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समाजशास्त्र

वैकल्पिक विषय

By Dr. S. S. Pandey

ऑनलाइन – ऑफलाइन

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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

Vipin, Niraj, Vivek, Sudhir Prasad, Vikas Tiwari, Manoj Singh, Abhijeet, Md. Shoaib, Prakash Jaiswal

TYPE SETTING AND DESIGNING

Faisal Khan, Suryajeet, Pooja Saluja, 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

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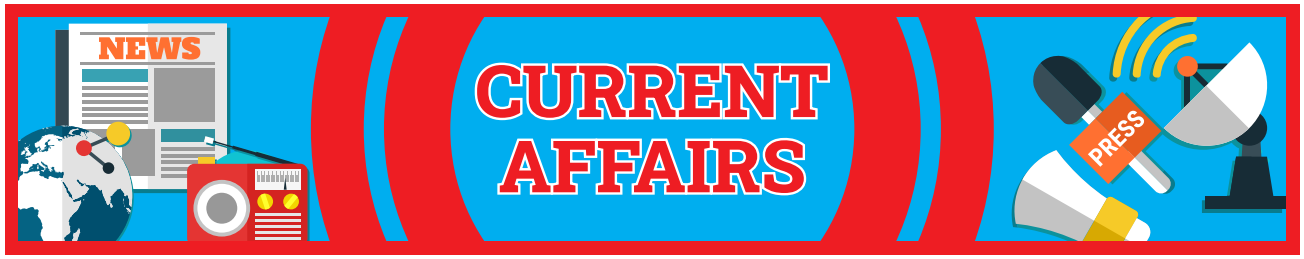


POLITY & GOVERNANCE

LAUNCH OF NATIONWIDE AWARENESS CAMPAIGN "ODOP-DEH SAMPARK

Why in news?

- Recently, the ODOP-DEH (One District One Product-Districts as export hubs) Invest India, DPIIT, Ministry of Commerce & Industry, Delhi, in collaboration with the Industries Department, Punjab, organized a nationwide awareness campaign for the initiative and interacted with manufacturers, artisans, state govt. officialsand media personals, in Jalandhar.
- This is the first such event in Punjab to promote district wise local products.

Aim:

- This initiative is part of the Government of India's efforts to promote the growth of micro, small and medium enterprises (MSMEs) and to support the development of indigenous products.
- The nationwide awareness campaign for ODOP-DEH is aimed at improving the economic viability of MSMEs and promoting the consumption of locally made products.

Stakeholders:

- It brought together manufacturers, artisans, traders, and beneficiaries from different sectors under ODOP-DEH. The ODOP-DEH team engaged in discussions with these stakeholders, providing updates on their products and the support and guidance available from the government.
- ODOP-DEH lead emphasized that the main objective of the campaign is to create awareness among the public about the unique products available in each district and to encourage their consumption.

Focus in Punjab:

- Under the ODOP – DEH initiative the products from Punjab reached a global platform where in AR videos of Sports goods from Jalandhar were displayed at World Economic Forum, Davos. The sports goods were sent to Embassy of India in Croatia, Argentina and Uruguay as well.
- Furthermore discussion for ODOP – DEH Products, Punjab included:
- Wood inlay from Hoshiarpur is facing acute shortage of skilled labour.
- Phulkari promotion at GI Pavilion, IITF
- Better marketing and branding for promoting ODOP – DEH products from Punjab globally.
- Adding Sports goods to Champions list (Top 15 sectors) and Make in India 2.0 list.
- Training workshops from NID, IIP can help significantly.
- Agriculture products can be further promoted and need for laboratories at more locations in Punjab.

Way Forward:

- ODOP platform is facilitating and guiding the producers, farmers, artisans and manufacturers to realise their potential.

ANDHRA PRADESH'S GUARANTEED PENSION SCHEME

Why in news?

- Amid calls to revert to the Old Pension Scheme (OPS) from various states, Andhra Pradesh's Guaranteed Pension Scheme (GPS) has caught the Centre's eye.
- The Central Government is attracted to the scheme because it combines the elements of both the OPS and the New Pension Scheme (NPS).

What is Guaranteed Pension Scheme (GPS)?

- The scheme, proposed for the first time in April 2022, offers a guaranteed pension of 33 per cent of the last

drawn basic pay without any deduction to the state government employees. For this, they would need to contribute 10 per cent of their basic salary every month, and the state government will match it.

- If the employee is willing to contribute a higher 14 per cent every month, they will receive a guaranteed pension of 40 per cent of their last drawn salary.
- The market conditions will not influence the pension under GPS, which is nearly 70 per cent higher than the current pension being offered under CPS, in line with the current interest rates.

Implementation & Concerns:

- The scheme was proposed to replace the Centre's NPS, which is called the Contributory Pension Scheme (CPS) in the state.
- While the state government is looking to implement the scheme, several employees have voiced their opposition to the GPS.
- The employee unions in the state believe that GPS is no better than CPS.
- The employee unions have also said that GPS, like CPS, involves payment of 10 per cent of basic pay by both the government and the employee concerned. The government projects GPS as a 65 per cent rise in the pension over the estimated 20 per cent return on their contributions under CPS.
- But the state government reportedly believes that shifting to OPS would take its budget outflow on account of pension and salaries to Rs 1,85,172 crore in 2023. Currently, it is expected to touch Rs 76,590 crore.

SC STEPS IN FOR UNDERTRIAL PRISONERS UNABLE TO FURNISH SURETY, BAIL BONDS

Why in news?

- Recently, the Supreme Court has issued a slew of directions to ensure that undertrial prisoners who have got bail, but are too poor to furnish surety and bail bonds, are released within seven days.
- The court has even suggested granting "temporary bail" to undertrial prisoners so that they can go out and arrange for bail bonds and sureties.

Background:

- The order by a Bench led by Justice Sanjay KishanKaul came in the wake of a National Legal Services Authority (NALSA) report in January that nearly 5,000 undertrial prisoners were in jail in the country despite courts granting them bail.
- They were either accused in multiple cases, or were simply too impoverished to comply with the bail conditions.

Key highlights of judgement:

- The Bench directed that courts should send soft copies of bail orders to the prison authorities on the same or the next day.
- The jail superintendent should record the date of the bail in the e-prisons software.
- The prison authorities should then inform the district legal services authorities (DLSA) concerned if an undertrial prisoner is not released within seven days of the grant of bail.
- The DLSA would depute a volunteer or an advocate to visit the jail and "assist the prisoner in all ways possible for his release".

Temporary bail:

- The NIC would "make attempts" to create separate fields in the e-prison software to record the date of grant of bail and the date of release.
- An automatic mail should be sent to the Secretary, DLSA, if a prisoner is not released in seven days.
- Paralegal volunteers or probation officers will enquire into the economic condition of such prisoners and place it before the courts with a request to relax bail conditions.
- The Bench directed that courts, in appropriate cases, could grant prisoners "temporary bail" so that they could arrange for sureties and bail bonds.

Suomotu action:

- The Bench further said that in cases in which bail bonds were not furnished within one month of granting the bail, the court concerned "may suomotu take up the case and consider whether the conditions of bail require modification/relaxation".
- The courts need not insist on local sureties, as ready availability of them have often been a cause of delay in releasing bailed prisoners.

UTTARAKHAND'S NEW ANTI-CHEATING LAW

Why in news?

- A day after a protest in Dehradun over paper leaks and scams in government recruitment tests turned violent, the Uttarakhand Governor gave his assent to an ordinance brought to prevent the use of unfair means in exams.
- The Uttarakhand Competitive Examination (Measures For Control and Prevention of Unfair Means

in Recruitment) Ordinance, 2023, has provisions of fines up to Rs 10 crore and life imprisonment for the guilty. With Governor Lt Gen (retd) Gurmit Singh's assent, it became law within 24 hours.

Key Provisions:

Objective:

- The main aim behind the law was to prevent offences related to obstructing the sanctity of examinations, use of unfair means, leakage of question papers, and other irregularities.
- It covers public examinations for recruitment to posts under the state government, autonomous bodies run by the government, and authorities, corporations, and institutions operated with grants of the state government.

Penalty:

- According to the ordinance, if any examinee is caught cheating or causing another examinee to cheat in a competitive examination (online and offline) or to have indulged in unfair means, he shall be punishable with imprisonment for three years and with a minimum fine of Rs 5 lakh. If the fine is not paid, the examinee shall be jailed for another nine months.
- A second-time offender will be punishable with a minimum jail term of 10 years and fine of Rs 10 lakh. In default of payment of fine, he will be jailed for another 30 months.
- If any person, printing press, service provider contracted or ordered for examination, management for conducting an examination, or any person and organisation authorised to keep and transport the examination material, any employee of the examination authority, limited liability partnership, coaching centre or any other institution has indulged in conspiracy or other unfair means, they shall be punished with a jail term of not less than 10 years, which may extend to life imprisonment.
- They will also be punished with a minimum fine of Rs 1 crore, which can go up to Rs 10 crore. If they can't pay the fine, the convicts will serve another jail term of three years.
- Also, an applicant found cheating will be debarred for two to five years from the date of the chargesheet, and in case of conviction, from all competitive exams for 10 years. All the properties earned using unfair means will be seized.
- The offences are cognizable, non-bailable and non-compoundable.

Background:

- The law was in the works from last year, after allegations of irregularities in the Uttarakhand Subordinate Services Selection Commission (UKSSSC) exams.
- For the past few days, there have been continuous agitations against multiple paper leaks in Uttarakhand since 2016.
- The Agricultural and Processed Food Products Export Development Authority (APEDA) completes 37 years of its journey

CONSTITUTIONAL OATH IS NOT A MERE FORMALITY

Context

- A Constitution is the basic law that lays the foundation for the governance of a country. It lays down broad policy/directives for the authorities and institutions tasked with its implementation.
- Basic eligibility criteria for appointment to several high constitutional offices are prescribed in the Constitution. Yet, many silent disqualifications operate.
- These are implied and read into the eligibility criteria by courts, solely guided by the objective of upholding the Constitution and the law and the integrity of the institution for which the functionary is chosen.

B.R. Kapur v. State of Tamil Nadu (2001):

- In B.R. Kapur v. State of Tamil Nadu (2001), the Governor's appointment of Jayalalithaa as Chief Minister despite her conviction for a criminal offence was called in question.
- Article 164(1) of the Constitution does not prescribe any disqualification for the appointment of a Chief Minister. Article 173, however, disqualifies a person

with prior conviction from being a member of the Legislature.

- The court was confronted with the question of whether it could import a disqualification for a person being appointed as a Chief Minister, when none was prescribed. The Supreme Court said yes.
- It held, "The will of the people as expressed through the majority party prevails only if it is in accord with the Constitution. The Governor... is sworn to preserve, protect and defend the Constitution and the laws (Article 159). The Governor cannot... do anything that is contrary to the Constitution and the laws." The Governor's act of administering oath to Jayalalithaa after her conviction was declared unconstitutional.

Oath for judges of the High Court and the Supreme Court:

- The oath to be taken by a judge of a High Court under Schedule III of the Constitution requires a declaration of allegiance to the Constitution and performance of duties "without fear or favour, affection or ill-will". The appointee must also declare that she will "uphold" the Constitution and the laws.
- Such an oath is unique to the judges of the High Court and the Supreme Court, since they are the sentinels of the Constitution.
- The oath is a solemn assurance to the people that justice will be rendered without any bias.

N. Kannadasan v. Ajoy Khose (2009):

- "Eligibility of a judge of a High Court should not be construed in a pedantic manner," declared the Supreme Court in N. Kannadasan v. Ajoy Khose (2009).
- An additional judge of the High Court, who was not appointed as a permanent judge due to allegations of lack of probity, was later recommended by the then Chief Justice of the Madras High Court for appointment as president of the State Consumer Commission.
- The appointment was declared illegal by the Supreme Court, which held that an independent and impartial judiciary should be manned by persons who dispense justice "without fear or favour, ill-will or affection." It held that a person who lacked the qualities necessary to adhere to the oath of office of a judge was ineligible for appointment to any judicial office. Thus, the capacity to dispense justice in terms of constitutional oath was held to be non-negotiable.

K.S. Haja Shareef (1983) Case:

- Inability to adhere to the Constitution as per the oath prescribed has been held to be a disqualification by a full Bench of the Madras High Court in the case of K.S. Haja Shareef (1983), who, after taking oath as a member of the Assembly to "bear true faith and allegiance to the Constitution," accepted appointment as Honorary Consul General of Turkey at Madras.
- On such appointment, he had agreed to abide by the directives of a foreign State. The court held that such a person cannot be expected to be a member of the Legislature since a conflict of interest between the two countries would arise and the constitutional oath will prevail to unseat him.

Selection of judges:

- To limit 'eligibility' for appointment of a High Court judge to a minimum of 10 years of legal practice prescribed in Article 217(2) makes a mockery of the integrity and independence of the judiciary. Such a facile reading turns the solemn assurance of an impartial and fair judiciary into a hollow promise. Just as breach of the oath will result in removal, adherence to the Constitution should precede taking the oath of office.
- Faced with opacity in judicial appointments/ transfers, the Supreme Court in S.P. Gupta v. Union of India (1981) directed the Government and the Chief Justice of India (CJI) to disclose all the materials.
- The judges held that their constitutional duty demanded such scrutiny through judicial review. They also held that if on scrutiny it was found that all the materials were not before the CJI (now collegium), the consultation/ selection process is defective and invalid.

Conclusion & Way Forward:

- The events leading up to the pronouncement of the Supreme Court regarding the selection of Justice Victoria Gowri reveal the fault lines between the government and the judiciary. The selection process came under a cloud once the CJI expressed in open court that materials now brought before the collegium were not available earlier.
- The collegium relies on the government's agencies to produce background materials of persons recommended to be judges. Transparency and accountability in the selection of judges alone will ensure an independent judiciary. The Preamble to the Constitution should permeate selection of every judge.

THE MISSING DEPUTY SPEAKER: THE POST, AND WHAT THE CONSTITUTION SAYS

Why in news?

- Recently, the Supreme Court issued notices to the Centre and five states: Rajasthan, Uttarakhand, Madhya Pradesh, Uttar Pradesh, and Jharkhand over the failure to elect a Deputy Speaker.
- A Bench led by Chief Justice of India (CJI) sought responses on a PIL that contends that not electing a Deputy Speaker to the 17th (present) Lok Sabha, which was constituted on June 19, 2019, is "against

the letter and spirit of the Constitution".

- The post has been lying vacant in the five state Assemblies as well, which were constituted between four years and almost one year ago.

What does the Constitution say about the Deputy Speaker?

- Article 93 says "The House of the People shall, as soon as may be, choose two members...to be...Speaker and Deputy Speaker...and, so often as the office of Speaker or Deputy Speaker becomes vacant, the House shall choose another member..."
- Article 178 contains the corresponding position for Speaker and Deputy Speaker of the Legislative Assembly of a state.
- Both Articles 93 and 178 use the word "shall", indicating that the election of Speaker and Deputy Speaker is mandatory under the Constitution.

How soon must the Deputy Speaker be elected?

- "As soon as may be", say Articles 93 and 178. But they do not lay down a specific time frame.
- In general, the practice in both Lok Sabha and the state Assemblies has been to elect the Speaker during the (mostly short) first session of the new House, usually on the third day after the oath-taking and affirmations over the first two days.
- The election of the Deputy Speaker usually takes place in the second sessio and is generally not delayed further in the absence of genuine and unavoidable constraints.
- Rule 8 of The Rules of Procedure and Conduct of Business in Lok Sabha says the election of Deputy Speaker "shall be held on such date as the Speaker may fix". The Deputy Speaker is elected once a motion proposing his name is carried in the House.
- Once elected, the Deputy Speaker usually continues in office for the entire duration of the House.Under Article 94 (Article 179 for state legislatures), the Speaker or Deputy Speaker "shall vacate his office if he ceases to be a member of the House...". They may also resign to each other, or "may be removed from... office by a resolution of the House of the People passed by a majority of all the then members of the House".

How was the post of Deputy Speaker envisaged?

- On May 19, 1941, H V Kamath argued in the Constituent Assembly that if the Speaker resigns, "it will be far better if he addresses his resignation to the President and not to the Deputy Speaker, because the Deputy Speaker holds an office subordinate to him".
- Dr B R Ambedkar disagreed and pointed out that a person normally tenders his resignation to the person who has appointed him. "...The Speaker and the Deputy Speaker are...appointed or chosen or elected by the House. Consequently these two people, if they want to resign, must tender their resignations to the House which is the appointing authority.
- Of course, the House being a collective body of people, a resignation could not be addressed to each member of the House separately. Consequently, the provision is made that the resignation should be addressed either to the Speaker or to the Deputy Speaker, because it is they who represent the House," he said.
- When Neelam Sanjiva Reddy resigned as Speaker of the 4th Lok Sabha on July 19, 1969, he addressed his resignation to the Deputy Speaker.

But what happens if the post of Deputy Speaker is vacant?

- The House is informed of the resignation of the Speaker by the Deputy Speaker and if the office of the Deputy Speaker is vacant, by the Secretary-General who receives the letter of resignation in that House.
- The resignation is notified in the Gazette and the Bulletin.

Do the powers of the Speaker extend to the Deputy Speaker as well?

- Article 95(1) says: "While the office of Speaker is vacant, the duties of the office shall be performed by the Deputy Speaker".
- In general, the Deputy Speaker has the same powers as the Speaker when presiding over a sitting of the House. All references to the Speaker in the Rules are deemed to be references to the Deputy Speaker when he presides.
- It has been repeatedly held that no appeal lies to the Speaker against a ruling given by the Deputy Speaker or any person presiding over the House in the absence of the Speaker.

Can the courts intervene in cases of a delay in electing the Deputy Speaker?

- In September 2021, a petition was filed before the Delhi High Court, which argued that delay in the election of the Deputy Speaker violated Article 93 (Pawan Reley v. Speaker, Lok Sabha & Ors). However, there is no precedent of a court forcing the legislature to elect the Deputy Speaker.
- Courts usually don't intervene in the procedural conduct of Parliament. Article 122(1) says: "The

validity of any proceedings in Parliament shall not be called in question on the ground of any alleged irregularity of procedure."

- However, the courts do have jurisdiction to at least inquire into why there has been no election to the post of Deputy Speaker since the Constitution does envisage an election "as soon as may be".

INTERNATIONAL RELATION

THE SAGA OF A 'SPY' BALLOON IN U.S. AIRSPACE

Why in news?

- Recently, the U.S. shot down a Chinese 'spy' balloon, days after the surveillance device was first spotted over American airspace, bringing the dramatic saga to a climax and dealing yet another blow to the already strained diplomatic relation between the two sides.

What happened?

- Reports of a massive white orb floating high above the U.S. State of Montana captured global attention.
- Ending speculations, American defence and military officials confirmed that the reconnaissance balloon had travelled from China, entered the air defence zone north of the Aleutian Islands on January 28, subsequently moved over land across Alaska and into Canadian airspace and crossed back into the U.S. over Idaho.
- President was briefed on the matter and the military considered shooting down the balloon which Pentagon believed was a Chinese surveillance tool carrying sensors and equipment to collect information about military and other strategic sites like Montana, which is home to one of the nation's three nuclear missile silo fields.
- China insisted that the balloon was an errant civilian airship used mainly for meteorological research that went off course due to winds.

How was the balloon shot down?

- Ahead of the mission, NASA assessed the debris field based on the trajectory of the balloon, weather and estimated payload of sensors. Multiple fighters and refuelling aircraft, including F-15s and tanker aircraft, were part of the mission.
- But it was an F-22 Raptor fighter jet that took off from an air force base in Virginia that took down the balloon by firing a short-range AIM-9X Sidewinder missile.
- The downing of the balloon by a missile drew a strong reaction from China which insisted that the flyover was an accident and criticised U.S. for an "obvious overreaction". The shoot down of the balloon has "seriously impacted and damaged" relations between the two countries.

What are spy balloons?

- Spy balloons are high-altitude surveillance tools that usually operate at 80,000-1,20,000 feet well above the cruising altitude of commercial aircraft, to gather intelligence and carry out other military missions.
- Typically, a spy balloon is equipped with cameras and imaging devices suspended beneath the gas-filled white object to capture things of interest. Unlike satellites, balloons are economically viable.
- Due to their proximity to the Earth's surface, they can widely scan an area from close quarters and capture clearer, high-resolution images of the target.
- The disadvantage is that these are not directly steered, but can be roughly guided by changing altitudes to catch different wind currents. They are also a relatively easy target.
- Taiwan has accused the Peoples Liberation Army (PLA) of using spy balloons in the past. A similar sighting was reported over Andaman and Nicobar Islands in January 2022. There has, however, been no official confirmation or evidence that establishes its link with China.

INDIA WILL TAKE LEADING ROLE IN OIL REQUIREMENT TILL 2045: OPEC REPORT

Why in news?

- Recently, the OPEC's "World Oil Outlook 2045" report, was released during the ongoing India Energy Week.
- After China driving the initial demand growth, it is going to be India which will take the leading role in crude requirement, along with other Asian and African countries.

Details:

- India, fairly robust growth during this period is also projected for African and other Asian countries where economic progress, urbanisation, industrialisation, and vehicle fleet expansion will be fastest among all regions.
- This, will result in respective demand increases of around 1.4 mb/d, 0.8 mb/d and 0.7 mb/d, for India, Africa and Other Asia respectively during the 2040-2045 period.

Key observations:

- Even by 2045, oil demand will still grow at a rate of more than 2 per cent per annum in India and Africa and 1 per cent per annum in Other Asia region.
- Cumulative oil-related investment requirements are projected at $12.1 trillion over the entire 2022-2045 period (in 2022 US dollars).
- This is slightly higher than assessed in the World Oil Outlook (WOO) 2021, as upward-revised demand projections and assumed cost inflation in the short- and medium-term more than offset the forecast period being one year shorter.
- Upstream needs make up $9.5 trillion, while downstream and midstream requirements are $1.6 and $1 trillion, respectively.

Way Forward:

- In the current geopolitical context, besides a pressing need to increase climate ambitions, countries are increasingly focused on energy security issues.
- There is now more attention on an energy sustainability trilemma, related to affordability, energy security and reducing emissions, evidenced in many countries publicly recognising the need for inclusive and resilient approaches, including through more investments in oil and gas projects going forward.

About OPEC:

- The Organisation of the Petroleum Exporting Countries (OPEC) is a permanent intergovernmental organisation consisting of 13 major oil-exporting countries.
- It is headquartered in Vienna, Austria, where the OPEC Secretariat, the executive organ, carries out the day-to-day business.

About OPEC+:

- OPEC+ is a group of oil-producing nations consisting of the 13 OPEC members and 10 other non-OPEC members.
- The OPEC+ was set up in 2017 to coordinate oil production among the countries in order to stabilise prices.

CHINA PLANNING AKSAI CHIN RAILWAY LINE TO CONNECT TIBET AND XINJIANG

Why in news?

- China will soon begin construction on an ambitious new railway line connecting Xinjiang and Tibet that will run close to the Line of Actual Control (LAC) and through the disputed Aksai Chin region, according to a new railway plan released by the Tibet Autonomous Region (TAR) government.
- The "medium to long term railway plan" for Tibet, envisages expanding the TAR rail network to reach 4,000 km by 2025 up from the current 1,400 km, including new routes that will run up to China's borders with India and Nepal.

Xinjiang-Tibet railway:

- The most ambitious of the new plans is the Xinjiang-Tibet railway, which will broadly follow the course of the G219 national highway. The construction of the Xinjiang-Tibet highway through Aksai Chin had triggered tensions between India and China in the lead up to the 1962 war.
- The proposed railway will begin in Shigatse in Tibet, and run northwest along the Nepal border, before cutting north through Aksai Chin and ending in Hotan in Xinjiang. The planned route will pass through Rutog and around Pangong Lake on the Chinese side of the LAC.
- The first section, from Shigatse to Pakhuktso, will be completed by 2025, with the rest of the line, up to Hotan, expected to be finished by 2035.

Twin purposes

- The railway construction is being seen as serving two purposes:
  a) boosting border security by enabling China to more closely integrate border areas as well as mobilise quickly to the frontier when needed; and
  b) accelerating Tibet's economic integration with the hinterland.

c) While Qinghai province has a rail link to Tibet, the plan will now extend railway links for the first time to the three other neighbouring provinces of Sichuan, Yunnan and Gansu.

Rail lines in operation:

- Tibet currently only has three rail lines in operation: the Qinghai-Tibet link that opened in 2006, the Lhasa-Shigatse rail launched in 2014, and the Lhasa-Nyingchi line that began operation in 2021.
- The Lhasa-Nyingchi line runs to Tibet's southeast, and near the border with India's Arunachal Pradesh. This line is being extended further east up to Chengdu, the provincial capital of Sichuan and a major economic and military hub in western China, shortening the travel time between the two regional capitals from 36 hours to 12 hours.
- Under the plan, border railway lines will be built up to Gyirong, the land port on the Nepal-Tibet border, and to Yadong county in the Chumbi valley, which borders India's Sikkim as well as Bhutan.

INTERNATIONAL SOLAR ALLIANCE AND WEST AFRICAN POWER POOL HOSTS 13 AFRICAN COUNTRIES

Why in news?

- International Solar Alliance (ISA), in collaboration with Grid Controller of India Ltd (Grid-India) and West African Power Pool (WAPP), is hosting delegates from the West African Region in New Delhi, from 14th to 18th February.
- Sixty participants from thirteen WAPP countries: Benin, Burkina Faso, Cote d'Ivoire, Gambia, Ghana, Guinea, Liberia, Mali, Niger, Nigeria, Senegal, Sierra Leone, and Togo will participate in a knowledge sharing and study tour highlighting aspects of solar energy implementation.

Key Highlights:

- The programme participants include officials from ministries, statutory, regulatory bodies, and utility companies from participating African nations.
- The tour highlights include classroom sessions and interactions in New Delhi and Bengaluru, visits to Pavagada Solar Park, Southern Regional Load Despatch Centre, and Southern Regional Renewable Energy Management Centre.
- The programme agenda will help participants with insights into global and Indian solar energy scenarios, policies, guidelines, and regulations overview for renewable energy in India from a solar energy perspective.

About the International Solar Alliance:

- The International Solar Alliance is an international organisation with 114 Member and Signatory countries.
- It works with governments to improve energy access and security worldwide and promote solar power as a sustainable transition to a carbon-neutral future. ISA's mission is to unlock US$ 1 trillion of investments in solar by 2030 while reducing the cost of the technology and its financing.
- It promotes the use of solar energy in the Agriculture, Health, Transport and Power Generation sectors. ISA member countries are driving change by enacting policies and regulations, sharing best practices, agreeing on common standards, and mobilising investments.
- Through this work, ISA has identified and designed and tested new business models for solar projects; supported governments to make their energy legislation and policies solar-friendly through Ease of Doing Solar analytics and advisory; pooled demand for solar technology from different countries; and drove down costs; improved access to finance by reducing the risks and making the sector more attractive to private investment; increased access to solar training, data and insights for solar engineers and energy policymakers.
- With the signing and ratification of the ISA Framework Agreement by 15 countries on 6 December 2017, ISA became the first international intergovernmental organisation to be headquartered in India.
- ISA is partnering with multilateral development banks (MDBs), development financial institutions (DFIs), private and public sector organisations, civil society, and other international institutions to deploy cost-effective and transformational solutions through solar energy, especially in the least Developed Countries (LDCs) and the Small Island Developing States (SIDS).

INDIA WRITES TO WTO AGAINST CARBON BORDER TAX

Why in news?

- India in a submission to the World Trade Organisation (WTO) recently has slammed carbon border measures being imposed by some countries, calling them discriminatory and protectionist, the Economic Times reported.

- India has written to WTO raising concerns over the selective application of Carbon border rules to 'trade-exposed industries' like steel, aluminium, chemicals, plastics, polymers, chemicals and fertilisers, which reflects the underlying competitiveness concerns driving such measures.
- According to the WTO rules, it is mandatory that there is non-discriminatory treatment for same products, irrespective of their production methods and such border measures can lead to "behind-the-border" protectionist practices.

Details:

- This statement from India comes at a time when the US introduced an Inflation Reduction Act to establish green technology industries. The European Union (EU) too has a Carbon Border Adjustment Mechanism which is a global carbon tax levied on imports to the bloc.
- Emphasising the importance to follow the principles of equity and common but differentiated responsibilities and respective capabilities, and the Nationally Determined Contributions (NDCs), India told the WTO that 'Carbon border measures that are being considered for imposition on imported products effectively amount to prioritising a singular policy of the importing country over those of exporting countries and will amount to imposing a unilateral vision of how to combat climate change'.

What are Carbon Border measures?

- A few developed countries have imposed high costs on carbon-intensive businesses in their own countries to reduce emissions.
- However, it was found that businesses could overcome these restrictions by moving production to developing countries where the norms are less strict. This is known as carbon leakage. To curb these the countries started imposing Carbon Tax at borders.

Carbon Border Adjustment Mechanism (CBAM):

- EU defines CBAM as a 'landmark tool to put a fair price on the carbon emitted during the production of carbon-intensive goods that are entering the EU, and to encourage cleaner industrial production in non-EU countries'.
- It is like a carbon tax on goods entering the EU from other countries. India's concern is that these border taxes on its goods entering EU would increase the prices of Indian-made goods and make them less attractive to buyers and could negatively affect demand.
- Such a tax could pose a serious threat to companies with larger greenhouse gas footprints.

Issue raised by India & other countries:

- India along with other BASIC countries (Brazil, South Africa, India and China) raised this issue in November 2021 at the COP27 in Sharm El Sheikh, saying it could "result in market distortion".
- At COP 27, Indiasaid that 'just transition' to cleaner sources of energy did not mean that all countries should strive for the same level of decarbonisation.
- For India, just transition means the transition to a low-carbon development strategy over a time scale that ensures food and energy security, growth, and employment, leaving no one behind in the process.

WHY CHINA, RUSSIA ARE USING BALLOONS IN THE AGE OF SATELLITES AND DRONES

Context:

- The United States has a defence budget of a whopping $1.90 trillion, China spent over $200 billion on its military as per 2021 data, and Russia, which is engaged in a deadly war with Ukraine, pegs its defence budget at $84 billion.
- The three countries are equipped with state-of-the-art weaponry, cutting-edge defence technology, and superior tactical maneuverability. But, over the past three weeks, these countries have been engaged in a confrontation over balloons.

Recent incidents:

- The United States has suddenly seen a surge in sightings of alleged spy balloons above its mainland after it downed one belonging to China recently.
- Meanwhile, Russia has also been using a similar strategy in its war with Ukraine, and nearly half a dozen such spy balloons were reported over Kyiv.
- Primary findings suggested that the objects were balloons floating in the wind, which could have been equipped with intelligence equipment or reflectors.

Background:

- Balloons are not new in the field of war, they have been around since World War II and what makes them special is that they can operate at 24,000-37,000 meters above the ground.
- These mega-structures have been around even before the Wright brothers made their first flight 1903. The first hydrogen gas-filled balloon flew above Paris way back in 1783 and since then these vehicles have evolved and have been repurposed to suit various requirements.
- Just after the end of World War II, the US military started exploring the use of high-altitude spy balloons, which led to a large-scale series of missions called Project Genetrix. The project flew balloons for photography over Soviet bloc territory in the 1950s.

Technology advancement:

- The altitude that these balloons fly at is well above where commercial air traffic operates.
- The Sanriku Balloon Centre (SBC) in the north of Japan created history in 2022 when it quietly flew a balloon nearly 53 kilometers above the surface of the Earth. Another 47 kilometers and the balloon would have touched the Karmen line, the boundary between Earth and space.
- Over the years, several companies have perfected the system of balloons that can be deployed for multipurpose approaches, from scientific studies to understanding atmospheric composition to conducting aerial reconnaissance to gathering intelligence.
- With improvements in technology, the balloons have also been modified for longer missions powered by solar energy.

Cheaper than Surveillance Satellites:

- A surveillance satellite, while effective, is not an easy thing to launch. From development to integration, to launching to operations, satellites not only require constant manpower but also a continuous flow of financial resources.
- Balloons, on the other hand, are cheaper to not only manufacture, but also operate. The turnaround time is also significantly shorter.
- SpaceX takes about five days to ready a launchpad for two successive launches. As compared, balloons can be deployed with a shorter window, making them cheaper and viable.

UAV vs. Ballon:

- Unmanned Aerial Vehicles (UAVs) have been one of the most successful innovations when it comes to military aerial reconnaissance.
- But they come with their own disadvantages when compared with these balloons. The UAVs are able to fly at just 5,500 meters above Earth against balloons that go up to 37,000 meters.
- Another advantage these balloons pose is their quiet approach in the air as against the humming of the drones. However, drones do have a significant advantage of firepower and dropping heavy ammunition when required.

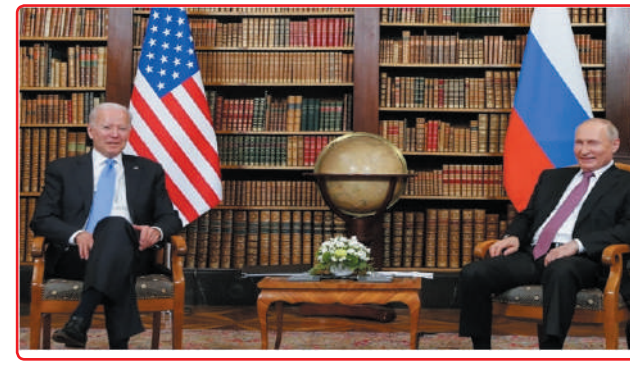
Conclusion:

- As the art of warfare evolves, the balloons could pose a major challenge to countries as they sneak in across the borders from above, do their business, and quietly disappear.

RUSSIA SUSPENDS THE LAST REMAINING MAJOR NUCLEAR TREATY WITH THE U.S.

Why in news?

- Recently, Russian President suspended its participation in the 2010 New START treaty, the last remaining nuclear arms control pact with the U.S. amid tensions with U.S. over the fighting in Ukraine.
- He accused the U.S. and its NATO allies of openly declaring the goal of Russia's defeat in Ukraine.
- New START's official name is, 'The Treaty between the United States of America and the Russian Federation on Measures for the Further Reduction and Limitation of Strategic Offensive Arms'.



What is the New START?

- The name START comes from the original "Strategic Arms Reduction Treaty", known as START-I, which was signed between the US and the erstwhile USSR in 1991, and came into force in 1994.
- START-I, which capped the numbers of nuclear warheads and intercontinental ballistic missiles (ICBMs) that each side could deploy at 6,000 and 1,600 respectively, lapsed in 2009, and was replaced first by the Strategic Offensive Reductions Treaty (SORT, also known as the Treaty of Moscow), and then by the New START treaty.
- The New START, officially, the "Treaty between the United States of America and the Russian Federation on Measures for the Further Reduction and Limitation of Strategic Offensive Arms", entered into force on February 5, 2011, and placed new verifiable limits on intercontinental-range nuclear weapons.
- The two countries had to meet the treaty's central

limits on strategic offensive arms by February 5, 2018, and to then stay within those limits for the period the treaty remained in force. The US and Russia Federation subsequently agreed to extend the treaty through February 4, 2026.

What limits did the New START impose on the two countries?

- 700 deployed intercontinental ballistic missiles (ICBMs), deployed submarine-launched ballistic missiles (SLBMs), and deployed heavy bombers equipped for nuclear armaments;
- 1,550 nuclear warheads on deployed ICBMs, deployed SLBMs, and deployed heavy bombers equipped for nuclear armaments (each such heavy bomber is counted as one warhead toward this limit);
- 800 deployed and non-deployed ICBM launchers, SLBM launchers, and heavy bombers equipped for nuclear armaments.

How is compliance with the treaty ensured?

- The treaty provides for 18 on-site inspections per year for US and Russian inspection teams.
- Type One inspections focus on sites with deployed and non-deployed strategic systems (up to 10 per year), and Type Two inspections focus on sites with only non-deployed strategic systems (up to 8 per year).

WHY HAVE FRENCH TROOPS WITHDRAWN FROM BURKINA FASO?

Why in news?

- Recently, Burkina Faso announced an official end to the operations led by France in the country.
- France had signed a military agreement with Burkina Faso in 2018 to achieve stability against the threat of Islamist militant groups.
- France signed a series of similar agreements with other West African nations, including Mali who terminated the operation in late 2022.

Why is France withdrawing?

- For France, the military governments in West Africa pose multiple challenges. In February 2022, while announcing the withdrawal of France and its allies from Mali, French President said, "Victory against terror is not possible if it's not supported by the state itself."
- France has also been critical of Russian inroads into Africa. It has accused the Russian private military company Wagner Group for working closely with the military governments in West Africa.

Why did Burkina Faso end it?

- France was asked to withdraw its troops from Burkina Faso months after it pulled out its troops from Mali. The primary reason behind the withdrawal is the failure of its counter insurgency operations in the Sahel region against Islamist groups.
- Islamist insurgency has surged since 2015 and fuelled two coups in Burkina Faso in 2022. The violence linked to al-Qaeda and Islamic State groups has killed thousands and forced more than two million to flee their homes in the country.
- Secondly, as Islamist insurgency kept intensifying, France's military presence in Burkina Faso came under scrutiny. After the second coup in September 2022, anti-France protests increased in Burkina Faso with demonstrators demanding French withdrawal from the country. There was also an increasing pro-Russia sentiment.
- And finally, the ruling military junta of Burkina Faso was looking beyond its traditional allies for support in its counterinsurgency campaign. Dissatisfaction with the French approach has made other actors including Russia and China more preferable partners to fight insurgency.

Is there Russian involvement?

- Russia's engagements in Africa have been under scrutiny for a few years, especially after the resurgence of military governments in West Africa since 2020.
- Following Ouagadougou's announcement of the termination of France operations, Burkinabe Prime Minister Apollinaire Kyelem de Tambela termed Russia "a reasonable choice".
- Simultaneously, Russia has been courting African countries; in 2023 alone, Russian Foreign Minister Sergei Lavrov visited seven countries in Africa: Angola, Eswatini, South Africa, Eritrea, Mali, Sudan and Mauritania.

What next for France and Burkina Faso?

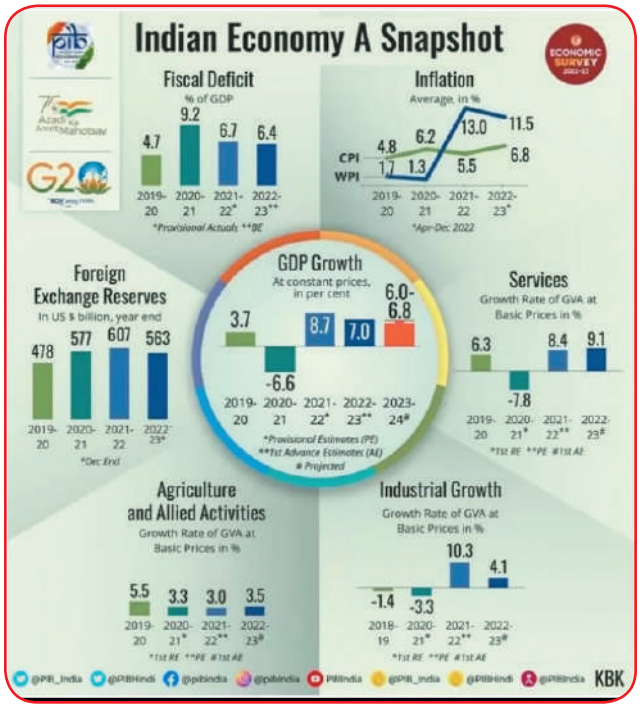
- France has accepted the military governments' decision which marks a significant change in its West Africa approach.
- In Burkina Faso, in the absence of France's troops, the alleged Russian mercenaries may fill the security void, as part of its bid to enhance military engagements in the continent.
- However, the new developments are unlikely to address the insurgency and the consequent insecurity.

ECONOMY

ECONOMIC SURVEY 2022-23: HIGHLIGHTS

Why in news?

- Recently, the Union Minister for Finance and Corporate Affairs, Nirmala Sitharaman, presented the Economic Survey 2022-23 in the Union Parliament. The highlights of the Survey are as follows:



State of the Economy 2022-23:

- Recovering from pandemic-induced contraction, Russian-Ukraine conflict and inflation, Indian economy is staging a broad based recovery across sectors, positioning to ascend to the pre-pandemic growth path in FY23.
- India's GDP growth is expected to remain robust in FY24. GDP forecast for FY24 to be in the range of 6-6.8 %.
- Private consumption in H1 is highest since FY15 and this has led to a boost to production activity resulting in enhanced capacity utilisation across sectors.
- The Capital Expenditure of Central Government and crowding in the private Capex led by strengthening of the balance sheets of the Corporates is one of the growth driver of the Indian economy in the current year.
- The credit growth to the MSME sector was over 30.6 per cent on average during Jan-Nov 2022.
- Retail inflation is back within RBI's target range in November 2022.
- Direct Tax collections for the period April-November 2022 remain buoyant.

India's Medium Term Growth Outlook:

- Indian economy underwent wide-ranging structural and governance reforms that strengthened the economy's fundamentals by enhancing its overall efficiency during 2014-2022.
- With an underlying emphasis on improving the ease of living and doing business, the reforms after 2014 were based on the broad principles of creating public goods, adopting trust-based governance, co-partnering with the private sector for development, and improving agricultural productivity.
- The period of 2014-2022 also witnessed balance sheet stress caused by the credit boom in the previous years and one-off global shocks, that adversely impacted the key macroeconomic variables such as credit growth, capital formation, and hence economic growth during this period.
- This situation is analogous to the period 1998-2002 when transformative reforms undertaken by the government had lagged growth returns due to temporary shocks in the economy. Once these shocks faded, the structural reforms paid growth dividends from 2003.
- Similarly, the Indian economy is well placed to grow faster in the coming decade once the global shocks of the pandemic and the spike in commodity prices in 2022 fade away.
- Indian economy has also started benefiting from the efficiency gains resulting from greater formalisation, higher financial inclusion, and economic opportunities created by digital technology-based economic reforms.

Fiscal Developments:

- The Union Government finances have shown a resilient performance during the year FY23, facilitated by the recovery in economic activity, buoyancy in revenues from direct taxes and GST, and realistic assumptions in the Budget.
- The Gross Tax Revenue registered a YoY growth of 15.5 per cent from April to November 2022, driven by robust growth in the direct taxes and Goods and Services Tax (GST).
- Growth in direct taxes during the first eight months of the year was much higher than their corresponding longer-term averages.
- GST has stabilised as a vital revenue source for central and state governments, with the gross GST collections increasing at 24.8 per cent on YoY basis from April to December 2022.

- Union Government's emphasis on capital expenditure (Capex) has continued despite higher revenue expenditure requirements during the year. The Centre's Capex has steadily increased from a long-term average of 1.7 per cent of GDP (FY09 to FY20) to 2.5 per cent of GDP in FY22 PA.
- The Centre has also incentivised the State Governments through interest-free loans and enhanced borrowing ceilings to prioritise their spending on Capex.
- With an emphasis on infrastructure-intensive sectors like roads and highways, railways, and housing and urban affairs, the increase in Capex has large-scale positive implications for medium-term growth.

Monetary Management and Financial Intermediation:

- The RBI initiated its monetary tightening cycle in April 2022 and has since raised the repo rate by 225 bps, leading to moderation of surplus liquidity conditions.
- Cleaner balance sheets led to enhanced lending by financial institutions.
- The growth in credit offtake is expected to sustain, and combined with a pick-up in private capex, will usher in a virtuous investment cycle.
- Non-food credit offtake by scheduled Commercial Banks (SCBs) has been growing in double digits since April 2022.
- Credit disbursed by Non-Banking Financial Companies (NBFCs) has also been on the rise.
- The Gross Non-Performing Assets (GNPA) ratio of SCBs has fallen to a seven-year low of 5.0.
- The Capital-to-Risk Weighted Assets Ratio (CRAR) remains healthy at 16.0.
- The recovery rate for the SCBs through Insolvency and Bankruptcy (IBC) was highest in FY22 compared to other channels.

Prices and Inflation:

- While the year 2022 witnessed a return of high inflation in the advanced world after three to four decades, India caps the rise in prices.
- While India's retail inflation rate peaked at 7.8 per cent in April 2022, above the RBI's upper tolerance limit of 6 per cent, the overshoot of inflation above the upper end of the target range in India was however one of the lowest in the world.
- The government adopted a multi-pronged approach to tame the increase in price levels
- Phase wise reduction in export duty of petrol and diesel
- Import duty on major inputs were brought to zero while tax on export of iron ores and concentrates increased from 30 to 50 per cent
- Waived customs duty on cotton imports w.e.f 14 April 2022, until 30 September 2022
- Prohibition on the export of wheat products under HS Code 1101 and imposition of export duty on rice
- Timely policy intervention by the government in housing sector, coupled with low home loan interest rates propped up demand and attracted buyers more readily in the affordable segment in FY23.
- An overall increase in composite Housing Price Indices (HPI) assessment and Housing Price Indices market prices indicates a revival in the housing finance sector. A stable to moderate increase in HPI also offers confidence to homeowners and home loan financiers in terms of the retained value of the asset.

Social Infrastructure and Employment:

- Social Sector witnessed significant increase in government spending.
- Central and State Government's budgeted expenditure on health sector touched 2.1% of GDP in FY23 (BE) and 2.2% in FY22 (RE) against 1.6% in FY21.
- Social sector expenditure increases to Rs. 21.3 lakh crore in FY23 (BE) from Rs. 9.1 lakh crore in FY16.
- Survey highlights the findings of the 2022 report of the UNDP on Multidimensional Poverty Index which says that 41.5 crore people exit poverty in India between 2005-06 and 2019-20.
- The Aspirational Districts Programme has emerged as a template for good governance, especially in remote and difficult areas.
- Labour markets have recovered beyond pre-Covid levels, in both urban and rural areas, with unemployment rates falling from 5.8 per cent in 2018-19 to 4.2 per cent in 2020-21.
- The year FY22 saw improvement in Gross Enrolment Ratios (GER) in schools and improvement in gender parity. GER in the primary-enrolment in class I to V as a percentage of the population in age 6 to 10 years - for girls as well as boys have improved in FY22.
- Due to several steps taken by the government on health, out-of-pocket expenditure as a percentage of total health expenditure declined from 64.2% in FY14 to 48.2% in FY19.

Climate Change and Environment:

- India declared the Net Zero Pledge to achieve net zero emissions goal by 2070.
- India achieved its target of 40 per cent installed electric capacity from non-fossil fuels ahead of 2030.
- The likely installed capacity from non-fossil fuels to be more than 500 GW by 2030 resulting in decline of average emission rate by around 29% by 2029-30, compared to 2014-15.
- India to reduce emissions intensity of its GDP by 45% by 2030 from 2005 levels.

- About 50% cumulative electric power installed capacity to come from non-fossil fuel-based energy resources by 2030.
- A mass movement LIFE– Life style for Environment launched.
- Sovereign Green Bond Framework (SGrBs) issued in November 2022.
- RBI auctions two tranches of ₹ 4,000 crore Sovereign Green Bonds (SGrB).
- National Green Hydrogen Mission to enable India to be energy independent by 2047.
- Green hydrogen production capacity of at least 5 MMT (Million Metric Tonne) per annum to be developed by 2030. Cumulative reduction in fossil fuel imports over ₹ 1 lakh crore and creation of over 6 lakh jobs by 2030 under the National green Hydrogen Mission. Renewable energy capacity addition of about 125 GW and abatement of nearly 50 MMT of annual GHG emissions by 2030.
- Solar power capacity installed, a key metric under the National Solar Mission stood at 61.6 GW as on October 2022.

Agriculture and Food Management:

- Private investment in agriculture increases to 9.3% in 2020-21.
- MSP for all mandated crops fixed at 1.5 times of all India weighted average cost of production since 2018.
- Institutional Credit to the Agricultural Sector continued to grow to 18.6 lakh crore in 2021-22
- Foodgrains production in India saw sustained increase and stood at 315.7 million tonnes in 2021-22.
- Free foodgrains to about 81.4 crore beneficiaries under the National Food Security Act for one year from January 1, 2023.
- About 11.3 crore farmers were covered under the Scheme in its April-July 2022-23 payment cycle.
- Rs 13,681 crores sanctioned for Post-Harvest Support and Community Farms under the Agriculture Infrastructure Fund.
- Online, Competitive, Transparent Bidding System with 1.74 crore farmers and 2.39 lakh traders put in place under the National Agriculture Market (e-NAM) Scheme.
- Organic Farming being promoted through Farmer Producer Organisations (FPO) under the Paramparagat Krishi Vikas Yojana (PKVY).
- India stands at the forefront to promote millets through the International Year of Millets initiative.

