Choose the correct option from the codes given below:

a) 1 and 2 b) 2 and 3
c) 1 and 3 d) 1, 2 and 3

82. Consider the following statement regarding Buff-breasted Sandpiper:
1. IUCN conservation is listed as critically endangered.
2. It breeds in the open arctic tundra of North America and usually in winters in South America.
3. It is one of the most delicately beautiful of the shorebirds.

Choose the correct option from the codes given below:

a) 1 and 2 b) 2 and 3
c) 1 and 3 d) 1, 2 and 3

83. Consider the following statement regarding Mt. Vesuvius:
1. It is an active volcano
2. It is the only active volcano in mainland Europe

Choose the correct option from the codes given below:

a) 1 Only b) 2 Only
c) 1 and 2 d) None of the above

84. Consider the following statement regarding Amazon River:
1. It is the world's largest river by water volume and width.
2. It is the second-longest river in the world after the Nile.
3. Its journey begins high in the Andes Mountains.

Choose the correct option from the codes given below:

a) 1 and 2 b) 2 and 3
c) 1 and 3 d) 1, 2 and 3

85. Consider the following statement regarding Marshall Islands:
1. It is located in the western Pacific Ocean.
2. It is a presidential republic with a parliamentary system.
3. Only English is used as an official language

Choose the correct option from the codes given below:

a) 1 and 2 b) 2 and 3
c) 1 and 3 d) 1, 2 and 3

86. Consider the following statement regarding Rafah Crossing:
1. It is wedged between Israel, Egypt, and the Mediterranean Sea.
2. The crossing is controlled by Egypt.
3. The crossing is at the north end of the Gaza Strip

Choose the correct option from the codes given below:

a) 1 and 2 b) 2 and 3
c) 1 and 3 d) 1, 2 and 3

87. Consider the following statement regarding Muthuvan tribe:
    1. These people live in the border hill forests of Chhattisgarh.
    2. They are animists and spirit worshippers and also worship the forest gods.
    3. These tribal people follow a unique system of governance called the 'Kani System'.

    Choose the correct option from the codes given below:
    a) 1 and 2 b) 2 and 3
    c) 1 and 3 d) 1, 2 and 3

88. Consider the following statement regarding RISC-V technology:
    1. It is an open-source technology that is pronounced "risk five".
    2. It is considered the fifth generation of processors.

    Choose the correct option from the codes given below:
    a) 1 Only b) 2 Only
    c) 1 and 2 d) None of the above

89. Consider the following statement regarding Lymphatic Filariasis:
    1. It is commonly known as elephantiasis.
    2. Infection occurs when filarial parasites are transmitted to humans through mosquitoes.
    3. It's caused by infection with parasites classified as nematodes.

    Choose the correct option from the codes given below:
    a) 1 and 2 b) 2 and 3
    c) 1 and 3 d) 1, 2 and 3

90. Consider the following statement regarding Chakmas:
    1. They are one of the largest ethnic groups native to the Chittagong Hill Tracts.
    2. The majority of Chakmas practise Theravada Buddhism.
    3. They speak a dialect of Kokborok.

    Choose the correct option from the codes given below:
    a) 1 and 2 b) 2 and 3
    c) 1 and 3 d) 1, 2 and 3

91. Consider the following statement regarding Orionid meteor shower:
    1. It is an annual phenomenon that lights up the night sky every October.
    2. It is produced when Earth passes through the debris left behind by Halley's Comet.
    3. The Orionids are viewable in Northern hemispheres only.

    Choose the correct option from the codes given below:
    a) 1 and 2 b) 2 and 3
    c) 1 and 3 d) 1, 2 and 3

92. Consider the following statement regarding Ethics Committee in Parliament:
    1. Ethics committee in Lok Sabha consists of not more than 10 committee.
    2. Ethics committee in Rajya Sabha is nominated by the chairman of Rajya Sabha
    3. Their main function is to oversee the moral and ethical conduct of the Members;

    Choose the correct option from the codes given below:
    a) 1 and 2 b) 2 and 3
    c) 1 and 3 d) 1, 2 and 3

93. Consider the following statement regarding Kati Bihu:
    1. It is celebrated in the state of Assam.
    2. It is also known as Kongali Bihu.