Industry:

- Overall Gross Value Added (GVA) by the Industrial Sector (for the first half of FY 22-23) rose 3.7 per cent, which is higher than the average growth of 2.8 per cent achieved in the first half of the last decade.
- PMI manufacturing has remained in the expansion zone for 18 months since July 2021, and Index of Industrial Production (IIP) grows at a healthy pace.
- Credit to Micro, Small and Medium Enterprises (MSMEs) has grown by an average of around 30% since January 2022 and credit to large industry has been showing double-digit growth since October 2022.
- Electronics exports rise nearly threefold, from US $4.4 billion in FY19 to US $11.6 Billion in FY22.
- India has become the **second-largest mobile phone manufacturer globally**, with the production of handsets going up from 6 crore units in FY15 to 29 crore units in FY21.
- Foreign Direct Investment (FDI) flows into the Pharma Industry has risen four times, from US $180 million in FY19 to US $699 million in FY22.
- The Production Linked Incentive (PLI) schemes introduced across 14 categories, with an estimated capex of ₹ 4 lakh crore over the next five years, to plug India into global supply chains. Investment of ₹ 47,500 crores has been seen under the PLI schemes in the FY22, which is 106% of the designated target for the year.
- Over 39,000 compliances have been reduced and more than 3500 provisions decriminalized as of January 2023.

Services:

- The services sector is expected to grow at 9.1% in FY23, as against 8.4% (YoY) in FY22.
- Robust expansion in PMI services, indicative of service sector activity, observed since July 2022.
- India was among the top ten services exporting countries in 2021, with its share in world commercial services exports increasing from 3 per cent in 2015 to 4 per cent in 2021.
- Credit to services sector has grown by over 16% since July 2022.
- US$ 7.1 billion FDI equity inflows in services sector in FY22.
- Contact-intensive services are set to reclaim pre-pandemic level growth rates in FY23.
- Sustained growth in the real estate sector is taking housing sales to pre-pandemic levels, with a 50% rise between 2021 and 2022.
- Hotel occupancy rate has improved from 30-32% in April 2021 to 68-70% in November 2022.
- Tourism sector is showing signs of revival, with foreign tourist arrivals in India in FY23 growing month-on-month with resumption of scheduled international flights and easing of Covid-19 regulations.
- Digital platforms are transforming India's financial services.

- India's e-commerce market is projected to grow at 18 per cent annually through 2025.

External Sector:

- Merchandise exports were US$ 332.8 billion for April-December 2022.
- India diversified its markets and increased its exports to Brazil, South Africa and Saudi Arabia.
- To increase its market size and ensure better penetration, in 2022, CEPA with UAE and ECTA with Australia come into force.
- India is the largest recipient of remittances in the world receiving US$ 100 bn in 2022. Remittances are the second largest major source of external financing after service export
- As of December 2022, Forex Reserves stood at US$ 563 bn covering 9.3 months of imports.
- As of end-November 2022, India is the sixth largest foreign exchange reserves holder in the world.
- The current stock of external debt is well shielded by the comfortable level of foreign exchange reserves.
- India has relatively low levels of total debt as a percentage of Gross National Income and short-term debt as a percentage of total debt.

DEPARTMENT OF FISHERIES LAUNCHES 'SAGAR PARIKRAMA' PROGRAM ON OCCASION OF 75TH AZADI KA AMRIT MAHOTSAV

Why in news?

- The Department of Fisheries, Ministry of Fisheries, Animal Husbandry and Dairying, Government of India has launched the 'Sagar Parikrama' program on occasion of 75th Azadi Ka Amrit Mahotsav.
- Sagar Parikrama program is being organized through a pre-decided sea route covering coastal states/UTs.

The main objectives of 'Sagar Parikrama' are

a) to facilitate interaction with fishermen, coastal communities and stakeholders so as to disseminate information of various fisheries related schemes and programs being implemented by the Government;

b) demonstrating solidarity with all fisher folk, fish farmers and concerned stakeholder as a spirit of Aatmanirbhar Bharat;

c) to promote responsible fisheries with focus on sustainable balance between the utilization of marine fisheries resources for food security of nation and livelihoods of coastal fisher communities and

d) protection of marine ecosystems.

Significance

- The fishermen, fisher communities and stakeholders in the coastal areas are likely to be benefitted with awareness of various beneficiary oriented schemes and programs being implemented by the Government and showcasing them the best practices that may be adopted.

Integration of programs:

- The interaction programs being organized during the 'Sagar Parikrama' aims to resolve the issues of the fishers and other stakeholders and to facilitate their economic upliftment through various fisheries schemes and programs being implemented by the Government of India, such as
- 'Pradhan Mantri Matsya Sampada Yojana' (PMMSY) a flagship scheme with highest ever estimated investment of Rs.20,050 crore in fisheries sector,
- 'Fisheries and Aquaculture Infrastructure Development Fund' (FIDF) of Rs. 7522.48 crore implemented since 2018-19 to provide concessional finance to eligible entities, and
- The facility of Kisan Credit Card (KCC) which has been extended for fishers and fish farmers since 2018-19.
- In addition to the schemes and programs of fisheries sector, the 'Sagar Parikrama' program envisages creation of awareness on various other schemes and programs of the Government of India.

GOVERNMENT ON TRACK TO ACHIEVE FISCAL DEFICIT TARGET OF 6.4%

Why in news?

- According to the Economic survey 2022-23, **fiscal deficit is expected to be at 6.4% of GDP in FY 23.** The Survey highlighted that conservative budget assumptions provided a buffer during global uncertainties.
- The resilience in the fiscal performance was due to a recovery in economic activity and buoyancy in revenues.

Gross Tax Revenue:

- Gross Tax Revenue registered a Year on year (YoY) growth of 15.5 % from April to November 2022, and the Net Tax Revenue to the Centre after the assignment to states grew by 7.9 % on a YoY basis.
- Structural reforms like the introduction of GST and the digitalisation of economic transactions have led to the greater formalisation of the economy and hence expanded the tax net and enhanced tax compliance. Thus revenues have grown at a pace much higher than the growth in GDP.
- The Direct taxes grew at 26 % Year On Year basis due to corporate and personal income tax growth in FY22. The growth rates observed in the major direct taxes during the first eight months of FY23 were much higher than their corresponding longer-term averages.
- The high imports have led to a 12.4 % YoY growth in the customs collection from April to November 2022. The excise duty collection has declined by 20.9 % from April to November 2022 on a YoY basis.

Buoyant GST Collection:

- The GST Tax payers doubled to 1.4 crore from 70 lakhs in 2022. The gross GST collections were ₹ 13.40 lakh crore from April to December 2022.
- Thus, implying a YoY growth of 24.8 % with an average monthly collection of ₹ 1.5 lakh crore.
- The improvement in GST collections has been due to the nationwide drive against GST evaders and fake bills and systemic changes introduced such as rate rationalisation correcting inverted duty structure.

Disinvestment:

- Out of the budgeted amount of ₹ 65,000 crore for FY23, 48 % has been collected as of 18 January 2023 as the pandemic-induced uncertainty, the geopolitical conflict, and the associated risks have posed challenges before the plans and prospects of the government's disinvestment targets over the last three years.
- The government has reaffirmed its commitment towards privatisation and strategic disinvestment of Public Sector Enterprises by implementing the New Public Sector Enterprise Policy and Asset Monetisation Strategy.

Capital expenditure:

- The capital expenditure by the Central Government has steadily increased from a long-term average 2.5% of GDP in FY22 PA. It is further budgeted to increase to 2.9% of GDP in FY23 highlighting an improvement in the quality of Government expenditure over the years.
- The Survey informed that ₹ 7.5 lakh crore of Capital Expenditure is budgeted for FY23, of which more than 59.6 % has been spent from April to November 2022.
- During this period, capital expenditure registered a YoY growth of over 60 %, much higher than the long-term average growth of 13.5 % recorded in the corresponding period from FY16 to FY20. Rs.1.5 lakh core were allocated to road transport and highways, Rs.1.20 lakh crore to railways, 0.7 lakh crore to defence and 0.3 lakh crore to telecommunications in FY22.
- It is considered as a counter-cyclical fiscal tool strengthening aggregate demand, generates employment and boosts other sectors.

Revenue Expenditure:

- The revenue expenditure of the Union government was brought down from 15.6% of GDP in FY21 to 13.5% of GDP in FY22 Provisional Actual (PA).
- This contraction was led by a reduction of the subsidy expenditure which was brought down from 3.6% of GDP in FY21 to 1.9% of GDP in FY22 PA.
- It was further budgeted to reduce to 1.2% of GDP in FY23. However, around 94.7% of the budgeted expenditure on subsidies has been utilised from April to November 2022 due to the sudden outbreak of geopolitical conflict resulting in higher international prices for food, fertiliser and fuel.
- Thus, the revenue expenditure from April to November 2022 has grown by over 10% on a YoY basis, higher than the growth noted in the corresponding period last year.

Overview of State Government Finances:

- The combined Gross Fiscal Deficit (GFD) of the States, which increased to 4.1% of GDP in FY21, was brought down to 2.8% in FY22 PA. Given the geopolitical uncertainties, the consolidated GFD-GDP ratio for States has been budgeted at 3.4% in FY23.

- However, from April- November 2022, the combined borrowings of the 27 major states have just reached 33.5% of their total budgeted borrowings for the year. The data from last three years shows that states had unutilised borrowing limits.
- The capital outlay of States grew by 31.7% in FY22 PA. This increase is attributable to strong revenue buoyancy and the support provided by the Centre in terms of advance releases of payments to the states, GST compensation payments, and interest-free loans.

Debt Profile of the Government:

- IMF projects the global government debt at 91% of GDP in 2022, about 7.5% points above the pre-pandemic levels. In this global backdrop, the total liabilities of the Union Government moderated from 59.2% of GDP in FY21 to 56.7% in FY22 (P).
- India's public debt profile is relatively stable and is characterised by low currency and interest rate risks. Of the Union Government's total net liabilities in end-March 2021, 95.1% were denominated in domestic currency, while sovereign external debt constituted 4.9%, implying low currency risk.
- Further, sovereign external debt is entirely from official sources, which insulates it from volatility in the international capital markets, highlights the Economic Survey.
- Furthermore, Public debt in India is primarily contracted at fixed interest rates, with floating internal debt constituting only 1.7% of GDP in end-March 2021. The debt portfolio is, therefore, insulated from interest rate volatility.

DISCOVERY OF LITHIUM DEPOSITS IN J&K TO CUT DEPENDENCE ON IMPORTS

Why in news?

- Recently, the Geological Survey of India (GSI) has said that for the first time in India's history, lithium reserves have been found in Jammu & Kashmir.
- The reserve is estimated to be around 60 lakh tons.
- Previously, 1,600 tonnes of lithium reserves were found in Karnataka's Mandya district. However, it was not commercially viable.

About Lithium:

- Lithium, which is an element on the periodic table, is one of the most sought-after minerals globally. The element was first discovered in 1817 by Johan August Arfvedson and the word lithium comes from lithos in Greek, which means stone.
- The metal with the lowest density, lithium, reacts vigorously with water and is toxic in nature.
- But lithium did not naturally form on the planet. Scientists have suggested that this is a cosmic element that formed from the bright stellar explosions called novae.
- A NASA study revealed that while the big bang created a small amount of lithium in the initial formation of the universe, the majority of lithium gets manufactured in the nuclear reactions that power the nova explosions, distributing the mineral throughout the galaxy.

Why it is a revolutionary mineral?

- It is the lithium-ion battery that has revolutionised electronic communications, computing, digitisation and is now powering the world moving towards clean energy, a much-needed switch from gas-guzzling and carbon-emitting technologies of the past.
- The emergence and dominance of lithium-ion batteries are due to their higher energy density compared to other rechargeable battery systems, which is further enabled by the design and development of high-energy density electrode materials.
- The development is so life-changing that Stanley Whittingham, John Goodenough, and Akira Yoshino were awarded the 2019 Nobel Prize in Chemistry for their work on the lithium-ion battery.
- While Whittingham worked on developing methods that could lead to fossil fuel-free energy technologies, Goodenough refined the cathode used in the battery and Yoshino created the first commercially viable lithium-ion battery in 1985.

Demand for Lithium for EVs:

- Australia, Chile, and China respectively are the three biggest producers and exporters of lithium.
- With the demand for EVs increasing, the debate over global reserves of lithium has been gaining momentum. At the current rate of carbon emissions, the world will need at least 2 billion (200 crores) EVs, and according to the World Economic Forum (WEF), there could be a lithium shortage as soon as 2025.

What it holds for India?

- The discovery of a massive reserve in India now sparks hope for the country, which has largely remained import-dependent for the mineral.
- What makes this discovery even more critical is that most of the global reserve is found in areas with high water stress. The mineral needs a high volume

of water for extraction and most of the reserves are in countries facing water issues, making India an alternative of the future.

- Apart from EVs, lithium also finds use in the medical sector and in electronics that power our phones, solar panels, and other renewable technologies needed for the transition to clean energy. The discovery could usher in a new era not only for India but also for the world.

INDIA RANKS THIRD IN NET GAIN IN AVERAGE ANNUAL FOREST AREA IN LAST DECADE: ECONOMIC SURVEY 2022-23

Why in news?

- The Economic Survey 2022-23 highlights India's climate vision which is integrally **linked to its vision of development that foregrounds the goals of poverty eradication and guaranteeing basic well-being** to all its citizens.

Progress on India's Climate Action

- India has made significant progress in promoting the sustainable development by integrating its development goals with the ambitious climate action goals.

India's Forest Cover:

- India ranks third globally with respect to the net gain in average annual forest area between 2010 and 2020.
- The survey attributes the same to the robust framework and policies of the National and State Governments such as Green India Mission (GIM), Compensatory Afforestation Fund Management and Planning Authority (CAMPA), etc.
- Among the Indian States, Arunachal Pradesh has the maximum carbon stock in forests and Jammu &Kashmir contributes the maximum per-hectare carbon stock of 173.41 tonnes.

Preservation of Ecosystems:

- As part of dedicated efforts to preserve ecosystems, India now has 75 Ramsar sites for wetlands covering the area of 13.3 lakh hectares.
- The economic survey also underlines an increase in mangrove cover by 364 sq. km. in 2021, as a result of various regulatory and promotional measures to protect and conserve mangroves.

Transition to Renewable Energy

- India is progressively becoming a favored destination for investment in renewables. During the period 2014 -2021, total investment in renewables stood at US$ 78.1 billion in India.
- The likely installed capacity by the end of 2029-30 is expected to be more than 800 GW, of which non-fossil fuel would contribute more than 500 GW, resulting in the decline of average emission rate of around 29 per cent by 2029-30, compared to 2014-15.
- The National Green Hydrogen Mission, approved by the government with an outlay of 19,744 crore is to make India an energy-independent nation, and to de-carbonize the critical sectors, thereby resulting in 3.6 Giga tonnes of cumulative CO2 emission reduction by 2050.

Finance for Sustainable Development

Green Bonds:

- The issuance of Sovereign Green Bonds will help the government to tap the requisite finance from potential investors for deployment in public sector projects aimed at reducing the carbon intensity of economy.
- A framework in this regard has been issued in compliance with International Capital Market Association (ICMA) Green Bond Principles (2021).
- A Green Finance working committee has also been set up to oversee and validate key decisions on the issuance of Sovereign green bonds.
- The Reserve Bank of India has notified the indicative calendar for the issuance of Sovereign Green Bonds for the fiscal year 2022-23, totaling ₹ 16,000 crore.

Business Responsibility and Sustainability Report (BRSR):

- SEBI has issued new sustainability reporting requirements under the Business Responsibility and Sustainability Report (BRSR), which are more granular with quantifiable metrics in line with the principles ensconced in the 'National Guidelines on Responsible Business Conduct'.

- The Survey mentions that BRSR was made mandatory for the top 1000 listed entities (by market capitalisation) from 2022-23.

India at COP 27

- India has updated its Nationally Determined Contributions (NDCs) by advancing its target of installed electric capacity from non-fossil fuels ahead of 2030, to 50%.
- The Survey mentions India's Long-Term Low Carbon Development Strategy (LT-LEDS) which focuses on the rational utilisation of national resources with due regard to energy security.
- This strategy is in line with the vision of LiFE, Lifestyle for the Environment, calling for a worldwide paradigm shift from mindless and destructive consumption to mindful and deliberate utilisation.

Initiatives related to other environmental issues

- India and Nepal have signed a Memorandum of Understanding (MoU) in August 2022 on biodiversity conservation to strengthen and enhance the coordination and cooperation in the field of forests and wildlife.
- The survey highlights the achievement of India in doubling the tiger numbers in 2018, four years before the targeted year 2022.
- The population of Asiatic Lions has also shown a steady increase, with a population of 674 individuals in 2020, higher than the 523 lions in 2015.
- New Battery Waste Management Rules, 2022, & E-Waste (Management) Rules, 2022, have also been notified to promote the circular economy.

HIGHLIGHTS OF THE UNION BUDGET 2023-24

Why in news?

- The Union Minister of Finance and Corporate Affairs recently presented the Union Budget 2023-24 in the Parliament.

Priorities:

- It listed seven priorities of the Union Budget and said that they complement each other and act as the 'Saptarishi' guiding through the Amrit Kaal. They are as follows:

1. Inclusive Development
2. Reaching the Last Mile
3. Infrastructure and Investment
4. Unleashing the Potential
5. Green Growth
6. Youth Power
7. Financial Sector

The highlights of the Budget are as follows:

PART A

- Per capita income has more than doubled to ₹ 1.97 lakh in around nine years.
- Indian economy has increased in size from being 10th to 5th largest in the world in the past nine years.

Outlay:

- Atmanirbhar Clean Plant Program with an outlay of ₹ 2200 crore to be launched to boost availability of disease-free, quality planting material for high value horticultural crops.
- 157 new nursing colleges to be established in co-location with the existing 157 medical colleges established since 2014.
- Centre to recruit 38,800 teachers and support staff for the 740 Eklavya Model Residential Schools, serving 3.5 lakh tribal students over the next three years.
- Outlay for PM Awas Yojana is being enhanced by 66% to over Rs. 79,000 crore.
- Capital outlay of Rs. 2.40 lakh crore has been provided for the Railways, which is the highest ever outlay and about nine times the outlay made in 2013-14.
- Urban Infrastructure Development Fund (UIDF) will be established through use of priority Sector Lending shortfall, which will be managed by the national Housing Bank, and will be used by public agencies to create urban infrastructure in Tier 2 and Tier 3 cities.
- Entity DigiLocker to be setup for use by MSMEs, large business and charitable trusts to store and share documents online securely.
- 100 labs to be setup for 5G servicesbased application development to realize a new range of opportunities, business models, and employment potential.
- 500 new 'waste to wealth' plants under GOBARdhan (Galvanizing Organic Bio-Agro Resources Dhan) scheme to be established for promoting circular economy at total investment of Rs 10,000 crore. 5 per cent compressed biogas mandate to be introduced for all organizations marketing natural and bio gas.
- Centre to facilitate one crore farmers to adopt natural farming over the next three years. For this, 10,000 Bio-Input Resource Centres to be set-up, creating a national-level distributed micro-fertilizer and pesticide manufacturing network.
- Pradhan Mantri Kaushal Vikas Yojana 4.0, to be launched to skill lakhs of youth within the next three

years covering new age courses for Industry 4.0 like coding, AI, robotics, mechatronics, IOT, 3D printing, drones, and soft skills.
- 30 Skill India International Centres to be set up across different States to skill youth for international opportunities.
- Revamped credit guarantee scheme for MSMEs to take effect from 1st April 2023 through infusion of Rs 9,000 crore in the corpus. This scheme would enable additional collateral-free guaranteed credit of Rs 2 lakh crore and also reduce the cost of the credit by about 1 per cent.
- Central Processing Centre to be setup for faster response to companies through centralized handling of various forms filed with field offices under the Companies Act.
- The maximum deposit limit for Senior Citizen Savings Scheme to be enhanced from Rs 15 lakh to Rs 30 lakh.
- Targeted Fiscal Deficit to be below 4.5% by 2025-26.

Agriculture:

- Agriculture Accelerator Fund to be set-up to encourage agri-startups by young entrepreneurs in rural areas.
- To make India a global hub for 'Shree Anna', the Indian Institute of Millet Research, Hyderabad will be supported as the Centre of Excellence for sharing best practices, research and technologies at the international level.
- ₹ 20 lakh crore agricultural credit targeted at animal husbandry, dairy and fisheries.
- A new sub-scheme of PM MatsyaSampada Yojana with targeted investment of ₹ 6,000 crore to be launched to further enable activities of fishermen, fish vendors, and micro & small enterprises, improve value chain efficiencies, and expand the market.
- Digital public infrastructure for agriculture to be built as an open source, open standard and inter operable public good to enable inclusive farmer centric solutions and support for growth of agri-tech industry and start-ups.
- Computerisation of 63,000 Primary Agricultural Credit Societies (PACS) with an investment of ₹ 2,516 crore initiated.
- Massive decentralised storage capacity to be set up to help farmers store their produce and realize remunerative prices through sale at appropriate times.

Health:

- Sickle Cell Anaemia elimination mission to be launched.
- Joint public and Private Medical research to be encouraged via select ICMR labs for encouraging collaborative research and innovation.
- New Programme to promote research in Pharmaceuticals to be launched.

Infrastructure:

- Rs. 10 lakh crore capital investment, a steep increase of 33% for third year in a row, to enhance growth potential and job creation, crowd-in private investments, and provide a cushion against global headwinds.
- Aspirational Blocks Programme covering 500 blocks launched for saturation of essential government services across multiple domains such as health, nutrition, education, agriculture, water resources, financial inclusion, skill development, and basic infrastructure.
- Rs. 15,000 crore for implementation of Pradhan Mantri PVTG Development Mission over the next three years under the Development Action Plan for the Scheduled Tribes.
- Investment of Rs. 75,000 crore, including Rs. 15,000 crore from private sources, for one hundred critical transport infrastructure projects, for last and first mile connectivity for ports, coal, steel, fertilizer, and food grains sectors.
- New Infrastructure Finance Secretariat established to enhance opportunities for private investment in infrastructure.

Education:

- District Institutes of Education and Training to be developed as vibrant institutes of excellence for Teachers' Training.
- A National Digital Library for Children and Adolescents to be set-up for facilitating availability of quality books across geographies, languages, genres and levels, and device agnostic accessibility.
- Rs. 5,300 crore to be given as central assistance to Upper Bhadra Project to provide sustainable micro irrigation and filling up of surface tanks for drinking water.
- 'Bharat Shared Repository of Inscriptions' to be set up in a digital epigraphy museum, with digitization of one lakh ancient inscriptions in the first stage.
- iGOTKarmayogi, an integrated online training platform, launched to provide continuous learning opportunities for lakhs of government employees to upgrade their skills and facilitate people-centric approach

Urban Planning:

- Encouragement to states and cities to undertake urban planning reforms and actions to transform our cities into 'sustainable cities of tomorrow'.
- Transition from manhole to machine-hole mode by enabling all cities and towns to undertake 100 percent mechanical desludging of septic tanks and sewers.

Governance:

- More than 39,000 compliances reduced and more than 3,400 legal provisions decriminalized to enhance Ease of Doing Business.
- Jan Vishwas Bill to amend 42 Central Acts have been introduced to further trust-based governance.
- Three centres of excellence for Artificial Intelligence to be set-up in top educational institutions to realise the vision of "Make AI in India and Make AI work for India".
- National Data Governance Policy to be brought out to unleash innovation and research by start-ups and academia.
- One stop solution for reconciliation and updation of identity and address of individuals to be established using DigiLocker service and Aadhaar as foundational identity.
- PAN will be used as the common identifier for all digital systems of specified government agencies to bring in Ease of Doing Business.
- Phase-3 of the E-Courts project to be launched with an outlay of Rs. 7,000 crore for efficient administration of justice.
- A unified Skill India Digital platform to be launched for enabling demand-based formal skilling, linking with employers including MSMEs, and facilitating access to entrepreneurship schemes.
- Direct Benefit Transfer under a pan-India National Apprenticeship Promotion Scheme to be rolled out to provide stipend support to 47 lakh youth in three years.

R & D:

- R & D grant for Lab Grown Diamonds (LGD) sector to encourage indigenous production of LGD seeds and machines and to reduce import dependency.

Energy:

- Annual production of 5 MMT under Green Hydrogen Mission to be targeted by 2030 to facilitate transition of the economy to low carbon intensity and to reduce dependence on fossil fuel imports.
- ₹ 35000 crore outlay for energy security, energy transition and net zero objectives.
- Battery energy storage systems to be promoted to steer the economy on the sustainable development path.
- 20,700 crore outlay provided for renewable energy grid integration and evacuation from Ladakh.

Environment:

- "PM Programme for Restoration, Awareness, Nourishment and Amelioration of Mother Earth" (PM-PRANAM) to be launched to incentivize States and Union Territories to promote alternative fertilizers and balanced use of chemical fertilizers.
- 'Mangrove Initiative for Shoreline Habitats & Tangible Incomes', MISHTI, to be taken up for mangrove plantation along the coastline and on salt pan lands, through convergence between MGNREGS, CAMPA Fund and other sources.
- Green Credit Programme to be notified under the Environment (Protection) Act to incentivize and mobilize additional resources for environmentally sustainable and responsive actions.
- Amrit Dharohar scheme to be implemented over the next three years to encourage optimal use of wetlands, enhance bio-diversity, carbon stock, eco-tourism opportunities and income generation for local communities.

Tourism:

- At least 50 tourist destinations to be selected through challenge mode; to be developed as a complete package for domestic and foreign tourists.
- Sector specific skilling and entrepreneurship development to be dovetailed to achieve the objectives of the 'Dekho Apna Desh' initiative.
- Tourism infrastructure and amenities to be facilitated in border villages through the Vibrant Villages Programme.
- States to be encouraged to set up a Unity Mall for promotion and sale of their own and also all others states' ODOPs (One District, One Product), GI products and handicrafts.

Financial sector:

- National Financial Information Registry to be set up to serve as the central repository of financial and ancillary information for facilitating efficient flow of credit, promoting financial inclusion, and fostering financial stability. A new legislative framework to be designed in consultation with RBI to govern this credit public infrastructure.
- Financial sector regulators to carry out a comprehensive review of existing regulations in consultation with public and regulated entities. Time limits to decide the applications under various regulations would also be laid down.
- To enhance business activities in GIFT IFSC, the following measures to be taken.
- Delegating powers under the SEZ Act to IFSCA to avoid dual regulation.
- Setting up a single window IT system for registration and approval from IFSCA, SEZ authorities, GSTN, RBI, SEBI and IRDAI.
- Permitting acquisition financing by IFSC Banking Units of foreign bank.
- Establishing a subsidiary of EXIM Bank for trade re-financing.
- Amending IFSCA Act for statutory provisions for

arbitration, ancillary services, and avoiding dual regulation under SEZ Act
- Recognizing offshore derivative instruments as valid contracts.
- Amendments proposed to the Banking Regulation Act, the Banking Companies Act and the Reserve of India Act to improve bank governance and enhance investors' protection.
- Countries looking for digital continuity solutions would be facilitated for setting up of their Data Embassies in GIFT IFSC.
- SEBI to be empowered to develop, regulate, maintain and enforce norms and standards for education in the National Institute of Securities Markets and to recognize award of degrees, diplomas and certificates.
- Integrated IT portal to be established to enable investors to easily reclaim the unclaimed shares and unpaid dividends from the Investor Education and Protection Fund Authority.

Savings:
- To commemorate Azadi Ka Amrit Mahotsav, a one-time new small savings scheme, Mahila Samman Savings Certificate to be launched. It will offer deposit facility upto Rs 2 lakh in the name of women or girls for tenure of 2 years (up to March 2025) at fixed interest rate of 7.5 per cent with partial withdrawal option.
- The maximum deposit limit for Monthly Income Account Scheme to be enhanced from Rs 4.5 lakh to Rs 9 lakh for single account and from Rs 9 lakh to Rs 15 lakh for joint account.
- The entire fifty-year interest free loan to states to be spent on capital expenditure within 2023-24. Part of the loan is conditional on States increasing actual Capital expenditure and parts of outlay will be linked to States undertaking specific loans.
- Fiscal Deficit of 3.5% of GSDP allowed for States of which 0.5% is tied to Power sector reforms.

Revised Estimates 2022-23:
- The total receipts other than borrowings is Rs 24.3 lakh crore, of which the net tax receipts are Rs 20.9 lakh crore.
- The total expenditure is Rs 41.9 lakh crore, of which the capital expenditure is about Rs 7.3 lakh crore.
- The fiscal deficit is 6.4 per cent of GDP, adhering to the Budget Estimate.

Budget Estimates 2023-24:
- The total receipts other than borrowings is estimated at Rs 27.2 lakh crore and the total expenditure is estimated at Rs 45 lakh crore.
- The net tax receipts are estimated at Rs 23.3 lakh crore.
- The fiscal deficit is estimated to be 5.9 per cent of GDP.
- To finance the fiscal deficit in 2023-24, the net market borrowings from dated securities are estimated at Rs 11.8 lakh crore.
- The gross market borrowings are estimated at Rs 15.4 lakh crore.

IS THE GOVERNMENT ON TRACK ON FISCAL DEFICIT TARGETS?

Why in news?
- In the Union Budget for 2023-24, Finance Minister chose the path of relative fiscal prudence and projected a decline in fiscal deficit to 5.9% of gross domestic product (GDP) in FY24, compared with 6.4% in FY23.

Details:
- The government planned to continue on the path of fiscal consolidation and reach a fiscal deficit below 4.5% by 2025-26.
- To finance the fiscal deficit in 2023-24, the net market borrowings from dated securities are estimated at ₹ 11.8 lakh crore, and that the balance financing is expected to come from small savings and other sources. The gross market borrowings are estimated at ₹ 15.4 lakh crore.

What is the direction on fiscal deficit given in the Budget?
- In Union Budget 2023-24, the fiscal deficit to GDP is pegged at 5.9% in FY24. This ratio has declined from 6.4% in 2022-23 (revised estimate) and 6.7% in 2021-22 (actual).
- In the revenue budget, the deficit was 4.1% of GDP in 2022-23 (revised estimate). In Union Budget 2023-24, revenue deficit is 2.9% of GDP. If interest payments are deducted from fiscal deficit, which is referred to as primary deficit, it stood at 3% of GDP in 2022-23 (RE).
- The primary deficit, which reflects the current fiscal stance devoid of past interest payment liabilities, is pegged at 2.3% of GDP in Union Budget 2023-24.

Are allocations lower for some sectors?

- The major allocations that have been pared down are food, fertilizer and petroleum subsidies.
- The food subsidy in 2022-23 (RE) was ₹ 2,87,194 crore. In 2023-24, it has been reduced to ₹ 1,97,350 crore. Similarly, the fertilizer subsidy in 2022-23 was ₹ 2,25,220 crore (RE); it has been reduced to ₹ 1,75,100 crore for FY24.
- The petroleum subsidy in 2022-23 was ₹ 9,171 crore (RE); it has declined to ₹ 2,257 crore in 2023-24 (Budget estimate/BE). However, the point to be noted is that compared with BE 2022-23, the decline is not that sharp.
- It is a laudable decision to extend food security to the poor for one more year amid rising inflation. However, rationalisation of subsidies is important so that the government can move towards reaching a fiscal deficit target of 4.5% by 2025-26.

What needs to be done for growth?

- The interest rate management by the RBI through inflation targeting alone cannot effectively control inflation, given the supply side shocks. Therefore, fiscal policy measures are crucial to tackle mounting inflation.
- Policy coordination between RBI and North Block is crucial for a sustained growth recovery process. The RBI has been increasing policy rates to tackle mounting inflation. But a high interest rate regime can hurt the economic growth process.
- So, the fiscal policy needs to remain "accommodative" with focus on gross capital formation in the economy with enhanced capital spending, especially infrastructure investment.
- In Budget 23-24, capital spending is expected to rise to 3.3% of GDP. The interest-free loan of ₹ 1.3 lakh crore for 50 years provided to States should help them spend and boost growth.

Can the govt. stick to fiscal consolidation?

- The Government has not deviated from the path of fiscal consolidation. In Union Budget 2023, the medium-term fiscal consolidation framework stated that there is a need to reduce fiscal deficit-GDP ratio to 4.5% by 2025-26 from the current 6.4%.
- There are revenue uncertainties in post-pandemic times and also geopolitical risks, mounting inflation, supply chain disruptions and energy price volatility. At the same time, the Government has kept the fiscal policy "accommodative", and has undertaken capital spending to support economic growth recovery.
- The predominant mode of financing fiscal deficit in India is through internal market borrowings. It is also to be financed through securities against small savings, provident funds and an insignificant component of external debt.
- In Union Budget 2023, India's external debt is pegged at ₹ 22,118 crore of the total fiscal deficit of 17,86,816 crore in 2023-24 (BE), which is approximately about 1%.
- In Union Budget 2023, it is also stated that the States will have to maintain a fiscal deficit of 3.5% of GSDP of which 0.5% will be tied to power sector reforms.

What lies ahead?

- The Finance Minister is focusing on economic growth recovery through capex. She contends that infrastructure investment will boost private investment.
- In the fiscal deficit-GDP ratio, if the denominator GDP expands, it will reduce the overall fiscal deficit-GDP ratio. Her focus is on economic growth recovery to strengthen GDP.

INDIA AT 5TH POSITION IN ACCREDITATION SYSTEMS IN THE WORLD: REPORT

Why in news?

- Recently, India's national accreditation system under the Quality Council of India (QCI) has been ranked 5th in the world in the recent Global Quality Infrastructure Index (GQII) 2021.

GQII 2021: Global Ranking and Subrankings by QI area (184 Economies)

Economy Name	Economy Code	GQII Rank	GQII Scores	Rank Metrology	Rank Standardization	Rank Accreditation
Germany	DEU	1	0,996	2	2	1
China	CHN	2	0,990	3	1	3
United States	USA	3	0,987	1	8	2
United Kingdom	GBR	4	0,982	4	4	6
Japan	JPN	5	0,976	5	3	12
France	FRA	6	0,973	7	6	11
Korea, Republic of	KOR	7	0,962	6	7	17
Italy	ITA	8	0,957	15	5	4
Spain	ESP	9	0,949	13	10	7
India	IND	10	0,932	21	9	5
Poland	POL	11	0,927	19	15	7
Switzerland	CHE	12	0,924	14	12	21
Brazil	BRA	13	0,924	11	20	18
Australia	AUS	14	0,923	9	18	22
Czech Republic	CZE	15	0,923	18	13	14
Turkey	TUR	16	0,921	16	25	10
Netherlands	NLD	17	0,914	20	11	15
Mexico	MEX	18	0,913	10	42	9
Canada	CAN	19	0,912	8	24	26
South Africa	ZAF	20	0,909	12	27	19

Details:

- The GQII ranks the 184 economies in the world on the basis of the quality infrastructure (QI).
- India's overall QI system ranking continues to be in the Top 10 at the 10th position, with the standardization system (under BIS) at 9th and the metrology system (under NPL-CSIR) at 21st position in the world.

QI:

- QI is the technical backbone for international trade, with metrology, standardization, accreditation and conformity assessment services providing reliability and trust between trading partners.
- In India, the National Physical Laboratory under the Council of Scientific & Industrial Research (NPL-CSIR) is the national metrology institute, the Bureau of Indian Standards (BIS) is the national standards body and the constituent national accreditation

boards under Quality Council of India support are the custodians of the national accreditation system.

Top 25 QI systems:

- Geographically, the top 25 QI systems are mainly located in Europe, North America, and Asia-Pacific, with some exceptions, such as India (10th), Brazil (13th), Australia (14th), Turkey (16th), Mexico (18th) and South Africa (20th).

National Accreditation System:

- Accreditation helps establish the competence and credibility of conformity assessment bodies (CABs) which perform testing, certification, inspection, etc.
- The National Accreditation System as per international standards in India is established by the Quality Council of India (QCI), a body established in 1997 jointly by the Department for Promotion of Industry & Internal Trade (DPIIT), Ministry of Commerce & Industry, and the Indian industry.
- It is operated through the constituent Boards of QCI, primarily the National Accreditation Board for Certification Bodies (NABCB), which provides accreditation to the certification, inspection, and validation / verification bodies, and the National Accreditation Board for Testing & Calibration Laboratories (NABL), which provides accreditation to the testing, calibration and medical laboratories.
- Both, NABCB and NABL are signatories to the Multilateral Recognition Arrangements of the international bodies, the International Accreditation Forum (IAF), and the International Laboratory Accreditation Cooperation (ILAC), which provides international equivalence and acceptance to reports and certificates issued under their accreditation.
- The government, regulators, industry and conformity assessment bodies increasingly rely on the NABCB and NABL accreditation for conformity assessment in India.

Background:

- The GQII measures the relative development of countries' QI.
- A formula calculates a score for each country based on its position in the sub-rankings for metrology, standards and accreditation.
- The GQII rankings are published and presented post-facto for each year based on the data collected till the end of that year. The 2021 rankings are based on data till end of December 2021, collected and analyzed through 2022.
- It is an initiative on metrology, standardisation, accreditation and related services, supported by Physikalisch-Technische Bundesanstalt (PTB) and the Federal Ministry for Economic Cooperation and Development (BMZ), Germany.

WHAT MADE MORGAN STANLEY CAPITAL INTERNATIONAL (MSCI), ACT ON ADANI STOCKS?

Why in news?

- Morgan Stanley Capital International (MSCI), a global index provider for financial markets, recently announced on that it willreduce the free float designations for four Adani Group companies in multiple indices.
- These companies had a combined 0.4% weighting in the MSCI Emerging Markets Index.
- The decision follows MSCI's decision to review the free float status of companies belonging to the Adani Group following investor concerns.
- Apart from Adani Enterprises, the MSCI will cut the free floats assigned to Adani Total Gas, Adani Transmission, and ACC. These changes will come into effect from March 1.

What is free float?

- Free float refers to the proportion of the total outstanding shares of a publicly listed company that is readily available for trading in the market. Shares held by promoters and large institutional investors are normally not freely traded in the market.
- The free float of a company can sometimes give investors a rough idea about the likely liquidity of the company's shares in the public market. The weightage given to a company's stock in certain indices is based on the company's market capitalisation.
- A company's market capitalisation is calculated based on the free float of the company and also the market price of the company's stock. So, a drop in the number of freely floating shares of a company can cause a drop in its market capitalisation and reduce its weightage in indices.

What led to the MSCI's decision?

- The decision to reduce the free float assigned to the Adani stocks comes in the wake of a report released by Hindenburg Research, a U.S.-based investment research firm and short seller.
- Hindenburg had alleged that more than 75% of the outstanding shares of various companies of the Adani Group were owned by their promoters.
- Indian market regulations stipulate that non-promoter public shareholders should own at least 25% of the total outstanding shares of a company. This rule hopes to prevent manipulation of stock

prices by promoters who could influence the price of the stock by trading among themselves when they hold an outsized portion of the outstanding shares.
- In particular, Hindenburg alleged that the Adani Group used offshore shell entities to hide holdings by members of Chairman Gautam Adani's family. If true, this would reduce the float or the proportion of outstanding shares readily available for trade in the market.
- MSCI's decision to cut the weights assigned to the Adani stocks in its indices going forward, however, may not be solely due to concerns over the free float of these stocks. Shares of the Adani Group's companies have fallen steeply over the last few weeks, thus affecting the market cap of these companies.
- In fact, the Adani Group has lost about $110 billion of its market cap since the release of the Hindenburg report.

What will be the impact?

- MSCI's decision will adversely affect the amount of capital flowing into the Adani stocks. Many passive investors invest in the indices that are constructed by bodies such as the MSCI.
- So, a cut in the weightage of the four Adani stocks in the Emerging Markets Index will likely reduce the amount of money flowing into these stocks.
- In fact, Goldman Sachs believes that India's weight in the MSCI's emerging markets index itself could drop by 20-30 basis points following the resultant reduction in weight of Adani stocks.

THE AGRICULTURAL AND PROCESSED FOOD PRODUCTS EXPORT DEVELOPMENT AUTHORITY (APEDA) COMPLETES 37 YEARS OF ITS JOURNEY

Why in news?

- Recently, the Agricultural and Processed Food Products Export Development Authority (APEDA),completed 37 years of its journey.
- It was established in 1986 and works under the Ministry of Commerce and Trade.

Highlights of journey:

- Started with a merely USD 0.6 billion export in 1987-88, the APEDA's active intervention took the export of agricultural products to a new height of USD 19.69 billion till April-December 2022-23 and expanded the export basket to over 200 countries. In 2021-22, the APEDA exported agricultural products worth USD 24.77 billion.
- The target given to APEDA in the current financial year (2022-23) is USD 23.56 billion, out of which 84% i.e. USD 19.69 billion has been achieved till December 2022, and the remaining target is expected to be completed within the stipulated time period.
- According to the WTO Trade Data, India was ranked at 25th in 1986, which slipped further to 28th in 1987 and at 29th position in 1988.
- However, the ranking of India improved significantly as the county's position moved to 10th rank in 2019 which improved further to 9th position in 2020 and at 8th rank in 2021.

Key Interventions:

- Aiming to take export of agricultural products to a new level, APEDA promoted IT-enabled activities for ease of doing business in the promotion and development of exports from India. APEDA has undertaken initiatives like paperless office (re-engineering, digital signatures, electronic payment facility), APEDA Mobile App, phase-wise delivery of online services, monitoring and evaluation, uniform access, and virtual trade fair to make governance more efficient and effective.
- The Agriculture Export Policy stepped in as an Institutional mechanism in 2018 for promotion of agricultural exports in the States for the first time with a focus on agriculture export-oriented production, export promotion, better farmer realization and synchronization with the policies and programmes of Govt. of India laying emphasis on farmer-centric approach.
- A Market Intelligence Cell has been constituted in APEDA and the activity of dissemination of E-market intelligence reports comprising detailed market analysis has commenced.
- A Farmer Connect Portal has also been set up by APEDA on its website for providing a platform for FPOs/FPCs, Cooperatives to interact with exporters.

Background:

- Agricultural sector is one of the key sectors of the Indian economy as it provides direct employment to about 65% of the working population in the country and also forms the basis of major key industries.
- Agriculture contributes about 20.2% to GDP and about 14.1% India's export of agricultural products during 2020-21.
- Realising the importance of agriculture and processed food products export from the country, the Government in 1986 had set up Agricultural and Processed Food Products Export Development

Authority (APEDA) through an Act of Parliament under the Commerce Ministry. Then the newly created body replaced the then existing Processed Food Export Promotion Council (PFEPC).

- The APEDA had been undertaking most of the activities as per its mandate and scope of work allocated spanning its 14 product categories which mainly includes the sector of fruits and vegetables, processed fruits and vegetables, animal, dairy and poultry products and cereals.
- The Government of India through the Ministry of Commerce initiated development of National Programme for Organic Production (NPOP), which was approved by the Government on May 2, 2001 and APEDA designated as Secretariat for NPOP.

Way Forward:

- The visionary approach, aggressive and consistent efforts of APEDA has enabled India to position itself as a consistent and quality supplier of agri products.

VOSTRO ACCOUNTS AND HOW THEY FACILITATE TRADE

Why in news?

- Recently, 20 Russian banks, including Rosbank, Tinkoff Bank, Centro Credit Bank and Credit Bank of Moscow have opened Special Rupee Vostro Accounts (SRVA) with partner banks in India.
- All major domestic banks have listed their nodal officers to sort out issues faced by exporters under the arrangement.

What is the SRVA arrangement?

- A Vostro Account is an account that domestic banks hold for foreign banks in the former's domestic currency, in this case, the rupee. Domestic banks use it to provide international banking services to their clients who have global banking needs.
- It is an integral offshoot of correspondent banking that entails a bank (or an intermediary) to facilitate wire transfer, conduct business transactions, accept deposits and gather documents on behalf of the other bank. It helps domestic banks gain wider access to foreign financial markets and serve international clients without having to be physically present abroad.
- The SRVA is an additional arrangement to the existing system that uses freely convertible currencies and works as a complimentary system.
- For perspective, freely convertible currencies refer to currencies permitted by rules and regulations of the concerned country to be converted to major reserve currencies (like U.S. dollar or pound sterling) and for which a fairly active market exists for dealings against major currencies. The existing systems thus require maintaining balances and position in such currencies.

How does it function?

- The framework entails three important components, namely, invoicing, exchange rate and settlement. Invoicing entails that all exports and imports must be denominated and invoiced in INR.
- The exchange rate between the currencies of the trading partner countries would be market-determined. To conclude, the final settlement also takes place in Indian National Rupee (INR).
- The authorised domestic dealer banks (those authorised to deal in foreign currencies) are required to open SRVA accounts for correspondent banks of the partner trading country.
- Domestic importers are required to make payment (in INR) into the SRVA account of the correspondent bank against the invoices for supply of goods or services from the overseas seller/supplier.
- Similarly, domestic exporters are to be paid the export proceeds (in INR) from the balances in the designated account of the correspondent bank of the partner country.
- As for availing an advance against exports, it would be the responsibility of the domestic bank to accord foremost priority to ensuring that the available funds are used to meet existing payment obligations, that is, from the already executed export orders or export payments in the pipeline.
- All reporting of cross-border transactions are to be done in accordance with the extant guidelines under the Foreign Exchange Management Act (FEMA), 1999.

What is the eligibility criteria of banks?

- Banks from partner countries are required to approach an authorised domestic dealer bank for opening the SRVA. The domestic bank would then seek approval from the apex banking regulator providing details of the arrangement.
- It would be the responsibility of the domestic banks to ensure that the correspondent bank is not from a country mentioned in the updated Financial Action Task Force (FATF) Public Statement on High Risk & Non-Co-operative jurisdictions. Domestic banks must also put forth for perusal, financial parameters pertaining to the corresponding bank.
- Authorised banks can open multiple SRV accounts

for different banks from the same country. Further, balances in the account can be repatriated in freely convertible currency and/or currency of the beneficiary partner country depending on the underlying transaction, that is, for which the account was credited.

What is its purpose?

- The Economic Survey (2022-23) had argued that the framework could largely reduce the "net demand for foreign exchange, the U.S. dollar in particular, for the settlement of current account related trade flows".
- It added that the framework would also reduce the need for holding foreign exchange reserves and dependence on foreign currencies, making the country less vulnerable to external shocks.
- Indian exporters could get advance payments in INR from overseas clients and in the long-term promote INR as an international currency once the rupee settlement mechanism gains traction, the survey argued.
- As per the Bureau for International (BIS) Settlements' Triennial Central Bank Survey 2022, the U.S. dollar was the most dominant vehicle currency accounting for 88% of all trades. The INR accounted for 1.6%.

INDIA REMAINS A 'BRIGHT SPOT', TO CONTRIBUTE 15% OF GLOBAL GROWTH IN 2023: IMF

Why in news?

- India continues to remain a relative "bright spot" in the world economy, and will alone contribute 15% of the global growth in 2023, International Monetary Fund (IMF) said.

Projections:

- For 2023, India is expected to retain a high growth rate, 6.8% for the year that ends in March. For FY 2023/24, (April 2023 to March 2024) IMP project 6.1%, a bit of slowdown like the rest of the world economy, but way above the global average.
- And in that way, India is providing about 15% of global growth in 2023.That is the fastest growth rate among major economies.

Why is India a bright spot?

- India remains a bright spot at a time when the IMF is projecting 2023 to be difficult with global growth slowing down from 3.4% last year to 2.9% in 2023.
- It has done really well to turn the digitalisation that has been already moving quite well into a major driver of overcoming the impact of the pandemic and creating opportunities for growth and jobs.
- India's fiscal policy has been responsive to economic conditions. The new Budget signals the commitment to fiscal consolidation, while at the same time provides significant financing for capital investments.
- India didn't shy away to learn the lessons from the pandemic and to implement very strong policies to overcome what has been really a difficult time for a number of months.

Way Forward:

- India is paying attention on investing in the green economy, including renewables with potential to shift the country towards clean energy and keep growth going.
- While digitisation pulled out the world's fifth-largest economy from pandemic lows, prudent fiscal policy and significant financing for capital investments provided in the Union Budget will help sustain the growth momentum.

WHY INDIA'S UJH DAM & 2ND SUTLEJ-BEAS LINK PROJECTS, KEY TO INDUS WATERS, HAVE HIT ROADBLOCK

Why in news?

- India's plans to build a multipurpose project on the Ujh river in Jammu & Kashmir for irrigation and hydro power and the second Sutlej-Beas link project in Punjab, so as to better utiliseIndus river waters currently flowing to Pakistan, have hit a roadblock.
- While the Finance Ministry's Public Investment Board (PIB) has not cleared the strategic Ujh project on the ground that it is not financially viable, the Sutlej-Beas link project is facing land acquisition issues in Punjab as well as delay in finalisation of the location of its barrage,

Details:

- The dam at Ujh (a tributary of Ravi), the second Sutlej-Beas link project, along with a third ongoing dam project in Shahpur Kandi in Punjab, are all on the eastern rivers of the Indus basin and are key to India's aim of utilising the water it is guaranteed under the 1960 Indus Waters Treaty with Pakistan.
- Of the three, work is at an advanced stage on the Rs 2,793 crore Shahpur Kandi dam project. Expected to be complete by the end of 2023, the dam will help check the unutilised water that goes to Pakistan through Madhopur headworks downstream.