    Choose the correct option from the codes given below:
    a) 1 Only b) 2 Only
    c) 1 and 2 d) None of the above

94. Consider the following statement regarding Niemann-Pick Disease:
    1. It is a rare genetic disorder.
    2. This disease involves dysfunctional metabolism of sphingolipids.
    3. This disease can affect the brain, nerves, liver, spleen, bone marrow and, in severe cases, lungs.

    Choose the correct option from the codes given below:
    a) 1 and 2 b) 2 and 3
    c) 1 and 3 d) 1, 2 and 3

95. Consider the following statement regarding Microalgae:
    1. They are unicellular species that exist individually or in chains or groups.
    2. They are mostly photosynthetic.
    3. They have root, stem and leaves.

    Choose the correct option from the codes given below:
    a) 1 and 2 b) 2 and 3
    c) 1 and 3 d) 1, 2 and 3

96. Consider the following statement regarding Regional Rapid Transit System:
    1. It aims to ensure "balanced and sustainable urban development" through better connectivity across the National Capital Region (NCR).
    2. It is modelled on systems such as the RER in Paris.
    3. It is not an integrated mass transit network.

    Choose the correct option from the codes given below:
    a) 1 and 2 b) 2 and 3
    c) 1 and 3 d) 1, 2 and 3

97. Consider the following statement regarding Someshwara inscription:
1. This inscription is very significant in the study of Chola history.
2. The rest of the inscription written below the panels is in Kannada script.
3. The human figures shown in the inscription represent Kulashekara Alupendra.

Choose the correct option from the codes given below:
a) 1 and 2 b) 2 and 3
c) 1 and 3 d) 1, 2 and 3

98. Consider the following statement regarding Idukki Dam:
1. It is built on the Periyar River.
2. It is the first dam in Asia that is constructed in a double-curvature arch dam type and the second in the world.

Choose the correct option from the codes given below:
a) 1 Only b) 2 Only
c) 1 and 2 d) None of the above

99. Consider the following statement regarding Bhimashankar Temple:
1. It is an ancient Hindu shrine dedicated to Lord Shiva.
2. It is the source of the river Bhima.
3. This sanctuary is a part of the Western Ghats.

Choose the correct option from the codes given below:
a) 1 and 2 b) 2 and 3
c) 1 and 3 d) 1, 2 and 3

100. Consider the following statement Railway Protection Force:
1. It was declared a statutory force in 1957 by an enactment of Parliament.
2. It is led by a director-general.
3. It is an armed force under the operational and administrative control of the Union Ministry of Home.

Choose the correct option from the codes given below:
a) 1 and 2 b) 2 and 3
c) 1 and 3 d) 1, 2 and 3

101. Consider the following statement regarding Neurocysticercosis:
1. It is a parasitic infection.
2. Humans become infected after consuming undercooked food, particularly pork.
3. It affect the human heart.

Choose the correct option from the codes given below:
a) 1 and 2 b) 2 and 3
c) 1 and 3 d) 1, 2 and 3

102. Consider the following statement regarding Snow crabs:
1. It is generally found in warm and humid climate.
2. Males and females can be distinguished by the shape of their abdominal flaps.
3. These are found off the coast of Alaska in the Bering, Beaufort, and Chukchi Seas.

Choose the correct option from the codes given below:
a) 1 and 2 b) 2 and 3
c) 1 and 3 d) 1, 2 and 3

103. Consider the following statement regarding United Nations World Tourism Organization (UNWTO):
1. It serves as a global forum for tourism policy.
2. Spanish is one of the official language of this Organisation.

Choose the correct option from the codes given below:
a) 1 Only b) 2 Only
c) 1 and 2 d) None of the above

104. Consider the following statement regarding Bombay Stock Exchange (BSE):
1. It is the oldest and largest stock exchange in India.
2. It was established as the Native Share and Stock Brokers' Association.
3. It trade in equity, fiat, debt instruments, derivatives, and mutual funds.

Choose the correct option from the codes given below:
a) 1 and 2 b) 2 and 3
c) 1 and 3 d) 1, 2 and 3

105. Consider the following statement regarding Jet Streams:
1. Jet streams blow from west to east all across the globe.
2. Earth has four primary jet streams.
3. They are formed when cold air masses intersect each other in the atmosphere.

Choose the correct option from the codes given below:
a) 1 and 2 b) 2 and 3
c) 1 and 3 d) 1, 2 and 3

106. Consider the following statement regarding Paintbrush Swift Butterfly:
1. It is a butterfly species of the Hesperiidae family.
2. The species' larvae feed on bamboo and some other grass species.
3. This species is protected by IUCN as critically endangered.

Choose the correct option from the codes given below:
a) 1 and 2 b) 2 and 3
c) 1 and 3 d) 1, 2 and 3

107. Consider the following statement regarding Graphite:
1. It consists of a ring of eight carbon atoms closely bonded together.
2. It is an opaque, non-metallic carbon polymorph.
3. It is formed by the metamorphosis of sediments containing carbonaceous material.

Choose the correct option from the codes given below:
a) 1 and 2 b) 2 and 3
c) 1 and 3 d) 1, 2 and 3

108. Consider the following statement regarding Edakkal Caves:
1. These caves is located in the majestic Ambukuthi Hills.
2. These feature Neolithic-era pictorial writings believed to date to at least 6,000 BCE.

Choose the correct option from the codes given below:
a) 1 Only b) 2 Only
c) 1 and 2 d) None of the above

109. Consider the following statement regarding Guillain-Barre syndrome:
1. This could be a bacterial or viral infection.
2. It is a rare autoimmune disorder where the body's immune system mistakenly attacks the peripheral nerves
3. It is more common in adults and males, but it can affect people of all ages.

Choose the correct option from the codes given below:
a) 1 and 2 b) 2 and 3
c) 1 and 3 d) 1, 2 and 3

110. Consider the following statement regarding Pobitora Wildlife Sanctuary:
1. It is located on the southern bank of the river Brahmaputra.
2. It is dominated by alluvial lowlands and marshland.
3. It is home to the highest population density of the Asiatic Lion.

Choose the correct option from the codes given below:
a) 1 and 2 b) 2 and 3
c) 1 and 3 d) 1, 2 and 3

111. Consider the following statement:
1. Leniency plus' norms is a new cartel detecting tool and sheds light on how the competition watchdog.
2. This "leniency plus" regime is already recognised in jurisdictions like the UK, US, Singapore, and Brazil.
3. Competition Commission of India is a non-constitutional body of the Government of India.

Choose the correct option from the codes given below:
a) 1 and 2 b) 2 and 3
c) 1 and 3 d) 1, 2 and 3

112. Consider the following statement regarding Lemru Elephant reserve:
1. It is located in Madhya Pradesh.
2. It seeks to give elephants a permanent habitat while also minimising property damage.
3. There are 33 notified Elephant Reserves (ERs) in the country.

Choose the correct option from the codes given below:
a) 1 and 2 b) 2 and 3
c) 1 and 3 d) 1, 2 and 3

113. Consider the following statement regarding Infantile Hypophosphatasia:
1. It is a rare genetic disease in which the patient's bones and teeth demineralise, making her fragile and prone to fractures.
2. The initial problem may be the baby's failure to gain weight and grow as expected.

Choose the correct option from the codes given below:
a) 1 Only b) 2 Only
c) 1 and 2 d) None of the above

114. Consider the following statement regarding Optoelectronics:
1. It is the study and application of light-emitting or light-detecting devices.
2. It is widely considered a sub-discipline of photonics.
3. It is largely based on semiconductor materials.

Choose the correct option from the codes given below:
a) 1 and 2 b) 2 and 3
c) 1 and 3 d) 1, 2 and 3

115. Consider the following statement regarding Laodracon carsticola:
1. It has been discovered to live only in the karstic massifs.
2. They are typically omnivores.
3. It is a newly discovered species of bats.

Choose the correct option from the codes given below:
a) 1 and 2 b) 2 and 3
c) 1 and 3 d) 1, 2 and 3

116. Consider the following statement regarding Osteoporosis:
1. It is a health condition that weakens bones.
2. In this condition body reabsorbs more bone tissue and produces less to replace it, lowering bone density.
3. It is observed annually on October 25th.

Choose the correct option from the codes given below:
a) 1 and 2 b) 2 and 3
c) 1 and 3 d) 1, 2 and 3

117. Consider the following statement regarding Long Valley Caldera:
1. It is located in Australia.
2. It is a dormant super volcano.
3. Caldera is a depression created after a volcano releases the majority of the contents of its magma chamber in an explosive eruption.

Choose the correct option from the codes given below:
a) 1 and 2 b) 2 and 3
c) 1 and 3 d) 1, 2 and 3

118. Consider the following statement regarding Article 142 of the Indian Constitution:
1. It deals with the Supreme Court's power to exercise its jurisdiction and pass an order for doing complete justice in any cause or matter pending before it.
2. It allows the Supreme Court to deliver justice in exceptional cases.