Indus Waters Treaty:

- The Indus Waters Treaty, brokered by the World Bank in 1960, outlines how India and Pakistan will utilise the six rivers of the shared Indus River system.
- While the western rivers of the system; Indus, Jhelum and Chenabfall in Pakistan's share, the three eastern ones; Ravi, Beas and Sutlej are to be used by India.
- Under the treaty, India gets unrestricted use of over approximately 33 million acre-feet (MAF) water from the three eastern rivers, while Pakistan gets over 135 MAF from the three western ones.

Hydro projects by India on Indus System:

- Currently, India utilises around 94-95 per cent of its share of water in the eastern rivers through a network of dams, including the Bhakra on Sutlej, Ranjit Sagar on Ravi, and Pong and Pandoh on Beas.
- The three projects; Shahpur Kandi, Ujh and the second Sutlej-Beas link will help India utilise the remaining 5 per cent of water that currently flows into Pakistan.
- India has several ongoing as well as proposed projects on the three western rivers as well. Currently, it is locked in a dispute with Pakistan over two of its hydroelectric projects on the western rivers Kishanganga and Ratle.
- The World Bank has appointed a neutral expert on the request of India and set up a Court of Arbitration on the request of Pakistan to resolve the matter.

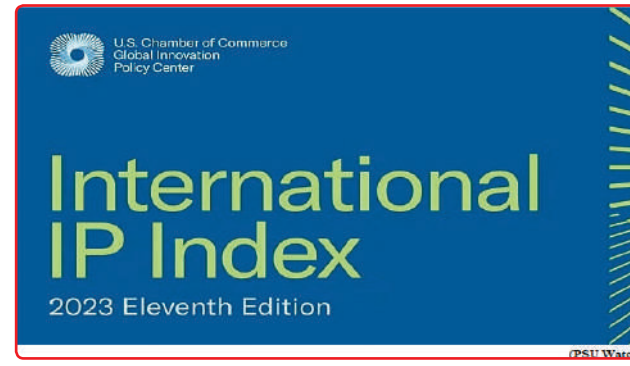
Hurdles in the way:

- In October 2022 that the PIB rejected the Ministry of Jal Shakti's Rs 6,000-crore proposal to build the Ujh multipurpose project that comprises a dam and hydroelectric plant, holding it financially unviable.
- The PIB appraises public funded projects worth more than Rs 500 crore, before the ministry piloting the project moves the cabinet to get it approved.
- The second Sutlej-Beas link project, on the other hand, is getting delayed because of land acquisition issues in Punjab as well as the finalisation of the exact location of the barrage.
- Green think tank CEEW suggests EU & Korea-like 'emissions trade' for India's carbon market launch

INDIA RANKS 42 IN 55 COUNTRIES ON INTERNATIONAL IP INDEX

Why in news?

- India ranks 42nd among 55 leading global economies on the International IP Index released by the US Chambers of Commerce.
- As India's size and economic influence grows on the world stage, India is ripe to become a leader for emerging markets seeking to transform their economy through IP-driven innovation.



About International IP Index:

- The annual International IP Index evaluates the protection of IP rights in 55 of the world's leading economies, together representing around 90% of global GDP.
- The report covers everything from patent and copyright laws to the ability to monetise IP assets and the ratification of international agreements.

Achievements:

- According to the report, India has maintained continued strong efforts in copyright piracy through the issuing of dynamic injunction orders.
- India not only has generous R&D and IP-based tax incentives, but also has a strong awareness-raising efforts regarding the negative impact of piracy and counterfeiting.
- It is a global leader on targeted administrative incentives for the creation and use of IP assets for SMEs.

Challenges:

- India has taken steps to improve enforcement against copyright-infringing content and provides a best-in-class framework to promote better understanding and utilisation of IP assets.
- However, addressing long-standing gaps in its IP framework will be critical to India's ability to create a new model for the region and India's continued economic growth.
- However, the 2021 dissolution of the Intellectual Property Appellate Board, combined with the long standing issue of an under-resourced and overstretched judiciary, raises serious concerns

about rights holders' ability to enforce their IP rights in India and to resolve IP-related disputes.

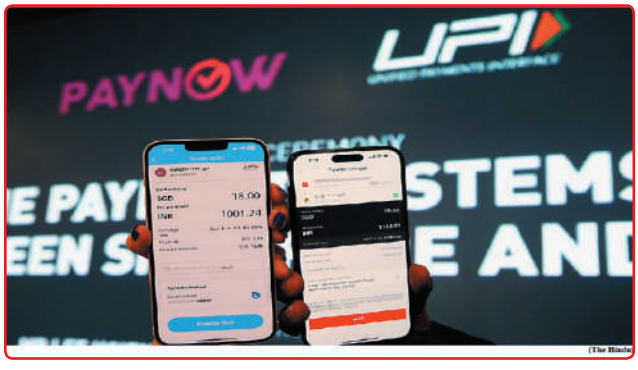
Significance of the Index:

- The report shows a torrent of proposals, both domestic and international are threatening to erode intellectual property (IP) rights.
- By analysing the IP landscape in global markets, the index aims to help nations navigate toward a brighter economic future marked by greater innovation, creativity, and competitiveness.
-
- About US Chamber of Commerce:
- • It is the world's largest business federation representing the interests of more than 3 million businesses of all sizes, sectors, and regions, as well as state and local chambers and industry associations.
- • The group was founded in April 1912 out of local chambers of commerce at the urging of President William Howard Taft and his Secretary of Commerce and Labour Charles Nagel.

WHO WILL BENEFIT FROM THE UPI-PAYNOW LINK?

Why in news?

- Recently, India's Unified Payments Interface (UPI) and Singapore's PayNowwere officially connected to allow for "real-time payment linkage".
- Singapore is the first country with which cross-border Person to Person (P2P) payment facilities have been launched.
- The plan was first announced by the Reserve Bank of India (RBI) and the Monetary Authority of Singapore (MAS) in September 2021 to facilitate instant low-cost, cross-border fund transfer.



How will it help?

- When the scheme was announced, the RBI had said that the cross-border interoperability of payments using cards and QR codes between India and Singapore would further anchor trade, travel and remittance flows between the two countries. The initiative is a part of the government's push towards as UPI-based payment ecosystem.
- In January 2023, the National Payments Corporation of India (NPCI) enabled international phone numbers to be able to transact using UPI. The Union Cabinet had approved incentivisation schemes for promoting low-value BHIM-UPI transactions in April 2022.
- On February 21, both Prime Minister'sattended the virtual launch.
- This would help the Indian diaspora in Singapore, especially migrant workers and students and "bring the benefits of digitalisation and fintech to the common man through instantaneous and low-cost transfer of money from Singapore to India and vice-versa."

How will the scheme work?

- For users at the Indian end, State Bank of India, Indian Overseas Bank, Indian Bank and ICICI Bank will facilitate both inward and outward remittances, while Axis Bank and DBS India will only facilitate inward remittances for now.
- DBS-Singapore and Liquid Group, a fintech company, will facilitate the service for users in Singapore. More banks will be included in the linkage with time.
- Account holders of listed banks can transfer funds to/from India using their UPI ID, mobile number, or Virtual Payment Address (VPA). To begin with, Indian users can remit up to 60,000 per day. This is equal to around $ (Singapore) 1,000.
- Cross-border remittances to Singapore can be done through the bank's mobile application or internet banking facilities. Apps of participating Indian banks will have an opt in/opt out feature for receiving remittances from Singapore.
- India has also considered allowing UPI remittances from other countries like the United Arab Emirates (UAE) which hosts a large Indian population.
- In November 2022, India and UAE discussed allowing cross-border remittances through UPI platforms.

What are real-time payments (RTP)?

- The real-time payments are money transfers that are mostly settled as soon as they are performed. RTPs are allowed 24x7, 365 days a year. They help simplify the process of fund transfer as well as ease communication between the payer and the payee.
- P2P payments involve the transfer of funds from one user's bank account to another through a digital medium. Common examples of P2P mobile apps in India include GPay and Paytm. Using P2P payments eliminates the risk of sharing bank account details.

BLUE ECONOMY OCCUPIES VITAL POSITION IN INDIA'S ECONOMIC GROWTH: CAG

Why in news?

- The blue economy occupies a vital position in India's economic growth, and it could well be the next multiplier of GDP and well-being, provided sustainability and socio-economic welfare are kept

at the centre stage, said CAG G C Murmu.

- Comptroller & Auditor General of India (CAG) was speaking at a seminar on the challenges and opportunities in the Blue Economy.

Vast maritime resources of India:

- India has a 7,517 km long coastline that is home to nine coastal states and 1,382 islands. The coastal economy sustains over 4 million fishermen and other coastal communities.
- There are nearly 199 ports, including 12 major ports that handle approximately 1,400 million tons of cargo each year.
- Moreover, India's Exclusive Economic Zone of over 2 million square kilometres has a bounty of living and non-living resources with significant recoverable resources such as crude oil and natural gas.

Priority areas at SAI20:

- With India assuming the Presidency of the G20 in 2022-2023, CAG holds the chair for SAI20.
- In line with the Indian theme of the G20 Presidency- "Vasudhaiva Kutumbakam" or "One Earth. One Family. One Future", the CAG has selected two priority areas viz. "Blue Economy" and "Responsible AI" for deliberations.

Significance of blue economy economic system:

- The blue economy economic system promotes the sustainable use of marine and freshwater resources while conserving their environments.
- It encompasses policies and operational dimensions aimed at producing food and energy, supporting livelihoods, and driving economic advancement and welfare.
- Blue Economy while being intrinsically linked to the Sustainable Development Goal (SDG) 14, which focuses on conserving and using oceans, seas, and marine resources for sustainable development shall also be viewed from a holistic perspective of SDG 13 - Climate Action; SDG 6 - Clean Water; SDG 7- Clean and Renewable Energy.

Single auditing framework:

- While there were audit criteria and framework for auditing sub-sectors, such as, marine fisheries, coastal ecosystem, aquaculture, coastal and marine tourism, biotechnology from marine resources and extraction of sea-bed mineral resources, integrating them into a single auditing framework would be key to all Supreme Audit Institutions (SAIs), including the SAI20 Engagement group.
- SAIs could strive to scale up their efforts, develop study papers on the condition of the Blue Economy and make recommendations on how the governments could direct their efforts and policies for sustainable development of the Blue Economy of their nations.

About SAI20 Engagement Group:

- It is a group of Supreme Audit Institutions of G20 countries.
- The Supreme Audit Institution is the country's official top audit institute or agency. In India, it is CAG.
- The establishment of SAI20 was initiated by Indonesia during its 2022 G20 Presidency.
- It aims to contribute, among other things, to the transparency and accountability of good governance.
- With India's assumption of the G20 presidency on December 1, 2022, CAG of India, i.e., SAI India shall take the chairmanship of SAI20.

THE YELLOW RIVER, 'CHINA'S SORROW'

Why in news?

- The mighty Yellow River, the 'mother river' of Chinese civilisation, has also been known as the 'River of Disaster' and 'China's sorrow' because of the devastating floods it has wrought in its basin from pre-history to the last century.
- • While much of the blame has been put on the upstream Loess Plateau, a new study has noted that the Chinese practice of building embankments is also to blame.

Details:

- The visited several sites along the river and studied sediment and historical records to conclude that the river used to flood four times every century before humans began to alter the environment.
- Around 6,000 years (3500 Before Common Era), when humans brought the practice of settled farming to the region, the river began to flood 10 times.
- The Chinese practice of building mud embankments,

especially during the Imperial Period to 'tame' the river as having only made matters worse.

About Yellow River:

- The Yellow River is the sixth-longest river in the world and is also the most sediment-laden.
- Also known as Huang He, it originates in the province of Qinghai, flows through the Loess Plateau, where it takes sediment that gives its waters their characteristic yellow colour. It then flows across the flat North China Plain before draining into the Bohai Sea, a part of the Yellow Sea.
- The sediment or loess (a type of silt) from the plateau usually settles on the river bed and raises its height, making the river especially flood-prone in the lower reaches, on the North China Plain.
- The Flood of 1887, which occurred during the rule of the Qing Dynasty, is said to have killed almost two million people and is considered to be one of the deadliest natural disasters in history.

Embankments along the river:

- The Chinese responded to the floods in the river by constructing embankments or levees. Their analyses suggested embankments, though the least expedient strategy for flood control, had only short-term effects on flood mitigation.
- In the Yellow River's case, deforestation and soil erosion on the Loess Plateau played an important part in increasing the need to create embankments.
- The deposition of sediment in the river channel necessitated the construction of artificial levees to keep the river water from spilling out.
- But the superelevation between the riverbed and the surrounding flood basin would be increased, making the area flood-prone. This would necessitate the need for more embankments and more floods.

Management strategy:

- The management and greening of the Loess Plateau since the 1950s, after the establishment of the People's Republic of China, had made the flood hazard nearly zero.
- The scientists suggested using structural flood control with other risk-mitigation strategies for long-term benefits. They also said attention must be paid to extreme weather events.
- The results provide a knowledge base not only for the planning and design application of river engineering but also for developing deliverable adaptive strategies and preventive measures that may be readily transferable to other human-dominated rivers.

DEFENCE & SECURITY

HAL TO PROVIDE MAINTENANCE AND OVERHAUL SUPPORT FOR MQ-9B DRONE ENGINES IN INDIA

Why in news?

- The Hindustan Aeronautics Ltd. (HAL) and General Atomics are looking to formulate a comprehensive engine maintenance, repair and overhaul (MRO) programme for the upcoming HALE RPAS projects.

Details:

- As India looks to purchase armed Predator Remotely Piloted Aircraft Systems (RPAS) from the U.S., (HAL) and General Atomics announced at Aero India that the turbo-propeller engines that power the MQ-9B Guardian High Altitude Long Endurance (HALE) RPAS will be supported by the HAL engine division for the Indian market.
- HAL has been manufacturing and providing MRO support for TPE 331-5 engines for the past 40 years. It is also establishing facilities for manufacturing TPE 331-12B engines for HTT-40 project.
- The engine used on the MQ-9B RPAS belongs to the same family of engines with upgraded configuration to adapt to the RPAS technology.

HAL & HENSOLDT:

- In another announcement, HAL and Germany-based HENSOLDT announced a collaboration agreement covering design/IPR Transfer for design and manufacturing of Obstacle Avoidance System (OAS) for Indian helicopters, primarily the Advanced Light Helicopter (ALH), and future exports.

Background:

- The Indian Navy operates two MQ-9B Sea Guardians taken on lease in 2020. A larger deal for 30 armed MQ-9Bs, 10 for each Service, is pending.
- In 2021, the Defence Ministry ordered a reassessment of the requirements of the deal estimated at around $3 billion.

MQ9B Sea Guardian:

- It is the maritime variant of the Predator MQ9 Unmanned Aerial Vehicle (UAV).
- It has a maximum endurance of 40 hours and a maximum flying altitude of 40,000 feet.
- It has a 3600 maritime surveillance radar and an optional multimode maritime surface search radar.
- It can be used in operations such as Anti-Surface Warfare, Anti-Submarine Warfare, Humanitarian

Assistance/Disaster Relief, Search and Rescue, Law Enforcement (Drug Trafficking, Illegal Immigration and Piracy), etc.

INDIAN SCIENTISTS BOMBARD FIGHTER JET WITH ELECTRIC CURRENT TO UNDERSTAND LIGHTNING STRIKES IN AIR

Why in news?

- Scientists at the India Institute of Science in Bengaluru have developed a new model to simulate how lightning strikes aircraft to better understand protective measures against the natural phenomenon.

Impact of Lightning strikes:

- Lightning strikes can damage the aircraft surface, lead to temporary disruptions in electrical and electronic systems or even cause permanent damage, and in extreme cases could lead to explosions or even fatal crashes.
- It is estimated that on average, a commercial aircraft gets struck by lightning once in every 1000 flight hours, which is approximately equivalent to once in a year.

How the experiment was conducted?

- Scientists carried out a first-of-its-kind experiment on a small military aircraft by injecting it with enormous amounts of current and by collecting electric field data from inside the craft.
- They developed a model that can be applied to two different aircraft geometries: a DC10 passenger aircraft and the SDM fighter aircraft model.
- They worked on the computation of the electric field around the aircraft and suitable modeling of the electrical discharges.

Outcome:

- They were able to obtain estimates of the minimum ambient electric field required for the initiation of lightning leader discharges from the aircraft. These values are in good agreement with measured data from instrumented aircraft flown through thunderstorms.
- The model takes into account the role of atmospheric conditions such as humidity and air pressure and showed that the aircraft at higher altitudes had a greater affinity for lightning strikes.
- They have been studying lightning protection for the past few years. They have analysed the effectiveness of lightning rods in safeguarding tall buildings in a thunderstorm. They have developed unique models that have addressed several long-standing issues of lightning current evolution.

What's next?

- The model and the data obtained from it, states that the first step toward designing suitable protective measures against lightning is identifying the attachment locations.
- They are trying to understand the peak value of the lightning strike current for aircraft-initiated lightning. Secondly, what could be the local changes around the aircraft during the lightning strike evolution?
- In addition, they are investigating disruptions to the internal electrical equipment when struck by lightning.

SOCIAL ISSUE

PRADHAN MANTRI PVTG DEVELOPMENT MISSION TO BE LAUNCHED WITH AN OUTLAY OF RS.15000 CRORE

Why in news?

- Recently, the Union Minister for Finance and Corporate Affairs, tabled the Union Budget 2023-24.
- In order to improve socio-economic conditions of the particularly vulnerable tribal groups (PVTGs), the Finance Minister stated that the Pradhan Mantri PVTG Development Mission will be launched.

Details:

- The Pradhan Mantri PVTG Mission will be launched as part of 'Reaching The Last Mile', one of the seven Saptarishi priorities enlisted in 2023 Budget.
- There are 75 PVTG groups in India that will benefit from this scheme.

Pradhan Mantri PVTG Development Mission:

- This will saturate PVTG families and habitations with basic facilities such as safe housing, clean drinking water and sanitation, improved access to education, health and nutrition, road and telecom connectivity, and sustainable livelihood opportunities.
- Rs.15,000 crore will be made available to implement the Mission in the next three years under the Development Action Plan for the Scheduled Tribes.

Eklavya Model Residential Schools:

- 38,800 teachers and support staff will be recruited for the 740 Eklavya Model Residential Schools, serving 3.5 lakh tribal students in the next three years.

Aspirational Districts and Blocks Programme

- The Aspirational Blocks Programme has been launched covering 500 blocks for saturation of essential government services across multiple domains such as health, nutrition, education, agriculture, water resources, financial inclusion, skill development, and basic infrastructure.

PM Awas Yojana

- The outlay for PM Awas Yojana is proposed to be enhanced by 66 per cent to over Rs.79,000 crore.

Water for Drought Prone Region

- In the drought prone central region of Karnataka, central assistance of Rs.5,300 crore is proposed to be given to Upper Bhadra Project to provide sustainable micro irrigation and filling up of surface tanks for drinking water.

Bharat Shared Repository of Inscriptions (Bharat SHRI)

- A 'Bharat Shared Repository of Inscriptions' will be set up in a digital epigraphy museum, with digitization of one lakh ancient inscriptions in the first stage.

Support for poor prisoners

- In order to provide support to poor persons who are in prisons and unable to afford the penalty or the bail amount, the required financial support will be provided.

MENSTRUAL LEAVES INTRODUCED IN SPAIN

Why in news?

- Recently, Spain has become the first European country to introduce paid menstrual or period leaves, with a law passed. The government would foot the bill for the monthly paid leaves of three to five days, after a doctor's note is shown.
- Also included in the law are provisions for free menstrual hygiene products that would be made available in educational centres, prisons, and social centres.
- In India's Supreme Court, a Public Interest Litigation (PIL) has been filed seeking menstrual leave for female students and working women across India.

What is the demand for paid menstrual leave?

- Allowing women (as well as transgender people and those of other gender identities who experience menstruation) to avail the option of taking a few days' leaves in a month has been advocated as a step towards better working conditions.
- While this is not a new idea, the concept has gained traction within the last decade. In 2017, a Bill was introduced by NinongEring, a Congress MP from Arunachal Pradesh, in the Lok Sabha for the purpose.
- It stated that women employed in a government-registered establishment and students of Class VIII and above would be entitled to paid leave or leave from the school, "as the case may be", for four days during her menstruation.However, the Bill never became law.

In which countries have period leaves been introduced?

- The measure for period leaves is not exactly new. Many Asian countries have them, the earliest being Japan.
- Zambia's law states, "A female employee is entitled to one day's absence from work each month without having to produce a medical certificate or give reason to the employer."
- Russian workers in the 1920s first pioneered the concept. Since then it has made its way in some shape or form to countries like Taiwan and Indonesia.

Case in India:

- In India, states govern the subject of health and their experience has varied. The Kerala government said it would grant menstrual leave for female students studying in all state universities coming under the Department of Higher Education. Much earlier, Bihar under then Chief Minister Lalu Prasad Yadav introduced the provision in 1992.

- But the measure, arguably, is yet to be normalized, 'The Patna University Teachers' Association sought its implementation. However, most women professors, especially in co-educational colleges, found it awkward to ask for such a leave.
- The PIL to be soon heard by the SC also cited a study on the impact of menstruation on women's health, and how Article 14 of the Indian Constitution (right to equality) is violated since some states have such policies in place while others do not.

Why is the idea of menstrual leave still contentious?

- The experience of places where such laws are in place does not give a clear picture.
- Where it has been in place, like in Japan, at times there have not been too many takers. This is because simply changing one policy does not lead to the removal of the taboos associated with menstruation and its discussion.
- Another argument says mandating paid leaves would discourage the hiring of women ,who are already underrepresented in the workforce in most countries.
- Further, these protections would highlight differences among employees, something that many women have at times refrained from emphasising to avoid discrimination.
- But with greater acknowledgement of the obvious difficulties caused because of menstruation, attempts are being made for inclusive policies by even private organisations, such as Zomato and Nike.
- The flexibility offered to employees in taking these leaves is one example, another is an all-around approach towards normalising menstruation, and making available clean public toilets, sanitary products and water in the workplace and wider public spaces.

CULTURE

INTERNATIONAL MOTHER LANGUAGE DAY 2023: ADIVASI CHILDREN IN INDIA UNABLE TO STUDY IN THEIR OWN TONGUES NEEDS REDRESSAL

Why in news?

- As the world celebrates International Mother Language Day February 21, 2023, the situation in India in this regard is grim.

About International Mother Language:

- Every year, International Mother Language Day is observed on February 21 to highlight the cultural and linguistic diversity in the country. UNESCO recognised the importance of this day at the General Assembly in 1999.
- Bangladesh is the first country to initiate the celebration of International Mother Language Day, which was accepted at the 1999 UNESCO General Conference.
- The theme of International Mother Language Day 2023 is 'multilingual education - a necessity to transform education'.

Challenges in India:

- One of the most linguistically diverse areas of the planet, India nevertheless is losing many of its tongues fast owing to the forces of modernisation and globalisation. One of the main drivers of language death in the country is lack of education in them.

Example of Odisha:

- Odisha has 62 tribal groups including 13 Particularly Vulnerable Tribal Groups.
- When tribal children go to primary school, they find most of the teachers do not belong to that particular district or locality.
- The teachers expect the children to speak the Odia language. The tribal students, who are not that familiar with Odia, make an effort but it does not come out well.
- The irony is that of the 62 tribal groups in the state, including 13 particularly vulnerable ones, literature and education material is available only in Santhali and Ho.

Global issue:

- While mother-tongue-based education is essential to the full development of individuals and to the transmission of linguistic heritage, 40 per cent of the world's students do not have access to education in the language they speak or understand best.
- Each of the more than 7,000 languages spoken by humanity carries within it a unique view of the world, of things and of beings, a way of thinking and feeling, so much so that each disappearance of a language constitutes an irretrievable loss.

- The United Nations agency initiated the International Decade of Indigenous Languages (2022-2032) in a bid to mobilise the international community for safeguarding a major part of the world's cultural diversity.

Way Forward:

- The National Education Policy 2020 advocates mother tongue-based education from the early stage to higher education.
- The question of linguistic justice should be addressed immediately.

THE SIGNIFICANCE OF THE FINDINGS IN KEELADI

Why in news?

- Keeladi is a tiny hamlet in the Sivaganga district in south Tamil Nadu. It is about 12 km south-east to the temple city of Madurai and is located along the Vaigai river.
- The excavations here from 2015 prove that an urban civilisation existed in Tamil Nadu in the Sangam age on the banks of the Vaigai river.

How is Keeladi linked to Sangam age?

- The Sangam age is a period of history in ancient Tamil Nadu which was believed to be from the third century BCE to the third century CE. The name is derived from the renowned Sangam poets of Madurai from that time.
- Excavations by the Archaeological Survey of India (ASI) and Tamil Nadu State Archaeology Department (TNSDA) has pushed the Sangam age further back.
- In 2019, a TNSDA report dated the unearthed artefacts from Keeladi to a period between sixth century BCE and first century BCE.
- One of the six samples collected at a depth of 353 cm, sent for carbon dating in the U.S., dated back to 580 BCE. The findings in the TNSDA report placed Keeladi artefacts about 300 years earlier than the previously believed third century BCE.

Recent findings:

- A recent ASI report has pushed the Sangam age to 800 BCE based on these archaeological findings.
- Keeladi could also provide crucial evidence for understanding the missing links of the Iron Age (12th century BCE to sixth century BCE) to the Early Historic Period (sixth century BCE to fourth century BCE) and subsequent cultural developments.

Are there links to Indus Valley?

- The unearthed Keeladi artefacts have led academics to describe the site as part of the Vaigai Valley Civilisation. The findings have also invited comparisons with the Indus Valley Civilisation while acknowledging the cultural gap of 1,000 years between the two places.
- Till now, the gap is filled with Iron Age material in south India, which serve as residual links. However, some of the symbols found in pot sherds of Keeladi bear a close resemblance to Indus Valley signs. A lot of digging and study has to be done to establish the links between these two civilisations.
- TNSDA affirms that Keeladi has all the characteristics of an urban civilisation, with brick structures, luxury items and proof of internal and external trade.
- It comes across as an industrious and advanced civilisation and has given evidence of urban life and settlements in Tamil Nadu during the Early Historic Period. Keeladi has also added to the credibility of Sangam Literature.

What has been unearthed so far?

- In the eight rounds of excavations, including the first three by the ASI, over 18,000 artefacts have been unearthed from the site and the unique artefacts will be on display at the museum to be opened soon.
- Unearthing of heaps of pottery suggest the existence of a pottery making industry, mostly made of locally available raw materials. Over 120 potsherds containing Tamil Brahmi inscriptions have been found. Keeladi, along with other Tamil Nadu sites which have over a thousand inscribed potsherds, clearly suggest the long survival of the script.
- Spindle whorls, copper needles, terracotta seal, hanging stones of the yarn, terracotta spheres and earthen vessels to hold liquid suggest various stages of a weaving industry. There also existed a dyeing industry and a glass bead industry.
- Gold ornaments, copper articles, semi-precious stones, shell bangles, ivory bangles and ivory combs reflect the artistic, culturally rich and prosperous lifestyle of the Keeladi people.
- Agate and carnelian beads suggest import through commercial networks while terracotta and ivory dice, gamesmen and evidence of hopscotch have been unearthed revealing their pastime hobbies.

ENVIRONMENT

MOHUA SIGNS MOU TO DEVELOP WASTE TO WEALTH PLANTS IN MILLION PLUS CITIES

Why in news?

- As part of furthering the 'Green Growth' agenda, the Ministry of Housing and Urban Affairs signed a Memorandum of Understanding with Engineers India Limited to develop Waste to Energy and bio-methanation projects in cities with a population of million plus.

'Green Growth' agenda:

- Recently, the Union Minister for Finance and Corporate Affairs, presented the Budget 2023-2024 listing the seven priorities or the 'Saptarishi' guiding through the Amrit Kaal.
- In the 'Green Growth' segment, 500 new Waste to Wealth plants will be established under the GOBARdhan scheme for promoting circular economy.
- These will include 200 compressed biogas plants, 75 in urban areas, 300 community or cluster-based plants, at a total investment of Rs 10,000 Cr.

Details:

- The thrust on sustainable solid waste management has been strengthened under the ambit of Swachh Bharat Mission-Urban 2.0, with the overall vision of creating garbage-free cities.
- Focusing on this objective, MoHUA has decided to set up large-scale solid waste processing facilities in million plus cities.
- There are 59 million plus cities in India like Lucknow, Kanpur, Bareilly, Nasik, Thane, Nagpur, Gwalior, Chennai, Madurai, Coimbatore to name a few.
- For management of organic/wet fraction of municipal solid waste bio-methanation plants have been Background

GOBARdhan plant in Indore:

- In February 2022, Prime Minister, inaugurated Asia's biggest municipal solid waste based GOBARdhan plant in Indore aiming to generate 19,000 kg bio-CNG gas.
- Under Swachh Bharat Mission-Urban 2.0, the bio-methanation plants linked to the GOBARdhan and SATAT schemes will produce Bio-CNG as a renewable energy.

Significance of waste to energy:

- Waste to Energy plants use dry waste fraction of municipal solid waste and produce renewable power with maximum reduction of waste volume utilizing least space in execution in compliance with SWM Rules 2016 and fulfill all the statutory norms of environment protection.
- Waste to Energy and bio-methanation projects will integrate the concept of circularity in waste management by producing green energy from dry and wet waste component of municipal solid waste.
- The by-product such as electricity and Bio-CNG will also help in achieving sustainability of waste management operations.

Highlights of the MoU:

- EIL will assist and handhold the million plus cities in developing such projects for larger quantum of waste integrating circularity in waste management.
- In the first phase, 25 million plus cities will be selected for developing large-scale process plants. The success of these projects will be pivotal as it will be conceptualized and executed as bench-marking for such projects.
- Thus, collaboration for providing support in preliminary technical assessment and Transaction Advisory services from EIL will have significant impact.
- EIL will also handhold ULBs in carrying out monitoring process of these PPP projects during the construction phase and will assist in obtaining statutory approvals.

Way Forward:

- The initiative will result in additional processing capacity of 15,000 TPD for Bio-Methanation and 10,000 TPD for Waste to Energy respectively.

WATER VISION@2047- SUGGESTION FOR ADDRESSING WATER SECURITY CHALLENGES

Why in news?

- Water is intrinsic not only to life but also to economic growth and development. Recently, the State Ministers' Conference with the theme 'Water Vision@2047' was organized at Bhopal in this context.

Objective:

- The primary objective of the Conference was to deliberate on Water Vision@2047 with the States.
- 33 States/Union Territories participated in the Conference, including Ministers from 25 States/UTs.

Action Plan and Key Recommendations of first All India Annual State Ministers' Conference on Water Vision @2047:

- Need for a more comprehensive and integrated Water Vision@2047, including adaption and mitigation strategies with timeline, addressing both demand and supply side needs.
- Need for a Task Force on Water Vision@2047 to work out a complete strategy for implementation of the recommendations of the Conference, clearly outlining the role of Central Government and State Governments with deliverables and timelines to achieve the outcomes of a water secure future.
- To minimize loss of water in the water conveyance system, building of piped distribution network may be encouraged.
- Micro irrigation may be promoted in an accelerated manner to utilize the estimated potential of about 70 million hectares fully.
- Use of technology including IoT in irrigation may be promoted to optimize water uses on one hand, and improve productivity on the other.
- People's participation or jan bhagidari is key to sustainability of initiatives in the water sector. Formation of Water Users Association in Command Area, their effective functioning and linking them to Farmers' Producer Organisations (FPOs) is important to reduce the IPC-IPU gap estimated to be about 20%. Village water and sanitation committees to be actively engaged in operation & maintenance of rural drinking water schemes.
- A single regulating body is required at the State level, for groundwater as well as surface water, including water pricing and reuse of waste water to regulate the water sector in a holistic manner.
- Mapping of health of drinking water sources and measures to restore health of degraded sources (both quality and sustainability) through convergence of resources need to be undertaken. Springshed management in hill areas may be promoted in a focused manner for this purpose.
- Use of geo-sensing, geo-mapping, remote sensing and 3-D modeling may be promoted for better assessment and planning of water resources.
- Circular economy in water sector may be promoted by treating all waste water generated in urban areas and re-using such treated used water progressively. In rural areas also, grey water should be reused / used to recharge groundwater.
- Water budgeting and management (both supply and demand sides) at gram panchayat and village as well as town/city level may be taken up universally with people's participation and leadership of rural and urban local bodies.

Water efficiency:

- Water storage capacity may be enhanced, both at large scale and small scale, to manage existing and future demand and build climate resilience.
- Effective management of sedimentation in reservoirs, rivers and other water bodies through suitable means may be encouraged.
- Potable water for drinking should have priority over all other uses of water. Areas and regions vulnerable to shortage of drinking water should be mapped and connected to the water grid suitably.
- Inter-basin transfer of water from flood prone areas should be encouraged.
- Agriculture uses 80-90% of water; therefore appropriate cropping patterns, crop varieties, efficient water utilization may be promoted with 'whole of Government' approach.
- Industry may be encouraged to become water efficient and adopt zero liquid discharge (ZLD).

Water quality:

- Assessment of water quality should be taken up regularly at appropriate intervals for groundwater as well as of different stretches of rivers. Quality of drinking water must be stringently monitored including at household level.
- Effective action needs to be taken to restore water quality in affected areas, or stretches. Natural farming may be encouraged near river bank to avoid pollution by chemical fertilizers and pesticides.

Holistic management:

- River health needs to be managed holistically with the help of the catchment from surrounding wetlands. Appropriate e-flow should be provided for.
- Robustness of irrigation infrastructure may be ensured by allocating adequate resources for its operation and maintenance.
- Safety inspection of dams and their proper upkeep may be ensured as mandated.
- Initiatives such as Jal Shakti Abhiyan as well as initiatives taken by State Governments may be embedded in the administrative procedure for their timely execution in a sustained manner.
- Flood plain zoning may be taken up in all vulnerable areas for taking appropriate mitigating, early warning and regulatory measures.

EASING AN ALBATROSS OFF THE NECK OF THE GREAT INDIAN BUSTARD

Why in news?

- Recently, a Supreme Court appointed-committee has recommended that, in order to protect the endangered

Great Indian Bustard, close to 800 km, or about 10% of the length of proposed power lines in the Thar and Kutch deserts of Rajasthan and Gujarat should be re-routed or made to go underground.

- Moreover, despite a Supreme Court order directing that low-voltage power lines go underground, no significant steps appear to have been taken by power companies and State governments to comply with them.

Background:

- The nearly 7,200 km of overhead lines are meant to transfer solar power into the grid but existing lines have been harming Great Indian Bustards, which have been dying by colliding into them or getting electrocuted.
- Only about 150 of these birds are still left, most of them in Jaisalmer in Rajasthan.

Bird conservation vs solar power

- The deaths of these birds, and the danger to them from power lines and renewable energy projects, triggered a petition in the Supreme Court in 2019, by environmentalists who asked that all overhead lines be made to go underground.
- Private and public power companies, supported by the Centre's Ministry of New and Renewable Energy (MNRE), contended that shifting all overhead lines underground would be expensive and impractical, and would significantly hike the cost of solar power, undermining India's commitment to green growth.
- The Centre has so far sanctioned the development of solar projects with a capacity of nearly 39,000 MW, but only a fourth have actually been commissioned so far.
- In April 2021, the court directed that all low-voltage power lines in areas demarcated as "priority and potential habitats of the Great Indian Bustard" in the Thar and Kutch deserts be pushed underground.
- "Priority zones" are areas where the birds are known to live and "potential regions" are those where conservation programmes, such as breeding the birds in captivity, are ongoing.

Bird diverters:

- High-voltage lines in these zones were also expected to follow suit. However, if power companies found undergrounding technically infeasible, they could approach a Supreme Court-appointed three-member committee for permission to go ahead with overhead lines with modifications.
- These modifications include installing "bird diverters", which are flaps installed on power lines that work like reflectors and are visible to the flying birds from about 50 metres away, giving them a chance to swerve out of the path of a power line.
- The Great Indian Bustard is a relatively heavy bird, nearly a metre in height, and with frontal vision that makes it hard to avoid collisions.
- Low-voltage lines are more likely to electrocute the birds, but they are more likely to die from high-voltage lines due to collisions. Bird diverters are, however, considered to be a stop-gap measure, as they cannot entirely guarantee an end to bird hits.

About GIB:

- The Great Indian Bustard (GIB), the State bird of Rajasthan, is considered India's most critically endangered bird.
- It is considered the flagship grassland species, representing the health of the grassland ecology.
- Its population is confined mostly to Rajasthan and Gujarat. Small populations occur in Maharashtra, Karnataka and Andhra Pradesh.

CLIMATE CHANGE WILL INCREASE HYDROPOWER GENERATION

Why in news?

- Unlike coal-powered power plants, hydropower, which is the second highest power producing source at 13%, is a significant contributor to clean global electricity generation.
- Based on observations and climate projections, a two-member team from IIT Gandhinagar studied the hydroclimatic changes in the catchment areas and their implications for hydropower generation in 46 major dams located in north, central and south India.

Database:

- They looked at the increase in rainfall in the catchment areas and the resultant inflow into all the 46 major reservoirs in the near (2021–2040), mid

(2041–2060), and far (2081–2100) periods against the reference period (1995–2014) for two shared socioeconomic pathway scenarios, SSP1-2.6 and SSP5-8.5.

- While SSP1-2.6 is a low-emission scenario, SSP5-8.5 is characterised by high radiative forcing by the end of the 21st century.

Key Findings:

- Based on selected hydroelectric dams, the projected increase in hydropower potential in India is 10-23%.
- A warmer and wetter climate is projected to bring about 5%-33% increased rainfall. As a result, hydropower production is very likely to increase by 9%-36% for most dams and this will come from increased inflow (7-70%) into the dams. The dams in central India show significant increase compared to dams in north and south India.
- Due to global warming, there will be a simultaneous rise in extreme inflow and high reservoir storage conditions for most dams.
- Compared with central and south India, north India is projected to experience higher warming in the future. As per the study, the highest warming (about 5 degree C) is projected for north India, while the warming is projected to be around 3-4 degree C for central and south India.
- Similar to substantial warming, most reservoir catchments are likely to witness increased precipitation due to global warming.
- The study found that inflow to a few dams in Ganga, Mahanadi, Brahmani, and west-coast river basins is projected to decline in the future.
- This reduction in inflow is due to increase in atmospheric water demands in response to the considerable warming compared to increase in precipitation.

Timeline of changes:

- The projected change in hydropower potential is the highest in the far period (-5% to 62.8%) and the lowest for the near period (-6.2% to 39%).
- The potential hydropower generation is projected to rise by more than 50% in Tehri, Ramganga, Kadana, Omkareshwar, Maheshwar, and Sriramsagar dams in the far period.
- In the case of south India, eight out of eleven dams are projected to experience a decline in hydropower potential. Dams in central India are projected to experience a more substantial increase in hydropower generation than north and central India.
- Substantial warming projected for north India may reduce snow and glacial storage, reducing snowmelt water contribution in the long run. But a substantial increase in rainfall is more likely to compensate for the reduction from snowmelt in north India.

Way Forward:

- The findings provide crucial insights into projected changes in hydroclimate and hydropower for the major dams in India.
- India may have to change reservoir rule curves on how much storage should be permitted at different times during the monsoon season.

LONG-TERM GROUNDWATER STORAGE IN GANGA BASIN DECLINING AT 2.6 CM PER YEAR: STUDY

Why in news?

- Groundwater storage levels have been declining by 2.6 centimetres per year in the Ganga basin, according to new estimates.

Details:

- The impacts were more pronounced in Rajasthan, Haryana and Delhi, with average storage declines of roughly 14 cm year−1, 7.5 cm year−1 and 7.2 cm year−1, respectively.
- The average storage decline in Uttar Pradesh, Bihar and West Bengal was estimated to be roughly 2cm year−1, 1 cm year−1 and 0.6 cm year−1, respectively.

Three methods:

- The Ganga Basin's aquifers are one of the largest reservoirs of groundwater in the world.
- The researchers from CSIRO Land and Water, University of Bergen, and Indian Institute of Technology, Roorkee, used three different methods to study long-term groundwater storage across six states.

First method:

- First, they collected groundwater level data between 1996 and 2017 from the Central Groundwater Board.
- The average groundwater levels have been declining at a rate of 2.6 cm year−1 between 1996-2017.
- West and southwest areas, including agriculturally intensive regions and urban areas like Delhi and Agra, took the biggest hit.

Second method:

- The second method involved the analysis of satellite data from the Gravity Recovery and Climate

Experiment (GRACE), which yielded an average loss of 1.7 cm year–1.
- Grace satellites, launched in 2002, assess Earth's water reservoirs over land, ice and ocean.

Third method:
- For the last method, they turned to a model to study groundwater dynamics and storage changes. The team calculated the volume of water entering and leaving the aquifer storage.
- The difference between the two represented storage loss, which stood at roughly 3.2 cm year–1.

Key observations:
- Delhi and Haryana have high groundwater abstraction rates, which explains the steep decline.
- Rajasthan, whose groundwater reserves contribute about 90 per cent of the drinking water and 60 per cent of the irrigation, is showing an improvement in groundwater levels in the recent past.
- A recent Central Groundwater Board yearbook, which monitors groundwater levels four times a year, found that the water levels in 2021-2022 rose compared to the 2011-2020 average, barring the pre-monsoon period.

Brahmaputra basin:
- The Brahmaputra basin, which was not a part of the study, shows more groundwater level reduction than the Ganga and Indus basins.
- A 2019 study estimated groundwater depletion of greater than 5 cubic kilometres per year in Assam, which falls under the Brahmaputra basin.

Way Forward:
- They now hopes to extend their study to identify districts in the Ganga basin with the highest rates of storage losses.
- They also plan to perform scenario analysis of impacts from climate and other stresses for basin planning and policy decisions for management.

FIFTH INTERNATIONAL MARINE PROTECTED AREAS CONGRESS

Why in news?
- Recently, the experts from across the world have gathered at the fifth International Marine Protected Areas Congress in Canada.

Background:
- Countries agreed to protect 30 per cent of the planet's lands and oceans by 2030 at the 15th Conference of the Parties to the Convention on Biological Diversity, 2022.
- Climate change is driving ocean temperature and sea level rise. The waters are turning acidic.
- Temperatures of the top few metres of the sea have increased by approximately 0.13 degrees Celsius per decade over the past 100 years.
- The expert called for efforts to establish and deploy science-based decision-support tools to ensure that 18 million square kilometres of new MPAs are climate-smart.
- Most current MPAs are located in coastal areas, while only 1.2 per cent of the high seas are protected. High seas are regions that are not controlled by any country.

Lack of Funding:
- A lack of funding poses challenges to the benefits that marine protected areas (MPA), areas managed for long-term conservation, can potentially provide.
- As many as 70 per cent of MPAs are underfunded. A well-managed and sufficiently funded MPA can restore good health to vulnerable ecosystems.
- This is crucial as nations agreed to protect 30 per cent of the planet's lands and oceans by 2030 at the 15th Conference of the Parties to the Convention on Biological Diversity held in 2022.

Example of Blue Finance:
- Blue Finance, a social enterprise, presented how they partner with local entities to build and manage four 'bankable' MPAs. The organisation has helped preserve 350,000 hectares (ha) of high-biodiversity coral reefs.
- This involves a partnership between the government and a local non-profit entity. The former remains the owner, while the latter is responsible for management functions.
- The four MPAs are Turneffe Atoll Marine Reserve in Belize, Mindoro Network in the Philippines, North Pemba in Zanzibar and Banggai in Indonesia.

Blue credits:
- Revenue can be generated from statutory and non-statutory MPA fees for tourism programmes, blue carbon credits generated from mangrove conservation and avoided deforestation as well as seaweed farming and sustainable coastal fisheries.
- Blue credits allow businesses to achieve net-zero greenhouse gas emissions by purchasing carbon credits (removal of one tonne of carbon dioxide from the atmosphere) equivalent to their emissions.
- Credits will be generated to conserve blue carbon ecosystems, such as mangroves, seagrasses and salt marshes, which are known to sequester carbon.

- These models can fetch tangible returns for investors. It also ensures that the regions maintain independence from donors.

About MOA:

- Marine Protected Areas (MPAs) involve the protective management of natural areas for economic resources, biodiversity conservation, and species protection.

STEPS TAKEN BY UNION GOVERNMENT TO PROMOTE CONSERVATION OF WATER

Why in news?

- Recently, Minister of State for Jal Shakti, in a written reply in Lok Sabha informed about the initiatives taken by the Government of India for making availability of water, its conservation and distribution.

The details of some of the major schemes/ programmes are as under:

National Water Mission:

- National Water Mission has been launched with the objective of conservation of water, minimizing wastage and ensuring its more equitable distribution both across and within States through integrated water resources development and management.
- Under this mission, a campaign namely "Sahi Fasal" has also been initiated to nudge farmers to favour agricultural crops which consume less water and to use water more efficiently in agriculture, as a part of demand side management.
- Also, to promote dialogue and information sharing among participants on variety of water related topics, a monthly seminar series - "Water Talk" has been initiated with intended to create awareness, build capacities of stakeholders and to encourage people to become active participants in the conservation and saving of water.

Atal Bhujal Yojana:

- Atal Bhujal Yojana, a Central Sector Scheme, with focus on community participation, demand side interventions and convergence of ongoing schemes for sustainable ground water management is being implemented from 1 April 2020.
- It is implemented in seven States; Gujarat, Haryana, Karnataka, Madya Pradesh, Maharashtra, Rajasthan and Uttar Pradesh.

Har Khet Ko Pani (HKKP):

- Har Khet Ko Pani (HKKP), a component of Pradhan Mantri Krishi Sinchai Yojana (PMKSY), Repair, Renovation and Restoration (RRR) of Water Bodies Scheme was launched.
- It aims to revive irrigation potential by improvement and restoration of water bodies by enhancing the tank storage capacity, along with other multiple objectives such as ground water recharge, increased availability of drinking water, improvement of catchment of tank commands etc.

AMRUT:

- The Atal Mission for Rejuvenation and Urban Transformation (AMRUT) was launched by the Government of India on June 25, 2015 in selected 500 cities and towns across the country for a period of 5 years i.e. from FY 2015-2016 to FY 2019-2020, which has been extended for completing the grounded projects.
- The Mission focuses on the development of basic urban infrastructure in the Mission cities in the sectors of water supply, sewerage & septage management, storm water drainage, green spaces & parks and non-motorized urban transport.

Jal Jeevan Mission:

- Jal Jeevan Mission-Har Ghar Jal is being implemented by Government of India, in partnership with States since August, 2019, which aims at providing potable water in adequate quantity (55 litres per capita per day) of prescribed quality (BIS:10500) on regular and long-term basis to every rural household through tap water connection, by 2024.
- At the time of announcement of Jal Jeevan Mission in August 2019, 3.23 Crore (17%) rural households were reported to have tap water connections. So far, as reported by States/UTs as on 06.02.2023, around 7.87 Crore rural households have been provided with tap water connections in last three and half years under JJM.
- Thus, as on 06.02.2023, out of 19.36 Crore rural households in the country, around 11.10 Crore (57%) households are reported to have tap water supply in their homes.

Jal Shakti Abhiyan-I (JSA-I):

- Jal Shakti Abhiyan-I (JSA-I) was launched in 2019 in 256 water stressed districts to promote water conservation and water resource management by focusing on accelerated implementation of five target interventions, viz., water conservation and rainwater harvesting, renovation of traditional and other water bodies/ tanks, reuse and recharge of bore wells, watershed development and intensive afforestation.

- In 2021, "Jal Shakti Abhiyan: Catch the Rain" (JSA:CTR) was initiated with the theme "Catch the Rain - Where it Falls When it Falls" to cover all the blocks of all districts (rural as well as urban areas) across the country.
- The focused interventions for JSA includes water conservation and rainwater harvesting, renovation of traditional and other water bodies/ tanks, reuse and recharge of borewells, watershed development and intensive afforestation.

Allocation by 15th FC:

- Furthermore, 15th Finance Commission in its report for 2021-22 to 2025-26, has earmarked 60 percent of the tied grants for water and sanitation related activities of which 50 percent is water component to be utilised by Rural Local Bodies/ Panchayati Raj Institutions (PRI).

HIMALAYAN PLUNDER: 3 MILLION INDIANS LIVE IN AREAS THAT CAN BE SWEPT BY GLACIAL LAKE FLOODS, SAYS STUDY

Why in news?

- Three million Indians live in areas where a glacial lake outburst flood (GLOF) can happen at any time, the first global assessment of such areas has found.
- Together with two million Pakistanis, they form a third of the total number of people worldwide facing such a risk.

Details:

- Globally, 90 million people across 30 countries live in 1,089 basins containing glacial lakes. Of these, 15 million (16.6 per cent) live within 50 kilometres of a glacial lake.
- The majority of the globally exposed population amounting to 9.3 million (62 per cent) are located in the region of high mountain Asia (HMA).
- Just four highly populous countries accounted for more than 50 per cent of the globally exposed population: India, Pakistan, Peru and China.