Choose the correct option from the codes given below:
a) 1 Only b) 2 Only
c) 1 and 2 d) None of the above

119. Consider the following statement regarding UMEED scheme:
1. The scheme under the Jammu and Kashmir Rural Livelihoods Mission (JKRLM).
2. The main objective of the scheme is to help the rural poor across Jammu and Kashmir.
3. It is implemented by the Jammu & Kashmir State Rural Livelihoods Society.

Choose the correct option from the codes given below:
a) 1 and 2 b) 2 and 3
c) 1 and 3 d) 1, 2 and 3

120. Consider the following statement regarding Bedouin Arabs:
1. They have traditionally been pastoralists.
2. They are Arab people of residing in Southern Palestine.

Choose the correct option from the codes given below:
a) 1 Only b) 2 Only
c) 1 and 2 d) None of the above

121. Consider the following statement regarding United Nations Forum on Forests:
1. It promotes the management, conservation, and sustainable development of all types of forests.
2. India is a founding member of UNFF.
3. It was established by UNEP.

Choose the correct option from the codes given below:
a) 1 and 2 b) 2 and 3
c) 1 and 3 d) 1, 2 and 3

122. Consider the following statement regarding Sea Cucumber:
1. They exhibit only asexual reproduction.
2. They excrete inorganic nitrogen and phosphorus, enhancing the productivity of benthic biota.
3. These are benthic, meaning they live on the ocean floor.

Choose the correct option from the codes given below:
a) 1 and 2 b) 2 and 3
c) 1 and 3 d) 1, 2 and 3

123. Consider the following statement regarding Vikram-1 Rocket:
1. It is an all-carbon-fibre-bodied rocket that can place multiple satellites into orbit.
2. It is a multi-stage launch vehicle with a capacity to place around 300 kg of payloads in low-earth orbit.

Choose the correct option from the codes given below:
a) 1 Only b) 2 Only
c) 1 and 2 d) None of the above

124. Consider the following statement regarding Nancy Grace Roman Space Telescope:
1. It will provide one of the deepest-ever views into the heart of our Milky Way galaxy
2. The mission will monitor hundreds of millions of stars the outskirts of our solar system, and isolated black holes.
3. It will measure light from a billion galaxies over the course of the mission's lifetime.

Choose the correct option from the codes given below:
a) 1 and 2 b) 2 and 3
c) 1 and 3 d) 1, 2 and 3

125. Consider the following statement regarding Alcalus fontinalis:
1. It is a newly discovered species of frog.
2. The frog appeared to be a mix of a bush frog and a water frog.
3. It was discovered in the Bandipur Tiger Reserve, Arunachal Pradesh.

Choose the correct option from the codes given below:
a) 1 and 2 b) 2 and 3
c) 1 and 3 d) 1, 2 and 3

126. Consider the following statement regarding United Nations Forum on Forests:
1. It promotes the management, conservation, and sustainable development of all types of forests.

2. India is a founding member of UNFF.
3. It was established by UNEP.

Choose the correct option from the codes given below:

a) 1 and 2 b) 2 and 3
c) 1 and 3 d) 1, 2 and 3

127. Consider the following statement regarding Sea Cucumber:
1. They exhibit only asexual reproduction.
2. They excrete inorganic nitrogen and phosphorus, enhancing the productivity of benthic biota.
3. These are benthic, meaning they live on the ocean floor.

Choose the correct option from the codes given below:

a) 1 and 2 b) 2 and 3
c) 1 and 3 d) 1, 2 and 3

128. Consider the following statement regarding Vikram-1 Rocket:
1. It is an all-carbon-fibre-bodied rocket that can place multiple satellites into orbit.
2. It is a multi-stage launch vehicle with a capacity to place around 300 kg of payloads in low-earth orbit.

Choose the correct option from the codes given below:

a) 1 Only b) 2 Only
c) 1 and 2 d) None of the above

129. Consider the following statement regarding Nancy Grace Roman Space Telescope:
1. It will provide one of the deepest-ever views into the heart of our Milky Way galaxy
2. The mission will monitor hundreds of millions of stars the outskirts of our solar system, and isolated black holes.
3. It will measure light from a billion galaxies over the course of the mission's lifetime.

Choose the correct option from the codes given below:

a) 1 and 2 b) 2 and 3
c) 1 and 3 d) 1, 2 and 3

130. Consider the following statement regarding Alcalus fontinalis:
1. It is a newly discovered species of frog.
2. The frog appeared to be a mix of a bush frog and a water frog.
3. It was discovered in the Bandipur Tiger Reserve, Arunachal Pradesh.

Choose the correct option from the codes given below:

a) 1 and 2 b) 2 and 3
c) 1 and 3 d) 1, 2 and 3

131. Consider the following statement regarding Melghat Tiger Reserve (MTR):
1. It is located in Maharashtra.
2. The forest is tropical dry deciduous in nature, dominated by teak.
3. It was the second tiger reserve in Maharashtra.

Choose the correct option from the codes given below:

a) 1 and 2 b) 2 and 3
c) 1 and 3 d) 1, 2 and 3

132. Consider the following statement regarding East China Sea:
1. It is an arm of the Western Pacific Ocean.
2. The Korean peninsula, China, Japan, and Taiwan lie within or border the East China Sea.
3. The East China Sea and the South China Sea together form the China Sea.

Choose the correct option from the codes given below:

a) 1 and 2 b) 2 and 3
c) 1 and 3 d) 1, 2 and 3

133. Consider the following statement regarding Transfer of Property Act, 1882:
1. It is an important piece of legislation that governs the transfer of property between living beings in India.
2. This Act was first introduced in 1882.

Choose the correct option from the codes given below:

a) 1 Only b) 2 Only
c) 1 and 2 d) None of the above

134. Consider the following statement regarding Musi River:
1. It is a tributary of the Krishna River.
2. Hyderabad stands on the bank of this river.
3. Himayat Sagar and Osman Sagar are the two dams that are constructed over the river.

Choose the correct option from the codes given below:

a) 1 and 2 b) 2 and 3
c) 1 and 3 d) 1, 2 and 3

135. Consider the following statement regarding Leopard Toby Puffer Fish:
1. It is a deepwater reef species.
2. It is also known as blowfish.
3. Conservation status by IUCN is Critically Endangered.

Choose the correct option from the codes given below:

a) 1 and 2 b) 2 and 3
c) 1 and 3 d) 1, 2 and 3

136. Consider the following statement regarding Cardamom Cultivation in India:
1. It is cultivated mainly in the Southern states, viz., Kerala, Karnataka, and Tamil Nadu.
2. It is native to the evergreen, rainy forests of Western Ghats in South India.
3. It is grown in black soils.

Choose the correct option from the codes given below:
a) 1 and 2 b) 2 and 3
c) 1 and 3 d) 1, 2 and 3

137. Consider the following statement regarding Talagirishwara Temple:
1. It is located in Kerala.
2. The temple was constructed by Pallava king Narasimhavarman II.
3. This Seventh Century structure incorporates a Vimana that resembles that of Kailasanatha temple in Kanchipuram

Choose the correct option from the codes given below:
a) 1 and 2 b) 2 and 3
c) 1 and 3 d) 1, 2 and 3

138. Consider the following statement regarding Subsurface Water Ice Mapping (SWIM) project:
1. It aims to locate the best places to access water ice buried under the Martian surface.
2. The project uses data from several NASA missions.

Choose the correct option from the codes given below:
a) 1 Only b) 2 Only
c) 1 and 2 d) None of the above

139. Consider the following statement:
1. Reykjanes peninsula is a peninsula in South West Iceland.
2. Reykjanes peninsula runs along the Mid-Atlantic Rift.
3. Recently, a seismic swarm has hit the Reykjanes peninsula.

Choose the correct option from the codes given below:
a) 1 and 2 b) 2 and 3
c) 1 and 3 d) 1, 2 and 3

140. Consider the following statement regarding NASA-ISRO Synthetic Aperture Radar (NISAR):
1. It consists of both L-band and S-band synthetic aperture radar (SAR) instruments.
2. NISAR will be the first satellite mission to use two different radar frequencies (L-band and S-band)
3. It is a Low Earth Orbit (LEO) observatory jointly developed by NASA only.

Choose the correct option from the codes given below:
a) 1 and 2 b) 2 and 3
c) 1 and 3 d) 1, 2 and 3

141. Consider the following statement regarding Point Calimere Wildlife Sanctuary:
1. It is situated in Tamil Nadu.
2. It houses the famous bird sanctuary of Vedaranyam and the Talaignayar forests.
3. It is not designated as Ramsar site.