Population exposed to GLOFs:

- The population exposed to GLOFs increases with distance from a glacial lake. Almost half (48 per cent) of exposed populations are globally located between 20 km and 35 km downstream of lakesy.
- Only two per cent (300,000) of the global population exposed to GLOFs live within five km of one or more glacial lakes, with the majority of these — 66 per cent or 198,000 people found in HMA.
- Populations in HMA live, on average, closer to glacial lakes than anywhere else, with "one million people living within 10 km downstream of a glacial lake, where any early warning time is likely to be low, and, uncertainty in GLOF magnitude high".
- The researchers grouped basins into four mountain ranges: HMA, European Alps, Andes and Pacific Northwest (PNW). The remaining 131 (12 per cent) basins outside of these ranges were referred to as 'High Arctic and Outlying Countries'.
- Populations across the PNW and High Arctic and Outlying Countries are generally situated further than 35 km downstream from glacial lakes.

Impacts of GLOF:

- GLOF has the potential to catastrophically threaten people's lives, livelihoods and regional infrastructure.
- The researchers found that it was not the size or number of glacial lakes that determined the risk to people. Instead, it was the number of exposed people that greatly elevated the potential impact of GLOFs globally especially across HMA and the Andes.
- For instance, the island of Greenland has the highest number and area of glacial lakes. However, nobody resides in such areas, giving it a danger score of zero.
- On the other hand, the most dangerous basins, mainly found across HMA and the Andes do not always host the most, or the largest, glacial lakes. It is the high number of people as well as their reduced capacity to cope with disaster that plays an important role in determining the overall GLOF danger.

Risk Zone:

- The most dangerous of the 1,089 glacial basins analysed are found in Pakistan (Khyber Pakhtunkhwa basin), Peru (Santa basin) and Bolivia (Beni basin) containing 1.2 million, 0.9 million and 0.1 million people respectively who could be exposed to GLOF impacts.
- The glaciers across the Andes have undergone rapid deglaciation over the last 20 years in response to climate changes.
- This has led to the growth of many large glacial lakes and consequently a growth in overall GLOF lake conditions. The number of glacial lakes across the region increased by 93 per cent, compared to just 37 per cent in HMA across the period.

Status in India:

- Climate impact is visible in the Himalayas, with 25 glacial lakes and water bodies witnessing an increase in water spread area since 2009.
- There has been a 40 per cent increase in water spread area in India, China and Nepal, posing a huge threat to seven Indian states and Union Territories.

- Of these, six are Himalayan states / UTs: Jammu and Kashmir, Ladakh, Himachal Pradesh, Sikkim, Assam and Arunachal Pradesh.
- The rapid onset and high discharge of GLOFs means there is often insufficient time to effectively warn downstream populations and for effective action to be taken, particularly for populations located within 10-15 km of the source lake.

Way Forward:

- Improvements are urgently needed in designing early warning systems alongside evacuation drills and other forms of community outreach to enable more rapid warnings and emergency action in these highly exposed areas.

DHARA - ANNUAL MEETING OF MEMBERS OF THE RIVER CITIES ALLIANCE

Why in news?

- DHARA which stands for Driving Holistic Action for Urban Rivers, the annual meeting of the members of the River Cities Alliance (RCA), is being organised by the National Mission for Clean Ganga (NMCG) in association with National Institute of Urban Affairs (NIUA) in Pune.

Details:

- DHARA 2023 will provide a platform for senior officials including Commissioners, Addl. Commissioners, Chief Engineers and Senior Planners of the 95-member river cities in India to co-learn and discuss solutions for managing local water bodies.
- • The event has strong synergies with the Urban20 (U20) initiative under the ambit of India's G20 Presidency. One of the thrust areas of U20 is to promulgate urban water security. Healthy rivers have a vital role to play in enhancing the overall water security of the city.

Significance:

- DHARA 2023 is being organised for the Municipal Commissioners of the member cities to initiate in-depth discussions and come up with possible learning solutions for urban river management.
- The expected outcome of DHARA 2023 is to inspire members of the RCA to engage in progressive actions for urban river management in their cities.
- It is also expected that the event will shine light on the unaddressed issues and challenges for river management in cities, which will help NIUA and its partners in formulating an effective work plan.
- The event will also develop a compendium of technological solutions that cities may adopt for enhancing the management of their local rivers.

About RCA:

- River Cities Alliance (RCA) started with 30 cities in 2021 and currently has 95 cities as members across India.
- RCA was launched on November 2021 as a dedicated platform for river cities in India to ideate, discuss and exchange information for sustainable management of urban rivers.
- River Cities Alliance, first-of-its-kind Alliance in the world, symbolizes the successful partnership of the two Ministries i.e., Ministry of Jal Shakti and Ministry of Housing and Urban Affairs.
- The Alliance focuses on three broad themes- Networking, Capacity Building and Technical Support.

UTTARAKHAND FIRMS UP JOSHIMATH RELIEF PLAN

Why in news?

- The Uttarakhand Cabinet recently approved a proposed policy to offer compensation to people who lost their land and buildings due to land subsidence in Joshimath town.

Details:

- The policy was based on cost, options and conditions.
- The rate of compensation for residential buildings would be calculated by applying the cost index to the plinth area rates of the Central Public Works Department. The final compensation would be calculated after the deduction of depreciation for the affected building from the cost of the upcoming building.
- A similar form of relief could be paid for commercial structures for which the government had created five different slabs.

Key Highlights:

Three options:

- For the permanent rehabilitation of disaster-affected families, the government is offering them three options.
- The first is opt for compensation.
- In the second option, the affected person or family can seek land from the government and compensation for the damaged building. Land measuring up to 75 square metres (50 metres for building construction and 25 metres for cow shed and other works) would be provided for the construction of a residential building.
- In the third option, a person or family can demand a residential building constructed relative to his land and building. Buildings will be constructed by the State government on land up to a maximum area of 50 sq.m, with 25 sq.m for cow sheds and other works.

Commercial establishments:

- In case the owner wants the government to build a shop or other commercial establishment such as a hotel or a dhaba, he or she could opt to get compensation for the damaged commercial building or shop at the prescribed rate, and compensation for land at rates to be determined in the future on the basis of reports from technical institutions.
- If the affected person wanted the government to build a shop or business establishment, then it would be made available by the State government on land up to a maximum area of 15 sq. m. at the identified site. If a person in Joshimath who has been working in the disaster-affected area of Joshimath for more than one year by taking a shop on rent and due to the disaster both the land and the building of the shop/business establishment is unsafe, his employment has been affected. If so, such persons will be provided a one-time financial assistance of 2 lakh.

'OMORGUS KHANDESH', A NEWLY DISCOVERED INDIAN BEETLE

Why in news?

- Recently, a new beetle species has been discovered in India. The beetle is important for forensic science as it helps detect the time of death of an animal or human.
- The bug was discovered by scientist Aparna Sureshchandra Kalawate who works with Zoological Survey of India, Western Regional Centre (WRC), Pune.

Key Features:

- The new species belongs to the Trogidae family. With the addition of this new species, now there are a total of 14 extant species of this family in India.
- The beetles of this group are sometimes called hide beetles as they tend to cover their body under the soil and hide.
- They are not photogenic; they are usually black or grey and encrusted in dirt. Their bumpy appearance is distinct, with short, dense setae all over the body.
- The new species is morphologically most similar to Omorgus rimulosus.
- Omorgus Khandesh is mainly associated with bird and mammal nests or burrows and the details of their life histories are poorly known. They feign death upon being disturbed and become motionless.

Keratin beetle:

- Omorgus Khandesh is necrophagous and is, therefore, also called a keratin beetle. During the decomposition of a body, blowflies are amongst the first ones to arrive in the early stages.
- Meanwhile, the final successional stage is with the arrival of the keratin feeders, thus their importance in forensic science.

SOUTH AFRICA TRANSLOCATES 12 CHEETAH TO INDIA

Why in news?

- Recently, twelve cheetahs departed from South Africa for India as part of an initiative to expand the cheetah meta-population and to reintroduce cheetahs to a former range state following their local extinction due to over hunting and loss of habitat in the last century.
- The cheetah will join eight of the mammals relocated to India's Kuno National Park from Namibia in September 2022.

MoU in 2023:

- Earlier, the governments of South Africa and India signed a Memorandum of Understanding (MoU) on Cooperation on the Re-introduction of Cheetah to India.
- The MoU facilitates cooperation between the two countries to establish a viable and secure cheetah population in India; promotes conservation and ensures that expertise is shared and exchanged, and capacity built, to promote cheetah conservation.
- This includes human-wildlife conflict resolution, capture and translocation of wildlife and community participation in conservation in the two countries.

Why restoring cheetah population in India?

- Restoring cheetah populations is considered by India to have vital and far-reaching conservation consequences, which would aim to achieve a number of ecological objectives, including re-establishing the function role of cheetah within their historical range in India and improving the enhancing the livelihood options and economies of the local communities.
- Following the import of the 12 cheetahs in February, the plan is to translocate a further 12 annually for the next eight to 10 years. Scientific assessments will be undertaken periodically to inform such translocations.

About the Cheetah:

- The Cheetah, Acinonyx jubatus, is the world's fastest mammal, and is endemic to the savannahs of Africa. While southern Africa is the cheetah's regional stronghold, it is considered to be a vulnerable under the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) and is listed in Appendix I.
- The cheetah was declared extinct in India in 1952.

Population in South Africa:

- Worldwide, cheetah numbers have declined from an estimated 15 000 adults in 1975 to a current global population of less than 7, 000 individuals. In South Africa, the transition to democracy had substantial implications for wild cheetah conservation.
- The Cheetahs were kindly made available by Phinda Game Reserve (3), Tswalu Kalahari Reserve (3), the Waterberg Biosphere (3), Kwandwe Game Reserve (2) and Mapesu Game Reserve (1) and their translocation is in line with IUCN Guidelines for Reintroductions and Other Conservation Translocation and in accordance with international veterinary standards and protocols.

RHODODENDRONS CARPET DARJEELING AND SIKKIM HIMALAYAS

Why in news?

- The Darjeeling and Sikkim Himalayas are home to more than one-third of all types of rhododendrons found in India, reveals the latest publication of the Botanical Survey of India (BSI).
- The publication, titled, 'Rhododendrons of Sikkim and Darjeeling Himalaya — An Illustrated Account', lists 45 taxa of rhododendrons (36 species, one subspecies, two variety and seven natural hybrids).

Key Findings:

- There are 132 taxa (80 species, 25 subspecies and 27 varieties) of rhododendrons found in India.
- Of the 45 taxa recorded in the publication, 24 are found in the Darjeeling Himalayas and 44 in the Sikkim Himalayas.
- Darjeeling and Sikkim Himalayas comprise only 0.3% of India's geographical area but the region is home to one-third (34%) of all rhododendron types. This highlights the ecological significance of the region as far as an indicator species like rhododendron is concernednd.

Under threat:

- Of the 45 taxa documented by the BSI, five are facing a high threat due to anthropological pressures and climate change, according to scientists.
- Rhododendron edgeworthii, with white campanulate flowers, recorded a huge habitat decline in both Darjeeling and Sikkim.
- Rhododendron niveum, with big purple flowers, found in the Lachung area of north Sikkim is facing threats from rampant construction.
- Rhododendron baileyi, Rhododendron lindleyi and Rhododendron maddenii are also under threat.

Climate Change:

- Rhododendron, meaning rose tree in Greek, is considered an indicator species for climate change.
- The flowering season for rhododendrons starts in March and continues till May. However, recently, flowering was found to begin as early as in January for some species.

Background:

- Rhododendrons have a prominent place in the country's botanical history. They were first recorded by Captain Hardwick in Jammu and Kashmir in 1776 where he spotted Rhododendron arboreum.
- However, it was a visit by the British botanist Joseph D. Hooker to Sikkim between 1848 and 1850 that revealed the rhododendron wealth of the Sikkim and Darjeeling Himalayas.
- The first species Rhododendron from northeast India, Rhododendron dalhousiae was reported from Sikkim by Hooker in 1848 in his book The Rhododendrons of Sikkim Himalaya.

INDIA PLANS TO EXPORT SOLAR POWER

Why in news?

- By 2026, Indian industry will be able to manufacture every year solar modules that can generate 100 gigawatts of power, and help the country be a net exporter of solar power.
- This will significantly aid India's target of installing 500 GW of electricity capacity from non-fossil sources by 2030.

Challenges in India's solar energy target:

- India was to have installed 175 GW of renewable energy, from solar, wind, biomass and small hydropower sources by December 2022, but has only installed 122 GW. Of this, solar power was to have been 100 GW, though only 62 GW has been installed.
- A key bottleneck has been the cost of solar modules (or panels). While India has traditionally relied on Chinese-made components such as polysilicone wafers, necessary to make modules, higher customs duty on them (to make equivalent Indian-manufactured components more competitive) has shrunk supply.
- Apart from module prices, land acquisition has been a major challenge for solar power manufacturers. Despite the Centre commissioning 57 large solar parks with a capacity of 40 GW in recent years, only 10 GW has been operationalised.

Future phase:

- The future phase of India's renewable energy development will be led by hybrid projects and renewable energy parks that will host solar and wind projects along with battery storage systems.
- States have been demanding consistent, dependable power and that can be done only if solar and wind power is stored and made available on demand. This is, of course, a challenge globally.

PM KUSUM:

- The Pradhan Mantri Kisan Urja Suraksha evam Uttham Mahabhiyan (PM KUSUM) scheme, which aims to help farmers access reliable daytime solar power for irrigation, reduce power subsidies, and thereby decarbonise agriculture, was behind schedule because of the "high cost of finance" for farmers.
- Under the scheme, 34,422 crore is to be spent by the Centre to have farmers or farmer groups install 10,000-MW solar power plants, installation of 20-lakh solar-powered agriculture pumps that are not connected to the grid (off-grid), and converting 15 lakh agriculture pumps that are already connected to the grid into solar-powered pumps.
- As of December 31, 2022 only 88.46 MW of solar capacity had been added, 181,058 solar pumps had been installed, and 1,174 grid-connected pumps had been converted. The deadline for the scheme has been shifted to 2026.

GREEN THINK TANK CEEW SUGGESTS EU & KOREA-LIKE 'EMISSIONS TRADE' FOR INDIA'S CARBON MARKET LAUNCH

Why in news?

- With the government greenlighting the establishment of a carbon market, India should create a carbon emissions trading scheme (ETS) similar to what the European Union or South Korea have set up, according to the Delhi-based think tank Council on Energy, Environment and Water (CEEW).
- The CEEW recommended a cap-and-trade mechanism for greenhouse gas emissions that can be made applicable to various sectors in order to drive down emissions in a cost-effective manner.

Background:

- The Bureau of Energy Efficiency (BEE), which is in charge of regulating this market, is likely to come up with a framework for a domestic carbon market by the end of next month.
- The Energy (Conservation) Amendment Bill, passed in Parliament in 2022, paved the way for the establishment of a domestic carbon market in India, which seeks to incentivise emissions reductions among carbon-intensive industries.

Details:

- According to the CEEW, India's own carbon market could regulate 50 per cent of its carbon dioxide emissions, while the rest could be mitigated "through dedicated and complementary sectoral policies".
- While ETS in countries like EU and Korea set absolute targets on emissions reductions, in India, the emissions targets will not be absolute, but in terms of emissions intensity". Emissions intensity refers to the volume of carbon per unit of output.
- India has pledged to achieve net-zero emissions by 2070, as well as reduce its carbon emissions intensity of gross domestic product (GDP) by 45 per cent by 2030. Carbon markets are viewed as an essential tool by policymakers to achieve these climate goals.

ETS inEuropean Union:

- The Energy (Conservation) Amendment Bill allows the central government or any other authorised agency to grant "carbon credit certificates" or carbon allowances to a registered entity, opening the doors to establishing a carbon market.
- A carbon market puts a price on carbon and other greenhouse gases emitted in order to discourage fossil fuel use.
- In the EU, for example, the carbon market has materialised as a cap-and-trade scheme, wherein a regulatory body issues carbon allowances, each of which is equal to one tonne of carbon or its equivalent.
- These allowances, which are limited in number, must cover a registered entity's annual emissions, and can be bought and sold as and when needed. A registered entity that does not have adequate permits may be penalised.
- According to the CEEW, it's important that such a scheme be tailored to the Indian context, where ETS is still a novel concept.

CDM:

- India's experience with carbon markets in the international arena has been more project-based, under what's called the Clean Development Mechanism (CDM).
- The CDM was set up by the Kyoto Protocol, an international agreement in which certain developed countries pledged to reduce greenhouse gas emissions.
- In the CDM system, carbon credits were generated by activities or projects that reduce carbon emissions, such as afforestation and renewable energy production. These credits are then bought by emitting entities as a way to "offset" their emissions.

Way Forward:

- For a domestic ETS scheme, however, the CEEW recommends applying one emissions cap across sectors like thermal power, cement, aluminum, paper and pulp, iron and steel, and textile industries.
- A single cap across sectors enables the inherent cost-efficiency of an ETS to be fully utilised by allowing emissions reductions to take place where they are cheapest across all covered sectors.

ACCESS AND BENEFIT-SHARING: PAPER PROPOSES 8 PRINCIPLES ON USE OF INDIGENOUS MEDICINE

Why in news?

- A group of practitioners, activists, scholars, lawyers and human rights defenders has come together and proposed a set of ethical guidelines that they say can guide Western psychedelic research and practice on traditional indigenous medicines.
- The set of eight ethical principles; each beginning with the letter 'R', can address increasing concerns among many indigenous nations regarding the cultural appropriation of their traditional medicines.

Background:

- The proposed guidelines come even as the use of psychedelics for therapeutic purposes is on the rise. There are now more than 30 million estimated

psychedelic users in the United States (US) alone.

- There were 367 registered clinical studies on psychedelics as of 2022. An increasing number of cities and states in the US have also legalised their use.
- Indigenous healing medicines like Ayahuasca are rising in popularity. Yet, the economic profits hardly accrue to the communities and regions from where these medicines originate.

Indigenous rights:

- There are frameworks that mention indigenous rights to the use and development of their traditional medicines and related practices. These include the Article 8 (j), Article 16 and Annex 1 of the Convention on Biological Diversity (CBD) as well as the Articles 7 and 12 of the CBD's Nagoya protocol on Access and benefit-sharing (ABS).
- However, countries like the US where research on psychedelics using traditional indigenous medicine is being carried out, are not signatories to the CBD and therefore also not party to the Nagoya protocol on ABS.
- On December 19, 2022, delegates at the 15th Conference of Parties (COP15) to the UN Convention on Biological Diversity (CBD) adopted the Kunming-Montreal Global Biodiversity Framework (GBF). The framework has 23 targets that the world needs to achieve by 2030.

The 8 Rs:

- The eight ethical principles to address indigenous concerns: Reverence, Respect, Responsibility, Relevance, Regulation, Reparation, Restoration, and Reconciliation.
- These were categorised within four overarching categories:
  a) Acknowledgement
  b) Knowledge-Translation and Education
  c) Intellectual Property
  d) Belonging

Impacts of Western psychedelic research:

- Western psychedelic research had turned the 'kincentric' approaches (treating all relationships, including medicines, as kin) of indigenous medicine systems to anthropocentric approaches (human-centric).
- For instance, westerners travelled thousands of kilometres (increasing their carbon footprint) to take part in indigenous healing ceremonies (like ayahuasca). This failed to promote environmental care.
- Western psychedelic research and psychedelic tourism is also leading to excessive extraction of ingredients used in traditional medicines. Indigenous traditions are not properly acknowledged in medicines, rituals, ceremonial use, they noted under 'respect'.
- No 'responsibility' was being taken while making use of traditional benefits, benefitting from it or the harms that were being caused due to it.

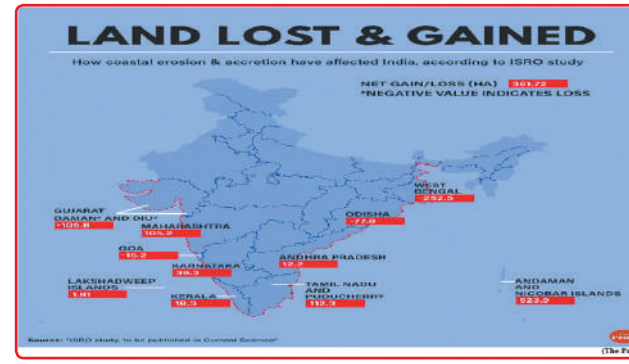
Way Forward:

- They called for 'regulation'. Indigenous Peoples should give their free, prior and informed consent on the use of their medicines and practices. Benefits from any use must be shared with such communities.
- Institutions and organisations using psychedelics for research and/or therapies must provide 'reparation' in the form of promotion and safeguarding of indigenous self-determination.

ISRO STUDY SHOWS HOW INDIA COASTLINE CHANGED IN 10 YRS

Why in news?

- India lost over 3,680 hectares of land due to coastal erosion in the course of 10 years, with West Bengal and Gujarat bearing the maximum brunt, according to a study by the Indian Space Research Organisation (ISRO).



Details:

- The research, conducted by ISRO's Space Applications Centre, Ahmedabad, on comprehensive data available between 2004-06 and 2014-16, shows that 15 per cent of India's coastline, amounting to nearly 1,144 km is undergoing erosion. Meanwhile, 14 per cent (1,084 km) of the Indian shoreline is accreting.
- India gained 4,042 hectares of coastal area between 2004-06 and 2014-16. Although there is a net gain in the total coastal area (due to settlement of sediment/sand), the stretch under erosion is greater than the accreting shoreline.

Coastal Erosion:

- The world's shorelines are constantly changing due to natural processes such as coastal erosion and accretion, as well as human activities that affect sediment transport.
- However, the anticipated sea level rise, increased wave activity, and projected increase in the frequency and intensity of tropical cyclones due to climate change are expected to cause more rapid and severe

shoreline changes in the near future.

- Coastal erosion means acres of land are disappearing. This can lead to a habitat reduction for local fauna and flora, and make people living in coastal areas vulnerable, their land disappears, and they are closer to the sea.

Accretion:

- Accretion is the process of coastal sediment returning to the visible portion of a beach or foreshore after a submersion event. A sustainable beach or foreshore often goes through a cycle of submersion during rough weather and accretion during calmer periods.
- Accretion can be beneficial in some cases, as there is an increase in the land area. But it can harm marine life, like sea creatures suddenly finding their waters getting shallower, or turtle habitats moving away from the shoreline.

Mapping HTA:

- The researchers considered the High Tide Line (HTL) as the coastline. Using images from the LISS-IV sensor aboard ISRO's Resourcesat-1 and 2 satellites, they were able to map the HTL of the Indian coastal states with a spatial resolution of 5.8 m corresponding to 2004-06 and 2014-16 time frames.
- For different states, the HTL is represented by different landscape indicators, such as mangroves, cliffs, seawalls, or permanent vegetation lines. The team used a digitisation technique to map out the shorelines for each of the states.

Key Findings:

- They found that the Andaman and Nicobar Islands have the longest eroding coastline (231 km) and the longest accreting shoreline (256 km). Erosion is lowest in Lakshadweep Islands (12 km), and the lowest length of the accreting shoreline is in Goa (7 km).
- The percentage of eroding shoreline is highest for West Bengal (36 per cent), followed by Odisha (32 per cent), Kerala (23 per cent) and Andhra Pradesh (23 per cent). The remaining maritime states have less than 20 per cent of eroding shoreline, with Lakshadweep recording the minimum (8 per cent).
- Andhra has the highest percentage of accreting coastline (26 per cent), followed by Tamil Nadu, Odisha and West Bengal (22 per cent each), and Kerala (21 per cent).
- The percentage of stable shoreline is highest for Gujarat (87 per cent), followed by Lakshadweep (82 per cent). The figure is 80 per cent for Maharashtra and Goa.

Shoreline changes higher on eastern coast:

- Shoreline change is higher along the eastern coast of the Indian peninsula than the western coast.
- West Bengal, Gujarat, Odisha, and Goa have suffered a net loss of coastal area due to erosion in the course of 10 years. The loss is the largest for West Bengal (252 hectares).
- Meanwhile, Tamil Nadu, Maharashtra, Karnataka, Kerala, Andhra Pradesh, and Lakshadweep have gained coastal land. The gain is the largest for Andaman and Nicobar Islands (524 hectares).

Significance:

- As coastal erosion is a serious threat to both the ecology and economy of the country, the shoreline change inventory is the primary information required for planning coastal development activities.
- Keeping track of shoreline changes helps in planning measures to carry out sustainable development activities along the coastal region.

VENICE'S FAMOUS CANALS ARE NOW DRYING

Why in news?

- With some of Venice's secondary canals almost drying up in the past few days, images of docked water taxis, gondolas and ambulance boats have garnered a lot of attention on social media.
- Experts believe that a prolonged long spell of low tides and lack of rain are responsible for the issue in the city.
- The low water levels have come as a surprise because Venice is known to suffer from frequent flooding. In 2019, it witnessed the worst floods since 1966, which resulted in damages worth hundreds of millions of euros.

What are the famous canal and gondolas of Venice?

- Located in northern Italy, the city of Venice has a unique geography. It is a collection of over 118 small islands spread over a lagoon, which is a kind of water body that is separated from a larger water body through some kind of land formation.
- Covering 70,176.4 ha., the Venetian lagoon is separated from the Adriatic Sea. A NASA image shows the red tile roofs of buildings in the Venetian Lagoon.
- According to UNESCO, temporary settlements in the 5th century gradually became permanent here, comprising land-dwelling peasants and fishermen.

Why have some Venitian canals gone dry?

- At present, the near waterless canals have disrupted everyday life in the city because they're responsible for carrying a bulk of transportation, automobiles are banned throughout much of Venice.
- The situation has forced medical crews to tie up ambulance boats farther away from their destination.
- According to weather analysts, a high-pressure system is stuck over the city, creating low tides, which has led to low water levels. However, many say the root cause behind the issue is the drought-like situation across Italy.

What is the water crisis in Italy?

- Since last summer, the region has been seeing a severe shortage of water in its rivers and lakes.
- The Italian Alps have received nearly half of the normal snowfall during this winter.
- Meanwhile, Italy's longest river, the Po, which travels from the Alps to the Adriatic, has 61 per cent less water than normal at this time of year. To make matters worse, Italy's largest lake, Lake Garda, is also suffering from low water levels.
- Some experts suggest that the region hasn't been able to recuperate from the after-effects of drought of 2022. In 2022, Italy experienced its worst drought in 70 years, with authorities declaring a state of emergency in five northern areas: Emilia-Romagna, Friuli-Venezia Giulia, Lombardy, Piedmont and Veneto.

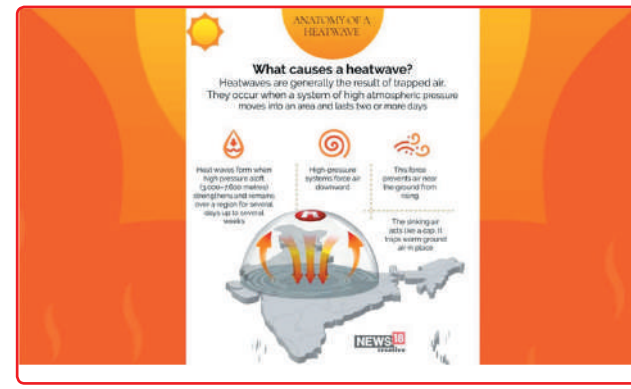
Conclusion:

- Scientists have been sounding the alarm for decades regarding the impact of climate change on Italian rivers and lakes but successive governments have failed to take action,. Stefano Fenoglio, professor of zoology.
- Italy is very exposed to climate change, especially the Alpine region and facing this crisis should be a priority.

THE SOPHISTICATED ANATOMY OF HEAT WAVES

Why in news?

- Recently, the India Meteorological Department (IMD) warned that the maximum temperatures over northwest, west, and central India would be 3-5°C higher than the long-term average.
- On February 21, the national capital recorded its third hottest February day (33.6° C) in more than five decades.



What is a heat wave?

- According to the IMD, a region has a heat wave if its ambient temperature deviates by at least 4.5-6.4°C from the long-term average.There is also a heat wave if the maximum temperature crosses 45°C (or 37°C at a hill-station).
- Heat waves are expected to become longer and more intense and frequent over the Indian subcontinent. In 2022 itself, the heat waves started early and were more numerous.
- They also extended further south into peninsular India due to a north-south pressure pattern set up by the La Niña, a world-affecting weather phenomenon in which a band of cool water spreads east-west across the equatorial Pacific Ocean.
- The last three years have been La Niña years, which has served as a precursor to 2023 likely being an El Niño year. The El Niño is a complementary phenomenon in which warmer water spreads west-east across the equatorial Pacific Ocean. Heat waves tend to be confined to north and northwest India in El Niño years.

How do heat waves occur?

- Heat waves are formed for one of two reasons; warmer air is flowing in from elsewhere or it is being produced locally.
- It is a local phenomenon when the air is warmed by higher land surface temperature or because the air sinking down from above is compressed along the way, producing hot air near the surface.

Direction of air-flow:

- In spring, India typically has air flowing in from the west-northwest. This direction of air-flow is bad news for India for several reasons. In the context of climate change, West Asia is warming faster than other regions in latitudes similarly close to the equator, and serves as a source of the warm air that blows into India.
- Likewise, air flowing in from the northwest rolls in over the mountains of Afghanistan and Pakistan, so some of the compression also happens on the leeward side of these mountains, entering India with a bristling warmth.

- While air flowing in over the oceans is expected to bring cooler air, the Arabian Sea is unfortunately warming faster than most other ocean regions.

Westerlies:

- The strong upper atmospheric westerly winds, that come in from the Atlantic Ocean over to India during spring, control the near-surface winds. Any time winds flow from the west to the east, the winds are blowing faster than the planet itself, which is also rotating from west to east.
- The energy to run past the earth near the surface, against surface friction, can only come from above. This descending air compresses and warms up to generate some heat waves.

Declining Lapse rate:

- Finally, the so-called lapse rate, the rate at which temperatures cool from the surface to the upper atmosphere is declining under global warming. In other words, global warming tends to warm the upper atmosphere faster than the air near the surface.
- This in turn means that the sinking air is warmer due to global warming, and thus produces heat waves as it sinks and compresses.

How does air mass contribute to heat waves?

- The other factors that affect the formation of heat waves are the age of the air mass and how far it has travelled. The north-northwestern heatwaves are typically formed with air masses that come from 800-1,600 km away and are around two days old.
- Heat waves over peninsular India on the other hand arrive from the oceans, which are closer (around 200-400 km) and are barely a day old. As a result, they are on average less intense.

Conclusion & Way Forward:

- In sum, heat waves have a sophisticated anatomy with important implications for how well they are predicted. Nonetheless, early-warning systems can take advantage of the processes, modes of formation, location, and age of the air mass to improve the quality of warnings and also increase how soon they can be issued.
- Sizeable investments in human and computational resources have already increased India's forecast skills in the last decade.

ALMA TELESCOPE WILL SOON GET A 'NEW BRAIN'

Why in news?

- The Atacama Large Millimetre/submillimetre Array (ALMA), a radio telescope comprising 66 antennas located in the Atacama Desert of northern Chile is set to get software and hardware upgrades.
- It will help it to collect much more data and produce sharper images than ever before.
- It added that the upgrades would take around five years to finish and cost $37 million.

New Correlator:

- The most significant modernisation made to ALMA will be the replacement of its correlator, a supercomputer that combines the input from individual antennas and allows astronomers to produce highly detailed images of celestial objects.
- Today, ALMA's correlators are among the world's fastest supercomputers. Over the next 10 years, the upgrade will double and eventually quadruple their overall observing speed.

Collaboration:

- As ALMA is operated under a partnership among the United States, 16 countries in Europe,Canada, Japan, South Korea, Taiwan, and Chile, the announcement came after all the partners cleared the funding required for the improvements.
- Fully functional since 2013, the radio telescope was designed, planned and constructed by the US's National Radio Astronomy Observatory (NRAO), the National Astronomical Observatory of Japan (NAOJ) and the European Southern Observatory (ESO).
- Over the years, it has helped astronomers make groundbreaking discoveries, including that of starburst galaxies and the dust formation inside supernova 1987A.

What is ALMA?

- ALMA is a state-of-the-art telescope that studies celestial objects at millimetre and submillimetrewavelengths, they can penetrate through dust clouds and help astronomers examine dim and distant galaxies and stars out there.
- It also has extraordinary sensitivity, which allows it to detect even extremely faint radio signals.
- The telescope consists of 66 high-precision antennas, spread over a distance of up to 16 km.

Why is ALMA located in Chile's Atacama Desert?

- ALMA is situated at an altitude of 16,570 feet (5,050 metres) above sea level on the Chajnantor plateau in Chile's Atacama Desert as the millimetre and submillimetre waves observed by it are very susceptible to atmospheric water vapour absorption on Earth.

- Moreover, the desert is the driest place in the world, meaning most of the nights here are clear of clouds and free of light-distorting moisture, making it a perfect location for examining the universe.

What are some of the notable discoveries made by ALMA?

- With ALMA's capability of capturing high-resolution images of gas and dust from which stars and planets are formed and materials that could be building blocks of life, scientists are trying to find answers to age-old questions of cosmic origins.
- One of the earliest findings came in 2013 when it discovered starburst galaxies earlier in the universe's history than they were previously thought to have existed.
- Next year, ALMA provided detailed images of the protoplanetary disc surrounding HL Tauri, a very young T Tauri star in the constellation Taurus, approximately 450 light years from Earth and transformed the previously accepted theories about the planetary formation.
- In 2015, the telescope helped scientists observe a phenomenon known as the Einstein ring, which occurs when light from a galaxy or star passes by a massive object en route to the Earth, in extraordinary detail.
- More recently, as part of the Event Horizon Telescope project, a large telescope array consisting of a global network of radio telescopes, it provided the first image of the supermassive black hole at the centre of our own Milky Way galaxy. The image was unveiled by scientists in May 2022.

SCIENCE & TECH

MOU SIGNED FOR COMMERCIAL ARE DIAMONDS MADE IN A LABORATORY BETTER THAN NATURALLY-OCCURRING ONES?

Why in news?

- The 2023 Union Budget shines special attention on laboratory-grown diamonds (LGD).
- In her Budget speech, Finance Minister said that the sector has "high employment potential" and announced a number of schemes to promote their research and development in India.


Natural Diamond


Lab Grown Diamond

What are laboratory-grown diamonds?

- As the name suggests, LGD are manufactured in laboratories, as opposed to naturally-occurring diamonds. However, the chemical composition and other physical and optical properties of the two are the same.
- Naturally-occurring diamonds take millions of years to form; they are created when carbon deposits buried within the earth are exposed to extreme heat and pressure.
- On the other hand, LGDs are mostly manufactured through two processes – high pressure, high temperature (HPHT) method or Chemical Vapour Deposition (CVD) method.
- Both HPHT and CVD methods of growing diamonds artificially begin with a seed — a slice of another diamond. In the HPHT method, the seed, along with pure graphite carbon, is exposed to temperatures around 1,500 degrees Celsius and extremely high pressure.
- In the CVD method, the seed is heated to around 800 degrees Celsius inside a sealed chamber filled with a carbon-rich gas. The gas sticks to the seed, gradually building the diamond.
- Scientists working at a General Electric research laboratory in New York are credited with the creation of the world's first-ever LGD in 1954.

Are LGDs better than naturally-occurring diamonds?

- Visually and chemically, the two are the same. However, the environmental footprint of a diamond grown in a laboratory is much lesser than that of a naturally-occurring diamond.
- It takes ten times more energy to extract a natural diamond from the earth than it takes in creating one above the ground.
- Open-pit mining, one of the most common methods of mining naturally-occurring diamonds, involves moving tonnes of earth and rock to extract these precious stones.

Provisions regarding LGDs in the 2023 Budget:

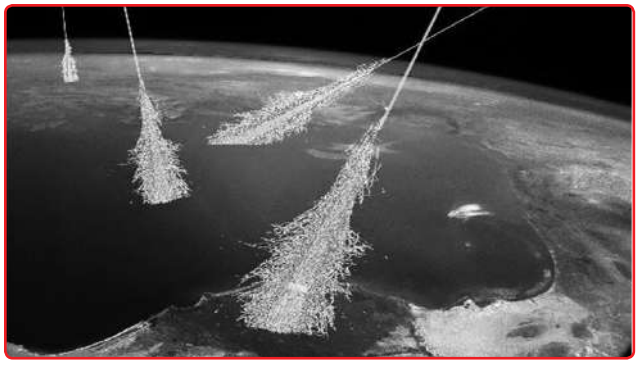
- India is a global leader in cutting and polishing natural diamonds, but as its resources are becoming scarce, the industry is shifting towards LGDs.
- The 2023 Union Budget promises to reduce the basic customs duty on seeds used in the manufacture of lab-grown diamonds in a bid to popularise their production in India, the duty on seeds for rough LGDs will be reduced from 5% to nil. The change will come into effect starting February 2, 2023.
- A five-year research grant will also be provided to one of the Indian Institute of Technologies (IITs) for research and development in the field of LGDs.
- It also proposed the creation of new tariff lines to help in better identification of a number of products,

including synthetic diamonds. The aim of the move is to help facilitate trade as well as to have clarity on availing concessional import duty.

SCIENTISTS USE OUTER SPACE PARTICLES TO EXAMINE THE FORTRESS WALL OF XI'AN CITY

Why in news?

- As per a new study, researchers are examining the fortress wall of Xi'an, an ancient city in China, by using tiny outer space particles that can penetrate hundreds of metres of stone surfaces.
- Known as muons, these particles have helped them find small density anomalies, which are potential safety hazards, inside the wall.
- Xi'an's wall is 12 metres high and 18 metres thick. To analyse this 14 kilometres long rampart, researchers deployed a technique called muon tomography or muography, which uses muons to generate three-dimensional images of such large structures.



What are muons?

- Muons are subatomic particles raining from space. They are created when the particles in Earth's atmosphere collide with cosmic rays, clusters of high-energy particles that move through space at just below the speed of light.
- These particles resemble electrons but are 207 times as massive. Therefore, they are sometimes called "fat electrons".
- Because muons are so heavy, they can travel through hundreds of metres of rock or other matter before getting absorbed or decaying into electrons and neutrinos. In comparison, electrons can penetrate through only a few centimetres. Muons are highly unstable and exist for just 2.2 microseconds.

What is muon tomography or muography?

- Muography is conceptually similar to X-ray but capable of scanning much larger and wider structures, owing to the penetration power of muons.
- As these high-energy particles are naturally produced and ubiquitous, all one needs to do is place a muon detector underneath, within or near the object of interest.
- The detector then tracks the number of muons going through the object from different directions, to form a three-dimensional image.

Muons and archaeology:

- The technique was first used in the late 1960s, when Nobel Laureate and US experimental physicist Luis Alvarez joined hands with Egyptologists to search for hidden chambers in the Pyramid of Khafre, Giza. Nothing was found at the time.
- However, in 2017, modern archaeologists repeated the experiment with more sophisticated and advanced muon detectors and stumbled upon a major finding.
- By placing several detectors in the queen's chamber and in an adjacent corridor within the pyramid and at its base on the north side, the archaeologists were able to discover a previously unknown chamber at least 30 metres long. It was the first major inner structure to be found in the pyramid since the 19th century.
- Much like the 2017 experiment, scientists of the latest study also used a muon detector, called CORMIS (Cosmic Ray Muon Imaging System), to examine the wall of Xi'an city.

Applications of muography:

- Apart from archaeology, muography has found use in customs security, internal imaging of volcanoes and others.
- Around 2015, scientists used the technique to look inside the Fukushima nuclear reactors after the 2011 earthquake and tsunami in Japan. As the site was highly radioactive, they put the two muon detectors in 10 centimetres thick boxes to protect them from radiation and then carried out the scanning.
- Muography is also being used by researchers to analyse Mount Vesuvius, a volcano in Italy.

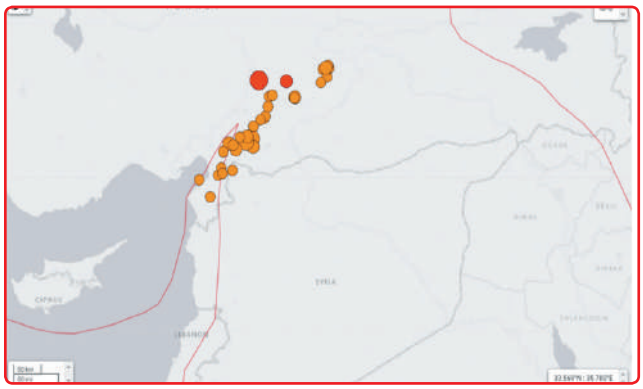
Way Forward:

- According to a 2022 study, with the help of this technique, researchers are trying to understand the finer details of the volcano's internal structure. They hope that the data will play a crucial role in predicting what hazards to expect in an eventual eruption.

TURKEY-SYRIA QUAKE: THE ANATOLIAN PLATE IS ONE OF THE MOST SEISMICALLY ACTIVE

Why in news?

- An earthquake of magnitude 7.8 struck Turkiye, one of the most seismically active regions in the Mediterranean and the world, on February 6, 2023.
- The epicentre was Pazarcik near Gaziantep, a city near the country's border with northern Syria.
- This was followed by 30 aftershocks, with six having magnitudes of 5 and larger.
- A second earthquake of magnitude 7.5 shook southeast Turkey centred in Elbistan later.



Why Anatolia?

- Turkiye (the Turkish/Anatolian plate) sits between three major tectonic plates: African, Arabian and Eurasian.
- Collisions between the Arabian and African plates with Eurasia typically result in earthquakes.

The Anatolian plate is divided into three major fault zones:

a) North Anatolian Fault Zone (NAFZ)
b) East Anatolian Fault Zone (EAFZ)
c) South Eastern Anatolian Thrust Zone (SAT)

- The North Anatolian Fault is similar to the San Andreas fault of California. The February 6 earthquake and the aftershocks occurred along or in the vicinity of the EAFZ.
- Earthquakes occur along faults, which are fractures between blocks of rock, allowing them to move relative to one another.
- In some places along the East Anatolian Fault, the Anatolian Plate slid past the Arabian plate with a slip of up to three metres.

Previous instances:

- Since 1970, only three earthquakes of magnitude 6 or larger have occurred within 250 kilometres of the February 6 earthquake.
- EAF witnessed many large earthquakes during the last two centuries. They occurred in 1866, 1874, 1893 and 1971.
- The 1114 AD earthquake destroyed the city of Marash, Turkey.

Intensity on Mercalli scale:

- The Modified Mercalli Intensity Scale describes the effects of an earthquake on human beings, natural structures and industrial installations in a given region.
- The scale is designated in roman numerals. The earthquake's intensity was XI, which means violent.

VOICE DEEPFAKES: HOW THEY ARE GENERATED, USED, MISUSED AND DIFFERENTIATED

Why in news?

- Recently, several users of the social media platform 4chan, used "speech synthesis" and "voice cloning" service provider, ElevenLabs, to make voice deepfakes of celebrities like Emma Watson, Joe Rogan, and Ben Shapiro. These deepfake audios made racist, abusive, and violent comments.
- Making deepfake voices to impersonate others without their consent is a serious concern that could have devastating consequences.

What are voice deepfakes?

- A voice deepfake is one that closely mimics a real person's voice. The voice can accurately replicate tonality, accents, cadence, and other unique characteristics of the target person.
- People use AI and robust computing power to generate such voice clones or synthetic voices. Sometimes it can take weeks to produce such voices.

How are voice deepfakes created?

- To create deepfakes one needs high-end computers with powerful graphics cards, leveraging cloud computing power.
- Besides specialised tools and software, generating deepfakes need training data to be fed to AI models. This data are often original recordings of the target person's voice.
- AI can use this data to render an authentic-sounding voice, which can then be used to say anything.

What are the threats arising from the use of voice deepfakes?

- Attackers are using such technology to defraud users, steal their identity, and to engage in various other illegal activities like phone scams and posting fake videos on social media platforms.
- Voice deepfakes used in filmmaking have also raised ethical concerns about the use of the technology.
- Gathering clear recordings of people's voices is getting easier and can be obtained through recorders, online interviews, and press conferences.
- Voice capture technology is also improving, making the data fed to AI models more accurate and leading to more believable deepfake voices.

What are the ways to detect voice deepfakes?

- Detecting voice deepfakes need highly advanced

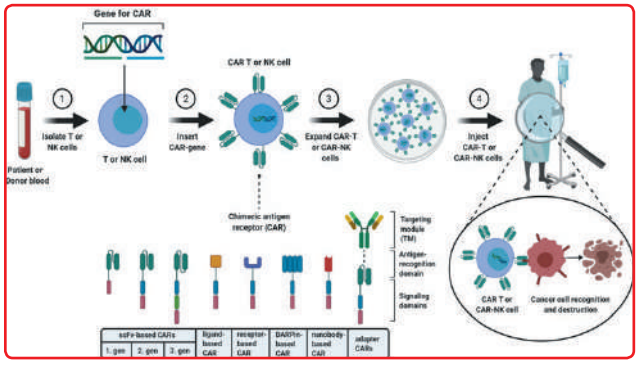
technologies, software, and hardware to break down speech patterns, background noise, and other elements. Cybersecurity tools have yet to create foolproof ways to detect audio deepfakes, Speechify noted.

- Research labs use watermarks and blockchain technologies to detect deepfake technology, but the tech designed to outsmart deepfake detectors is constantly evolving.
- Programmes like Deeptrace are helping to provide protection. Deeptrace uses a combination of antivirus and spam filters that monitor incoming media and quarantine suspicious content.

CAR T-CELL THERAPY: THE NEXT STEP TOWARDS A HOLISTIC TREATMENT OF CANCER

Why in news?

- The three major forms of treatment for any cancer are surgery (removing the cancer), radiotherapy (delivering ionising radiation to the tumour), and systemic therapy (administering medicines that act on the tumour).
- Surgery and radiotherapy have been refined significantly over time whereas advances in systemic therapy have been unparalleled.
- A new development on this front, currently holding the attention of many researchers worldwide, is the CAR T-cell therapy.



How has systemic therapy evolved?

- Systemic therapy's earliest form was chemotherapy; when administered, it preferentially acts on cancer cells because of the latter's rapid, unregulated growth and poor healing mechanisms.
- Chemotherapeutic drugs have modest response rates and significant side-effects as they affect numerous cell types in the body.
- The next stage in its evolution was targeted agents, also known as immunotherapy. Here the drugs bind to specific targets on the cancer or on the immune cells that help the tumour grow or spread.
- This method often has fewer side-effects as the impact on non-tumour cells is limited. However, it is effective only against tumours that express these targets.

What are CAR T-cells?

- Chimeric antigen receptor (CAR) T-cell therapies represent a quantum leap in the sophistication of cancer treatment.
- Unlike chemotherapy or immunotherapy, which require mass-produced injectable or oral medication, CAR T-cell therapies use a patient's own cells. They are modified in the laboratory to activate T-cells, a component of immune cells, to attack tumours.
- These modified cells are then infused back into the patient's bloodstream after conditioning them to multiply more effectively.
- The cells are even more specific than targeted agents and directly activate the patient's immune system against cancer, making the treatment more clinically effective. This is why they're called 'living drugs'.

How does it work?

- In CAR T-cell therapy, the patient's blood is drawn to harvest T-cells which are immune cells that play a major role in destroying tumour cells.
- Researchers modify these cells in the laboratory so that they express specific proteins on their surface, known as chimeric antigen receptors (CAR).
- They have an affinity for proteins on the surface of tumour cells. This modification in the cellular structure allows CAR T-cells to effectively bind to the tumour and destroy it.
- The final step in the tumour's destruction involves its clearance by the patient's immune system.

Where is it used?

- As of today, CAR T-cell therapy has been approved for leukaemias (cancers arising from the cells that produce white blood cells) and lymphomas (arising from the lymphatic system).
- These cancers occur through the unregulated reproduction of a single clone of cells, that is, following the cancerous transformation of a single type of cell, it produces millions of identical copies. As a result, the target for CAR T-cells is consistent and reliable.
- CAR T-cell therapy is also used among patients with cancers that have returned after an initial successful treatment or which haven't responded to previous combinations of chemotherapy or immunotherapy.
- The potential side-effects are also significant, associated with cytokine release syndrome (a widespread activation of the immune system and collateral damage to the body's normal cells) and neurological symptoms (severe confusion, seizures, and speech impairment).

How widespread is its use?

- The complexity of preparing CAR T-cells has been a major barrier to their use. The first clinical trial showing they were effective was published almost a decade ago; the first indigenously

developed therapy in India was successfully performed only in 2022.
- The technical and human resources required to administer this therapy are also considerable. Treatments in the U.S. cost more than a million dollars.
- Trials are underway in India, with companies looking to indigenously manufacture CAR T-cells at a fraction of the cost. The preliminary results have been encouraging.

GAGANYAAN MISSION: ISRO, INDIAN NAVY CONDUCT TRIALS FOR CREW MODULE RECOVERY

Why in news?

- Recently, the Indian Space Research Organisation (ISRO) along with the Indian Navy carried out initial recovery trials of the Crew Module for the Gaganyaan, a human space flight mission.
- The trials were conducted in the **Navy's Water Survival Test Facility (WSTF) in Kochi.**

What are recovery trials?