Choose the correct option from the codes given below:
a) 1 and 2 b) 2 and 3
c) 1 and 3 d) 1, 2 and 3

142. Consider the following statement regarding Bru refugees:
1. It is an indigenous tribe from Chhattisgarh.
2. They belong to Indo-Mongoloid racial stock.
3. They speak a language known as "Kaubru,".

Choose the correct option from the codes given below:
a) 1 and 2 b) 2 and 3
c) 1 and 3 d) 1, 2 and 3

143. Consider the following statement regarding Hostile Activity Watch Kernel (HAWK) system:
1. It is Cloud Based Information Management System designed to manage interlinked databases of wildlife crime.
2. The system connects the entire state forest department in real-time.

Choose the correct option from the codes given below:
a) 1 Only b) 2 Only
c) 1 and 2 d) None of the above

144. Consider the following statement regarding Improvised Explosive Device (IED):
1. It is a type of unconventional explosive weapon.
2. The extent of damage caused by an IED depends on its size, construction, and placement, and whether it incorporates a high explosive or propellant.
3. The term IED came into common usage during the Iraq War that began in 2003.

Choose the correct option from the codes given below:
a) 1 and 2 b) 2 and 3
c) 1 and 3 d) 1, 2 and 3

145. Consider the following statement regarding Amangarh Tiger Reserve:
1. It is located in Uttar Pradesh.
2. It shares its boundaries with Jim Corbett National Park of Uttarakhand.
3. The vegetation of the tiger reserve is tropical forest.

Choose the correct option from the codes given below:
a) 1 and 2 b) 2 and 3
c) 1 and 3 d) 1, 2 and 3

146. Consider the following statement regarding of Section 295-A:
1. The accused must insult or attempt to insult the religion or religious beliefs of any class of citizens of India.
2. It is a cognisable, non-bailable, and non-compoundable offence.
3. The said insult must be only in spoken or written.

Choose the correct option from the codes given below:
a) 1 and 2 b) 2 and 3
c) 1 and 3 d) 1, 2 and 3

147. Consider the following statement regarding Aralam Wildlife Sanctuary:
1. It is located on the eastern slopes of the Eastern Ghats.
2. The highest peak in this sanctuary is Katti Betta.
3. Forest coast tropical evergreen and west coast semievergreen forests are predominant here.

Choose the correct option from the codes given below:
a) 1 and 2 b) 2 and 3
c) 1 and 3 d) 1, 2 and 3

148. Consider the following statement regarding Aerogels:
1. Aerogels are composed mostly of air.
2. They, also known as 'solid air' or 'frozen smoke'.

Choose the correct option from the codes given below:
a) 1 Only b) 2 only
c) 1 and 2 d) None of the above

149. Consider the following statement regarding Crab-plover:
1. It is a long-legged, black and white bird of Indian Ocean coasts.
2. They are residents of the coasts and islands of the Indian Ocean.
3. Conservation Status by IUCN is Least Concern.

Choose the correct option from the codes given below:
a) 1 and 2 b) 2 and 3
c) 1 and 3 d) 1, 2 and 3

150. Consider the following statement regarding Haemoglobin (Hb):
1. It is an iron-containing protein found in the red blood cells.
2. It is made up of four protein molecules (globulin chains) that are connected together.
3. Hemoglobin forms stable, irreversible bond with oxygen.

Choose the correct option from the codes given below:
a) 1 and 2 b) 2 and 3
c) 1 and 3 d) 1, 2 and 3

PRACTICE QUESTION FOR UPSC MAINS EXAM

1. Why does the government favour Aadhaar-based authentication for rations under the public distribution system and government-to-citizen cash transfer programmes such as wage payments in MGNREGS? What are some common problems faced by rights-holders?
2. It is critical to create and nurture age-responsive healthcare systems that ensure equitable access to person-centred care and services for all older persons and their families who are affected by tuberculosis. Comment and discuss.
3. How does the Official Prison Statistics India report label 'natural' and 'unnatural' deaths? Why do courts and experts think this classification is vague? Is the lack of space in prison facilities one of the leading factors resulting in custodial deaths?
4. Why has the embassy of the Islamic Republic of Afghanistan announced its closure? Are the consulates of Afghanistan also shutting down? What is the current state of the relationship between India and Taliban-ruled Afghanistan?
5. Recognising the complexity and interconnectedness of the climate polycrisis, it is crucial in developing a holistic approach to help bring the nation under one carbon accounting framework. Comment and discuss.
6. Discuss the role of unhealthy ultra-processed foods and beverages in India's growing diabetes burden. Also discuss how only a legal framework o can safeguard people from the strategies of the food industry.
7. Educational institutions have to rethink their approach so that it is in tune with the NEP which will be crucial in realising the 2030 deadline for SDGs. Comment.
8. How do the work of the three Physics Nobel laureates demonstrate a way to create short pulses of light that can be used to measure the rapid fashion in which electrons move or change energy? What are the applications of this discovery?
9. Highlight the transformative potential of cotton within the T&A industry. Discuss how a powerful symbol of transformation within the fashion industry, the 'white gold' can indeed become more 'fashionable' in its cultivation methods and a beacon of hope for a more sustainable and biodiverse tomorrow.
10. How are Scheduled Areas identified and governed? What did the Bhuria committee in 1995 recommend? How have the provisions of the Panchayats (Extension to Scheduled Areas) Act, or PESA, in 1996 changed governance of Scheduled Areas?
11. What is Professor Goldin's (Winner of Sveriges Riksbank Prize in Economic Sciences for 2023) claim about the inconsistency of women's participation in the labour market? How do expectations of future careers play a role in women's employment rate? How did the introduction of the birth control pill change the trajectory of women's careers?
12. Highlight the Voluntary Vehicle Fleet Modernisation Program (V-VMP). Discuss why the vehicle scrappage policy should be implemented as it would allow for greater mobility and enable municipal sweepers to keep the roads clean?
13. Is there a relation between caste, religion, poverty and discrimination? What do the social, economic indicators show? Does this pattern extend to education and employment? Is the informal sector disproportionately populated by Scheduled Tribes, Scheduled Castes and Other Backward Classes?
14. Discuss how the current global economic situation presents an opportunity for India and Bangladesh to collaborate and emerge stronger in the years ahead.
15. Highlight how is the Indian Ocean Rim Association's (IORA) a key bloc for India? Has the grouping managed to keep out big power rivalries? What are its focus areas?
16. Highlight the need to adopt innovative and collaborative approaches for improved management, conservation and availability of scarce water resources in India and around the globe.
17. The Environment Impact Assessment (EIA) process, especially concerning the Indian Himalayan Region (IHR), requires a comprehensive review. Exploring tools like strategic environmental assessment can be more effective in addressing the cumulative impact of development in regions like the IHR. Comment.
18. Critically analyse the Wildlife Protection (Amendment) Act, 2022. Discuss how an inordinate number of species have been included in the new schedules of the Wildlife Protection (Amendment) Act, 2022, with no consultation, process or logic.
19. Artificial General Intelligence (AGI) could prove to be as radical a game-changer in the world of the 21st century as the Industrial Revolution was in the 18th century. Comment. Also discuss the catastrophic consequences of AGI.
20. Highlight the challenges ailing India's food system. Discuss how a triad approach that engages all three sides of the food system: consumers, producers, and middlemen, can ensure truly sustainable food system.

21. Give a brief note on Supreme Court's recent observations made in Rajesh & Anr. vs The State of Madhya Pradesh, emphasising the need to devise a consistent and dependable code of investigation.
22. Why did the court not allow the Special Marriage Act to be used for queer couples to get married? Will the legislature be open to enacting a law to make same-sex marriage legal?
23. In the face of recent disasters in Himalayan states, involving the local population and grass-roots bodies in determining the carrying capacity of the Indian Himalayan Region is the only viable strategy in the Himalaya ecological restoration. Comment.
24. Discuss how the opening up of the Chattogram Port for transit and transhipment of goods and allowing regular movement is a powerful testimony of the India-Bangladesh partnership.
25. The economic impact of the non-participation of married women in the workforce in India is considerable, given their substantial representation among the working-age population. The female participation in the labour market did not exhibit an upward trend but rather a U-shaped curve. Illustrate.
26. The New Delhi Declaration's policy commitments in the health sector emphasise the role of the G20 in revising the existing financial and global health governance discussions. Comment.
27. The New Delhi Declaration's policy commitments in the health sector emphasise the role of the G20 in revising the existing financial and global health governance discussions. Comment.
28. Give a brief note on recently launched draft Guidelines for Prevention and Regulation of Dark Patterns in India. Discuss how it is a significant step toward safeguarding consumers and what are the loopholes, challenges associated?
29. Why has the National Crime Records Bureau cautioned against the misuse of the database by ensuring identification and deployment of appropriate safeguards allowing only designated officials to access the data in real time? What are the concerns?
30. Discuss how the office of Speakers of the Lok Sabha and Legislative Assemblies is posing a threat to the stability of elected governments.
31. The COVID-19 pandemic extracted a heavy mortality toll across the world and this has been a huge global public health concern. Discuss the need for task force of national experts to analyse civil registration data in India.