- A Crew Module Recovery Model (CMRM) that simulates the mass, center of gravity, outer dimensions, and externals of the actual Crew Module at touchdown was used for the trials.
- As the safe recovery of the crew is the final step to be accomplished for any successful human spaceflight, it is of paramount importance and has to be carried out with the minimum lapse of time.
- The recovery trials will be initially carried out in a closed pool, followed by trials in a harbor and in the open sea.
- Different phases of recovery trials starting with the recovery of the Crew Module to the flight crew training are planned at WSTF.

What is Water Survival Test Facility?

- WSTF is a state-of-the-art facility of the Indian Navy that provides realistic training of aircrew for escape from a ditched aircraft under varied simulated conditions and crash scenarios.
- WSTF simulates different sea state conditions, environmental conditions, and day/night conditions.
- These trials assist in validating the SoP, and training recovery teams as well as the flight crew. The feedback from the recovery team/trainers helps improve the recovery operations SoP, design various recovery accessories, and finalize the training plan.

WHAT WILL CHANDRAYAAN-3 DO ON THE MOON?

Why in news?

- The Indian Space Research Organisation (ISRO) likely to be launch the Chandrayaan-3 mission to the Moon in 2023.

Details:

- Chandrayaan-3 is a follow-up to the Chandrayan-2 mission that will demonstrate end-to-end capability in safe landing and roving on the lunar surface and consists of a lander-rover configuration.
- The mission will be launched aboard India's most powerful rocket, the LVM-III, from the Satish Dhawan Space Centre in Sriharikota.

Targets:

- The mission is aimed at better understanding the Moon's composition. ISRO has laid out three main objectives for the mission, which include
  a) demonstrating a safe and soft landing on the lunar surface,
  b) demonstrating the rover's roving capabilities on the moon and
  c) performing in-situ scientific observations.

Instruments:

- The mission's Chandra Surface Thermophysical Experiment (ChaSTE) will measure the thermal conductivity and temperature, while the Instrument for Lunar Seismic Activity (ILSA) will measure the seismicity around the landing site.
- The Langmuir Probe (LP) will estimate the plasma density and its variations and a passive Laser Retroreflector Array from NASA is accommodated on the mission for lunar laser ranging studies.

Lander & Rover:

- Chandrayaan-3 consists of an indigenous Lander module (LM), Propulsion module (PM), and a Rover

with the objective of developing and demonstrating new technologies required for Interplanetary missions.

- The Lander will have the capability to soft land at a specified lunar site and deploy the Rover which will carry out in-situ chemical analysis of the lunar surface during the course of its mobility.
- The propulsion module has the Spectro-polarimetry of Habitable Planet Earth (SHAPE) payload to study the spectral and Polari metric measurements of Earth from the lunar orbit.
- The propulsion module will carry the lander and rover configuration to about 100 kilometers of lunar orbit.

Way Forward:

- ISRO has made changes to Chandrayaan-3 following the loss of the Chandrayaan-2 mission while landing on the lunar surface in 2018.
- The mission is designed to better navigate the terrain conditions while attempting to land on the surface and deploy the rover.

SUCCESSFUL FLIGHT OF SMALL SATELLITE LAUNCH VEHICLE (SSLV)

Why in news?

- Recently, the Indian Space Research Organisation (ISRO) successfully launched SSLV-D2from Sriharikota.

Details:

- SSLV-D2 carried EOS-07, a 153.6 kg Earth Observation Satellite realised by ISRO; Janus-1, a technology demonstration satellite weighing 10.2 kg belong ANTARIS, USA; and AzaadiSAT-2, an 8.8 kg satellite realised by Space Kidz India by integrating various scientific payloads developed by 750 girl students across India.

EOS-07:

- The EOS-07 satellite weighing 156.3 kg, developed by ISRO has a mission life of 1 year.
- The mission objective was to design and develop payload instruments compatible with a micro satellite bus and new technologies that are required for future operational satellites and to design and develop a micro satellite accommodating new technology payloads in a quick turn-around time.

Janus-1:

- The 10.2kg Janus-1 is a technology demonstrator smart satellite, based on USA's Antaris software platform.

AzaadiSAT-2:

- The AzaadiSAT-2 weighing around 8.8kg has been developed by a team of Space Kidz India, a Chennai based Indian Aerospace Startup.
- About 750 girl students were guided to develop the payloads. The NanoSAT aims to demonstrate LoRa and amateur radio communication capabilities, measuring radiation levels in space.

SSLV:

- SSLV is the new small satellite launch vehicle developed by ISRO to cater the launch of small satellites up to 500 kg to Low Earth Orbits on 'launch-on-demand' basis. It is configured with three solid stages 87 t, 7.7 t and 4.5 t respectively.
- SSLV is a 34 m tall, 2 m diameter vehicle having a lift-off mass of 120 t.
- A liquid propulsion-based Velocity Trimming Module (VTM) achieves desired velocity for the insertion of the satellites into the intended orbit.
- SSLV is capable of launching Mini, Micro, or Nanosatellites (10 to 500 kg mass) to a 500 km orbit. It provides low-cost access to Space, offers low turn-around time, facilitates flexibility in accommodating multiple satellites and demands minimal launch infrastructure.

SSLV-D1:

- In its first developmental flight on August 7, 2022, SSLV-D1 had marginally missed to place the satellites. SSLV-D2 implemented the recommendations made by the expert committee that analysed the shortcomings of SSLV-D1 flight.

Way Forward:

- With this launch India has got a new launch vehicle which was aimed to commercialise the small satellite launches through Industry on demand basis.
- ISRO looks forward for catering to the increasing global need of launching smaller satellites into Space.

MAMMALIAN SPREAD OF H5N1 AND ITS PANDEMIC POTENTIAL

Why in news?

- Recent reports of H5N1 spread between mammals raise concerns about its potential to cause a human pandemic if it were to spill over and become transmissible among humans.

Avian influenza:

- Avian influenza, or bird flu, is a highly contagious viral infection that primarily affects birds. Infrequently, the virus can infect mammals from birds, a phenomenon called spillover, and rarely can spread between mammals.
- There are several different subtypes of avian influenza viruses, ranging from low pathogenic to highly pathogenic types.
- H5N1 is a highly pathogenic subtype of avian influenza that causes severe disease and death in birds. This subtype has caused a number of human infections through close contact with infected birds or contaminated environments, and is often fatal.

Cause for concern:

- The H5N1 subtype has the potential to spill over to other mammals such as minks, ferrets, seals and domestic cats when the animals come in contact with infected birds or their feces or consume carcasses of infected birds and further serve as reservoirs.
- Recently, scientists have been investigating a potential mammalian spillover event after a mass mortality event whichkilled over 700 seals along Russia's Caspian Sea coast where a H5N1 variant was detected in wild birds a few months ago.
- In February 2023, Peru reported cases of H5N1 in sea lions and a dolphin, and a lion dying from H5N1 in a zoo. The U.K. has also reported deaths of otters and foxes due to infection by H5N1 subtype.
- However, the only recorded incidents of intra-mammal transmission of the virus have been among mink in captivity at a farm in Spain, in 2022.

Human transmission of Influenza H5N1:

- If the H5N1 variant of avian flu has evolved to be transmitted between mammals, there is a rare possibility of another evolutionary jump resulting in human transmission and outbreaks.
- The H5N1 avian influenza virus was first detected in 1996 on a goose farm in China. Subsequently, a major outbreak was reported in 1997 among poultry in Hong Kong, also leading to human infections of H5N1, which left 6 people dead and 18 infected.
- In 2004, H5N1 was reported in several countries in Asia, and further a global outbreak which continues to date. In 2013 and 2014, many countries in Europe and Asia reported H5N1 in poultry.
- Over the years the virus has caused outbreaks across the world, predominantly spread by migratory birds. Till date, over 800 cases of human H5N1 infections have also been reported, with a high fatality of 53%.

New strain of H5N1:

- A new strain of H5N1, named 2.3.4.4b, emerged in 2020 and rapidly spread across Asia, Africa and Europe and subsequently to North and South America by 2021 and 2022, respectively.
- Many mammals were also infected in these outbreaks, including human infections.
- H5N1 sequenced from the mink farm in Spain also show several mutations, including (T271A) that enhances viral replication in mammalian tissues.
- The impact of this mutation in helping the virus spread to and among humans, therefore, remains unknown. Influenza H5N1 can rarely infect humans through direct contact with animals, but often causes severe disease and death.

What can be done?

- Preventing H5N1 spillovers and outbreaks requires a combination of measures including vaccination of poultry, safe disposal of dead birds, quarantine and culling of affected animals, wearing personal protective equipment when handling birds, and improved surveillance and monitoring of H5N1 in birds and other animals.
- Human vaccines against H5N1 avian influenza have been designed to protect against the most severe forms of the disease. However, the highly mutable nature of the H5N1 virus could potentially decrease vaccine efficacy over time. Therefore, molecular surveillance of H5N1 and its subtypes is essential in understanding and responding to outbreaks.
- Genome sequencing can be employed to monitor the emergence of new subtypes, and keep a close watch on mutations and virulence factors that may increase the ability to infect humans.

Conclusion & Way Forward:

- Although the risk of H5N1 to infect and spread among humans has been evaluated as low, disease and genomic surveillance as an integrated approach to controlling avian influenza are needed to keep a close watch on the outbreak.
- As learned from the COVID-19 outbreak, monitoring the evolution of the virus can add to the preparedness against a potential pandemic.

WHAT ARE MICROLED DISPLAYS, AND WHY IS APPLE SHIFTING TO IT?

Why in news?

- The microLEDs are self-illuminating diodes that have brighter and better colour reproduction than Organic

Light Emitting Diode (OLED) display technology.

- Apple is currently working on this new display technology and plans to implement the same on future watch models starting 2024, and gradually to its other devices including iPhones and Macs.

What is microLED display technology?

- The basis of microLED technology are sapphires. A sapphire can shine on its own forever. A microLED screen is filled with such small but strong light. The picture in a microLED screen is generated by several individual light-emitting diodes.
- Samsung, the pioneer in microLED technology explained in a video that a microLED is as small as cutting a centimetre of hair into 200 smaller pieces.
- Each of these microLEDs are semiconductors that receive electric signals. Once these microLEDs are gathered, they form a module. Several modules are then combined to form screens.

What are its benefits over other displays?

- MicroLED displays are brighter, have better colour reproduction and provide better viewing angles.
- MicroLEDs have limitless scalability, as they are resolution-free, bezel-free, ratio-free, and even size-free.The screen can be freely resized in any form for practical usage.
- In addition to being self-emissive, MicroLEDs also individually produce red, green, and blue colours without needing the same backlighting or colour filters as conventional displays.
- Samsung has come up with MicroLED displays with up to 4,000 nits of peak brightness, roughly double of what the best OLED and LCD TVs are capable of right now.

What does the new technology mean for Apple?

- MicroLED displays will be Apple's first screens designed and developed in-house. The tech company currently sources screens from Samsung, LG, Japan Display Inc.,Sharp Corp. and BOE Technology Group Co.
- Apple's transition to the new displays could reduce its reliance on technology partners like Samsung and LG and replace Apple supplies with homegrown parts.
- The Cupertino-based company currently makes its own M1 and M2 chips. It has dropped Intel's chips in its Mac computers to boost in-house designs and plans to do the same with key wireless components in its iPhones.
- Now, by making the displays on its own, Apple could be in a better position to customise its devices and keep a stronger control on its supply chain, thus reducing delays in product availability.

When can we see it and in which products?

- The screens are expected to debut with the Apple Watch Ultra in 2024, but Apple eventually plans to bring the technology to its entire lineup of iPhone, iPad, Mac, and Apple Watch devices.

CIVIL SERVANTS' CAPACITY BUILDING TO INVOLVE LATEST GEOSPATIAL TECHNOLOGY

Why in news?

- Recently, the Union Minister of Science & Technologyannounced that in keeping with Prime Minister's penchant for technology driven governance, the Civil Servants' capacity building will involve the latest GeoSpatial technology which is one of the most recent technologies available.
- There is increasing integration between two of the important Ministries, namely the Personnel/ DoPT and Science & Technology/ DST.

NIGST in Civil Services:

- The NIGST (National Institute of Geo-Informatics Science & Technology) has the potential and expertise in Geospatial technologies to play a pivotal role in building the civil service.
- As per National Geospatial Policy (NGP) 2022, online courses in geospatial science & technology areas are to be made available through iGoT Karmayogi platform.
- NIGST can augment the civil service training eco-system with competencies & role based education in the areas of Basic GIS, Drone Survey & Mapping, GIS Analysis, Land Surveying, Cadastral Mapping, GNSS Surveying, Digital Mapping, LIDAR Mapping, Utility Mapping, 3D-City Mapping, Geoid Modeling, CORS Network etc.

National Geospatial Policy (NGP), 2022:

- The National Geospatial Policy (NGP), 2022 has laid down the overarching framework for holistic development of the Geospatial ecosystem to support the national development and economic prosperity.
- It has laid emphasis on developing the Geospatial skill and knowledge standards across the country because need for Geospatial professionals, their training & development in diverse area of geospatial & allied technology has been spelt out in the policy.
- The NGP categorically talks about developing NIGST into a Centre of Excellence (CoE) for providing training in specialized courses in the domain of geospatial science & technology.

About NIGST:

- NIGST (earlier known as Indian institute of Surveying & Mapping or IISM) is a Surveying & Mapping training institute under Survey of India known for short term and long term training & capacity building over past over 50 years to various countries (like Thailand, Nepal, Bhutan, Sri Lanka, Saudi Arabia, Oman etc.), Centre and state ministries/agencies, Security agencies, private industry etc.

MISSION JUICE WILL LOOK FOR A HABITABLE PLACE AROUND JUPITER

Why in news?

- Jupiter recently became the planet with the most moons, after a dozen new lunar worlds were discovered lurking around it. The planet has trumped Saturn with its list of 92 moons in all.
- A new mission from Earth is ready to explore the planet's biggest moons and will be launched in April 2022.

JUICE:

- The spacecraft, dubbed Jupiter Icy Moons Explorer or Juice, has arrived at Europe's Spaceport in French Guiana for final preparations before it lifts off onboard the Ariance-5 rocket.
- The spacecraft will be on an eight-year voyage to Jupiter, where it will explore the icy moons and try to find answers to the evolution of the biggest planet in our Solar System.

Agenda:

- The mission tries to understand how the icy worlds might harbour life and, study the Jupiter system as a model for complex environments around gas giant planets across the Universe. The primary goal will be to study Jupiter's large, ocean-bearing icy moons.
- The spacecraft will be packed with 10 instruments and will characterize Jupiter's ocean-bearing icy moons as planetary objects and possible habitats.
- The mission also looks for answers to, questions of is the origin of life is unique to our planet, or whether could it occur elsewhere in our Solar System or beyond.

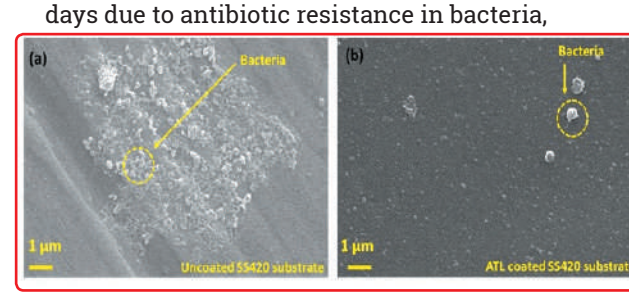
Why Jupiter?

- The biggest planet in the Solar System, Jupiter is five times farther from the Sun than our Earth. This makes it a challenging target to reach.
- The spacecraft after launch will conduct several gravities assists with Earth and Venus to race toward Jupiter for an arrival scheduled in 2031.
- Once around Jupiter, the mission will conduct 35 flybys of the gas giant's moons to explore its principal objectives: Callisto, Europa, and Ganymede.
- The mission will conclude with an extended study of Ganymede – in 2034 it will become the first spacecraft to orbit a moon other than Earth's.

UNIQUE NON-CYTOTOXIC NANOCOMPOSITE COATINGS DEVELOPED TO PREVENT POST-SURGICAL INFECTIONS

Why in news?

- A newly developed nanocomposite coating can inhibit biofilm formation and also kill attached bacteria, thereby helping tackle growing post-operative infections, a common occurrence these days due to antibiotic resistance in bacteria,



Why it matters?

- These post-operative surgical site infections (SSIs), which according to WHO, affect 11 percent of patients in low and middle-income countries, are caused by the development of biofilms (groups of bacteria growing in formation that are highly resistant to antibiotics) on the incision site or in the soft tissue inside the site.
- The biofilm matrix, which may come from existing infections in the patient's body or can be transferred

from the hospital environment through potential carriers like surgical equipment, wound dressing, or bandage/surgical sutures, acts as a physical shield against antibiotics given during the operation, slowing down their penetration.

- Hence, it is important to have an antibacterial coating on the surface of these materials that can act as potential sources of SSI.

Non-cytotoxic materials:

- Conventionally antibacterial coatings containing biocides like nanosilver, nanocopper, triclosan, and chlorhexidine have been used to prevent bacterial infections.
- Although, Triclosan and chlorhexidine exhibit antibacterial effects towards a broad-spectrum of bacteria, they and other biocides are found to produce cytotoxicity. As a result, there is an increasing focus on developing alternative non-cytotoxic materials with antibacterial properties.

New research:

- Researchers from ARCI have developed a nanocomposite coating ((named as ATL)) by combining water repellence and biocidal property (combinatorial approach), which exhibits both hydrophobic and biocidal behaviour.
- The developed coating not only inhibits biofilm formation by restricting bacterial and water adhesion but also kills attached bacteria.
- The ATL-coated vicryl sutures exhibited higher percentage biofilm inhibition when compared to commercially available triclosan-coated antibacterial sutures.
- Cytotoxicity of the formulation was evaluated on coated surface, and it was found that ATL coatings are non-cytotoxic.

Way Forward:

- The coatings developed in the present study can be used as a non-cytotoxic alternative to the commercially available antibacterial coatings, especially for healthcare applications on surgical sutures/surgical instruments to prevent the rise of multidrug-resistant bacteria.

MEASURING AN ELECTRON'S MAGNETIC MOMENT WITH EXTREME ACCURACY

Why in news?

- In a new study, physicists recently reported measuring the electron's magnetic moment with a precision of 0.13 parts per trillion (ppt). The resulting measurement is 2.2 times more accurate than the previous best, recorded 14 years ago.
- This, however, has raised some questions about one of physics's most successful theories,the Standard Model of particle physics.

The Standard Model:

- The Standard Model (SM) is the theory that describes the properties of all subatomic particles, classifies them into different groups, and determines how they're affected by three of the four fundamental forces of nature: strong-nuclear force, weak-nuclear force, and electromagnetic force.
- In the 1960s, physicists used SM to predict the existence of a particle called the Higgs boson, which was finally discovered in 2012.
- Similarly, the SM has allowed physicists to successfully predict the existence and properties of dozens of particles and is considered to be one of the most successful theories in the history of physics. However, it still can't explain why the universe has more matter than antimatter, what dark matter is, or what dark energy is.

How does the electron's magnetic moment matter?

- The SM's most precise prediction is of the electron's magnetic moment. Physically, the magnetic moment describes how willing an electron is to align itself in the direction of a magnetic field.
- Mathematically, it's equal to −/B. Here, (pronounced mew) is the electron's magnetic moment (measured in amperes sq.metres) and B is a physical constant called the Bohr magneton. Together,-/B is a dimensionless number.
- In the new study, researchers in the U.S. suspended a single electron in a magnetic field at an ultracold temperature inside a vacuum chamber, and measured currents induced in nearby electrodes by the electron's movement. They measured the value of −/B to be 1.00115965218059, within 0.13 ppt.
- They achieved such a precise result by closely controlling the electric fields that hold the electron in place, stabilising the magnetic field, and finely adjusting the physical properties of the hardware, thus subtracting the sources of uncertainty that could affect the data.

Implications of the result:

- While the result could be good for the SM, it is also affected by two open questions:
- First, the electron and the muon are very similar particles, but the muon is around 207 times heavier.

Multiple measurements until 2021 have found that the muon's magnetic moment disagrees with the SM prediction by about 0.00000000251.

- If this is the handiwork of beyond-SM forces acting on the particle, their effects should be visible on the electron's magnetic moment as well.
- But because the electron is lighter, the effects will be 40,000 times weaker. By achieving such a highly precise result, the new result suggests that the physicists couldn't find these signs.

Discrepancy:

- Second, a series of mathematical calculations connect the data that physicists record in an experiment and the value of the electron's magnetic moment.
- One of these calculations involves the fine structure constant () – a universal constant that specifies the strength with which an electron couples to the electromagnetic field. (If it couples more strongly, the field will exert a greater force on the electron.)
- Two studies published in 2018 and 2020 measured the value of and reached two distinct answers differing by 0.00000016. They should have reached the same answer since is a constant. If this discrepancy is resolved, the physicists' measurement can test the SM prediction to 10 times more precision.

What's next?

- Physicists will test as many of the SM's predictions as they can, to the extent they can, to look for a crack in its façade.
- Physicists have also built detectors to look for different kinds of hypothetical dark-matter particles, are combing through astronomical data to make sense of dark energy, and are scrutinising each other's calculations.
- Many of them are also debating whether they need an even larger supercollider to succeed the Large Hadron Collider. The group that measured the electron's magnetic moment itself has plans to upgrade its setup and repeat the measurement with the electron's anti-particle, the positron.
- All together, the community hopes that at least one of these efforts, guided by the principles they uncover in their theoretical studies, will reveal a glimpse of a world beyond the Standard Model.

APJ ABDUL KALAM SATELLITE LAUNCH VEHICLE MISSION2023

Why in news?

- Recently, a total of 150 satellites made by school students from different states were launched on a rocket as part of APJ Abdul Kalam Satellite Launch Vehicle Mission2023.
- The Martin Foundation in association with Dr APJ Abdul Kalam International Foundation and Space Zone India launched the misson.
- The rocket was launched from Pattipolam village, Chengalpattu district, Tamil Nadu.

Dr APJ Abdul Kalam International Foundation:

- Dr APJ Abdul Kalam International Foundation was established by the Family of Dr. Kalam in 2015 to fulfill his dreams for transforming India.

Key Highlights:

- Through this initiative, more than 5000 students from Grades VI to XII from different parts of the country, have been enabled to design and develop 150 PICO satellites, which are to be launched through the rocket.
- This mission has also provided an opportunity for selected students to learn more about Science, Technology, Engineering, and Mathematics.
- The selected students have been taught about satellite technology through virtual classes, which have been followed by hands-on sessions to help them explore the project domain. They have also been made aware of the numerous benefits available in this sector.

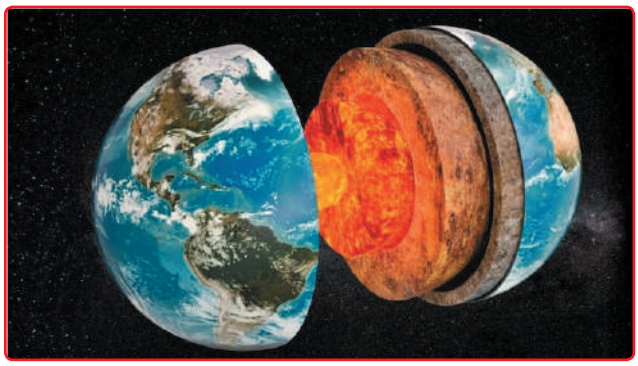
Significance:

- A total of 2000 students from more than 100 government schools are a part of this rocket project.
- This will be a good platform for government school students to get trained in space sciences and provide them with a platform to explore a career in that domain.

SCIENTISTS DISCOVER FIFTH LAYER OF EARTH

Why in news?

- Researchers trying to uncover the secrets of Earth's geology have revealed the fifth layer of the planet.



Background:

- Seismic waves generated by earthquakes have revealed new insights about the deepest parts of Earth's inner core.
- The team of researchers from the Australian National University measured the speeds at which these seismic waves penetrate and pass through the Earth's inner core.
- They believes that this has presented evidence of a distinct layer inside Earth known as the innermost inner core.

Key Highlights:

- The researchers analysed data from about 200 magnitude-6 and above earthquakes from the last decade.
- This layer is a solid 'metallic ball' that sits within the center of the inner core.
- So far, four layers of Earth's structure had been identified. This includes - the crust, mantle, outer core, and inner core. The new findings indicate a fifth layer beneath that.
- The team assessed the seismic waves that travel directly through the Earth's center and 'spit out' at the opposite side of the globe to where the earthquake was triggered. The waves then travel back to the source of the quake.
- The team studied the earthquake, which originated in Alaska. The waves bounced off somewhere in the South Atlantic Ocean, before traveling back to Alaska.

Anisotropy:

- The researchers studied the anisotropy of the iron-nickel alloy that comprises the inside of the Earth's inner core.
- Anisotropy is used to describe how seismic waves speed up or slow down through the material of the Earth's inner core, depending on the direction in which they travel.
- They found that bouncing seismic waves repeatedly probed spots near the Earth's center from different angles.

Observations:

- Theyanalysed the variation of travel times of seismic waves for different earthquakes.
- They found that crystallised structure within the inner core's innermost region is likely different from the outer layer.
- They suspects that there could have been a major global event at some point during Earth's evolutionary timeline that led to a "significant" change in the crystal structure of the inner core.

Significance:

- The study states that probing the Earth's center is critical for understanding planetary formation and evolution.

THE MULTI-YEAR CYBER-ATTACK ON GODADDY SERVERS AND ITS IMPACT

Why in news?

- Recently, an unauthorised third-party gained access to GoDaddy servers in its cPanel shared hosting environment, the company shared in a blog post.
- Attackers installed malware on servers causing intermittent redirection of customer websites to malicious sites leading to increased chances of successful phishing campaigns.

What does GoDaddy do?

- GoDaddy is one of the largest domain registrar and web hosting platforms. The company offers services like eCommerce solutions, SSL certificates, professional business emails, web servers, and website builders.
- Its WordPress shared hosting services allow users to manage and build websites using plug-ins and themes. GoDaddy currently has 1.5 million paying customers with $4 billion in revenues.

What are redirects, and how do they work?

- Redirect, redirecting, or URL forwarding is a method used to ensure that web pages with more than one URL can be accessed by users who do not have the precise or all the existing URLs.
- Redirects are predominantly used when a site is shifted to a new domain where multiple URLs are available for the same webpage. Or, when two or more websites are merged, and when a web page is removed and users are sent to a new page to ensure continued services.

- Setting up a server-side redirect, the kind used by threat actors in the attack on GoDaddy servers requires access to server configuration files or setting the redirect headers with server-side scripts.
- End-users are mostly unaware when they are being redirected to a new web page unless the web browser they use notifies them. However, redirects can be used by threat actors to get unsuspecting users to visit, interact and share information on malicious web pages.

How did they carry out the attack?

- The attack on its servers in December 2022 granted threat actors access to the company's shared servers. Cybercriminals obtained pieces of code related to some services within GoDaddy and installed malware that intermittently redirected random customer websites to malicious sites.
- The company shared that the redirects were happening on seemingly random websites hosted on its cPanel shared hosting servers and were not easily reproducible by GoDaddy, even on the same website.
- A cPanel is an online Linux-based graphical interface (GUI) used as a control panel to simplify website and server management for website owners and developers. These redirects could be used by threat actors to run successful phishing campaigns on the websites of GoDaddy users.

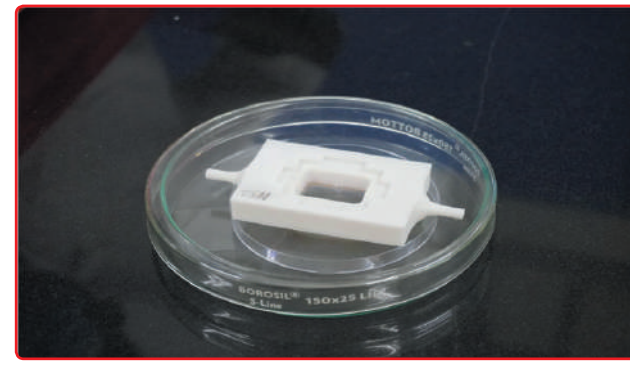
What was the impact of the attack?

- To date, these incidents as well as other cyber threats and attacks have not resulted in any material adverse impact to the business or operations.
- However, the impact of phishing campaigns carried out by threat actors by intermittently redirecting customers' websites is yet to be ascertained.
- Since GoDaddy's business involves the storage and transmission of confidential information, including personal information and payment card information they could be subject to liability, loss of business, litigation, government investigations, or other losses in case of a breach of sensitive data.

'ORGAN ON A CHIP': A TECH WHICH MIMICS DISEASE SYSTEMS IN LABORATORY CONDITIONS

Context:

- In 2022, the U.S. government passed the Food and Drug Administration Modernization Act 2.0.
- The move is expected to boost the research and development of 'organ chips', small devices containing human cells that are used to mimic the environment in human organs, including blood flow and breathing movements, serving as synthetic environments in which to test new drugs.



Why focus is on alternative models that mimic human diseases?

- Bringing a new drug into the market is an expensive process ridden with failure. First, researchers identify chemical compounds that can be used to treat a condition using modelling and other techniques. Then they shortlist those that perform well and test them on cells grown on plastic dishes in the lab or on animals that can mimic the disease in certain conditions.
- At this stage, called the preclinical trial, scientists determine whether these drugs are toxic and if they can efficaciously treat the condition. Animals used here include mice, rats, hamsters, and guinea pigs, depending on the drug being tested. Researchers also use pigs when testing implant devices like stents. If the trial results are favourable, researchers can begin human clinical trials.
- Today, fewer than 10% of new drugs complete preclinical studies and fewer than 50% of these eventually successfully complete clinical trials.
- These challenges have led scientists to look for alternative models that mimic human diseases. One such is the organ-on-a-chip model, which has garnered a lot of attention in the last decade.

Organ chips:

- Donald Ingber, a professor of bioengineering and director of the Wyss Institute at Harvard University, and his colleagues developed the first human organ-on-a-chip model in 2010. It was a 'lung on a chip' that mimicked biochemical aspects of the lung and its breathing motions.
- In 2014, Wyss Institute members launched a startup called Emulate Inc. to commercialise their technology. The group has since created several different chips, including of the bone marrow, epithelial barrier, lung, gut, kidney, and vagina.
- Recently, Emulate's liver chips could successfully predict the ability of drugs to cause liver injury with 87% sensitivity and 100% specificity. The researchers used liver chips to evaluate the toxic effects of 27 drugs known to be either safe or cause liver injury in humans.

Organ chips in India:

- A few research groups in India have also been developing organ-on-chip models.
- Prajakta Dandekar-Jain at the Institute of Chemical Technology, Mumbai has developed a skin-on-chip model together with the team of Abhijit Majumdar, an associate professor of chemical engineering at IIT Bombay.
- The model is currently being tested for studying skin irritation and toxicity. The two groups are also developing a retina-on-chip model together.
- Dr. Majumdar and his team are also separately developing a placenta-on-chip model with Debjani Paul, a professor of bioscience and bioengineering at IIT Bombay, and Deepak Modi, a scientist at the ICMR-National Institute for Research in Reproductive and Child Health, Mumbai.
- These models better predict treatment outcomes than conventional cell-culture systems, where researchers grow cells in plastic dishes in the lab, since they model different aspects of the human body, including its three-dimensional geometry and the flow of fluids like blood and lymph.

Mimicking diseases:

- Apart from organs, researchers are also trying to mimic different disease states using chips. Kaushik Chatterjee, an associate professor of materials engineering, and Deepak K. Saini, a professor of developmental biology and genetics at the Indian Institute of Science, Bengaluru, are doing this for the lung.
- A group has developed an infection-on-a-chip model to recreate a human skin wound infection state. The goal is to mimic an infection that doesn't heal despite prolonged and repeated antibiotic treatment.

Way Forward:

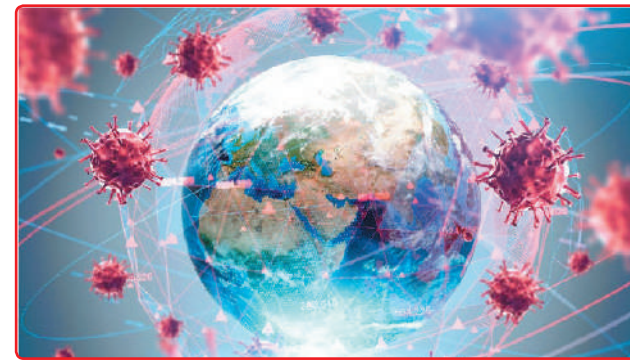
- Some of these organs-on-chips that Indian scientists have developed are ready for use as drug test-beds in lab settings, but they could be a decade away from featuring in preclinical trials.
- Researchers and biomedical companies in the West have started to build larger human-on-chip models, assemblies of different organ chips containing nutrients for the cells flowing across them, mimicking the flow of blood and nutrients across different organs in the body.
- The idea is to predict the efficacy of a drug against a particular disease in the presence of messy organ interactions instead of cleanly isolated systems.

HEALTH

WHO PUBLISHES ZERO-DRAFT OF PANDEMIC TREATY: EQUITY, IPR TAKE CENTRE STAGE

Why in news?

- Recently, the World Health Organization's (WHO) Intergovernmental Negotiating Body (INB) published a 'zero-draft' of the pandemic treaty.
- With this, negotiations will officially begin on what the final document, due to be presented at the World Health Assembly in 2024, will entail for global- and national-level pandemic preparedness.



Key Highlights:

- The zero-draft of the pandemic treaty was established based on recognising the catastrophic failure of the international community in showing solidarity and equity in response to the novel coronavirus disease (COVID-19) pandemic.
- Particularly from a developing country's perspective, the draft noted "common but differentiated responsibilities and capabilities in pandemic prevention, preparedness, response and recovery of health systems" as one of its guiding principles.
- This draft marks a powerful recognition that pandemic response cannot succeed in charity, rather it requires global solidarity.
- As per this draft, if and when a pandemic occurs, parties must "take appropriate measures to support time-bound waivers of intellectual property rights that can accelerate or scale up manufacturing of pandemic-related products."
- To ensure fair and equitable benefit-sharing, the draft details 20 per cent access for the WHO to pandemic-related products, including diagnostics, vaccines and therapeutics. Here, 10 per cent each will be designated for donation and sale at affordable prices, respectively.

Strengthening health systems:

- The draft also stresses the need to strengthen health systems to help realise the goal of universal health coverage.
- In addressing gender disparities in the healthcare workforce, the draft aims to "ensure meaningful representation, engagement, participation and empowerment of all health and care workers" by stressing equal pay and addressing barriers specific to women in taking leadership roles.

PABS:

- The constitution of a Pathogen Access and Benefit-Sharing system (PABS) under the WHO is another key element of the draft. Genomic sequences of all pathogens with pandemic potential and the benefits that come with such information are to be shared on an "equal footing" in the system.
- The information is to be shared on a publicly accessible platform and in a time-bound manner.

What is a pandemic?

- As per the document, an outbreak is considered a pandemic when an infection spreads quickly globally, with high morbidity and mortality.
- Other factors are infecting immunologically naive human populations, pushing health systems to their capacity and beyond, and triggering social and economic disruptions, where mitigation measures require coordinated efforts across the geographical spectrum.

JNU SCIENTISTS FIND UNIQUE WAY TO COMBAT MALARIA

Why in news?

- Recently, a team of scientists from Jawaharlal Nehru University (JNU) has found a new way to combat malaria by targetting host lipids using an antitumor drug.

Terms:

- Lipids are an essential component of the cell involved in various vital processes of life and the malaria parasite targets some of these lipid molecules for its growth and development.
- Antitumor agents kill those cells that divide rapidly and are used in cancer treatment as well.

About Malaria:

- The mosquito-borne disease, malaria, is caused by a parasite, which grows and multiplies first in the liver cells and then in the red cells of the blood. The parasite grows in the red blood cells, multiplying and further invading.
- Four kinds of malaria parasites infect humans: Plasmodium falciparum, P. vivax, P. ovale, and P. malariae.

Details:

- They tested the antitumor agent and found that it depleted the source of the parasite, ultimately leading to its death.
- The evolution of resistance to practically all antimalarial drugs poses a challenge to the current malaria elimination and eradication efforts.

Why new research matters?

- Researchers say that despite the success of artemisinin-based chemotherapy against malaria, many children still die from severe malaria.
- Moreover, efforts for the eradication of malaria are hindered by limited drugs to target transmissible gametocyte parasites and liver-resident dormant Plasmodium vivax hypnozoites.
- Host-targeted therapy could be the alternative to targeting drug-resistant malaria parasites. The new therapy aims to interfere with host molecules, pathways, or networks that are required for infection or contribute to disease.

Way Forward:

- The Covid-19 pandemic has interrupted the campaign against malaria, resulting in an increase in cases and fatalities, indicating that malaria could be yet another dreadful consequence of the crisis.
- The results of the study are very promising for the future of malaria eradication.

UNDERSTANDING INDIA'S MENTAL HEALTHCARE ACT, 2017

Why in news?

- The National Human Rights Commission (NHRC) in a report flagged the "inhuman and deplorable" condition of all 46 government-run mental healthcare institutions across the country.
- The report notes that the facilities are "illegally" keeping patients long after their recovery, in what is an "infringement of the human rights of mentally ill patients".
- These observations were made after visits to all operational government facilities, to assess the implementation of the Mental Healthcare Act, 2017 (MHA).

What does the MHA, 2017 say?

- The MHA, 2017 centered the agency of individuals, acknowledged their right to live as part of a community (under Section 19), and focused on rehabilitation.
- Under Section 19 of the Act, the government was made responsible for creating opportunities to access less restrictive options for community living — such as halfway homes, sheltered accommodations, rehab homes, and supported accommodation.
- The Act also discourages using physical restraints (such as chaining), unmodified electro-convulsive therapy (ECT), and pushes for the right to hygiene, sanitation, food, recreation, privacy, and infrastructure.
- Additionally, under Section 5, people are empowered to make "advance directives". They can nominate a representative for themselves, thereby potentially helping to eliminate absolute forms of guardianship in favour of supported decision-making. This is barring cases where the person needs a higher degree of care and support.
- The Act acknowledged that external factors such as income, social status, and education impact mental well-being, and therefore, recovery needs a psychiatric as well as a social input.

What are the challenges?

- While the MHA safeguards the rights of people in mental healthcare establishments, enforcement challenges remain. Almost 36.25% of residential service users at state psychiatric facilities were found to be living for one year or more in these facilities.
- Under the MHA, all States are required to establish a State Mental Health Authority and Mental Health Review Boards (MHRBs), bodies that can further draft standards for mental healthcare institutes, oversee their functioning and ensure they comply with the Act.
- In a majority of States, "these bodies are yet to be established or remain defunct. Further, many States have not notified minimum standards which are meant to ensure the quality of MHEs.

Access to rehabilitation:

- Poor budgetary allocation and utilisation of funds creates a scenario where shelter homes remain underequipped, establishments understaffed, and professionals and service providers not adequately trained to deliver proper healthcare.
- While Section 19 recognises the right of people to "live in, be part of, and not be segregated from society," there have been no concrete efforts towards implementation. The dearth of alternative community-based services further complicates access to rehabilitation.

INDIA ACCOUNTS FOR 52% OF WORLD'S NEW LEPROSY PATIENTS

Why in news?

- With a renewed focus on tackling leprosy, the Union Health Ministry has devised a strategic road map for achieving zero cases of the infection by 2030.

Details:

- Despite India being declared "Leprosy Eliminated" in 2005, the country still accounts for over half (52%) of the world's new leprosy patients, Union Health Minister said in a written message of the National Strategic Plan and Roadmap for Leprosy 2023-2027.
- Leprosy is a chronic bacterial infection, which affects skin, nerves, lungs and eyes.

Impact of COVID pandemic:

- Earlier gains made in the leprosy programme were reversed during COVID-19 as a sudden decline in case detection numbers was noted. Early detection of the infection in the affected person can save them from physical disability.
- With the COVID pandemic in 2020, case detection dropped by 43% in 2020-21 and by 34% in 2021-22 in comparison to the pre-COVID year 2019-20.
- Annual case detection rate has halved from 8.13 cases per lakh population to 4.56 cases in 2020-21. In 2021-22, it has settled at 5.52 cases per lakh.

Grade 2 disabilities:

- The decline in detection has led to increase in patients with grade 2 disabilities. COVID-19 in India had its severe impact on leprosy case detection services, and resulted in hidden cases and a probable increase in grade 2 disabilities, which may delay attainment of the goal of zero leprosy. In 2021-22, a total of 75,394 new cases were detected in India.
- A total of 1,863 grade 2 disabilities detected amongst the new leprosy cases during 2021-22, indicating a G2D rate of 1.36 per million population and 2.47% G2D among new cases. In 2022-23, for data available till August 2022, this rate has gone a notch up to 1.71 per million population.

Most affected States:

- Arunachal Pradesh, West Bengal, Bihar, Jharkhand, Odisha, Chhattisgarh, Maharashtra, Uttar Pradesh, Delhi, Madhya Pradesh, Gujarat, Dadra Nagar Haveli and Daman Diu have either one or more districts (total 82 districts) which are yet to achieve leprosy elimination target and contributes to more than 90% cases in the country.

IS THERE A NEED FOR AN EXTRA DOSE OF POLIO?

Why in news?

- Recently, the West Bengal government announced that it was introducing an additional dose of injectable polio vaccine as part of the Universal ImmunisationProgramme (UIP) for children.
- The State, considered among high risk areas for polio, announced that this dose will be given at nine months, in addition to the existing doses in the current UIP.

Details:

- Additionally, two Polio Immunisation days are observed in the country each year and in some States, there are sub-national immunisation days, involving children under five years of age.
- An additional dose of inactivated poliovirus (IPV) at nine months will protect against any polio thereafter Vaccine Associated Paralytic Polio or Vaccine Derived Polioviruse.

What is polio?

- Poliovirus can invade the central nervous system and as it multiplies, destroy the nerve cells that activate muscles, causing irreversible paralysis in hours.
- There are three types of polio virus serotypes: types 1, 2 and 3. According to the India Polio Learning Exchange (along with UNICEF), of those paralysed, 5-10% die when their breathing muscles become immobilised.
- There is no cure for polio, but there are safe, effective vaccines which, given multiple times, protect a child for life. Polio held the world in a bind of fear until Jonas Salk developed the first polio vaccine.
- Later, Albert Sabin made a 'live' polio vaccine that could be administered orally which became the tool of the trade, especially for nations carrying out mass immunisation campaigns, including India.

How did India achieve its polio-free status?

- In 2012, the WHO removed India from the list of endemic countries.
- Seen as a massive achievement in public health, the campaign had begun years ago. While Rotary International launched its polio eradication campaign, Polio Plus, in 1985, it was in 1986 that it provided a $2.6 million grant to Tamil Nadu for a pilot polio vaccination campaign.
- In 1995, the Union government announced the first National Polio Immunisation Day.
- As per the India Polio Learning Exchange portal, the last case of poliovirus type 2 case was recorded in India in October 1999 at Aligarh, Uttar Pradesh; the last case of poliovirus type 3 case was on October 22, 2010, at Pakur, Jharkhand; and the last case of poliovirus type 1 case was recorded on January 13, 2011, at Howrah, West Bengal.
- As of October 2022, the WHO said only two countries worldwide remain with indigenous transmission of wild poliovirus type 1 (WPV1) — Afghanistan and Pakistan.
- It also recorded that so far, 33 countries have outbreaks of variant polioviruses, such as in the U.K., the U.S., Israel and Malawi.

What was the recent global polio crisis?

- Genetic variants of vaccine poliovirus type 2, imported from an unknown source, were detected in waste waters in Jerusalem, London and New York in early 2022.
- The wild poliovirus type 2 was globally eradicated in 1999, but vaccine virus type 2 continued for 16 more years; routine use of the vaccine was discontinued in 2016 and reintroduced occasionally on purpose.
- As an unintended consequence, type 2 vaccine virus variants (circulating vaccine-derived polioviruses) that mimic wild viruses' contagiousness and neurovirulence, have been emerging and spreading.

Way Forward:

- The recent events have shown how dramatically and rapidly global progress can unwind if the pressure is not maintained to vaccinate children.
- In November, at the meeting of the India Expert Advisory Group for polio eradication, participants discussed how India continues to maintain high population immunity, risk mitigation from polio viruses including containment and transitioning of polio networks.
- Their suggestions will guide revised policy changes to ensure that India remains polio free.

WHY ENVIRONMENTAL SURVEILLANCE FOR AVIAN INFLUENZA IS VITAL

Why in news?

- The world's largest northern gannet (a bird) colony at the Bass Rock,an island off the coast of North Berwick, Scotland has been recently decimated by avian influenza (H5N1) or bird flu.
- H5N1 has caused unprecedented loss of tens of thousands of birds in the U.K.

Other instances:

- The impact of this disease is very serious for bird conservationists. Recently, intra-mammal transmission of H5N1 in captivity in mink farms was recorded, posing a bigger concern in relation to zoonotic potential.
- In India, the latest major avian flu outbreak in2020-2021 swept through many States causing mass mortality of wild birds which brought the concerns on the lack of active surveillance to the forefront, and how wetland and waterfowl habitats at the interface of poultry need to be monitored.

Risk in India:

- While the avian flu outbreaks coincide with the peak migratory season leading to post-outbreak surveillance and culling, there are also reports of outbreaks in the off-season suggesting endemic transmission within the poultry sector.
- India is the fastest growing egg producer in the world, but unlike in Europe, poultry birds here are not vaccinated against flu.
- Furthermore, the farms with a diversity of animals or in the vicinity of nearby wetlands increases the potential for the viruses to undergo reassortment that can potentially generate more virulent strains H5N1 or H7N9 which could then infect humans.
- Despite this potential,there is noactive surveillance in the poultry sector. There may be no efficient human-to-human transmission mechanism yet, however, the risk cannot be ruled out as the virus continues to evolve.

Environmental surveillance:

- Wastewater-based epidemiology or pathogen surveillancehas become an integral component of environmental surveillance providing near real-time information on health and community exposure to pathogens.Whileenvironmental surveillanceis not a new concept and has been used widely for monitoring several pathogens, it offers an excellent tool.
- Birds infected with avian influenza virus shed large quantities of virus in their faeces, saliva and nasal secretions for about a week.
- Wild aquatic birds in the OrdersAnseriformesandCharadriiformesare the primordial reservoir for the virus.The transmission of the virus within these wild bird populations is dependent on faecal/oral transmission via contaminated water.

Surveillance network:

- Avian influenza viruses have been isolated from unconcentrated water in lakes in the U.S., Canada and China.Recurrent infections of animal hosts with the virus have posed a persistent threat.
- Having alarge-scale influenza A virus surveillance network in place across multiple sites is crucial for improving our understanding on the diversity, seasonal and geographical distributions of the virus in environments associated with poultry and wild birds.
- Avian influenza viruses can remain viable for extended periods of time in surface water and carcasses, suggesting that lakes and wetlands can act as environmental reservoirs at variable temperatures for several months.
- In a study in Hong Kong, an H3N2 virus was isolated from faeces and pond water every month during a one-year period, and the maintenance of this virus was proposed to be dependent on environmental persistence and the continued introduction of susceptible ducklings.
- Domestic ducks are recognised as an important reservoir for H5N1.

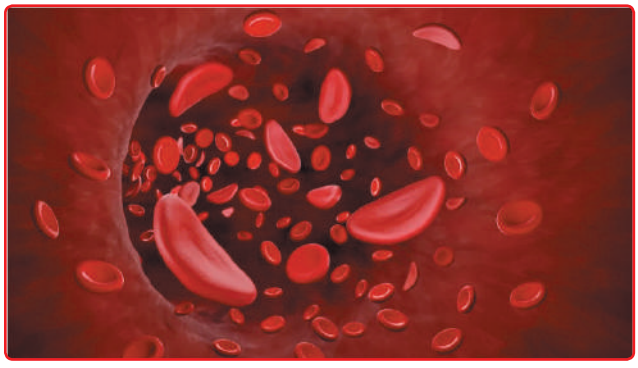
Way Forward:

- Currently, virussurveillance is reactive and relies on sampling dead birds. Environmental surveillance would be a great non-invasive tool that can be done without disturbing the birds and can be used to obtain both host and viral genetic material.
- Most importantly, environmental surveillance should be complemented with effective carcass collection and testing, and better biosecurity on poultry farms to improve preparedness and response in the future.

HOW IS INDIA ADDRESSING SICKLE CELL ANAEMIA?

Why in news?

- Sickle cell anaemia (SCA), a genetic blood disorder, found mention in the Union Budget 2023-24. Finance Minister said that the government will work in "mission mode" to eliminate the condition by 2047.
- India is the second-worst affected country in terms of predicted births with SCA — i.e. chances of being born with the condition.



What is sickle cell anaemia?

- Haemoglobin which is tasked with carrying oxygen to all parts of the body, has four protein subunits, two alpha and two beta. In some people, mutations in the gene that creates the beta subunits impact the shape of the blood cell and distorts it to look like a sickle.
- A round red blood cell can move easily through blood vessels because of its shape but sickle red blood cells end up slowing, and even blocking, the blood flow. Moreover, sickle cells die early, resulting in a shortage of red blood cells that deprive the body of oxygen.
- These obstructions and shortages may cause chronic anaemia, pain, fatigue, acute chest syndrome, stroke, and a host of other serious health complications. Without treatment, quality of life is compromised and severe cases can become fatal in the initial years of life.