PRACTICE QUESTION FOR UPSC PRELIMS EXAM

ANSWER KEY

1.	(a)	2.	(b)	3.	(c)	4.	(d)	5.	(a)	6.	(a)	7.	(b)	8.	(c)	9.	(d)	10.	(a)
11.	(a)	12.	(b)	13.	(c)	14.	(d)	15.	(a)	16.	(a)	17.	(b)	18.	(c)	19.	(d)	20.	(a)
21.	(a)	22.	(b)	23.	(c)	24.	(d)	25.	(a)	26.	(a)	27.	(b)	28.	(c)	29.	(d)	30.	(a)
31.	(a)	32.	(b)	33.	(c)	34.	(d)	35.	(a)	36.	(a)	37.	(b)	38.	(c)	39.	(d)	40.	(a)
41.	(a)	42.	(b)	43.	(c)	44.	(d)	45.	(a)	46.	(a)	47.	(b)	48.	(c)	49.	(d)	50.	(a)
51.	(a)	52.	(b)	53.	(c)	54.	(d)	55.	(a)	56.	(a)	57.	(b)	58.	(c)	59.	(d)	60.	(a)
61.	(a)	62.	(b)	63.	(c)	64.	(d)	65.	(a)	66.	(a)	67.	(b)	68.	(c)	69.	(d)	70.	(a)
71.	(a)	72.	(b)	73.	(c)	74.	(d)	75.	(a)	76.	(a)	77.	(b)	78.	(c)	79.	(d)	80.	(a)
81.	(a)	82.	(b)	83.	(c)	84.	(d)	85.	(a)	86.	(a)	87.	(b)	88.	(c)	89.	(d)	90.	(a)
91.	(a)	92.	(b)	93.	(c)	94.	(d)	95.	(a)	96.	(a)	97.	(b)	98.	(c)	99.	(d)	100.	(a)
101.	(a)	102.	(b)	103.	(c)	104.	(d)	105.	(a)	106.	(a)	107.	(b)	108.	(c)	109.	(d)	110.	(a)
111.	(a)	112.	(b)	113.	(c)	114.	(d)	115.	(a)	116.	(a)	117.	(b)	118.	(c)	119.	(d)	120.	(a)
121.	(a)	122.	(b)	123.	(c)	124.	(d)	125.	(a)	126.	(a)	127.	(b)	128.	(c)	129.	(d)	130.	(a)
131.	(a)	132.	(b)	133.	(c)	134.	(d)	135.	(a)	136.	(a)	137.	(b)	138.	(c)	139.	(d)	140.	(a)
141.	(a)	142.	(b)	143.	(c)	144.	(d)	145.	(a)	146.	(a)	147.	(b)	148.	(c)	149.	(d)	150.	(a)

दीक्षांत
Education Centre

BPSC
PRE+MAINS
फाउंडेशन बैच

सामान्य अध्ययन

ऑनलाइन/ऑफलाइन

- सर्वश्रेष्ठ एवं अनुभवी शिक्षकों द्वारा अध्यापन
- 600 घंटे से अधिक की कक्षाएँ
- प्रत्येक विषय/खंड के प्रिंटेड नोट्स
- नियमित क्लास टेस्ट
- डाउट क्लियरेंस हेतु विशेष मेन्टर की व्यवस्था

कक्षा आरंभ
28 NOV. 2023

Offline Fee	~~₹ 75,000~~ ₹ 30,000	3 INSTALLMENT OF ₹10,000
Online Fee	~~₹ 22,500~~ ₹ 15,000	3 INSTALLMENT OF ₹ 6,000

नामांकन प्रारंभ / सीमित सीटें

TO REGISTER INSTALL DIKSHANT APP/ ADD.: 289, DHAKA JOHAR, DR. MUKHERJEE NAGAR, DELHI-09, CALL : 7428092240