Does SCA only affect some?

- Research and screening programmes have found that the prevalence of haemoglobinopathies, disorders of the blood,is more common among tribal populations than non-tribal communities in India.
- Research has shown that SCA is prevalent in communities residing in areas where malaria is endemic. Around the middle 1940s, doctors found that those with sickle red blood cells were more likely to survive malaria.
- Those with the trait in some African countries were found to be potentially resistant to lethal forms of malaria and had a survival advantage. The sickle cell trait thus gave an evolutionary advantage, offering immunity to some people during malaria epidemics.
- In India, States and UTs with tribal populations contribute a significant malaria case load. Additionally, the documented prevalence of SCA is higher in communities that practice endogamy, as the chances of having two parents with sickle cell trait is higher.

Can it be treated?

- Sickle cell anaemia is a genetic disorder, making complete "elimination" a challenge that requires major scientific breakthrough. The only cure comes in the form of gene therapy and stem cell transplants — both costly and still in developmental stages.
- Blood transfusion, wherein red blood cells are removed from donated blood and given to a patient, is also a trusted treatment in the absence of permanent cures. But challenges include a scarcity of donors, fears around safe supply of blood, risk of infection etc.

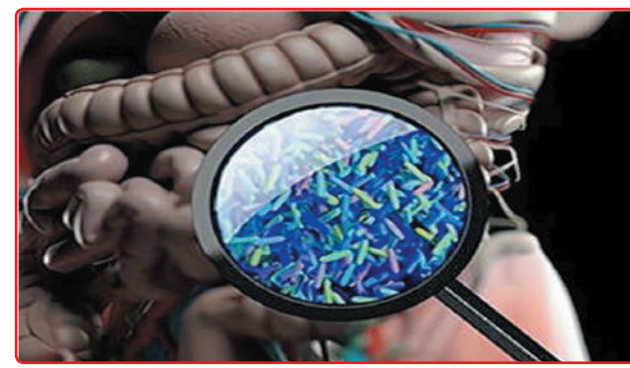
What has India done so far?

- The Indian Council of Medical Research and the National Rural Health Mission in different States are undertaking outreach programmes for better management and control of the disease.
- The Ministry of Tribal Affairs launched a portal wherein people can register themselves if they have the disease or the trait, in order to collate all information related to SCA among tribal groups.
- In the Budget, the Union Health Minister said the government plans to distribute "special cards" across tribal areas to people below the age of 40.

THE MICROBIOME LINK TO AUTISM DISORDERS

Context:

- A healthy gut microbiome is not a panacea but it may be able to help improve the quality of life of individuals with various diseases that lack other proven interventions.
- Differences in gut microbiome composition have been implicated in several diseases, including Crohn's disease, celiac disease and particularly, autism.



Autism spectrum disorder (ASD):

- Autism spectrum disorder (ASD) is the term for a

group of neurodevelopmental disorders. Researchers are yet to fully understand the aetiology of ASD.

- Aetiology is the study of factors that cause a condition or disease. However, they are beginning to find that a disorder in the gut-brain axis could have a prominent role.
- According to the WHO, ASD affects one in 100 children. Children with ASD have impaired social interactions, lack verbal and nonverbal communication skills, and display restricted and repetitive behaviours. These characteristics can adversely affect one's cognitive abilities and, over time, diminish one's quality of life.

Gastrointestinal link:

- A relatively under-researched aspect of ASD is the gastrointestinal problems associated with a subset of children with ASD.
- Limited research findings as well as anecdotal evidence indicate the presence of various gastrointestinal problems, like constipation, diarrhoea, flatulence, and bloating, among others, in children with ASD.
- But even as researchers have proposed several theories to explain the aetiology of ASD, the pathophysiology of the disorder remains largely unknown. At present, there are no known cures and therapeutic interventions available to treat or reverse ASD.

Studying the link:

- The gut microbiome is believed to have a big impact on immune modulation and metabolic activities in the human body. Immune modulation refers, among other things, to the efforts of the immune system to ensure its response is proportionate to a threat.
- Investigations of the dynamic cross-talk between the gut microbiome and the host environment have revealed potential connections to ASD symptoms.
- For example, aberrant antigen trafficking through an impaired intestinal barrier could allow these antigens to eventually pass through the barrier surrounding the brain, triggering a chain of events that worsen ASD symptoms.
- Even if the gut microbiome doesn't play a causative role, abnormalities in it can challenge a person with toxic metabolites and keep the person from synthesising the metabolites required to produce neurotransmitters involved in cognition, behaviour, mood, and sleep.
- As a result, 'fixing' the gut in ASD can reduce the toxic burden and/or help complete the necessary neurotransmitter synthesis pathways.

Key observations:

- They have explored the gut microbiome in children with and without ASD, and have reported several interesting microbial biomarkers in children with ASD.
- They observed dysbiosis in the gut microbiome of children with ASD. They had a higher abundance of lactobacillaceae, bifidobacteriaceae, and veillonellaceae bacteria. The fraction of bacteria of the phylum firmicuteswas found to be significantly higher in the guts of children with ASD.
- They also found an underrepresentation of certain microbes that produce short-chain fatty acids (SCFA), such as faecalibacterium and roseburia, in children with ASD. This supports the hypothesis that a lower level of SCFAs in ASD could lead to an imbalance in brain function and behaviour.
- This is the source of proposals to introduce these strains of bacteria as a probiotic for children with ASD, to help alleviate common gastrointestinal problems and in turn positively influence cognitive and behavioural functions.

What could be done?

- Reinstating a balance in the gut microbiome and reversing gut dysbiosis among children with ASD could alleviate many problems they face and improve their quality of life.
- One promising approach to reverse gut dysbiosis is faecal microbial transplantation (FMT), where stool samples from healthy individuals are transplanted into the large intestines of affected children.
- There is also some evidence that gluten-free and casein-free diets can help children with ASD. This could be because some of these children have been found to lack the bacteria that helps break down casein and gluten into metabolites.
- In all, the role of diet, prebiotics, probiotics, synbiotics (which combine the benefits of probiotics and prebiotics), and FMT for the efficient management of ASD can be said to be encouraging.

MEDICINAL PLANT COMMONLY CALLED BORTHEKERA IN ASSAMESE FOUND TO HAVE CARDIOPROTECTIVE POTENTIAL

Why in news?

- Garcinia pedunculata, a medicinal plant commonly called 'Borthekera' in the Assamese language, traditionally forbidden for raw consumption, has been found to protect from heart diseases.

Properties:

- Administration of the dried pulp of the ripe fruit of the medicinal plant reduced cardiac hypertrophy indicators and oxidative stress and heart inflammation brought on by ISO.
- The sun-dried slices of the ripe fruit are used for culinary and medicinal purposes and are known to have therapeutic properties like anti-inflammatory, anthelmintic, antibacterial, antifungal, antidiabetic, hypolipidemic, nephroprotective, and even neuroprotective activity.
- With scientific interventions seeking proof of these claims, multiple studies have been reported that G. pedunculata is a rich source of antioxidants. However, the cardioprotective potential has yet to be explored earlier.

How the property was explored?

- Scientists of Institute of Advanced Study in Science and Technology (IASST), explored this medicinal plant's potential to prevent heart diseases. A double dosage of bioactive chloroform fraction (GC) of the herb was fed to Wistar rats at 24-hour intervals (85mg/kg body weight (BW) for 28 days.
- To assess the therapeutic effect, this was followed by injection of isoproterenol following the isoproterenol-induced myocardial infarction model.
- All the animals were analyzed, revealing that the disease group had significant ST wave (ST is the segment representing the interval between depolarization and repolarization of the heart's ventricles) elevation, indicating myocardial infarction, which was normalized with Atenolol and GC treatment.
- Cardiac hypertrophy, cardiac troponin I, tissue lipid peroxidation, and serum inflammatory markers were all significantly elevated in the disease group, which were maintained at near-normal levels in the GC pretreated groups. The endogenous antioxidants were also revamped in the GC-treated groups.

Therapeutic potential:

- The chemical characterization of the chloroform fraction revealed the presence of active phytocompounds like hydroxycitric acid, hydroxycitric acid lactone, and parvifoliquinone along with compounds like GB-1a, Garcinone A, 9-Hydroxycalabaxanthone, Chlorogenic acid, and Garcinol as well.
- The therapeutic effects reported in this study are likely due to the presence of all these compounds.
- All these results strongly infer the good cardioprotective potential of G. pedunculata fruit abundantly available in Northeast India.

STUDIES IN MICE REVEAL NEURAL MECHANISM OF FEAR CONDITIONING

Why in news?

- Researchers have, for the first time, demonstrated in mice the underlying neural mechanism that allows mice to feel empathy. In mice, observational fear, a form of emotional contagion, provokes an emotional response in the form of empathy.
- The findings about empathy in mice may turn out to be true in the case of humans too, but further studies are needed in humans to conclusively prove this.

Observational fear:

- The capacity to sense the feelings of others is not unique to humans, and its biological mechanisms are shared with other mammals, including rodents. Observational fear, which is a rodent model for emotional contagion, is the basic form of affective empathy.
- During the observational fear experiment, a demonstrator mouse is given an electric shock, while an observer mouse watches from behind a transparent screen. When witnessing another animal receiving a shock, the observer mouse displays an immediate fear response, as demonstrated by its freezing behaviour.
- The observer mouse is also known to be able to recall the experience at a later time.Thus, observational fear is considered as a basic form of affective empathy.

Basolateral amygdala (BLA) in Human:

- Brain-imaging studies in humans have shown that theneuronal activities of the anterior cingulate cortex (ACC) and the amygdala change during observation of others experiencing fearor others' fearful facial expressions.
- It was also known that another region of the brain; basolateral amygdala (BLA) is essential for observational fear.
- So, researchers began to study the neural circuits involving the ACC and basolateral amygdala (BLA) in both the right and left hemispheres of the brain to understand the neural mechanism underlying

observational fear.

How research was conducted?

- The researchers turned to optogenetic experiments to prove thatreciprocal connection between ACC and BLA regions of the brain is essential for observational fear learning. Light sensitive protein was injected into the anterior cingulate cortex (ACC) in the right hemisphere andthe BLA was bilaterally illuminated with a yellow laser.
- The experiment was repeated by injecting the light sensitive protein into ACC in the left brain and BLA was bilaterally illuminated with a yellow laser.

Causal link:

- To test whether brain activity is causally linked to observational fear, the researchers undertook a closed-loop disruption of theta waves in the right ACC.
- The next step was to confirm the source of the theta oscillation. The researchers hypothesised that hippocampal theta waves may tune the synchronised theta oscillations in the ACC and BLA in the right brain during observational fear.
- To test this hypothesis, the theta oscillations in the entire hippocampal complex were first stimulated and later inhibited and its effect on the ACC and BLA in the right brain and the empathic response was studied.
- Following the changes in hippocampal theta oscillations power, 5-7 Hz rhythm in the ACC-BLA circuits and empathic responses were bi-directionally modulated. This conclusively showed that the theta oscillation is hippocampal-dependent.

PRELIMS FACT

POLITY & GOVERNANCE

CABINET APPROVES THE EXTENSION OF THE TERM OF THE TWENTY-SECOND LAW COMMISSION OF INDIA

Why in news?

- Recently, the Union Cabinet approved the extension of the term of the Twenty-second Law Commission of India upto 31st August, 2024.

About Law Commission of India:

- The Law Commission of India is a non-statutory body, constituted by the Government of India from time to time.
- The Commission was originally constituted in 1955 and is re-constituted from time to time. The tenure of present Twenty-second Law Commission of India ends on 20th February, 2023.
- The various Law Commission have been able to make important contribution towards the progressive development and codification of Law of the country. The Law Commission has so far submitted 277 Reports.

Composition:

- The Twenty-second Law Commission will consist of the same composition, which is as under:
  - a) a full-time Chairperson;
  - b) four full-time Members (including Member-Secretary)
  - c) Secretary, Department of Legal Affairs as ex-officio Member;
  - d) Secretary, Legislative Department as ex officio Member; and
  - e) Not more than five part-time Members.

Responsibilities of the Commission:

- The Law Commission during its extended term shall continue to discharge its existing responsibility, as bestowed upon it by order dated 21.02.2020, which, among other things, includes: -
  - a) identification of laws which are no longer relevant and recommending for the repeal of obsolete and unnecessary enactments;
  - b) suggesting enactment of new legislations as may be necessary to implement the Directive Principles and to attain the objectives set out in the Preamble of the Constitution;
  - c) Considering and conveying to the Government its views on any subject relating to law and judicial administration that may be specifically referred to it by the Government through Ministry of Law & Justice (Department of Legal Affairs);
  - d) Considering the requests for providing research to any foreign countries as may be referred to it by the Government through Ministry of Law & Justice (Department of Legal Affairs);
  - e) preparing and submitting to the Central Government, from time to time, reports on all issues, matters, studies and research undertaken by it and recommending such reports for effective measures to be taken by the Union or any State; and
  - f) performing such other functions as may be assigned to it by the Central Government from time to time.

KERALA BECOMES FIRST STATE TO USE ROBOTIC SCAVENGERS TO CLEAN MANHOLES

Why in news?

- Recently, the Kerala government launched robotic scavenger, Bandicoot, to clean sewages in this temple town, becoming the first state in the country to use robotic technology to clean all its commissioned manholes.
- Water Resources Minister, launched Bandicoot under the Guruvayur Sewerage Project in Thrissur district by the Kerala Water Authority (KWA), as part of the 100-day action plan of the state government.

How Bandicoot works?

- The robotic Tron Unit, which is the major component of Bandicoot, enters the manhole and removes sewage using robotic hands, similar to a man's limbs, the release, adding that the machine has waterproof, HD vision cameras and sensors that can detect harmful gases inside the manholes.
- Bandicoot, developed by Kerala-based Genrobotics, had recently bagged 'Kerala Pride' award at the Huddle Global 2022 conclave organised by Kerala Startup Mission (KSUM).

Significance:

- Genrobotics, a Technopark-based company, have developed "the world's first robotic scavenger" Bandicoot in an effort to eliminate manual scavenging providing respite for workers engaged in manhole cleaning.

Way Forward:

- Bandicoot will be cleaning all the commissioned sewerage and drainages in Kerala.
- Bandicoot robots are currently deployed in few towns across 17 states in India and three Union Territories. In 2018, KWA started using Bandicoot to clean the manholes in Thiruvananthapuram. Later, it was introduced in Ernakulam also.

BIHAR CABINET APPROVES $50,000 FOR DEVELOPING FOG ALERT SYSTEM WITH US-NCAR

Why in news?

- Recently, the Bihar cabinet approved USD 50,000 for developing an early warning system for dense fog and cold wave conditions in collaboration with the US National Center for Atmospheric Research (US-NCAR).
- The cabinet approved USD 50,000 (about Rs 41.41 lakh) for technical support of the works that will be jointly carried out by the state government and US-NCAR.

Early warning systems:

- Early warning systems are key elements of climate change adaptation and disaster risk reduction, and aim to avoid or reduce the damages caused by extreme weather conditions.
- The Bihar Mausam Seva Kendra (BMSK) is developing an app through which early warning for dense fog and cold wave conditions will be provided to the people.
- Besides, information regarding this will also be provided to the people through the call center of the BMSK.

What's next?

- A Memorandum of Understanding (MoU) will soon be signed between the state government and NCAR.

INTERNATIONAL RELATION

LAUNCH OF 'INNOVATION BRIDGE' TO CONNECT US, INDIAN DEFENCE STARTUPS

Why in news?

- Recently, the United States and India concluded their US-India initiative on Critical and Emerging Technology (iCET) meeting and decided to launch a new 'Innovation Bridge', which will connect both countries' defence startups, according to the statement released by the White House.
- The iCET meeting was inaugurated by National Security Advisor Ajit Doval and his US counterpart Jake Sullivan.

About iCET:

- iCET was announced in May 2022 by US President Joe Biden and Prime Minister Narendra Modi to elevate and expand our strategic technology partnership and defence industrial cooperation between the governments, businesses, and academic institutions of our two countries, as per the statement.

Key Highlights:

- Both sides discussed opportunities for greater cooperation in critical and emerging technologies, co-development and coproduction, and ways to deepen connectivity across our innovation ecosystems.
- They noted the value of establishing "innovation bridges" in key sectors, including through expos, hackathons, and pitch sessions.
- They identified the fields of biotechnology, advanced materials, and rare earth processing technology as areas for future cooperation.

New collaborations:

- They signed a new Implementation Arrangement for a Research Agency Partnership between the National Science Foundation and Indian science agencies to expand international collaboration in a range of areas including artificial intelligence, quantum technologies, and advanced wireless, to build a robust innovation ecosystem between our countries.

Way Forward:

- The next iCET meeting will take place in New Delhi in late 2023.
- The National Security Councils of both countries will coordinate with their respective ministries, departments and agencies to work with their counterparts to advance cooperation and to engage with stakeholders to deliver on ambitious objectives ahead of the next meeting.

CENTRE PITCHES FOR 100% SWITCH TO MECHANISED SEWER CLEANING

Why in news?

- Nearly a 100-crore allocation was made in 2023 Budget for the newly named NAMASTE (National Action Plan for Mechanised Sanitation Ecosystem) scheme.
- Finance Minister said the Union government was looking to enable 100% mechanical desludging of septic tanks and sewers in all cities and towns.

NAMASTE scheme:

- The NAMASTE scheme was launched in 2022, subsuming the already existing Self Employment Scheme for Rehabilitation of Manual Scavengers (SRMS).
- Since manual scavenging (humans collecting human waste by hand) was no longer practised in India, the next goal was to eliminate hazardous cleaning of sewers and septic tanks.
- As part of the NAMASTE scheme, the guidelines for which are close to being finalised, the Social Justice Ministry intends to first enumerate the number of people engaged in hazardous cleaning of sewers and septic tanks across 500 AMRUT (Atal Mission for Rejuvenation and Urban Transformation) cities and then proceed with its plans.
- The NAMASTE scheme, among other things, provides for capital subsidies to sewer cleaners on the purchase of sanitation machinery, training of workers, and loan subsidies on sanitation equipment.

Implementation:

- It is a joint project of Department of Drinking Water and Sanitation, Ministry of Social Justice and Empowerment and the Ministry of Housing and Urban Affairs (MoHUA).

Allocation to Social Justice Ministry:

- In 2023 Budget, the Social Justice Ministry has allocated 97.41 crore for the NAMASTE scheme, with no allocation for the SRMS programme.

INDIA JOINS UAE, FRANCE FOR TRILATERAL ON CLEAN ENERGY, COUNTER-PANDEMIC STEPS

Why in news?

- India, France and the United Arab Emiratesrecently declared their common intent to formalise a "trilateral cooperation initiative" to collaborate on nuclear energy and explore opportunities in the Indian Ocean region.
- The Foreign Ministers of the three countries held a telephonic conversation in this regard and agreed to work together in the field of solar and nuclear energy, climate change and biodiversity.

Towards 'One Health':

- In this regard, cooperation in multilateral organizations such as World Health Organization (WHO), Gavi-the Vaccine Alliance, the Global Fund, and Unitaid will be encouraged.
- Further, the three countries will attempt to identify tangible cooperation on implementing the "One Health" approach, and support the development of local capacities in biomedical innovation and production within developing countries.

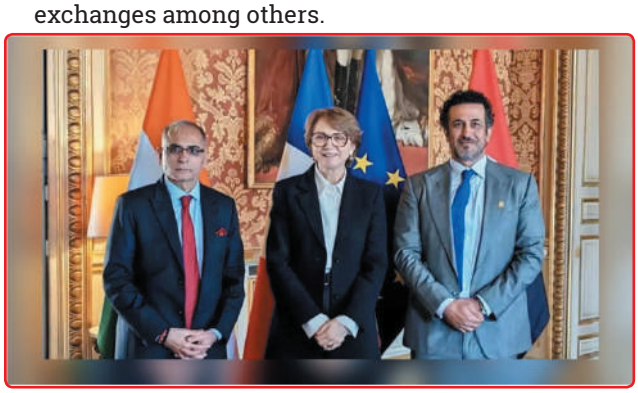
Background:

- The trilateral was first discussed when the three Ministers had met on the sidelines of the UN General Assembly in New York in September 2022.
- It was further agreed that "a range of trilateral events will be held in the backdrop of the Indian Presidency of the G-20 here and COP28 to be held in UAE in November-December 2023".
- The countries have also agreed to cooperate in defence preparation and in countering infectious diseases.

INDIA, FRANCE REVIEW COOPERATION IN AREAS OF NUCLEAR ENERGY, TRADE

Why in news?

- Recently, India and France carried out a comprehensive review of their cooperation in the areas of nuclear energy, trade and people-to-people exchanges among others.



Key Highlights:

- The two sides discussed global and regional issues including climate change and energy transition.
- They also exchanged views on topical issues such as India's G20 Presidency, the conflict in Ukraine and the security situation in Afghanistan.
- Both sides reviewed progress on key areas of bilateral cooperation, including on the various institutional dialogue mechanisms between the two countries, civil nuclear domain, on cooperation vis-a-vis the UNSC given the end of India's term, and the people-to-people and cultural sphere.

India-France-UAE trilateral dialogue:

- The Foreign Secretary of India also participated in the Focal Points' Meeting of the India-France-UAE trilateral dialogue.

OPERATION DOST

Why in news?

- The earthquake of magnitude 7.7 on the Richter ripped through Turkey and Syria on February 6, followed by a series of aftershocks that caused huge devastation, loss of lives and damage to infrastructure in the two countries.
- In an effort to help those hit by the earthquake, the Indian government is extending a hand of friendship to both countries in the form of massive humanitarian aid, with multiple jets flying off to the countries carrying relief material.

What is Operation Dost?

- In collaboration with the Indian Army, the government has sent tons of relief material to both Syria and Turkey as part of Operation Dost, which is a program by the Centre to help those in need by earthquake-hit countries.
- Under Operation Dost, India sent to Turkiye relief materials, a mobile hospital, and specialised search and rescue teams in four C-17 Globemaster military transport aircraft to support the country's rescue efforts.
- India also sent six tonnes of relief materials, including life-saving medicines and medical items, in a transport aircraft of the Indian Air Force (IAF) to Syria which was also hit by the earthquake on Monday. India became one of many countries which have extended a helping hand to Turkey and Syria after the earthquake.

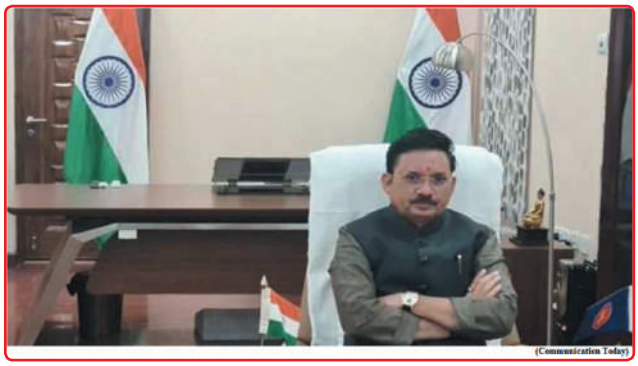
What's next?

- The sixth plane from India carrying rescue personnel, essentials, and medical equipment for earthquake relief efforts has reached Turkey recently.
- Hundreds still remain stuck in the debris while temporary houses have been built for those who have been left homeless.

INDIA-ASEAN APPROVED AT 3RD ASEAN DIGITAL MINISTERS (ADGMIN) MEETING

Why in news?

- Recently, the 3rd ASEAN Digital Ministers (ADGMIN) meeting with India was held on a virtual platform.



Details:

- In 2022, ASEAN India Friendship Year was celebrated, commemorating 30th anniversary of establishment of dialogue relations with ASEAN which culminated into ASEAN and India elevating Strategic Partnership to the Comprehensive Strategic Partnership (CSP).
- Under the theme: "Synergy Towards a Sustainable Digital Future", the meeting had fruitful and productive discussions on strengthening India ASEAN relations in the field of Information and Communication Technologies (ICTs).

India-ASEAN Digital Work Plan 2023:

- The Ministers meeting approved the India-ASEAN Digital Work Plan 2023.
- The workplan includes the capacity building and knowledge sharing in emerging areas in the field of Information and Communication Technologies such as
  a) Artificial Intelligence in Cyber Security,
  b) Application of IoT & AI in Next Generation Smart City & Society 5.0,
  c) Sustainable Data and Transport Network for Future: Standards and Applications,
  d) 5G technologies for IoT and future trends,
  e) Role of ICT in implementation of Digital Health and Security protection and assessment for future network, etc.

Way Forward:

- The ongoing and proposed projects in ICTs, will strengthen collaboration between India and ASEAN by leveraging complementary strengths of each other.

CABINET APPROVES SIGNING OF MOU BETWEEN INDIA AND CHILE FOR COOPERATION IN THE FIELD OF AGRICULTURE AND ALLIED SECTORS

Why in news?

- Recently, the Union Cabinet has approved the signing of Memorandum of Understanding(MoU) between India and Chile for cooperation in the field of Agriculture and Allied sectors.
- The MoU provides for cooperation in the field of agriculture and allied sectors.

Key Highlights:

- The main areas of cooperation envisaged are Agricultural policies for development of modern agriculture, Organic agriculture to facilitate the bilateral trade of organic products, as well as promote the exchange of policies aimed to develop organic production in both countries, Science and innovation to explore partnerships to promote innovation in the agricultural sector among Indian Institutes and Chilean institutes as well as collaborate to confront common challenges.
- Under the MoU, a Chile-India Agricultural Working Group will be constituted which will be responsible for the supervision, review and assessment of the implementation of this MoU as well as for establishing frequent communication and coordination.
- The meetings of the Agricultural Working Group will be held once a year alternatively in Chile and India.

What's next?

- The MoU shall enter into force upon its signature and shall remain in force for a period of five years from the date of execution after which it shall be automatically renewed for a further period of 5 years.

INDIA, NEPAL AGREES TO ADD 200 MW TO DHALKEBAR-MUZAFFARPUR TRANSMISSION LINE

Why in news?

- Recently, Nepal and India have inked an agreement to increase the power import and export capacity through the Dhalkebar-Muzaffarpur transmission line from 600 megawatts to 800 megawatts.
- The agreement was reached at the 10th meeting of Nepal India Energy Secretary-level Joint Steering Committee (JSC) meeting in Mount Abu, Rajasthan.

Key Highlights:

- The discussions were held on various important issues such as expanding the power of existing, under-construction and proposed transmission lines, Arun Third hydroelectric power, and related transmission line projects and international power export and import.
- An agreement to import and export 70 to 80 MW of electricity from Tanakpur-Mahendranagar 132 KV (kilovolt) power transmission was also signed between the two sides.
- A joint technical team will study possible options for exporting up to 200 megawatts of electricity as well.
- It has also been agreed to set up the necessary mechanisms to export power from Nepal to Bihar during the rainy season through the existing 132 KV transmission line.
- Both the parties agreed on the early completion of the construction work of the Indian section of the 400 KV new Butwal-Gorakhpur transmission line as the second international transmission line by March 2025.
- It was also agreed to build two additional 400 KV capacity international transmission lines between the two countries, including the Inaruwa-Poornia transmission line by 2027/28 and the New Lamki-Bareli transmission line by 2028-29.
- India has responded positively to Nepal's request to grant permission to export 50 MW of electricity to Bangladesh via India as per export-import guidelines if a specific proposal is submitted.

Background:

- Prime Minister Narendra Modi and his then Nepalese counterpart KP Sharma Oli had launched the 140 km Muzaffarpur-Dalkebar power transmission line in 2016.

'JADUIPITARA' TEACHING MATERIAL FOR FOUNDATIONAL STAGE LAUNCHED

Why in news?

- As envisaged under National Education Policy 2020, Union Education Minister launched Learning - Teaching Material for Foundational.
- In line with the vision of Prime Minister, 'JaduiPitara' -a play-based learning-teaching material tailored for children between the age group of 3-8 years has been launched.

JaduiPitara:

- 'JaduiPitara' comprising of playbooks, toys, puzzles, posters, flash cards, story books, worksheets as well as reflecting the local culture, social context and languages is designed to pique curiosity and accommodate the diverse needs of learners in the foundational stage.
- Learning and Development in 5 domains: Physical Development, Socio-emotional and Ethical Development, Cognitive Development, Language and Literacy Development, Aesthetic and Cultural Development, Positive Learning Habits has been included as another domain of development at this stage.
- 'JaduiPitara' developed under the National Curriculum Framework is available in 13 Indian languages.
- These resources should be made digitally available on DIKSHA platform - portal and mobile app.
- All Foundational Learning material should be in mother tongue.

Pedagogical structure:

- NCERT has developed trainers handbook mapping to panchkoshiyavikash and curricular goals of NCF-FS for future training of teachers at Foundational Stage.
- The National Education Policy 2020 envisages 5+3+3+4 curriculum pedagogical structure.
- The Department of School Education & Literacy under Ministry of Education has constituted a National Steering Committee headed by Prof. K. Kasturirangan to develop the National Curriculum Framework for each of the stages.
- The NCF for foundational stage (FS) was launched by Ministry of Education on 20th October, 2022 and as per the curriculum framework, NCERT has developed and collected Learning Teaching Material (LTM).

Way Forward:

- It is a giant leap towards enriching the learning-teaching environment and making it more child-

centric, lively and joyful for the Amrit Generation as envisioned in the NEP 2020.

CABINET APPROVES AIR SERVICES AGREEMENT BETWEEN INDIA AND GUYANA

Why in news?

- Recently, the Union Cabinet approved the signing of India and Guyana.
- The Air Services Agreement will come into force after the exchange of diplomatic notes between the parties confirming that each party has completed the necessary internal procedure for entry into force of this Agreement.

Why it matters?

- Indians have a sizeable presence in Guyana and are the largest ethnic group comprising about 40% of the population as per 2012 census. The signing of Air Services Agreement with Guyana will enable a framework for provision of air services between the two countries.
- In view of the growing aviation market and developments such as liberalization of aviation sector in India, air services agreement has been signed with many countries for paving way for International air connectivity.

Air Services Agreement (ASA):

- Air Services Agreement (ASA) provides the legal framework for air operations between two countries which is based on the principles of sovereignty of nations, nationality of carriers and reciprocity in terms of commercial opportunities for the designated airlines of each side.
- At present there is no Air Services Agreement (ASA) between the Government of India and the Government of Co-operative Republic of Guyana at present.

Background:

- India and Guyana are signatories to the Convention on International Civil Aviation (Chicago Convention).
- The delegations of both countries met in Nassau, Bahamas on 06 December 2016 during the ICAO Air Services Negotiations event where both countries had initialled the text of an ASA for scheduled air services between the two countries in terms of the Memorandum of Understanding between India and Guyana.

Way Forward:

- The new Air Services Agreement between India and Guyana will provide enabling environment for enhanced and seamless connectivity while providing commercial opportunities to the carriers of both the sides.

"JAIPUR DECLARATION" ADOPTED AT THE 18TH WORLD SECURITY CONGRESS

Why in news?

- The 18th UIC World Security Congress, jointly organized by Railway Protection Force (RPF) and the International Union of Railways (UIC), conclude with the adoption of the Jaipur Declaration by the attendees.
- The conference brought together experts, stakeholders, and delegates from around the world to discuss the latest developments and best practices in railway security, focusing on the theme of "Railway Security Strategy: Responses and Vision for Future."

Jaipur declaration:

- The "Jaipur declaration" outlined an actionable agenda for UIC to explore innovative approaches that can help global Railway organizations achieve their long-term goal of safety and security.
- The declaration highlighted the commitment of UIC to work towards providing a more safe and secure rail network acrossthe globe, by also fully activating the Asia-Pacific, Latin America and African regional assemblies by 2025.

About UIC:

- The UIC (Union International Des Chemins) or International Union of Railways established in 1922 is headquartered in Paris. It is the worldwide professional association representing the railway sector for research, development & promotion of rail transport.
- Members are invited to take a proactive role in the UIC working groups and assemblies where the railways' position on regional/worldwide issues is shaped.
- Active participation in the working groups is a unique opportunity to voice opinions and benefit from the weight of the railway sector at a coordinated worldwide level.
- The Security Platform of UIC is empowered to develop and formulate analysis and policy positions on behalf

of the global rail sector in matters relating to security of persons, property and installations.

About Railway Protection Force (RPF):

- Railway Protection Force (RPF) is the prime security and law- enforcement organization in the field of Railway Security in India.
- Constituted as a federal Force in the year 1957, RPF is responsible for security of railway property, passenger and passenger zones.
- RPF personnel serve the Nation and go the extra mile in their line of duty embodying its tagline "SEWA HI SANKALP"- "A PROMISE TO SERVE".
- The Railway Protection Force enhanced passenger security in lndia through various initiatives such as Operation NanheFarishte for rescue of children and Operation AAHT for rescuing women and children from the clutches of traffickers.

ECONOMY

UNION BUDGET 2023-24: RECORD RS 2.4 LAKH CRORE FOR RAILWAYS

Why in news?

- Recently, Finance Minister allocated Rs 2.40 lakh crore for the Railways for 2023-24.
- The outlay is Rs 1 lakh crore more than the Rs 1.40 lakh crore allocated to the Railways last fiscal. This is about nine times the outlay made in 2013-14.

Key Highlights:

- With increased passenger traffic, the Railways to refurbish more than 1,000 coaches of premier trains such as Rajdhani, Shatabdi, Duronto, Humsafar and Tejas. The interiors of these coaches will be improved with a modern look and for enhanced passenger comfort.
- 100 critical transport infrastructure projects for last- and first-mile connectivity for coal, fertiliser and food grain sectors have been identified and will be taken up on a priority basis with investment of Rs 75,000 crore, including Rs 15,000 crore from private sources.
- In 2023, the thrust will be on increasing the number of Vande Bharat trains, introducing hydrogen-powered trains, laying new tracks and completing the Ahmedabad-Mumbai bullet train project.

Vande Bharat & Metro:

- Vande Bharat Express would remain one of their major areas of focus. Besides the Perambur Integral Coach Factory, the Vande Bharat Express would now also be rolled out from three more factories inSonepat (Haryana), Latur (Maharashtra) and Raebareli (UP).
- With high speed Vande Bharat trains set to hit the tracks, the allocation for track renewal has been increased from Rs 15,388.05 crore in RE 2022-23 to Rs 17,296.84 crore in 2023.
- A new version of the Vande Bharat Express called "Vande Metro" would be launched for suburban passengers.
- The maximum speed limit of Vande Metro would be around 120 km – less than Vande Bharat Express that can clock an hourly maximum speed of 180 km. Vande Metro would, however, have better acceleration than the Vande Bharat Express. It would be a world-class shuttle train.

Other projects:

- New projects for FY 2023-24 would also include the indigenously built hydrogen trains (which use hydrogen as fuel). These trains will be introduced in heritage circuits, with the first such train to run between Kalka and Shimla from December.
- The double lines would be laid over 2,800 km, gauge conversion would be carried out over 150 km and new lines over 600 km would be constructed.
- Other big-ticket item on the agenda of the Railways was upgradation of railway stations. As many as 1,275 stations, including New Delhi, Mumbai, Kanpur, would be upgraded.

WHAT ARE UNITY MALLS, AND WHAT DID FM SITHARAMAN SAY ABOUT THEM IN BUDGET?

Why in news?

- In her Budget speech, Finance Minister proposed to set up 'Unity Malls' in every state.
- She said all states would be encouraged to construct a Unity Mall in their capitals, most popular tourism centres, or prominent economic centres.

What are Unity Malls?

- These Unity Malls malls would focus on promoting and selling the state's ODOPs, GI products and other handicraft products.
- They will also provide space and promote similar products from other states.
- There is nonetheless speculation that these malls would be modelled on the lines of the Ekta Mall located near the Statue of Unity in Kevadia in Gujarat.
- This mall sells handicraft items from various states to visitors from across India.
- It is spread over a vast area and has two floors and 20 emporiums showcasing traditional textiles and artisan handicrafts.

What's the idea behind setting up these malls?

- The idea gives a boost to local products, which have remained confined to an area in the absence of a platform to canvass their beauty.
- These malls will likely give a fillip to local economies and help artisans thrive. Also, they can be a great tourist attraction to show the local culture.

What is ODOP?

- ODOP stands for One District, One Product. The government launched this initiative to make regional products popular and more accessible, thereby increasing the earnings of the native artisans for their labour.
- Under this scheme, every state has to identify the main product of that district and offer support for its production, storage and marketing.
- The products can be anything from agri-produce and cereal-based products to food products. It can also be fisheries or those made from waste.
- For example, the ODOP from Ayodhya is jaggery; from Darjeeling, it is tea; from Guntur in Andhra Pradesh, it is spiced (chilli and turmeric); for Chandigarh, it is bakery-based products.

What is a GI tag?

- A geographical indication or GI tag is awarded to products that originate within a specific geographical region and possess some unique characteristics and qualities because of their area of origin.
- This tag assures the buyer that the product originated from a specific area. The total number of registered GI products in India is approaching 450.

NCS TO BE PRIMARY GOVT PORTAL FOR SKILLED AND UNSKILLED WORKERS

Why in news?

- Recently, the Centre has decided that the National Career Service (NCS) portalwill now be the primary government portal for both skilled and unskilled workers.

Key Highlights:

- The Udyam, e-Shram and NCS portals have been interlinked and the process of linking ASEEM with the other portals is ongoing.
- NCS, being the primary employment portal allows the vacancies posted by employers registered on the NCS portal to be visible to Udyam, e-shram and ASEEM users.
- About 175,000 informal and one million skilled workers, registered through the e-Shram and Skill India portals, respectively, have been shortlisted by employers. This came as the government began integrating both the portals with the NCS site.
- The NCS portal has also been integrated with other ministries/ departments like MHRD and AICTE.
- Online integration with EPFO, ESIC has also been done to link the willing employers. This would help them to shortlist candidates through a country-wide database on the NCS portal.
- Besides, the NCS portal has also been integrated with state employment portals of the 20 states/UTs. Seven states/UTs are directly using the NCS portal for registering jobseekers.

Background:

- According to a document titled 'Implementation of Budget Announcements 2022-23', at a meeting under the joint chairmanship of skill and labour ministers in October 2022, it was also decided to subsume the Atmanirbhar Skilled Employee-Employer Mapping (ASEEM) portal under the Skill India portal.
- The ASEEM portal acts as a directory that matches supply of the skilled workforce with the market demand.
- On the other hand, the Skill India portal accumulates the skills data of various central ministries, state governments, private training providers and corporates on a single platform.

WHAT HAS THE UNION BUDGET ALLOCATED TO MINORITIES?

Why in news?

- Recently, the Union Budget for 2023-24 came with a reduction of 38% in funds for the Ministry of Minority Affairs.

- The fund crunch is likely to impact spheres of madrasas besides general school education, higher research and local development in areas of minority concentration.

Which schemes are affected?

- The worst affected scheme under the all-encompassing fund crunch is the Education Scheme for Madrasas which suffered a whopping 93% cut in allocation, down to ₹ 10 crore from the ₹ 160 crore in the previous financial year.
- The total allocation for minorities' educational uplift was slashed to ₹ 1,689 crore from ₹ 2,515 crore last year with schemes for research as well as pre-matric scholarships experiencing a fund withdrawal or downsizing.
- The allocation for research schemes for minorities, including Muslims, Christians, Sikhs, Jains, Buddhists and Parsis was reduced by a little more than 50%, down from ₹ 41 crore last year to ₹ 20 crore in 2023.
- On the same lines, the government hugely cut the funds for pre-matric scholarships for minorities, down from ₹ 1,425 crore last year to ₹ 433 crore in the upcoming financial year.
- Completing the picture for fund-strapped schemes was the Pradhan Mantri Jan Vikas Karyakram (PMJYK). The allocation for PMJYK came down from ₹ 1,650 crore to 600 crore in 2023.
- The scheme aims to provide socio-economic infrastructure and elementary amenities in minority concentrated areas. It was said to be a key part of the government's Sabka Saath, Sabka Vikas initiative.
- The latest Budgetary setback comes on the heels of the scrapping the Maulana Azad National Fellowships for higher education.

Why was Nai Udaan grounded?

- The Nai Udaan Scheme meant to help minority students prepare for the Union Public Service Commission examinations was grounded. It was argued that the scheme overlaps with other similar affirmative plans of the government.
- The decision to cut funds for socio-economic and educational uplift of minorities has cast a shadow far and wide. For instance, the Scheme for Leadership Development of Minority Women which received ₹ 2.5 crore last year is now down to ₹ 10 lakh as per the new Budget.
- The Hamari Dharohar Scheme for conservation of minorities' culture and heritage which got ₹ 2 crore earlier, is now down to only ₹ 10 lakh.

Skill Development Initiative:

- The worst sufferer was the Skill Development Initiative among minorities. It received ₹ 235 crore in 2022-23 but is now down to merely ₹ 10 lakh.
- The funds for Nai Manzil, an integrated educational and livelihood scheme, were brought to just ₹ 10 lakh from the earlier ₹ 46 crore.
- For the Upgrading the Skills and Training in Traditional Arts/Crafts for Development scheme (USTTAD), the monetary allocation was slashed to ₹10 lakh in comparison to the ₹ 47 crore in 2022-23.
- The loan subsidy to minorities to study abroad under the Padho Pardesh Scheme also stood withdrawn.

What has the government said?

- The decision to scrap various scholarships followed by significant cut in budgetary expenditure for minorities resulted in several protests with many students from economically poor backgrounds pleading for continuation of the affirmative action.
- This reduction in overall expenditure came shortly after Prime Minister made an appealed to build bonds with Pasmanda and Bohra Muslims to make sure nobody was left behind in the nation's progress. The Budget failed to follow up his words with action.

'DIGITAL PAYMENTS UTSAV' LAUNCHED TO PROMOTE DIGITAL TRANSFORMATION

Why in news?

- Recently, the 'Digital Payments Utsav', a comprehensive campaign aimed at promoting digital payments across India was launched.

Details:

- The 'Digital Payments Utsav' is an extraordinary campaign that will showcase India's journey of digital transformation, with a series of events and initiatives to be held from 9th February to 9th October 2023.
- The focus of the campaign will be on promoting

digital payments in the country, especially in the cities of Lucknow, Pune, Hyderabad, and Bengaluru, as part of the G20 Digital Economy Working Group (DEWG) event.

DigiDhan Awards:

- In addition, 28 DigiDhan Awards were presented to top-performing banks, bankers, and fintech companies in different categories for their outstanding performance in the digital payments space.
- The awards recognize the efforts of these organizations in promoting digital payments and contributing to the growth of the digital economy.

Way Forward:

- The launch of the Digital Payments Utsav marks a major milestone in the government's efforts to promote digital payments and drive digital transformation in India.
- The comprehensive campaign is expected to bring together various stakeholders, including the government, industry, and citizens, to drive the growth of the digital economy and promote financial inclusion.

BEACHES IN VISAKHAPATNAM ARE NOW HEADING TOWARDS A DISASTER, SAY EXPERTS

Why in news?

- Recently, Union Minister of State for Earth Sciences Jitendra Singh said in Rajya Sabha that about 28.81 km of coastline in Visakhapatnam is prone to erosion.

Background:

- The erosion of beaches in Visakhapatnam is not new. It has been since 1930, ever since two ships were sunk near the Dolphin's Nose to create a breakwater to stop the process of sedimentation at the mouth of the Visakhapatnam harbour, during the construction phase of Viskhapatnam Port.
- This was just the beginning. Erosion aggravated with the construction of two breakwaters during the construction of the Outer Harbour during the 1970s.

Geographical aspect:

- Beaches are dynamic landforms and should be treated as part of the sea and not part of the land.
- The erosion and deposition of sand are primarily due to the high wave action and high wave energy and the problem arises when man meddle with them.

Threat:

- The beaches act as cushion between the high wave action of the sea and the landmass. Continuous nourishment of beaches is a must through the natural process and, if disturbed, they will face severe erosion.
- Due to the construction of the breakwaters on the south side, the sand no longer reaches the beaches in the north, such as RK Beach, and hence the beaches are not nourished.

Way Forward:

- As per the experts about 50 years from now, if adequate precautions are not taken, then RK Beach could become like the Marine Drive of Mumbai.

TELANGANA'S TEJA CHILLI IS HOT PROPERTY IN MANY NATIONS

Why in news?

- The burgeoning demand for the popular Teja variety of red chilli, famous for its culinary, medicinal and other wide-ranging uses, in the export market is proving to be a boon for the Khammam Agriculture Market.
- Khammam Agriculture Market houses Telangana's second largest chilli market yard, in the district headquarters town of Khammam.

Characteristics of Teja variety:

- Khammam district, the largest producer of the Teja variety of red chilli, is the leading exporter of the pungent produce, which is known not only for its culinary purpose to spice up various delicacies but also as a main ingredient in making pepper spray.
- The huge demand for oleoresin, a natural chilli extract, is mainly driving the export of the Teja variety of red chilli from Khammam district to various spice processing industries in several Asian countries.
- The Mudigonda-based oleoresin extraction firm of a Chinese company is engaged in export of the byproduct to its clients.
- The paste extracted from the pungent fruit is also

in demand for its use as a protective layer beneath ships in some of the Asian countries.

Export:

- The Teja variety of red chilli is being exported to China, Bangladesh and a few other south Asian countries from Khammam mainly through the Chennai port.
- The volume of exports of the commodity is picking up in tune with growing requirements of the spice processing industries and other allied units engaged in production of value-added products such as sauce and pickles.

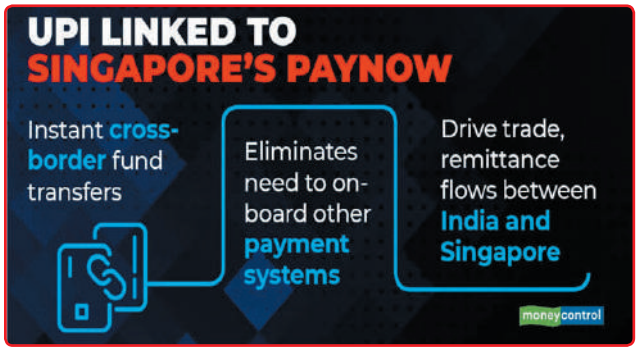
Way Forward:

- The export of Teja variety of red chilli is expected to grow from the present ₹ 2,000 crore per annum to ₹ ₹ 2,500 crore next year.

INDIA, SINGAPORE LINK PAYMENT SERVICES

Why in news?

- Recently, the Prime Minister of India and Singapore participated in the virtual launch of real time payment linkage between the Unified Payments Interface (UPI) of India and PayNow of Singapore.
- Singapore is the first country with which cross border Person to Person (P2P) payment facility has been launched.



Salient features:

- This will help the Indian diaspora in Singapore, especially migrant workers/students and bring the benefits of digitalisation and FINTECH to the common man through instantaneous and low-cost transfer of money from Singapore to India and vice-versa.
- Acceptance of UPI payments through QR codes is already available in selected merchant outlets in Singapore.

UPI-based payment ecosystem:

- The UPI-based payment ecosystem has witnessed significant attention recently. In January, the National Payments Corporation of India (NPCI) enabled international (phone) numbers to be able to transact using UPI.
- Later, the Union Cabinet chaired by PM Modi approved incentivisation schemes for promoting low-value BHIM-UPI transactions in FY 2022-23.
- In February 2023, PhonePe, launched support for the "UPI international" payments, allowing Indian users travelling abroad to pay foreign merchants using UPI.
- In the third quarter of 2022, India recorded over 23.06 billion digital payments worth 38.3 lakh crore. Out of these, UPI-based transactions amounted to 32.5 lakh crore in value.

CHILDREN HAVE THE RIGHT TO PROTECT THEIR GENETIC DATA: SC

Why in news?

- Recently, the Supreme Court has held in a judgment that children cannot be mechanically subjected to DNA tests in each and every case between warring parents as a short-cut to establish proof of infidelity.
- The judgment came in a petition filed by a man who questioned his second child's paternity.

Key Highlights of the judgement:

- It emphasized that "a child's genetic information is part of his fundamental right to privacy".
- Besides, mechanical orders allowing DNA tests would also harm the reputation and dignity of the mother.
- Family courts should direct for a DNA test only in expedient situations and in the interest of justice, as a last resort.
- Children have the right not to have their legitimacy questioned frivolously before a court of law. This is an essential attribute of the right to privacy.
- Courts are, therefore, required to acknowledge that children are not to be regarded like material objects, and be subjected to forensic/DNA testing, particularly when they are not parties to the divorce proceeding. It is imperative that children do not become the focal point of the battle between spouses.

Rights of privacy, autonomy and identity:

- Justice Nagarathna drew attention to the rights of privacy, autonomy and identity recognised under the United Nations Convention on the Rights of the Child.
- The Convention acknowledges the control that individuals, including children, have over their own personal boundaries and the means by which they define who they are in relation to other people.

Children are not to be deprived of this entitlement to influence and understand their sense of self simply by virtue of being children.

INDIA CENTRE FOR LAB GROWN DIAMOND (INCENT-LGD) PROPOSED TO BE ESTABLISHED AT IIT MADRAS

Why in news?

- It is proposed to establish an India Centre for Lab grown Diamond (InCent-LGD) at IIT Madras with the estimated cost of Rs. 242.96 crores over 5 years.

Background:

- In Union Budget 23-24, a five-year research grant for one of the Indian Institutes of Technology (IITs) was announced to encourage the indigenous production of lab-grown diamonds (LGD) machinery, seeds and recipe.
- It has been decided to give this project to IIT- Madras after a joint determination of its capabilities by a joint committee of Government, export promotion council and Industry representatives.

Aim:

- The aim of this project is to provide, in mission mode, technical assistance to the industries, and entrepreneurs in the country, in promote indigenous manufacturing of both Chemical Vapour Deposition (CVD) and High Pressure and High Temperature (HPHT) systems along with the recipes for expanding the Lab Grown Diamond (LGD) business at the upstream end.

Economic aspect:

- Lab grown diamonds are produced through 2 technologies, namely High-Pressure High Temperature (HPHT) and Chemical Vapour Deposition. India is one of the leading producers of lab grown diamonds using CVD technology.
- As per industry estimates, India's share in global trade in the financial year 2021-22 was 25.8. However, India to depend on other countries for the supply of critical machinery components and 'seeds', which are the raw material for producing synthetic diamonds.
- Good quality lab-grown diamonds with qualified certification, produced from the developed equipment and process parameters will attract many foreign customers increasing the export volume of lab-grown diamonds and scalability of production.
- Research efforts would make the technology available for startups at affordable cost, increase employment opportunities, increase exports of LGD thus play a significant role in fuelling India's economic growth.

Gems and Jewellery sector:

- The Gems and Jewellery sector plays a significant role in the Indian economy, contributing around 9% to India's total merchandise export.
- Over the past decade, there has been several positive developments in the Gem & Jewellery sector globally. One of the major technological developments in this sector has been Laboratory-grown diamonds (LGD).

Demand of LGD:

- Besides the jewellery industry, lab-grown diamonds are used in computer chips, satellites, 5G networks as they can be used in extreme environments due to their potential to operate at higher speeds while using less power than silicon-based chips.
- LGD has vast application in field of defence, optics, jewellery, thermal & medical industry.
- Globally, the market stood at $1 billion in 2020, the lab-grown diamond jewellery market is expected to rapidly rise to $ 5 billion by 2025 and exceed $ 15 billion by 2035.

TRIFED'S TRIBES INDIA STORE PRODUCTS TAGGED WITH ODOP & GI

Why in news?

- Recently, the ODOP and GI x TRIFED product launch was held at the Major Dhyan Chand National Stadium, New Delhi during the ongoing AadiMahotsav.

ODOP:

- The One District One Product (ODOP) programme under Department of Commerce (DoC) and Department for Promotion of Industry and Internal Trade (DPIIT), Ministry of Commerce & Industry is aimed at creating sustainable employment at the district level while promoting holistic socio-economic development.
- The idea is to select, brand, and promote one product from each district of the country.
- In pursuance of the Prime Minister's clarion call on

AatmaNirbhar Bharat and with India's current G20 Presidency, several initiatives are being undertaken by DPIIT.

- In addition, Union Minister of Commerce & Industry, at the launch of the ODOP Catalogue, requested every organisation to work in collaboration with the programme. This will help promote indigenous products from each district of the nation.

Highlights:

- A diverse collection of tribal products representing all parts of the country are available at TRIFED's TRIBES India Retail store.
- The ODOP and GI tagging was done for a range of products, including Kullu Shawl from Kullu, Himachal Pradesh, Darjeeling Tea from Darjeeling, West Bengal, Blue Pottery from Jaipur, Rajasthan, Bidriware from Bidar, Karnataka, Pattachitra paintings from Puri, Odisha, Bagh Prints from Dhar, Madhya Pradesh, Coffee from Wayanad, Kerala, Bastar Craft from Kondagaon, Chattisgarh& Rice-Jeeraphool from Balrampur, Chhattisgarh. The tagging is intended to create awareness about the sources of products representing different districts of India.

Way Forward:

- ODOP plans to further this campaign by engaging other such stores and emporiums that have overlaps with the products under ODOP to boost the morale of artisans and weaver clusters by giving them a larger platform to display their craft and bringing it to the forefront.

STRAWBERRY FARMING MAKING WAVES IN TRIBAL LAND OF ODISHA

Context:

- The strawberry harvest has triggered a celebration in the houses of 10 farmers who live in one of the 56 villages in the tropical deciduous forest of the Sunabeda Wildlife Sanctuary.
- The farmers, who from April to October plant paddy, were initiated into strawberry cultivation in November 2022.
- The rugged Sunabeda plateau, 3,000 feet above sea level, along the Odisha-Chhattisgarh boundary, has always been a difficult terrain to traverse.

Strawberry cultivation:

- The government officers persuaded them to take up this new kind of farming. It provided saplings and financial aid to dig a borewell. Each family has been given 10 acres, and 20,000 saplings planted on each acre.
- The horticulture department was roped in for mulching and drip irrigation. Farmers took loans from women's self-help groups (SHGs) to fund the labour component.

ChuktiaBhunjia tribe:

- Most people in Sunabeda are from the ChuktiaBhunjia tribe, one of the particularly vulnerable tribal groups (PVTGs).
- They were given the requisite training by the Nuapada district administration and the ChuktiaBhunjia Development Agency (CBDA), set up in 1994-95 by the State government to work for the development of the tribe.
- A CBDA team had gone to Mahabaleshwar in Maharashtra, which accounts for 80% of India's strawberry production. The altitude and climate there are similar to that of Sunabeda.

Marketing strategy:

- This is not the first time strawberry farming has been experimented within Odisha. The practice had a fair bit of success when it was introduced in 2021 in the Kotia gram panchayat in Koraput district, situated at a similar altitude to Sunabeda, and with a similar climate.
- The area, the jurisdiction of which is claimed by both the Odisha and Andhra Pradesh governments, has seen a huge inflow of government funds over the last four years. Now, the cultivation has spread to 20 acres with seven SHGs involved.

DEFENCE

PM UNVEILS INDIA'S BIGGEST HELICOPTER MANUFACTURING FACILITY IN KARNATAKA

Why in news?

- Recently, the Prime Minister inaugurated the Hindustan Aeronautics Limited's helicopter factory, the country's largest chopper manufacturing facility in Tumakuru district of Karnataka.

Background:

- The factory, spread across 615 acres for which the Prime Minister laid the foundation stone in 2016, would initially manufacture Light Utility Helicopters (LUH)).
- It will enable India to meet its entire requirement of helicopters without import and giving much-needed fillip to the Prime Minister's vision of 'Aatmanirbhar Bharat' in helicopter design, development, and manufacture.

LUH:

- The LUH is an indigenously designed and developed three-tonne class, single-engine multipurpose utility helicopter. Initially, the factory will produce around 30 helicopters per year and can be enhanced to 60 and then 90 every year in a phased manner.
- The factory will be augmented to produce other helicopters such as Light Combat Helicopters (LCHs) and Indian Multirole Helicopters (IMRHs).
- It will also be used for maintenance, repair and overhaul of LCH, LUH, Civil Advanced Light Helicopter (ALH) and IMRH in the future.

Potential of new facility:

- Potential exports of civil LUH will also be catered to from this factory, which is being equipped with state-of-the-art Industry 4.0 standard tools and techniques for its operations.
- The proximity of the factory, with the existing HAL facilities in Bengaluru, will boost the aerospace manufacturing ecosystem in the region and support skill and infrastructure development such as schools, colleges and residential areas.
- The factory is fully operational after the establishment of facilities like heli-runway, flight hangar, final assembly hangar, structure assembly hangar, air traffic control and various supporting service facilities.

Way Forward:

- HAL plans to produce more than 1,000 helicopters in the range of 3-15 tonne with a total business of more than Rs 4 lakh crore over a period of 20 years at this facility.

IAF'S NEW DOCTRINE CONTAIN

Why in news?

- Recently, the Indian Air Force (IAF) has come out with a new doctrine that includes lessons from the Russia-Ukraine war and standoff with China.
- The latest unclassified doctrine which takes over from the one that was set in 2012, emphasises on the need to shift from "threat-based and demanded" to "capability-demanded" force requirements.
- This comes at a time when the IAF faces an existential threat to its fighter squadron strength which is dwindling and its plans to procure 114 more Multi Role Combat Aircraft (MRFA) under Make in India is yet to be sanctioned.

Key Highlights:

- While the doctrine talks about the need for unified war fighting strategies, it also lays emphasis on retaining the unique character of air power that has the capability to be used as support to the ground and maritime forces.
- It also states that air power can be used for carrying out offensive strikes deep inside enemy territory to cripple logistics and key installations.
- The new doctrine underlines that modern conflicts can be decisively influenced only by each component of military power operating in synergy with each other and optimally exploiting the unique attributes of its medium of operation (air, land and sea) to achieve national objectives.
- This necessitates an intimate understanding of the core competencies, capabilities and limitations of each Service by the other two.

From airpower to aerospace power:

- The IAF notes that given the new spectrum of warfare, airpower should be seen as aerospace power.
- The Air Force called for a National Space Strategy as "concurrent vulnerabilities of India to hostile action" are increasing while also anticipating rise in use of space for economic and developmental purposes.
- In the 1965 war, Peshawar airbase was considered safe as it was a depth airfield, it was still attacked by IAF Canberras launched from Agra.

From peace to war and no war-no peace situation:

- The new doctrine lays out the capabilities of the air force in times of peace, in war and in no war-no peace situations – what India is facing currently, vis-à-vis China.
- One of the reason for the failure of Russian Air Force in the war against Ukraine was because it saw air power as a support arm to the ground forces while ignoring its standalone capabilities.
- The only time in India's history when the IAF was fully used for offensive operations was during the 1971 War and the new doctrine aims to bring to the public and policy makers the possibilities that exist with air power.

Way Forward:

- The ever evolving national, global and regional challenges have varying impacts on India's security.
- Adversaries have adopted grey zone tactics by employing cyber, information and economic means as instruments of statecraft.
- India's military therefore must build multi-domain capabilities and capacities that deter potential aggressors from hindering India's pursuit of its legitimate aspirations and goals.

HAL UNVEILS DESIGN FOR NEW SUPERSONIC TRAINER, CAN AID IAF IN MODERN COMBAT TRAINING

Why in news?

- Recently, the Hindustan Aeronautics Limited (HAL) has unveiled the design of a new supersonic jet trainer that could play a critical role in modern combat aircraft training of the Indian Air Force (IAF).
- It said there would be a scale model of the HLFT-42, the 'Next Gen Supersonic Trainer'.

HLFT-42:

- HAL plans to equip the new trainer aircraft with modern avionics like Active Electronically Scanned Array (AESA), Electronic Warfare (EW) Suite, Infrared Search and Track (IRST) with Fly by Wire (FBW) control system.
- This is a single engine trainer that has been in the works for a long time and underwent numerous design changes.
- The design of HLFT-42 is inspired from the Tejas Light Combat Aircraft programme.
- This aircraft could plug the gap between subsonic jet training which takes place on an actual fighter like the MiG-21.

New aircraft to replace Swiss-made Pilatus:

- In 2017, HAL and BAE Systems, which developed the Hawks, came together with a product called the Advanced Hawk.
- The BAE Systems had then said that new features on the Hawks would reduce training demands on more expensive frontline aircraft, creating additional capacity for operational tasks, and make training more cost-effective as well as structured.
- However, the IAF did not pursue this aircraft after it was found that the Advanced Hawk was not a supersonic jet.

Way Forward:

- The IAF had in October 2022 inked a Rs 6,800 crore deal with HAL for the purchase of 70 Hindustan Turbo Trainer (HTT)-40 trainer aircraft, a move that will reduce pressure on the force that is dealing with limited number of planes.
- The HTT-40 will be part of the first stage of training for the IAF pilots – basic training – and will eventually replace the Swiss-made Pilatus aircraft bought in 2012.

PM INAUGURATES 14TH EDITION OF AERO INDIA 2023 IN BENGALURU

Why in news?

- Recently, the Prime Minister inaugurated the 14th edition of Aero India 2023 at Air Force Station, Yelahanka in Bengaluru.

Details:

- The theme of Aero India 2023 is "The Runway to a Billion Opportunities'.
- It will witness participation by more than 80 countries along with 800 defence companies including around 100 foreign and 700 Indian companies.

Key Highlights:

- In line with the Prime Minister's vision of 'Make in India, Make for the World', the event will focus on displaying indigenous equipment/technologies and forging partnerships with foreign companies.
- Prime Minister's emphasis on Aatmanirbharta in the Indian Defence sector will also be displayed, as the event will showcase the country's progress in design leadership, growth in UAVs Sector, Defence Space and futuristic technologies.
- Further, the event will promote the export of indigenous air platforms like Light Combat Aircraft (LCA)-Tejas, HTT-40, Dornier Light Utility Helicopter (LUH), Light Combat Helicopter (LCH) and Advanced Light Helicopter (ALH).
- The event will also help in integrating domestic

MSMEs and start-ups in the global supply chain and attract foreign investments including partnerships for co-development and co-production.

Way Forward:

- The Prime Minister called upon the private sector to invest in the defence sector which will create new opportunities for them in India and in many other countries.

ITBP GETS 7 BATTALIONS, 1 OPERATIONAL BASE FOR SINO-INDIA LAC DEPLOYMENT

Why in news?

- The government recently sanctioned hiring of 9,400 fresh troops for raising seven new border battalions apart from a new operational base for the India-China LAC guarding force Indo-Tibetan Border Police (ITBP).
- The proposal was cleared during the meeting of the Cabinet Committee on Security (CCS).

Background:

- The about 90,000 personnel strong ITBP was raised in the aftermath of the 1962 Chinese aggression and it is tasked with guarding the 3,488-km-long Line of Actual Control (LAC) on India's eastern flank.
- The force is working along with the Army at this front even as the militaries of India and China are engaged in a standoff at Ladakh from 2020.

Key Highlights:

- The fresh manpower will be utilised for manning 47 new border posts and a dozen 'staging camps' or troops bases to be created along this frontier, largely in Arunachal Pradesh. These bases were sanctioned in 2020.
- In order to ensure effective guarding of the LAC, these new bases were sanctioned and now seven battalions and a new sector headquarter comprising about 9,400 personnel have been sanctioned.
- The battalions and the sector headquarter are expected to be put in place by 2025-26.
- A non-recurring expenditure of Rs 1,808.15 crore is estimated to be spent for land acquisition, creation of office and residential buildings, and arms and ammunition while a recurring annual expenditure of Rs 963.68 crore will be done under the salaries and rations head for the fresh manpower.

Way Forward:

- The creation of 47 new border posts will lead to a 26 per cent increase in the strength of these bases while the induction of 9,400 fresh personnel will enhance its strength by 10 per cent. The force has 176 border posts at the LAC currently.

DHARMA GUARDIAN 2023

Why in news?

- Recently, the 4th edition of joint military exercise, "EX DHARMA GUARDIAN", between India and Japan is being conducted at Camp Imazu in Shiga province, Japan from 17 February to 02 March 2023.
- It is an annual training event with Japan, is crucial and significant in terms of security challenges faced by both nations in the backdrop of current global situation.
- The scope of this exercise covers platoon level joint training on operations in jungle and semi urban/ urban terrain.

Key Highlights:

- Troops of the Garhwal Rifles Regiment of the Indian Army and an Infantry Regiment from the Middle Army of the Japan Ground Self Defence Force (JGSDF) are participating in the exercise to share experiences gained during operations in order to enhance inter-operability in planning & execution.
- The joint exercise will enable the two armies to share best practices in tactics, techniques and procedures of conducting tactical operations under a UN Mandate, in addition to developing inter-operability, bonhomie, camaraderie and friendship between the two armies.
- The training will focus primarily on high degree of physical fitness and sharing of drills at the tactical level.
- During the exercise, participants will engage in a variety of missions ranging from joint planning, joint tactical drills, basics of establishing integrated surveillance grids, including employment of aerial assets.

Way Forward:

- "Exercise Dharma Guardian" will further enhance the level of defence co-operation between Indian Army and Japanese Ground Self Defence Forces, furthering the bilateral relations between the two nations.

INDO-UZBEKISTAN JOINT MILITARY EXERCISE 'DUSTLIK'

Why in news?

- Recently, the 4th edition of joint military exercise 'DUSTLIK' between the Indian Army and Uzbekistan Army commenced in Foreign Training Node, Pithoragarh (Uttarakhand).

Background:

- The first edition of the exercise was held at Uzbekistan in November 2019.

Key Highlights:

- The 14 days long joint exercise would focus on joint counter-terrorist operations in mountainous and semi-urban scenario under UN mandate and will include field-training exercises, combat discussions, lectures, demonstrations and culminate with a validation exercise.
- Both sides will jointly train, plan and execute a series of tactical drills for neutralisation of likely threats, while learning to exploit new generation equipment and technology for conducting joint operations.
- Due emphasis is being laid on increasing interoperability between forces.

Way Forward:

- The bonhomie, espirit-de-corps and good will generated during the exercise will go a long way in further strengthening the bonds between both armies by enabling understanding of each other's organisation and methodology of conducting various operations.

INDO-ISRAELI JOINT VENTURE FIRM TO PROVIDE SERVICE SUPPORT FOR INDIA'S MRSAM MISSILES

Why in news?

- Israeli Aerospace Industries(IAI) and India's Bharat Electronics Limited (BEL), firms owned by their respective Governments, have entered into a Memorandum of Agreement (MoA) to form a joint venture firm for extending long-term product support services for Indian Armed Forces.
- Aimed at providing life-cycle support for the Indo-Israeli Medium-Range Surface to Air Missile (MRSAM), this joint venture furthers the long-standing cooperation between India and Israel in the field of Defence.

About MRSAM:

- MRSAM is an advanced air and missile defence system that provides protection against a variety of aerial platforms. The MRSAM is used by the Indian Air Force, Indian Army, Indian Navy and Israeli Defence Forces.
- The system includes an Advanced Phased Array Radar, command and control shelter, mobile launchers and interceptors with an advanced RF seeker.
- MRSAM is jointly developed by IAI and India's Defence Research Development Organization (DRDO) in collaboration with India and Israel for India's Armed Forces.
- The MRSAM missile is capable of taking down multiple aerial targets such as jets, drones, helicopters, and incoming missiles, within a 70km range.

Way Forward:

- The venture is to have its headquarters in New Delhi and will provide technical and maintenance support for MRSAM and its related systems.

EXERCISE COBRA WARRIOR

Why in news?

- An Indian Air Force contingent comprising 145 Air Warriors is participating in Exercise Cobra Warrior at the Waddington Air Force Base of the Royal Air Force in United Kingdom.
- The exercise is scheduled from 06 Mar 23 to 24 Mar 23.

Aim:

- The aim of the exercise is to participate in diverse fighter aircraft engagements and learn from the best practices of various Air Forces.

About Exercise Cobra Warrior:

- The Exercise Cobra Warrior is a multilateral Air exercise in which Air Forces from Finland, Sweden, South Africa, United States of America and Singapore would also be participating alongside Royal Air Force and IAF.
- The IAF is participating in 2023 with five Mirage 2000 fighters, two C-17 Globemaster III and an IL-78 mid air refueller aircraft.

INTERNAL SECURITY

RAILWAY PROTECTION FORCE (RPF) CONDUCTED A MONTH LONG NATIONWIDE DRIVE UNDER OPERATION "NARCOS" AND OPERATION AAHT

Why in news?

- Recently, the Railway Protection Force (RPF) conducted a month-long nationwide Pan India Drive with an objective to make a dent upon the syndicate involved in smuggling of Narcotic Products through the railway network under Operation "Narcos" and Human Trafficking under Operation AAHT.

Narcotics:

- Railway has been the preferred mode of trafficking of NDPS for longer distance, and therefore, Government of India, empowered RPF officers, of and above the rank of Astt. Sub-Inspector, to exercise the powers and perform the duties to conduct search, seize NDPS and arrest traffickers under the provisions of Narcotic Drugs and Psychotropic Substances (NDPS)Act, 1984 and further hand them over to the empowered law enforcing agencies.

Human Trafficking:

- Human Trafficking, especially of Women and Children, for sexual exploitation, prostitution, forced labour, forced marriage, domestic servitude, adoption, begging, organ transplant, drug peddling etc is an organised crime and the most abominable violation of human rights.
- In May 2011, Govt. of India ratified the United Nations Convention against Transnational Organised Crime (UNTOC) and one of its three protocols includes the protocol to prevent, suppress and punish trafficking in person, especially women and children.
- RPF has been working closely with other law enforcement agencies and other stake holders to identify and rescue victims of human trafficking under Operation "AAHT".

Role of RPF:

- RPF is entrusted with the responsibility of security of railway property, passenger area, passengers and matters connected therewith. In addition to the mandate, RPF has been entrusted with other responsibilities in the interest of national security.

United Nations Convention against Transnational Organised Crime (UNTOC)

- The Convention against Transnational Organized Crime or UNTOC is also known as the Palermo Convention since it was adopted in Palermo in Italy in 2000.
- The convention entered into force in 2003 after the required number of ratifications.
- The idea behind having an international convention against organized crime was that if crimes could cross borders, so must law enforcement.
- UNTOC enables cooperation between member states for tackling international organized crime.
- India ratified the UNTOC in 2011 becoming the fourth South Asian country to do so.
- The nodal agency for all dealings with UNTOC is the Central Bureau of Investigation (CBI).

KERALA, UN WOMEN SIGN PACT TO BOOST WOMEN-FRIENDLY ACTIVITIES IN TOURISM

Why in news?

- Recently, the Kerala government entered into an agreement with the United Nations (UN) Women to boost women-friendly activities in the State's tourism sector.
- A memorandum of understanding (MoU) signed by Kerala Tourism and UN Women India agreed to work towards promoting gender-inclusive tourism sites in the State.

Key Highlights:

- As per the pact inked at the first-ever Global Responsible Tourism Summit in Kumarakom, both parties will promote women-friendly tourism in Kerala.
- This will be done by creating modules and capacity-building of relevant stakeholders, besides providing advisory support for baseline research, implementing women-friendly tourist destinations and supporting interventions to change prevalent discriminatory social norms.
- The idea is to promote tourism with focus on women empowerment.

Implementation:

- It would be implemented by the Responsible Tourism Mission.

About UN Women:

- UN Women is the UN entity dedicated to gender equality and the empowerment of women. UN Women was established to accelerate progress on meeting their needs worldwide.
- In July 2010, the United Nations General Assembly created UN Women, the United Nations Entity for Gender Equality and the Empowerment of Women.
- It merges and builds on the important work of four previously distinct parts of the UN system, which focused exclusively on gender equality and women's empowerment:
  a) Division for the Advancement of Women (DAW).
  b) International Research and Training Institute for the Advancement of Women (INSTRAW).
  c) Office of the Special Adviser on Gender Issues and Advancement of Women (OSAGI).
  d) United Nations Development Fund for Women (UNIFEM).

ENVIRONMENT

CITES DATABASE REVEALS RED SANDERS SMUGGLING

Why in news?

- The CITES trade database has recorded 28 incidents of red sanders confiscation, seizure and specimens from the wild being exported from India, a fact sheet prepared by TRAFFIC, a global wildlife trade monitoring organisation has revealed.
- These consignments were exported to China (53.5%), Hong Kong (25.0%), Singapore (17.8%) and the United States of America (3.5%) from 2016 to 2020.

About CITES:

- CITES (Convention on International Trade in Endangered Species of Wild Fauna and Flora) is an international agreement between governments, whose aim is to ensure that international trade in wild animals and plants does not threaten the survival of the species.

Red Sanders:

- Red Sanders (Pterocarpus santalinus), or red sandalwood, is an endemic tree species with distribution restricted to the Eastern Ghats of India.
- The species found in Andhra Pradesh and growing up to a height of 10 to 15 metres is reported to be one of India's most exploited tree species, and is under severe pressure from illegal logging and harvesting.
- Under the foreign trade policy of India, the import of Red Sanders is prohibited, while export is restricted.

Usage:

- Red sanders is under severe pressure from illegal logging and harvesting.
- Its heartwood is in demand in both domestic and international markets and is used to make furniture and handicrafts, while the red dye obtained from the wood is used as a colouring agent in textiles and medicines.

Discrepancy:

- India reported an export of more than 19,049 tonnes of logs. In comparison, the importing countries reported about 4,610 tonnes of logs, 127 tonnes of sawn wood, 20 tonnes of transformed wood and 980 kg of wood products, clearly indicating a discrepancy in reporting of red sanders trade.
- China remains the largest importer with more than 13,618 tonnes of the products, followed by Hong Kong (5,215 tonnes) and Singapore (216 tonnes).

Status:

- Listed under Schedule IV of the Wildlife Protection Act and categorised as endangered as per the IUCN Red List.
- Red sanders is a very slow-growing tree species that attains maturity in natural forests after 25-40 years.

SCIENTISTS SPLIT SEAWATER WITHOUT PRE-TREATMENT TO PRODUCE GREEN HYDROGEN

Why in news?

- Recently, the researchers have successfully split seawater without pre-treatment to produce green hydrogen.

Details:

- The researchers split natural seawater into oxygen and hydrogen with nearly 100 per cent efficiency, to produce green hydrogen by electrolysis.
- They used a non-precious and cheap catalyst in a commercial electrolyser.A typical non-precious catalyst is cobalt oxide with chromium oxide on its surface.

Seawater electrolysis:

- Seawater is an almost infinite resource and is considered a natural feedstock electrolyte. This is more practical for regions with long coastlines and abundant sunlight.
- However, it is not practical for regions where seawater is scarce.
- Seawater electrolysis is still in early development compared with pure water electrolysis because of electrode side reactions, and corrosion arising from the complexities of using seawater.

Significance:

- It is always necessary to treat impure water to a level of water purity for conventional electrolysers including desalination and deionisation, which increases the operation and maintenance cost of the processes.
- The work provides a solution to directly utilise seawater without pre-treatment systems and alkali addition, which shows similar performance as that of existing metal-based mature pure water electrolyser.

Way Forward:

- They will work on scaling up the system by using a larger electrolyser so that it can be used in commercial processes such as hydrogen generation for fuel cells and ammonia synthesis.

'SAVE WETLANDS CAMPAIGN' LAUNCHED AS A "WHOLE OF SOCIETY" APPROACH FOR WETLANDS CONSERVATION

Why in news?

- Recently, the Union Minister for Environment, Forest and Climate Change launched the 'Save Wetlands Campaign'.

Details:

- This campaign is structured on a "whole of society" approach for wetlands conservation, enabling affirmative actions for wetlands conservation at all levels of the society and involving all strata of the society.
- This campaign over next one year will include sensitizing people of the value of wetlands, increasing the coverage of wetland mitras and building citizen partnerships for wetlands conservation.

Publications:

- Two publications were also released during the occasion, 'India's 75 AmritDharohar- India's Ramsar Sites Factbook' and ' Managing Climate Risks in Wetlands - A Practitioner's Guide.
- The factbook is a one-stop resource of information on our 75 Ramsar Sites, including their values, threats they face and management arrangements.
- The practitioner's Guide on Climate Risk Assessment provides step-wise guidance on assessing the site-level climate risks and integration of adaptation and mitigation responses into the wetland management plan.

About World Wetlands Day:

- World Wetlands Day is observed on 2nd February every year worldwide to commemorate the signing of the Ramsar Convention on Wetlands of International Importance in 1971.
- India is a party to the Convention since 1982 and has so far declared 75 wetlands as Ramsar sites covering 23 states and Union Territories.
- India has the largest network of Ramsar Sites in Asia, making these sites a critical ecological network for the conservation of global biological diversity and supporting human well-being.

Theme 2023:

- The 2023 theme for World Wetlands Day is 'Wetland Restoration' which highlights the urgent need to prioritize wetland restoration.
- It is a call on an entire generation to take proactive action for wetlands, by investing financial, human and political capital to save the wetlands from disappearing and to revive and restore those that have been degraded.

Mission Sahbhagita:

- The Ministry of Environment, Forest and Climate Change (MoEFCC) launched Mission Sahbhagita in 2022 with a mission of 'a healthy and effectively managed network of 75 wetlands of national and international significance which support
  - water and food security;
  - buffer from floods, droughts, cyclones and other extreme events;
  - employment generation;
  - conservation of species of local, national and international significance;
  - climate change mitigation and adaptation actions; and
  - recognition, conservation and celebration of cultural heritage.'

SOIL TAINTED BY AIR POLLUTION RELEASES CARBON, FINDS NEW RESEARCH

Why in news?

- According to a recent research, nitrogen released by gas-powered machines causes dry soilto let go of carbon and release it back into the atmosphere, where it can contribute to climate change.

Details:

- Industrial manufacturing, agricultural practices, and significantly, vehicles, all burn fossil fuels that release nitrogen into the air.
- As a result, levels of nitrogen in Earth's atmosphere have tripled since 1850. The research team wanted to understand whether this extra nitrogen is affecting soil's ability to hold onto carbon and keep it from becoming a greenhouse gas.
- They found that under certain conditions, extra nitrogen causes dryland soil to acidify and leach calcium. Calcium binds to carbon, and the two elements then leave the soil together.

How research was conducted?

- To obtain their results, they sampled soil from ecological reserves near San Diego and Irvine that have been fertilized with nitrogen in long-term experiments. This allowed them to know precisely how much nitrogen was being added, and account for any effects they observed.
- In many cases, nitrogen can affect biological processes that in turn influence how soil stores carbon. Such processes include the fueling of plant growth, as well as slowing down the microbes that help decompose dead things in the soil.
- In general, soils resist dramatic changes in pH by releasing elements like calcium in exchange for acidity. As nitrogen acidified soils at some of the sites in this study, the soil attempted to resist this acidity by releasing calcium. As it did so, some of the carbon stabilized by association with the calcium was lost.

Dryland soil:

- Dryland soil, characterized by limited ability to retain moisture and low levels of organic matter, covers roughly 45 per cent of Earth's land area.
- It is responsible for storing a large amount of the world's carbon.

Way Forward:

- Future studies may shed more light on how much dryland soil is being affected by nitrogen pollution in the way the study plots were.
- However, since there is no quick fix for this phenomenon, and no clear way to reverse the process once it has begun, researchers recommend reducing emissions as much as possible to help soil retain its carbon stores.

HILLARY CLINTON ANNOUNCES $50 MN FUND FOR WOMEN TO TACKLE CLIMATE CHANGE

Why in news?

- Recently, former US secretary of state Hillary Clinton announced a Global Climate Resilience Fund of 50 million dollars for women to fight climate change in association with the Self Employed Women's Association (SEWA) founded by late activist Ela Bhatt.
- The fund will empower women and communities to fight climate change and help provide new livelihood resources and education, she said.

Key Highlights:

- She had attended a programme in Ahmedabad to mark 50 years of SEWA as a trade union and paid homage to its founder and renowned social activist Ela Bhatt, who passed away in November 2022.
- During the event, she had said heat caused by climate change poses an additional challenge to women workers in informal sectors and the Global Climate Resilience Fund will help tackle this challenge.
- She said working with SEWA will be the Clinton Global Initiative, Rockefeller Foundation Resilience Center, Algorand Foundation, Council for Inclusive Capitalism, and the American India Foundation.

About Elaben Bhatt:

- She was a noted Gandhian, leading women's empowerment activist.
- For her work, Elaben received numerous accolades and was conferred several national and international awards including Padma Bhushan, Magsaysay Award and the Indira Gandhi Sadbhavna Award.

About SEWA:

- SEWA was born out of the Textile Labour Association (TLA) founded by Anasuya Sarabhai and Mahatma Gandhi in 1920 but it could not register as a trade union until 1972 because its members did not have an "employer" and were thus not seen as workers.
- In 1981, after the anti-reservation riots in which the Bhatts were targeted for supporting quotas for Dalits in medical education, the TLA broke up with SEWA.
- As early as in 1974, SEWA Bank was established to provide small loans to poor women.
- It is an initiative that was recognised by the International Labour Organisation as a microfinance movement.

WILDLIFE ENTHUSIASTS SPOT 145 SPECIES DURING FIRST SUNDARBAN BIRD FESTIVAL

Why in news?

- Recently, 145 different bird species were sighted during the first Sundarban bird festival.
- The first-ever festival was organised by the Sundarban Tiger Reserve (STR) division of West Bengal Forest Department, where six teams visited different areas inside the Sundarban Biosphere Reserve.

Key Highlights:

- The species recorded during the bird festival included 78 forest birds and 42 species of waders, raptors etc.
- The two-day exercise also recorded six species of waterfowl.
- The total number of birds spotted during the exercise was 5,065.
- Two threatened bird species of the Sundarbans, Eurasian Curlew and Lesser Sand Plover, were also spotted.
- Birders were able to spot seven of the 12 species of kingfishers found in the Sundarbans.

Threats:

- A publication by Zoological Survey of India, (ZSI) in 2021, had recorded 428 bird species in the Sundarbans which is one-third of all the avian species found in the country.
- Despite being home to so many species of birds the habitats face threats including plantation activity along the chars (river islands) which disturbs the birds, and illegal activities along chars and uninhabited islands.

Significance:

- The first-ever bird festival has provided baseline data as far as the number of bird species in the Sundarbans is concerned.

EMISSIONS FROM MANURE, SYNTHETIC FERTILISERS COULD BE CUT BY 80%: STUDY

Why in news?

- Emissions from manure and synthetic fertilisers could be reduced by as much as 80 per cent, to one-fifth of current levels, according to a new study.
- Researchers have quantified that two thirds of emissions from fertilisers take place after they are spread on fields, with one third of emissions coming from production processes.

Details:

- The researchers, from University of Cambridge, UK, have calculated the carbon footprint for the full life cycle of fertilisers.
- Fertilisers are responsible for approximately five percent of total greenhouse gas emissions, the first time this has been accurately quantified, and found that carbon emissions could be reduced to one-fifth of current levels by 2050.
- Although nitrogen-based fertilisers are already known to be a major source of greenhouse gas emissions, this is the first time that their overall contribution, from production to deployment, has been fully quantified.

Key Highlights:

- Their analysis found that manure and synthetic fertilisers emit the equivalent of 2.6 gigatonnes of carbon per year - more than global aviation and shipping combined.
- Carbon emissions from fertilisers urgently need to be reduced; however, this must be balanced against the need for global food security.
- According to the study, earlier research has estimated that 48 per cent of the global population are fed with crops grown with synthetic fertilisers, and the world's population is expected to grow by 20 per cent until 2050.

Recommendations:

- The Cambridge researchers said that a combination of scalable technological and policy solutions are needed to reduce fertiliser emissions while maintaining food security.
- However, they estimate that if such solutions could be implemented at scale, the emissions from manure and synthetic fertilisers could be reduced by as much as 80 per cent, to one-fifth of current levels, without a loss of productivity.

Mitigation:

- Emissions from the production of synthetic fertilisers are mostly from ammonia synthesis, partly due to chemical reactions used in the production process.
- The most effective mitigation at the production stage would be for the industry to decarbonise heating and hydrogen production.
- Fertilisers could also be mixed with chemicals called nitrification inhibitors, which prevent bacteria from forming nitrous oxide.However, these chemicals are likely to make fertilisers more expensive.

EU OPENS DOOR TO 'GREEN' NUCLEAR-DERIVED HYDROGEN

Why in news?

- Recently, the European Commission published rules that could allow some hydrogen produced in nuclear-based energy systems to count towards EU renewable energy goals, signalling a win for pro-nuclear France.
- Hydrogen is central to Europe's plans to decarbonise heavy industry, and the rules aim to incentivise investors and industries to shift from hydrogen produced from fossil fuels, to hydrogen produced instead from renewable electricity.

Background:

- The question of what the European Union will count as "renewable" has fuelled a dispute in recent months between France and countries such as Germany who say nuclear-based fuels should not be included.
- After a months-long delay, EU has now set out three types of hydrogen that will count towards the renewable targets.

Key Highlights:

- The types of hydrogen that will count towards the renewable targets include hydrogen from production facilities directly connected to a new renewable electricity generator, and those that take grid power if the local electricity zone had more than an average 90% share of renewable power in the last year.
- Facilities can also take grid power in regions that meet a low CO2 emissions limit so long as the producer also signs a long-term power purchase agreement (PPA) with a renewable electricity provider in their region.
- Requiring producers to either directly use newly installed renewable power or sign a PPA to support new local renewable energy projects is aimed at stopping hydrogen producers sucking up existing renewable electricity capacity, which could risk

driving up fossil fuel generation to meet overall energy demand.

What's next?

- EU countries and lawmakers have two months to object to the rules, or they will enter into force.

OVER 1,200 PANGOLINS TRAFFICKED IN INDIA IN 5 YEARS: REPORT

Why in news?

- On the eve of World Pangolin Day observed on February 18, a not-for-profit organisation working on the international trade of animals and plants, has brought out a fact sheet reporting that 1,203 pangolins have been found in illegal wildlife trade in India from 2018 to 2022.

Details:

- Pangolins, their scales and derivatives were recovered in 342 seizure incidents across 24 states and one Union territory of India, according to the analysis by TRAFFIC, a global wildlife conservation non-profit, and World Wide Fund for Nature-India.
- Half of the seizure incidents involved live pangolins and 40 per cent included scales of the animal, which is also called the 'scaly anteater'.

Status:

- Pangolins are nocturnal, toothless mammals that dig burrows and feed on ants and termites.
- Of the two species found in India, the Indian Pangolin (Manis crassicaudata) is recognised as 'Endangered' and the Chinese Pangolin (Manis pentadactyla) as 'Critically Endangered' in the International Union for Conservation of Nature List of Threatened Species.
- In India, they are protected by the Wildlife (Protection) Act, 1972 that prohibits its hunting, trade or any other form of utilisation.
- The commercial trade of pangolins was also banned by the Convention on International Trade in Endangered Species of Wild Fauna and Flora in 2017.

Role in ecosystem:

- They play a vital role in the ecosystem management, mostly in aerating and adding moisture to the soil as well as succession of plant communities through burrowing. They also keep in check the population of certain insects they prey on.
- The burrows made by pangolins also get utilised as shelters by other species within their ecosystem. Over 30 species have been reported to use the burrows made by Chinese Pangolin, including mammals, birds, reptiles and invertebrates, for different purposes.

Threat:

- Despite their ecosystem services, they are traded for their demand across the world, mostly in Asia, where their scales are considered to be medicinal and their meat a delicacy.

Way Forward:

- The demand of pangolins in countries where the animal and their byproducts are consumed need to be curtailed, the authors of the report suggested.
- Enforcement actions should be strengthened in India and internationally to deter trade and protect the mammals.

INDIA RANKS 4TH AMONG 51 COUNTRIES IN HAVING QUALITY ENTREPRENEURSHIP ECOSYSTEM: REPORT

Why in news?

- India has been ranked fourth out of 51 countries in having a quality entrepreneurship ecosystem, as per NECI report.
- India's ranking in the Global Entrepreneurship Monitor (GEM) National Entrepreneurship Context Index (NECI) report is a drastic turnaround following a much lower score in 2021, which was 16th overall.

Details:

- India's latest score of 6.1 reflects a steady increase in the country's overall entrepreneurial environment over the years.
- India's NECI score rose from 5.8 in 2019 (ranked 6th among GEM economies) to 6.0 in 2020 (ranked 4th). However, there was a dip in 2021, with a score of 5.0 (barely sufficient) and a rank of 16th.

Key observations:

- The improved quality of the entrepreneurship ecosystem is a reflection of both initiatives of the Indian government in supporting new businesses such as Make in India and Atal Innovation Mission, and a change in popular culture evident through the interest and celebration of entrepreneurship through television shows like Shark Tank India.
- One explanation for the reversing of the trend from 2021 may be that the pandemic was a severe, but temporary, shock to the Indian entrepreneurial environment with all 13 Entrepreneurial Framework Conditions scoring lower in 2021 than in 2020.

Start-ups:

- India entrepreneurs were at the top globally (nearly 70 percent) when it comes to pursuing new opportunities due to the pandemic.
- The GEM 2022/2023 Global Report also discusses results from the Adult Population Survey (APS) carried out in India with more than 2,000 respondents which found Indians excelling in several arenas of start-ups.
- According to it, nearly 80 percent of the respondents agreed that they had the skills and experience to start their own business, saw good opportunities to start a business and found it was easy to start a business in India.
- However, only 20 percent were expecting to start a new business in the next three years.

Parameters:

- GEM defines the entrepreneurial context of a particular economy in terms of 13 different characteristics, labelled the Entrepreneurship Framework Conditions (EFCs).
- The NECI results are based on the scores of the framework conditions for each of the participating 51 economies.
- At least 36 experts are selected to assess statements that make up the scores that can be compared across economies.

FIGHTING SEISMIC THREATS IN KASHMIR THE MUGHAL STYLE

Context:

- Disturbing images from Turkey that show mountains of rubble piled up on the streets after the devastating earthquake, have reminded denizens of Srinagar that the city is on the National Centre for Seismology's Zone-V, meaning it is at a very high risk for earthquakes.
- One way of saving lives in case of a natural calamity is to reconnect with older methods of architecture and construction.

What is Uroosi?

- Uroosi, a Mughal-era home architectural element, is one such. Uroosis are wooden shutters used as partition walls within homes, instead of concrete walls.
- In Uroosi, wooden shutters could be rolled up to make one room, or rolled down from hanging grooves in ceiling chambers, to partition the space into separate areas.
- Uroosi work includes octagonal and decagonal ornamental pillars too. Jalali House is a landmark in Srinagar that has this architectural element.
- Uroosi is believed to be a Persian term meaning 'hidden bride'.

History:

- The introduction of Uroosi in Kashmir is traced to Mughal emperor Shah Jahan for the influence it still retains.
- It bears a resemblance to Japan's houses where wooden walls are used as partition walls. It has the ability to absorb seismic shocks and withstand it. These wooden walls also significantly reduce load on the structure.

Dhajji Diwari:

- Dhajji Diwari or 'patchwork quilt wall' in Persian, is another indigenous technique of earthquake-resistant construction.
- A criss-cross of thin timber frames is filled with mud mortar, stone, and ballast, but this too is waning in Srinagar.

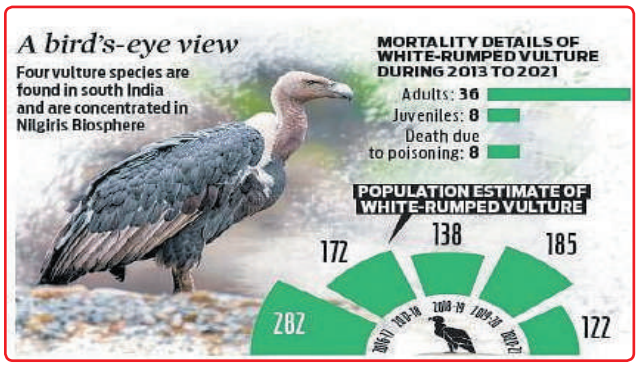
Way Forward:

- The people will go back to the traditional ways of home construction in the Valley.
- The only difference is that earlier it was deodar pine wood that was used extensively and now it's walnut.

FIRST SYNCHRONISED VULTURE SURVEY

Why in news?

- The Kerala Forest and Wildlife Department, with its counterparts in Tamil Nadu and Karnataka, is preparing to organise the first synchronised vulture survey in select regions of the Western Ghats on February 24, 25 and 26.



Background:

- Every year the Forest Departments in the three States were organising separate surveys at different times to count the remaining vulture population in South India. But this often resulted in duplications.

Key Highlights:

- The survey would simultaneously be organised in the three forest divisions, including the Wayanad Wildlife Sanctuary, and the South and North forest divisions.
- It will be conducted after dividing the Wayanad landscape, where the bird species are frequently sighted, into 10 locations.

Vulture population:

- Wayanad Wildlife Sanctuary, contiguous to the tiger reserves of Nagarhole and Bandipur of Karnataka and Mudumalai of Tamil Nadu, is the lone region where vultures thrive in Kerala.
- The sanctuary harbours nearly 120-150 white-rumped vultures and less than 25 red-headed vultures.
- The occasional sightings of long-billed vultures have also been reported in the sanctuary.

Threats:

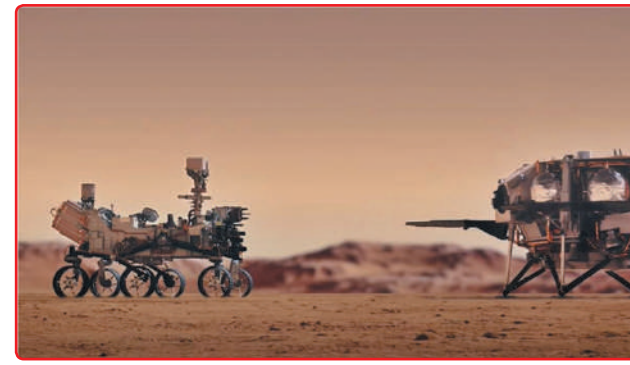
- Vultures faced a catastrophic population decline during the 2000s when the species was exposed to the anti-inflammatory drug diclofenac used as a painkiller for cattle.
- South Asia had about four crore white-rumped vultures until the end of the nineties. But the population has come down to less than 10,000.

SCIENCE & TECH

PERSEVERANCE ROVER MAKES HISTORY, CREATES FIRST SAMPLE DEPOT ON MARS

Why in news?

- Recently, the Perseverance rover has successfully created the first sample depot on the Mars Planet after dropping 10 titanium tubes to be brought to Earth on future missions.
- Ten sample tubes, capturing a variety of Martian geology, have been deposited on Mars' surface so that they could be studied on Earth in the future.
- The work has been completed in less than six weeks as NASA readies a mission to return samples from the Red Planet for detailed analysis.



"Three Forks" region:

- The samples have been dropped in the carefully arranged depot in the "Three Forks" region of Jezero Crater, which is believed to be the site of an ancient lake.
- The depot samples will serve as a backup set while the other half remain inside Perseverance, which would be the primary means to convey samples to a Sample Retrieval Lander as part of the campaign.

Samples:

- Astrobiologists believe that the igneous and sedimentary rock cores provide an excellent cross-section of the geologic processes that took place in Jezero shortly after the crater's formation almost 4 billion years ago.
- Apart from these rock samples, the rover has also dropped an atmospheric sample to determine if the samples being collected might be contaminated with materials that traveled with the rover from Earth.

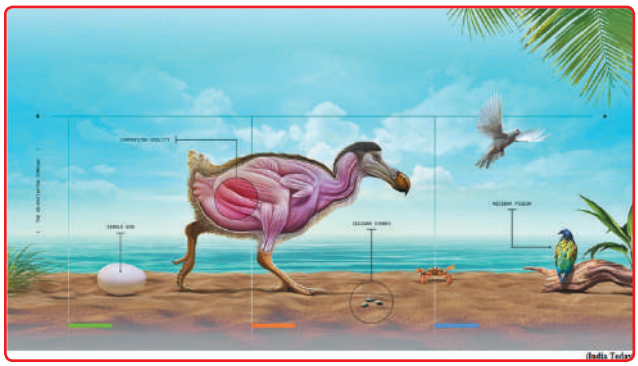
What's next for Perseverance rover on Mars?

- The rover has completed the Delta Front Campaign and is set to begin the Delta Top Campaign.
- One of the first stops the rover will make during the new science campaign is at a location called the "Curvilinear Unit."
- The unit is made up of sediments that were deposited in a bend in one of Jezero's inflowing river channels millions of years ago.

BRING BACK DODO: GENE COMPANY PLANS TO REVIVE BIRD THAT HAS BEEN DEAD FOR 350 YEARS

Why in news?

- It was in 1662 when humans last reported the sighting of the flightless bird Dodo. For over 350 years since then, the bird has remained extinct, but soon it could be brought back from the dead.
- Gene editing company Colossal Laboratories & Biosciences has now announced plans to resurrect the bird.



About Dodo:

- The last sighting of the bird was reported on the island of Mauritius, which is east of Madagascar in the Indian Ocean. While the bird was endemic to the region, it went extinct after humans arrived in the region in the mid-17th century.
- While humans encroached on their environment, they were also hunted by other species including monkeys, and rats and the threat of rising sea levels also contributed.

Habitat & Traits:

- Researchers believe that the volcanic island of Mauritius was the dodo bird's only home, likely due to its safety and plentiful resources. In fact, evolutionary traits indicate that living conditions were so ideal, the dodo bird ultimately became flightless and therefore, unable to leave.
- The bird used to reproduce by laying just one egg a year due to a stress-free environment.
- The bone structure suggests that chicks hatched sometime in or around August at an average height of 8 inches, growing very quickly into adulthood.
- The birds would feed on rocks along with fruit, nuts, seeds, bulbs, shellfish, and the occasional crab.

Resurrecting Dodo:

- The Dallas company, which launched in 2021, also announced it had raised an additional $150 million in funding. To date, it has raised $225 million from wide-ranging investors.
- The company is testing tools to tweak several parts of the genome simultaneously and working on technologies for what is sometimes called an artificial womb.
- They plan to study the DNA difference between the Dodo and its close relative the Nicobar pigeon to better understand what the genes are that really make a dodo.

Way Forward:

- They will then try to edit Nicobar pigeon cells to make them resemble dodo cells and attempt to put the tweaked cells into developing eggs of other birds, such as pigeons or chickens, to create offspring that may in turn naturally produce dodo eggs.
- The concept is still in an early theoretical stage for dodos.

BUDGET 2023-24: DEEP OCEAN MISSION GETS RS 600 CRORE

Why in news?

- The Centre's Deep Ocean Mission, which aims to explore marine biodiversity for the sustainable use of resources, has been allocated Rs 600 crore in the Union Budget 2023-2024.
- Oceans are storehouses of food, energy, minerals and medicines, according to the Ministry of Earth Sciences (MoES), which oversees the mission. It also modulates weather and climate.

Key Highlights:

- The MoES aims to allot money to a myriad of activities such as a manned submersible, ship-building, exploration and conservation of deep-sea biodiversity and identification of mineral deposits in the deep ocean.
- A manned submersible will be developed to carry three people to a depth of 6,000 metres in the ocean.
- The goal is to facilitate mineral exploration in the central Indian Ocean.
- Deep-sea mining involves extracting ores rich in cobalt, manganese, zinc and other rare metals from the sea floor. They contain critical minerals needed to build batteries for electric vehicles and renewable energy capacity, smartphones and laptops.

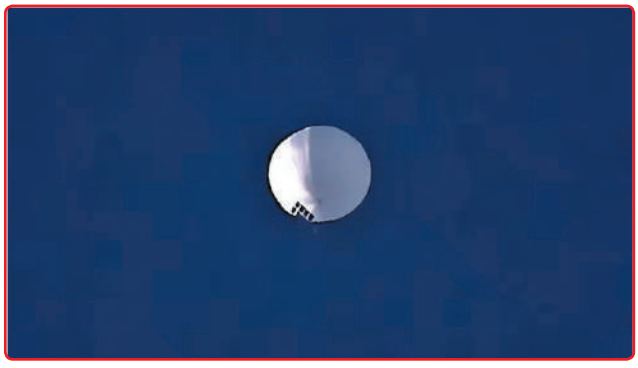
Deep Ocean Mission:

- In 2016, India was awarded a 15-year contract to explore an area of 75,000 square kilometres for mining polymetallic nodules from the Central Indian Ocean Basin at depths of 5,000-6,000 metres.
- The exploration studies of minerals will pave the way for commercial exploitation in the future.
- Under the deep ocean mission, Indian researchers are developing a technology for mining operations.
- The other components of the mission include developing ocean climate change advisory services and designing offshore Ocean Thermal Energy Conversion (OTEC) powered desalination plants.

WHAT IS A SPY BALLOON? THE WW-II RELIC CHINA HAS REPURPOSED

Why in news?

- Days ahead of a planned trip to China by US Secretary of State Antony Blinken, a Chinese spy balloon has been reported flying over the United States.
- While the US Air Force readied fighter jets to shoot it out of the sky, President was advised against doing it for fear of debris.
- The United States took custody of the balloon when it entered U.S. airspace and had observed it with piloted U.S. military aircraft.



What are spy balloons?

- The high-altitude balloons are the same as weather balloons deployed across the world to monitor changes in the local weather of the region. However, when it comes to spy balloons, their purpose is changed. These balloons operate 24,000-37,000 meters above the ground.
- The altitude that these balloons fly at is well above where commercial air traffic flies. Airliners almost never fly higher than 40,000 feet. The highest-performing fighter aircraft typically do not operate above 65,000 feet, although spy planes such as the U-2 have a service ceiling of 80,000 feet or more.
- The advantages of balloons over satellites include the ability to scan wide swathes of territory from closer in, and to be able to spend more time over a target area.
- Unlike satellites, which require space launchers that cost hundreds of millions of dollars, balloons can be launched cheaply.

WWII era:

- Spy balloons are not new and have been in use since World War II.
- Just after the end of the war, the US military started exploring the use of high-altitude spy balloons, which led to a large-scale series of missions called Project Genetrix.
- The project flew photographic balloons over Soviet bloc territory in the 1950s, according to government documents.
- During World War 2, the Japanese military tried to loft incendiary bombs into U.S. territory using balloons designed to float in jet stream air currents. While it did not damage military targets, it did cause civilian causalities.

Why is the matter sensitive?

- The spy balloon was trying to fly over the Montana missile fields, but the U.S. has assessed that it has "limited" value in terms of providing China with intelligence.
- It was not clear what the military was doing to prevent it from collecting sensitive information or what will happen with the balloon if it isn't shot down.

IIT-R DEVELOPS AIR NANO BUBBLE TECH TO REDUCE WATER USAGE IN TEXTILE SECTOR

Why in news?

- Recently, the Indian Institute of Technology, Ropar has developed an innovative green technology air nano bubble that can reduce the usage of water in the textile sector by up to 90 per cent.
- Textile is one of the most water-intensive industries and there is an escalating need to address the problem of managing water usage in the textile industry associated with contamination of water.

Water consumption in textile industry:

- As per rough estimate, 200-250 litres of water is required to process one kg of cotton fabric.
- The laboratory reports suggest that the air nano bubble dispersed in water can reduce the water consumption and chemical dosage by 90-95 per cent which ultimately saves 90 per cent of the energy consumption as well.
- In the textile industry, water is used at many steps required for fabric preparation, including for dyeing, finishing chemicals in textile substrates, desizing (process of removal of sizing material from yarn), scouring, bleaching, and mercerising (chemical treatment of fabric to enhance affinity towards dye.
- At the same time, the textile industry also produces the highest volume of waste water. The major source of water pollution is pre-treatment, dyeing, printing, and finishing of textile materials.

Nano bubble technology:

- The technology is based on nano bubbles of air and ozone. The bubbles are hydrophobic in nature therefore, interact better than water with the fabric and distribute chemicals and dyes in the fabric much more efficiently than just water.
- These bubbles are of a size equivalent to 1/10000th times of human hair. Ozone nano bubbles efficiently remove extra dye during fabric wash and degrade the dye in the water.
- Besides saving water consumption, water after processing with a nano bubble machine can be reused. Nano bubble serves as a carrier for the processing chemical and reduces the extra chemical required.
- Treatment of garment through this patented technology helps in maintaining its real colour for outdoor usage. It helps in obtaining 2-D effects, easy care, water repelling, and softening of fabric.

Way Forward:

- IIT Ropar has developed the eco-friendly technology under a start-up named NanoKritiPvt Limited, which is also working towards cleaning environment and is expanding in developing new applications ranging from water treatment to healthcare.

ADVANCED DRONE AIR TRAFFIC MANAGEMENT SYSTEM 'SKYE UTM' UNVEILED

Why in news?

- Recently, the Union Minister for Road Transport and Highways unveiled Skye UTM, touted as the most cutting-edge unmanned traffic management system in the world which is capable of handling 4,000 flights per hour and 96,000 flights per day.

What is Skye UTM?

- Skye UTM is a Cloud-based aerial traffic management system that integrates unmanned air traffic with the manned aviation airspace.
- Skye UTM has been built towards providing situational awareness, autonomous navigation, risk assessment, and traffic management to all drone/ other aerial mobility operators across the airspace.

Drone startup:

- The Ministry will soon invite participation from drone startups to be deployed for real-time monitoring and speed up highway constructions, and also keep a check on fatal road accidents.
- Drones are going to be used across sectors; from construction, agriculture, healthcare, defence, infrastructure, surveying, real estate, and transport.
- Drone companies will even monitor highways and road construction. There is a lot of research happening that will certainly help scale its usage

Advantages of Skye UTM:

- Skye UTM has supported more than 300 successful BVLOS (Beyond Visual Line of Sight) drone flights to date.
- The Skye UTM captures more than 255 parameters of UAV movements and stores them into its 'Blackbox' which is a published systematic description of the entire flight.
- The platform offers the first 3D view of the drone airspace, along with operations and regulations mapping servers which offer the latest airspace status, verified paths, and display real time UAV movements, said the company.

Way Forward:

- With the system's successful commercial debut in India, Skye UTM is now accessible to everyone and the traffic management system will also be introduced globally in the coming days.

DUST LAUNCHED FROM MOON COULD BE USED TO PROTECT EARTH FROM OVERHEATING

Why in news?

- As the world suffers from the impact of climate change, researchers have proposed a unique solution to prevent the planet from overheating.
- Dust launched from the surface of the Moon could reduce enough solar radiation to mitigate the impacts of climate change.
- Researchers have proposed adding that this dust could also be launched from a space station positioned between Earth and the Sun.

Details of the research:

- The study states that space-based approaches for

solar radiation management provide an alternative to reduce the effects of climate change. Objects in space that are well-positioned at the L1 Lagrange point between Earth and the Sun can efficiently shade our planet.

- For decades, scientists have considered using screens, objects, or dust particles to block just enough of the sun's radiation between 1 or 2% to mitigate the effects of global warming.
- Led by researchers from the University of Utah, theyanalyzed different properties of dust particles, quantities of dust, and the orbits that would be best suited for shading Earth.
- They found that launching dust from Earth to a way station at the "Lagrange Point" between Earth and the sun (L1) would be most effective but would require astronomical cost and effort.
- They suggest an alternative would be cost-effective, but it will involve launching lunar dust from the moon instead.

How study was conducted?

- In the first scenario, the team simulated shooting test particles along the L1 orbit, including the position of Earth, the sun, the moon, and other solar system planets. The simulation showed that when launched properly, the dust would follow a path between Earth and the sun, effectively creating shade, at least for a while.
- They then shot lunar dust from the surface of the moon toward the sun and found that the inherent properties of lunar dust were just right to effectively work as a sun shield.
- They tested how lunar dust scattered along various courses until they found excellent trajectories aimed toward L1 that served as an effective sun shield.

CURIOSITY ROVER MAKES STUNNING NEW DISCOVERY ABOUT MARS' WATERY PAST

Why in news?

- Recently, the Curiosity rover on the surface of Mars has made a stunning discovery. The scientists have found rippled rock textures on the surface suggesting an ancient lake once flowed where they had thought was a dry patch of land.

Details:

- Moving through the Gale crater on Mars, when Curiosity first reached the "sulfate-bearing unit" in 2022, scientists thought they'd seen the last evidence that lakes once covered this region.
- However, the rover has led to the discovery of the mission's clearest evidence yet of ancient water ripples that formed within lakes.

How ripples formed?

- Billions of years ago, waves on the surface of a shallow lake stirred up sediment at the lake bottom, over time creating rippled textures left in the rock.
- Scientists had earlier believed that the rock layers here formed in drier settings than regions explored earlier in the mission. The area's sulfates, salty minerals were thought to have been left behind when water was drying to a trickle.

Gediz Vallis:

- Scientists are also focusing on Gediz Vallis, an ancient valley that could harbour clues to the planet's watery past.
- Researchers said that while wind carved the valley, a channel running through it that starts higher up on Mount Sharp is thought to have been eroded by a small river.
- Scientists suspect wet landslides also occurred here, sending car-size boulders and debris to the bottom of the valley.

Background:

- The rover has been, since 2014, ascending the foothills of Mount Sharp, a 5-kilometer-tall mountain that was once laced with lakes and streams that would have provided a rich environment for microbial life if any ever formed on the Red Planet.
- It is made up of layers and as the rover moves up the newly formed layers allow scientists to study how Mars evolved from a planet that was more Earth-like in its ancient past, with a warmer climate and plentiful water, to the freezing desert it is today.

What's next?

- The rover has found rippled rock textures, which are so hard that it has been unable to drill into them. Scientists will be looking for softer rock in the week ahead.
- But even if they never get a sample from this unusual strip of rock, there are other sites they're eager to explore.

INDIA LONG ENDURANCE UAV TO MAKE FLYING DEBUT AT AERO INDIA SHOW

Why in news?

- The DRDO-developed Medium Altitude Long Endurance class unmanned aerial vehicle TAPAS-BH (Tactical Aerial Platform for Advanced Surveillance

- Beyond Horizon) will make its flying debut at 'Aero India'.
- The TAPAS-BH will showcase its capabilities and there will be static as well aerial displays.

TAPAS-BH:

- TAPAS is DRDO's solution to the tri services ISTAR (intelligence, surveillance, target acquisition, and reconnaissance) requirements. The UAV is capable of operating at altitudes up to 28000 feet, with an endurance of 18 plus hours.
- TAPAS-BH, which would make its first public flight, can carry a variety of payloads up to a maximum of 350 kg.

Display at 'Aero India':

- DRDO would display products on Aeronautical Systems, Missiles, Armaments, Electronics, Micro Electronic Devices and Computational Systems, Soldier Support Technologies, Life-sciences, Naval & Material Science amongst others.
- The DRDO pavilion will showcase over 330 products categorised into 12 zones including Combat Aircraft & UAVs, Missiles & Strategic Systems, Engine & Propulsion Systems, Airborne Surveillance Systems, and Sensors Electronic Warfare & Communication Systems, it was stated.

DRDO ASKS INDUSTRY TO JOIN FIFTH GENERATION FIGHTER DEVELOPMENT

Why in news?

- The Aeronautical Development Agency (ADA), under the Defence Research and Development Organisation, has invited Indian industry players to join the development and manufacture of the indigenous fifth generation fighter jet, the Advanced Medium Combat Aircraft (AMCA).

Details:

- Based on the success of the indigenous light combat aircraft, the Centre has entrusted the Agency with the design of a new fighter jet for the Indian Air Force, which will be a fifth generation, medium-weight, multi-role and twin-engine aircraft.

AMCA:

- The AMCA is envisaged as a 25-tonne twin-engine stealth aircraft with an internal weapons bay and diverterless supersonic intake, which has been developed in India for the first time.
- It is intended to have an internal carriage of 1,500 kg of payload and 5,500 kg of external payload with 6,500 kg of internal fuel.

LCA-Mk2:

- In September, 2022 the Cabinet Committee on Security sanctioned the development of the LCA-Mk2, a new light combat aircraft, at a development cost of 9,000 crore, of which 2,500 crore has already been spent.
- The first prototype is expected to roll out in 2025-26 with the first flight planned for 2026-27.
- The LCA-Mk2 will be a heavier and much more capable aircraft than the current light combat variants as well as the LCA-Mk1A, 83 of which have been contracted under a ₹ 48,000-crore deal with the Hindustan Aeronautics Ltd. The IAF has given a commitment to procure six squadrons of the LCA-Mk2.

Background:

- India's ambitious effort to build an indigenous fifth generation fighter, which only a handful of countries have accomplished, is in the critical design review phase and is now awaiting approval from the Cabinet Committee on Security.
- In 2009, the Union government had allocated ₹ 90 crore for a feasibility study on designing a fifth generation fighter, with an additional ₹ 447 crore sanctioned later.
- One the project is sanctioned, the first prototype could be rolled out in three years, with the first flight expected to take place in a year to a year-and-a-half after that.
- Hindustan Aeronautics Ltd., the production agency for the project, has already begun manufacturing activities.

SCIENTISTS REPORT FINDING A THIRD NATURAL SOURCE OF QUASICRYSTALS

Why in news?

- Scientists have reported finding only the third natural source of quasicrystals, a material once deemed impossible and whose unusual properties scientists are still unravelling.

Quasicrystal:

- In a crystal, the atoms are arranged in a pattern that periodically repeats itself. A quasicrystal's atoms are arranged in a pattern that repeats itself at irregular intervals.
- Quasicrystals were discovered in the lab in 1982. In the late 1990s, scientists began looking for quasicrystals in nature.

Findings in 2009:

- After a decade-long quest, Luca Bindi, Paul Steinhardt, and others reported finding the first natural quasicrystal in 2009 as microscopic grains in a piece of the Khatyrka meteorite in the Koryak mountains of Russia.
- This meteorite was involved in several collisions in space over millions of years, heating and pressurising it to a great degree and creating the quasicrystals.
- The discovery inspired a series of experiments in which physicists used 'shock synthesis' to create new varieties of quasicrystals in the lab.

Findings in 2021:

- In 2021, they reported finding a quasicrystal in the remains of the first nuclear weapon test, conducted on July 16, 1945, in New Mexico.
- They wrote that the material "was found in a sample of red trinitite, a combination of glass fused from natural sand and anthropogenic copper from transmission lines used during the test."

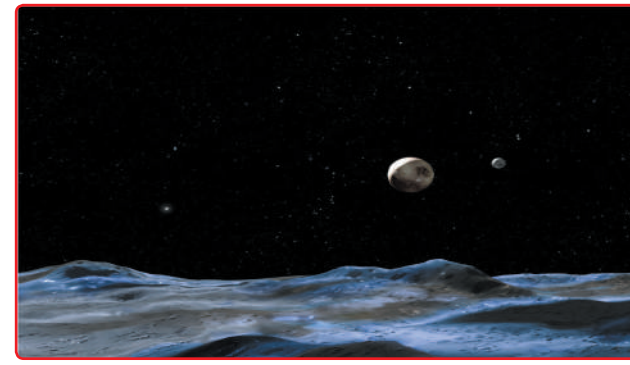
Recent research:

- Recently, in December 2022, they reported that in the wind-blown dunes of northern Nebraska, they had uncovered a metallic fragment in a long, tube-shaped mass of sand heated and fused by a heavy electric current. They also noticed a power line nearby had fallen to the ground.
- That's where the metal could have come from, but they couldn't tell where the current had originated: in the power line or as a lightning strike on a stormy night.
- Whatever the source, it had melted the quartz at the site and formed a silicate glass, a process that needs to happen at least 1,700° C. The metallic portion was a mass of aluminium, chromium, manganese, nickel, and silicon.
- When placed under a powerful electron microscope, they spotted a dodecagonal quasicrystal, rare even for quasicrystals.

THERE COULD BE AN OCEAN AT THE EDGE OF OUR SOLAR SYSTEM ON PLUTO'S MOON

Why in news?

- Recently, researchers have estimated that there could be an ocean under the surface of Charon, a moon at the edge of the Solar System.
- Charon is part of the Pluto system, which was discarded as a planet over a decade ago.



Details:

- The New Horizons spacecraft encountered the Pluto-Charon system in 2015 and analysis of data has now revealed that there are geologically active objects instead of the inert icy orbs previously envisioned.
- The team from Southwest Research Institute tried to understand the source of cryovolcanic flows and belt of fractures on Pluto's large moon Charon.

Key observations:

- What they found was that the cracks may have been caused by the subsurface frozen ocean, which is bursting through.
- The new model suggests that when the moon's internal ocean froze, it may have formed deep, elongated depressions along its girth. However, it was less likely to lead to cryovolcanoes erupting with ice, water, and other materials in its northern hemisphere.
- The study states that a combination of geological interpretations and thermal-orbital evolution models implies that Pluto's large moon, Charon, had subsurface water and possibly an ammonia ocean that eventually froze.

How the ocean beneath Charon froze?

- They modeled how fractures formed in Charon's ice shell as the ocean beneath it froze. They modeled oceans of water, ammonia, or a mixture of the two based on questions about the makeup.
- When fractures penetrate the entire ice shell and tap the subsurface ocean, the liquid, pressurized by the

increase in the volume of the newly frozen ice, can be pushed through the fractures to erupt onto the surface.
- Either Charon's ice shell was less than 6 miles (10 km) thick when the flows occurred, as opposed to the more than 60 miles or 100 km indicated, or the surface was not in direct communication with the ocean as part of the eruptive process.
- If Charon's ice shell had been thin enough to be fully cracked, it would imply substantially more ocean freezing than is indicated by the canyons identified on Charon's encounter hemisphere.

Way Forward:
- Ocean freezing also predicts a sequence of geologic activity, in which ocean-sourced cryovolcanism ceases before strain-created tectonism and a more detailed analysis of Charon's geologic record could help determine whether such a scenario is viable.

RARE AUBRITE METEOR THAT CRASHED IN GUJARAT COULD SHED LIGHT ON EVOLUTION OF PLANETS

Why in news?
- Recently, researchers have confirmed that a meteorite that crashed in two villages of Gujarat is a rare aubrite that originated from an extremely reduced differentiated parent body in our solar system.

Details:
- This rare element had similar and unique characteristics of highly reducing conditions on the surface of planet Mercury and it could prove important for understanding planetary processes in the future.
- The specimens of the meteorite fragments appeared as regolith and were similar in both locations, suggesting that they were likely part of a single meteorite mass before breaking during its passage through the Earth's atmosphere.

Where was the meteorite found?
- The meteorites fell in the villages Rantila and Ravel of Diyodar taluka in Banaskantha district, Gujarat. Dubbed the Diyodar meteorite, the fragments crashed over India on August 17, 2022, in soft, clayey agricultural land. While villagers did not witness any trail, a thunderous sound was heard, like the passing of a jet plane.
- While one of the fragments hit a neem tree branch and further split into smaller bits, the other big chunk crashed into a porch in Ravel village. Villagers then collected the large pieces immediately after the fall, which were around 200 grams that were handed over to scientists from the Physical Research Laboratory.
- Villagers said that the meteorite fragments yielded a strong, pungent smell similar to the sulfur gas. Analysis of the trajectory also indicated that there could be more fragments in between and away from these villages along the trajectory of the meteorite.

Key Findings:
- Researchers used reflectance spectroscopy to analyse the chunks of the meteor and found that it contained magnesium-rich pyroxene. The team polished a few small chips (0.5–1.5 cm) from the larger fragment of the Diyodar meteorite to conduct chemical analysis.
- The analysis revealed that the meteorite is a rare, unique specimen of aubrite, which is the rare achondrite group of meteorites.
- Aubrites contain sulfides of calcium, chromium, manganese, titanium, and sodium, all normal lithophile elements and silicon-bearing FeNi metal. They share a similar highly reduced nature, unusual mineralogy, and oxygen-isotopic composition with enstatite chondrites.

Background:
- The Indian subcontinent witnessed an exceptional record of meteorite falls.
- However, this is the second reported aubrite fall in India, after the Bustee fall in 1852 at Gorakhpur, Uttar Pradesh

DEEP-SEA MINING MAY DISRUPT WHALE COMMUNICATION, STUDY FINDS

Why in news?
- Noise produced by mining the seabed for nickel, cobalt and other metals for the green energy transition could interfere with whales' ability to navigate the ocean depths and communicate with one another, according to a recent study.
- The study argues that more research is needed to assess the risk deep-sea mining could pose to large marine mammals, although researchers did not collect field data themselves.

Why it matters?

- Potato-sized rocks filled with battery metals blanket vast swathes of the ocean floor at depths of 4 to 6 kilometers (2.5 to 3.7 miles). Several companies have proposed to essentially vacuum those nodules from the seabed and process their metals for use in electric vehicle batteries.
- The International Seabed Authority (ISA), a Jamaica-based United Nations body, may approve deep-sea mining for international waters as soon as this summer. Leaders in France, Fiji, Canada and Germany have voiced concerns about the practice.

Ongoing project:

- Supporters of deep-sea mining say it would lessen the need for large mining operations on land, which are often unpopular with host communities.
- The Metals Company Inc (TMC.O) and others are pushing ahead with plans to extract these nodules from the Clarion Clipperton Zone, an ocean region in the northern Pacific where the ISA has granted 17 seabed mining exploration licences.
- An estimated 22 to 30 cetacean species, including endangered blue whales, live in the area.

Way Forward:

- Previous research on ocean noise has found whales can suffer negative effects from deep-sea mining. One study found man-made noise could increase the risk of humpback whale mothers being separated from their calves because their normal vocalisations are quiet.
- Far more research is needed to determine how deep sea mining could affect aquatic ecosystems.

INDIAN SCIENTISTS REVEAL UNIQUE DETAIL ABOUT HOW OUR MOON EVOLVED

Why in news?

- Recently, the scientists at the Physical Research Laboratory in Ahmedabad have found unique evidence pointing to the evolutionary process of the Moon.

Key Findings:

- They found signs of a fundamental shift in the melting process on the Moon between 3.9 to 3.3 billion years ago.
- The new evidence points to the thermal evolution of the Moon as its interior melted in the form of basalt magmatism.
- The new findings challenge currently proposed scenarios for the generation of basalts on the surface, which were found in the samples returned to the Earth by Apollo missions.

Details:

- They found the unique group of ancient lunar basaltic meteorites had a very low abundance of KREEP (potassium, rare-earth elements, and phosphorus).
- This suggests that these meteorites must have come from a region different from the Procellarum KREEP Terrane (PKT) on the Moon and that there could be alternative ways of melting on the Moon.
- The sample return missions have provided the basis for understanding the thermochemical evolution of the Moon. Mare basalt sources are likely to have originated from the partial melting of the lunar magma ocean and then cumulating after solidification from an initially molten state.
- Analysis of the samples demonstrated that these basalts were generated at lower temperatures and shallower depths than typical Apollo mare basalts.
- The Indian Space Research Organisation said that these basalts must be a result of low-pressure melting in the Moon, similar to those in other terrestrial bodies, such as Earth and Mars.

Sources of the study:

- A team of scientists from India, the USA, and Japan have studied samples from lunar meteorite Asuka-881757, which was found in 1988 in Antarctica, lunar meteorite Kalahari 009 found in 1999 at the Kalahari Desert in South Africa, and samples collected by the Russian Luna-24 mission.

NORTH INDIA FIRST NUCLEAR PLANT

Why in news?

- North India's first Nuclear Plant is coming up in

Haryana in the town of Gorakhpur, which is about 150 km north of the national capital of New Delhi.

- Earlier the Nuclear/ Atomic Energy plants in other parts of the country, which were earlier confined mostly to the South Indian States like Tamil Nadu and Andhra Pradesh or in the west in Maharashtra.

GHAVP:

- Gorakhpur Haryana Anu Vidyut Pariyojana's (GHAVP) having two units of 700 MWe capacity each of Pressurised Heavy Water Reactor (PHWR) indigenous design is under implementation near Gorakhpur village in Fatehabad district in Haryana.
- Construction of Water Duct from Tohana to GHAVP for meeting operational cooling water requirements has been taken up through Haryana Irrigation & Water Resources Department (HI&WRD) as deposit work and progressing well.

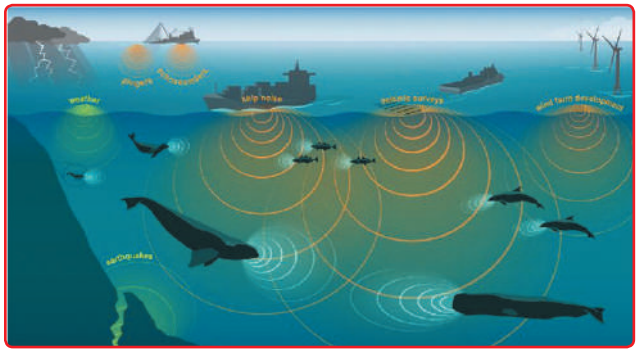
Way Forward:

- The Department of Atomic Energy, has also been given permission for forming joint ventures with PSUs for resources to opening up of atomic energy plants, which is an upcoming and promising sector, having potential to fulfill India's all energy needs in times to come.

UNDERWATER NOISE EMISSIONS POSE THREAT TO MARINE LIFE

Why in news?

- The rising man-made (anthropogenic) underwater noise emissions (UNE) from ships in the Indian waters are posing a threat to the life of marine mammals like Bottlenose dolphin, Manatees, Pilot whale, Seal and Sperm whale.



How UNE impact marine creatures?

- A knowledge of their hearing capabilities is vital to understanding their auditory system.
- The main form of energy for multiple behavioural activities of marine mammals, which include mating, communal interaction, feeding, cluster cohesion and foraging, is based on sound.
- However, the sound that radiates from ships, on a long-term basis, affects them and results in internal injuries, loss of hearing ability, change in behavioural responses, masking, and stress. There are Acute and Chronic noise categories in the emissions.

Masking:

- The frequencies of ships' underwater self-noise and machinery vibration levels are overlapping the marine species' communication frequencies in the low frequency range of less than 500 Hz.
- This is called masking, which could have led to a change in the migration route of the marine species to the shallow regions and also making it difficult for them to go back to the deeper water.

UNE levels in Indian waters:

- The UNE or underwater sound pressure levels in the Indian waters are 102-115 decibels, relative to one microPascal (dB re 1Pa).
- The East Coast level (10 dB re 1Pa) is slightly higher than that of the West. There is an increase by a significant value of about 20 dB re 1Pa.

How study was conducted?

- Continuous shipping movement is identified to be a major contributor to the increase in the global ocean noise level, according to a new study titled "Measuring Underwater Noise Levels Radiated by Ships in Indian Waters" at the Visakhapatnam Port (for the East) and Goa's Mormugao port (for the West).
- The measurement of the ambient noise levels was carried out by deploying a hydrophone autonomous system around 30 nautical miles from the Goa coastline. The depth of deployment of the sensor was 11 metres in a water depth of 22 metres.
- The single-channel hydrophone was deployed at different locations with in-water depth of 18 metres with a deployment depth of 3 and 5 metres off Visakhapatnam port.

MOUNTAIN ON MOON NAMED AFTER MATHEMATICIAN MELBA MOUTON WHO LED 'HUMAN COMPUTERS'

Why in news?

- Recently, NASA has named a mountain on the Moon in the honour of mathematician Melba Mouton for her immense contribution that paved way for operating satellites in space.

Location of the mountain named after her:

- The flat moon mountain is located near the water-rich lunar South Pole.
- The lunar South Pole is a target for landing the Artemis missions, which will mark the return of humans to the lunar surface in over half a century.
- The name has been proposed by the team of the Volatiles Investigating Polar Exploration Rover (VIPER) mission to the International Astronomical Union (IAU).

Key Highlights:

- The newly named mountain on the Moon is adjacent to the western rim of the Nobile Crater, on which VIPER will land and explore during its approximately 100-day mission as part of NASA's Artemis program.
- The flat-shaped moon named after the mathematician was created over billions of years by lunar impacts, which sculpted it out of its surroundings.
- Mons Mouton stands as tall as Denali, the tallest mountain in North America approximately 20,000 feet higher than its neighboring features on the Moon's South Pole.

Who was Melba Mouton?

- Melna Mouton was one of the leading mathematicians of the 'Hidden Figures' era of NASA. Being black, she was first employed at NASA in 1959, just a year after the space agency was established.
- She became the head mathematician who led a group of "human computers," who tracked the Echo 1 and 2 satellites, launched into Earth's orbit in 1960 and 1964, respectively.
- She was also the head programmer responsible for the Mission and Trajectory Analysis Division's Program Systems Branch. Her team coded computer programs used to calculate spacecraft locations and trajectories, giving NASA the ability to track spacecraft while in orbit.
- In a career spanning 14 years at NASA, Mouton also served as the assistant chief of research programs for the Trajectory and Geodynamics Division at Goddard. Her work was instrumental in the landing and safe return of the Apollo 11 mission to the Moon.

JAPANESE STARTUP UNVEILS BALLOON FLIGHT FOR SPACE VIEWING TOURS

Why in news?

- A Japanese startup is to launch commercial space viewing balloon flights that it hopes will bring an otherwise astronomically expensive experience down to Earth.

Details:

- The company, Iwaya Giken, based in Sapporo in northern Japan, has been working on the project since 2012 and says it has developed an airtight two-seat cabin and a balloon capable of rising up to an altitude of 25 kilometers (15 miles), where the curve of the Earth can be clearly viewed.
- While passengers won't be in outer space, the balloon only goes up to roughly the middle of the stratosphere, they'll be higher than a jet plane flies and have an unobstructed view of outer space.

How it works?

- Unlike a rocket or a hot air balloon, the Iwaya Giken vessel will be lifted by helium that can be largely reused, and flights will safely stay above Japanese territory or airspace.
- The balloon, which can carry a pilot and a passenger, would take off from a balloon port in Hokkaido, rise for two hours to as high as 25 kilometers (15 miles) and stay there for one hour before a one-hour descent.
- The drum-shaped plastic cabin is 1.5 meters (4.9 feet) in diameter and has several large windows to allow a view of space above or the Earth below.

SpaceX:

- While Japanese space ventures have fallen behind U.S. companies like SpaceX, the aim is to make space more reachable.
- SpaceX launched three rich businessmen and their astronaut escort to the International Space Station in April for $55 million each, the company's first private charter flight to the orbiting lab after two years of carrying astronauts there for NASA.

What's next?

- The first trip is planned as early as later 2023.

SCIENTISTS DISSECT 3,500-YEAR-OLD BEAR DISCOVERED IN SIBERIAN PERMAFROST

Why in news?

- A brown bear that lay almost perfectly preserved in the frozen wilds of eastern Siberia for 3,500 years has undergone a necropsy by a team of scientists after it was discovered by reindeer herders on a desolate island in the Arctic.

Etherican brown bear:

- The female bear was found by reindeer herders in 2020 jutting out of the permafrost on Bolshoy Lyakhovsky Island, part of the New Siberian archipelago around 4,600 km east of Moscow.
- Because it was found just east of the Bolshoy Etherican River, it has been named the Etherican brown bear.
- The extreme temperatures helped preserve the bear's soft tissue for 3,460 years, as well as remains of its final repasts - bird feathers and plants.
- The bear is described as being 1.55 metres (5.09 ft) tall and weighing nearly 78 kg (172 pounds).

How dissection was done?

- They cut through the bear's tough hide, allowing scientists to examine its brain, internal organs and carry out a host of cellular, microbiological, virological and genetic studies.
- The pink tissue and yellow fat of the bear was clearly visible as the team dissected the ancient beast.
- They also sawed through its skull, using a vacuum cleaner to suck up the skull bone dust, before extracting its brain.

Observations made:

- Genetic analysis has shown that the bear does not differ in mitochondrial DNA from the modern bear from the north-east of Russia – Yakutia and Chukotka.
- The bear was probably aged about 2-3 years. It died from an injury to its spinal column.

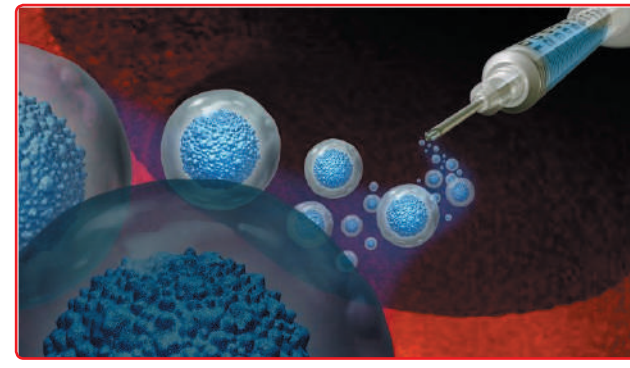
Significance:

- The Lyakhovsky islands contain some of the richest palaeontological treasures in the world, attracting both scientists and ivory traders hunting for woolly mammoths.
- For the first time, a carcass with soft tissues has fallen into the hands of scientists, giving us the opportunity to study the internal organs and examine the brain.

STEM CELL TRANSPLANT CURING HIV

Why in news?

- Recently, the Düsseldorf patient, a 53-year-old German man, has been labelled as the third person to have been 'cured of HIV (Human Immunodeficiency Virus)'.
- Even four years after quitting the medication, the virus is still undetectable in his body.
- This has been made possible with a bone-marrow transplant from a person carrying a specific HIV-resistant genetic mutation.



Successful cases:

- Timothy Ray Brown, referred to as the Berlin patient, got two stem cell transplants in 2007 and 2008 to cure his blood cancer, and as a result, he became the first person to successfully overcome HIV. His physicians chose a donor with two copies of the CCR5-delta 32 genetic mutation since the mutation is known to render carriers nearly resistant to HIV. Until his death in 2020 from cancer, he never had HIV.
- Years later, researchers reported similar results in Adam Castillejo, a patient from London, who underwent the same treatment for the first time in 2019. Four years after he stopped using the anti-retroviral medications that regulate the amount of the virus in the body, the Düsseldorf patient, who also received a transplant for blood cancer, has continued to be HIV-free.
- In 2022, there were two further cases of "The City of Hope patient" and "New York patient."

CCR5 mutation and how does it work against HIV?

- The CD4 immune cells in the human body are the primary targets of HIV, which makes it harder for a person to fend against secondary infections.
- The HIV virus enters the body through the CCR5 receptors on the surface of CD4 immune cells. However, the CCR5-delta 32 mutation blocks the formation of these surface-bound HIV viral receptors, by effectively closing the passage.

- Just one per cent of the world's population has the CCR5-delta 32 mutation in two copies, which means they acquired it from both parents. 20 per cent of people, mostly those of European heritage, have the mutation in one copy. Those who carry the mutation are therefore almost resistant to the virus.

Are transplants a solution to the HIV crisis?

- Finding a compatible donor in the first instance would be extremely challenging given the mutation's rarity and the almost 38.4 million individuals living with HIV worldwide, according to the World Health Organisation (WHO).
- The donor pool for many, especially those from nations with high HIV prevalence, reduces even more when the mutation occurs mostly in Caucasians.
- Yet, experts think it is extremely improbable that bone marrow transplants could be made available to everyone with HIV, even if donors were to become available.
- This is due to the fact that it is a significant surgery with significant dangers, particularly the chance of the recipient rejecting the given bone marrow.
- Also, there is a chance that the virus will evolve and find new ways to infiltrate cells.

What are the currently available treatments for HIV?

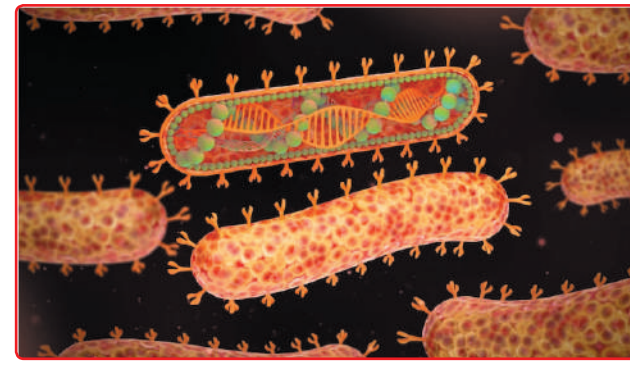
- Despite the fact that there are currently no treatments for the infection, antiretroviral medication can be used to control the disease. These drugs prevent the virus from replicating within the body, enabling the number of CD4 immune cells to increase once more.
- Although the government's programme used to solely provide medications to people with low CD4 counts, it now supports anybody who has been diagnosed with HIV.
- As the virus is still present in the body's reservoirs, the medications must be taken for the rest of one's life. The virus can once more begin multiplying and spreading if the medications are stopped. It is less likely for someone to spread the virus when viral levels are low.

HEALTH

MARBURG DISEASE OUTBREAK CONFIRMED IN EQUATORIAL GUINEA

Why in news?

- Recently, the World Health Organisation (WHO) has confirmed the first case of Marburg virus, a highly deadly disease, in Equatorial Guinea. The virus which is similar to the deadly Ebola caused the death of nine people.
- Cameroon has also restricted movement along the border. Over 16 suspected cases of Marburg virus have been reported in Equatorial Guinea with symptoms including fever, fatigue and blood-stained vomit and diarrhoea.



What is Marburg Virus Disease?

- As per WHO, the Marburg virus disease (MVD) is a highly virulent disease that causes haemorrhagic fever. The fatality ratio of the disease after contracting it is up to 88 per cent.
- In 1967, two large outbreaks of Marburg disease occurred simultaneously in Frankfurt, Germany and Belgrade, Serbia. The disease was associated to African green monkeys (Cercopithecus aethiops) imported by Uganda.
- Marburg virus disease results from prolonged exposure to mines or caves inhabited by Rousettus bat colonies.

Transmission:

- WHO reports that once a person is infected with the virus, it can spread through human-to-human transmission via direct contact like broken skin or mucous membranes, with blood, secretions, organs or other bodily fluids.
- It can also spread with surface materials contaminated with these fluids.

What are the symptoms of Marburg Disease?

- An infected individual will have a high fever, severe headache and severe malaise (discomfort). Muscle aches and pains are also seen.
- Other symptoms include vomiting, cramping, abdominal pain, and diarrhoea on the third day of infection. The appearance of patients at this phase has been described as showing “ghost-like” drawn features, deep-set eyes, expressionless faces and extreme lethargy.
- Many patients even develop severe haemorrhagic manifestations within 7 days and fatal cases include bleeding from multiple areas. The involvement of the central nervous system could cause confusion.

Treatment:

- There is no approved vaccine for Marburg virus disease to date. Experimental vaccines are in the initial phase of clinical studies.
- The diagnosis of Marburg virus disease (MVD) could

be difficult to distinguish from other infectious diseases.
- Treatment involves supportive care like rehydration with oral or intravenous fluids. However, there is no proven treatment available yet. Potential treatments including blood products, immune therapies and drug therapies are currently being evaluated.

CULTURE

ASI DECIDES TO FORM SPECIAL PANEL TO TRACE AND CERTIFY 24 'MISSING' MONUMENTS

Why in news?
- The Archaeological Survey of India (ASI) has decided to form a special committee to trace and certify 24 protected monuments which have gone "missing".
- The decision comes after repeated red flags by a parliamentary committee as well as criticism from the Economic Advisory Council to the Prime Minister.

Key Highlights:
- There are at present 3,693 Centrally protected monuments and sites in the country.
- The committee would be formed of internal experts of the ASI and would be headed in all probability by the Director-General of the ASI.
- It would survey the missing 24 monuments and certify them as 'found' or 'not found'.
- In case a monument is 'not found', then a process would be initiated to denotify them through the parliamentary procedure.

Background:
- The report of the CAG in 2013 stated that 92 protected monuments were missing. However, the ASI has traced 68 monuments and 24 are not yet traced.
- Citing a performance audit of the Comptroller and Auditor-General of India (CAG) which had included a joint physical inspection along with the ASI of over 1,655 monuments and sites, the Rajya Sabha Standing Committee on Transport, Tourism and Culture said it was "perturbed" to find that the Barakhamba Cemetery in the very heart of the capital city was among the untraceable monuments.
- Some of the other missing monuments are the ruins of a temple circle in Uttar Pradesh's Mirzapur dating to AD 1000, two Kos Minars (one in Faridabad's Mujesar and the other in Kurukshetra's Shahabad), a 12th century temple in Rajasthan's Baran and the InchlaWaliGumti at MubarakpurKotla in the capital.

GEO-SCIENCES COMMUNITY CALLS FOR BROAD PANEL OF EXPERTS TO POWER HERITAGE BILL

Why in news?
- A draft Bill, aimed at protecting India's geological heritage has raised alarm in India's geo-sciences and palaeontology community.

Details:
- The Draft Geo-heritage Sites and Geo-relics (Preservation and Maintenance) Bill, 2022, while deemed necessary by several researchers, vests powers entirely in the Geological Survey of India (GSI), a 170-year-old organisation that comes under the Ministry of Mines.
- Provisions of the Bill give it the power to declare sites as having 'geo-heritage' value, take possession of relics (fossils, rocks) that rest in private hands, prohibit construction 100 metres around such a site, penalise with fines up to ₹ 5 lakh and possibly imprisonment; vandalism, defacement, and violations of directives of a site by the Director General of GSI.
- Other than protecting places of geological interest, the need for a law that specifically protects sites of geo-heritage value follows from India being a signatory to the UNESCO Convention concerning the Protection of the World Cultural and Natural Heritage, since 1972.

Concerns:
- The scientists alleged that the bill was prepared without consulting them and was completely different from what they had proposed in 2019 to the Prime Minister's Office after a national level consultation of experts on the need to preserve geo-heritage sites, many of which are also rich in fossils.
- Rather than have all authority in the Director

General, GSI, there needs to be a broader committee of experts from a wider range of institutions. This would mean that the interests and difficulties faced by researchers, who actually work in the field, are kept in mind.

What are Geoheritage sites?

- Geoheritage sites are sites of rare and unique geological, geo-morphological, mineralogical, petrological, and paleontological significance including caves, natural rock-sculptures of national and international interest.
- Geo-relics are any relic or material of geological significance, sediments rocks, minerals, meteorites or fossils.
- The dinosaur remains of Madhya Pradesh and Gujarat, marine fossils of Kutch and Spiti, wood fossils of Gondwana, oldest life forms oldest life forms (stromatolites) of Rajasthan and Madhya Pradesh and vertebrate fossils of Siwaliks are some of such geoheritage sites.

Limitations:

- The GSI has identified 32 geo-heritage sites for protection and maintenance, but its efforts were hampered due to absence of an enabling law because such sites are threatened not only by the natural cause of decay but also by population pressure and changing socio-economic conditions.
- The scientists point out that GSI's own track records are far from being satisfactory. The track record of GSI in maintaining sites under its control like Saketi Fossil Park in Himachal Pradesh and Rahioli Dinosaur Park in Gujarat leaves much to be desired.
- Material excavated in Rahioli in 1983-1984 lay unattended in various GSI offices for nearly 20 years or so and in the process a lot of material was lost.

1,300-YEAR-OLD BUDDHIST STUPA FOUND IN ODISHA'S JAJPUR

Why in news?

- Recently, the Archaeological Survey of India (ASI) stumbled upon a 1,300-year-old stupa.

Key Highlights:

- The stupa could be 4.5-metre tall and initial assessment showed that it may belong to the 7th or 8th century.
- The archaeological asset was found at Parabhadi, which is situated near Lalitagiri, a major Buddhist complex, having a large number of stupas and monasteries.
- It has been found right in the middle of a mining site in Odisha's Jajpur district from where Khondalite stones were supplied for the beautification project around the 12th century Shree Jagannath Temple in Puri.

Khondalite stones:

- Khondalite stones were widely used in ancient temple complexes. The State government had come up with an ambitious plan to spend 3,208 crore under the Augmentation of Basic Amenities and Development of Heritage and Architecture (ABADHA) scheme in three years to transform Puri into a world heritage city.
- Khondalite stones are proposed to be used widely to maintain aesthetic value of some projects such as the heritage security zone, the Jagannath Ballav pilgrim centre, Puri lake development project, the Atharnala heritage project and the Matha Development Initiative.
- Sukhuapada was the biggest of six Khondalite stone blocks reserved for the OMC. While Khondalite mining is being undertaken across 78.3 acres at Sukhuapada, other sites include Teligarh (27.5 acres), Gobindpur (20.3 acres), Chandia (4 acres), KundakundiKunda stone quarry (4.67 acres) and Kurumpada decorative stone quarry (1.67 acres) in Khordha district.

What's next?

- After discovery of the Buddhist stupa from the mining site, the ASI intervened and asked the Odisha government to stop mining through its Odisha Mining Corporation (OMC). The mining has since stopped.
- The newly discovered stupa was possibly disfigured in an earlier period. The ASI would now attempt to fully retrieve the structure's archaeological heritage, restore it to its original form and undertake protection of the site.

MISCELLANEOUS

PM INAUGURATES 200TH JAYANTI CELEBRATIONS OF MAHARISHI DAYANAND SARASWATI

Why in news?

- Recently, the Prime Minister inaugurated the year-long celebrations commemorating the 200th birth anniversary of Maharishi Dayanand Saraswati, at Indira Gandhi Indoor Stadium in Delhi.
- He also released a logo for commemoration.

Key Highlights:

- He handed over the LED Mashal to youth representatives as a symbolic carry forward of the spark ignited in this programme reinforcing the messages of Maharshi Dayanand Saraswati to the rest of India and the world.
- He underlined that the auspicious occasion will be celebrated for two years.

Background:

- Born on 12th February 1824, Maharishi Dayanand Saraswati was a social reformer who founded Arya Samaj in 1875 to counter social inequities prevalent during the times.
- Arya Samaj has played a crucial role in the cultural and social awakening of the country through its emphasis on social reforms and education.
- His main message was for Hindus to go back to the roots of their religion, which are the Vedas. By doing this, he felt that Hindus would be able to improve the depressive religious, social, political, and economic conditions prevailing in the country in his times.

Politics:

- For instance, he was the first to give the call for 'Swarajya' as 'India for Indians' in 1876, later taken up by Lokmanya Tilak.
- One of his most influential works is the book Satyarth Prakash, which contributed to the Indian independence movement. His followers included Sri Aurobindo and S. Radhakrishnan.

CABINET APPROVES CENTRALLY SPONSORED SCHEME- "VIBRANT VILLAGES PROGRAMME" FOR THE FINANCIAL YEARS 2022-23 TO 2025-26.

Why in news?

- Recently, the Union Cabinet has approved Centrally Sponsored Scheme- "Vibrant Villages Programme" (VVP) for the Financial Years 2022-23 to 2025-26 with financial allocation of Rs. 4800 Crore.

Mandate:

- Comprehensive development of villages of blocks on northern border thus improving the quality of life of people living in identified border villages.
- This will help in encouraging people to stay in their native locations in border areas and reversing the outmigration from these villages adding to improved security of the border.

Key Highlights:

- The scheme will provide funds for development of essential infrastructure and creation of livelihood opportunities in 19 Districts and 46 Border blocks 4 states and 1 UT along the northern land border of the country which will help in achieving inclusive growth and retaining the populatiion in the border areas. In the first phase 663 Villages will be taken up in the programme.
- The scheme aids to identify and develop the economic drivers based on local natural human and other resources of the border villages on northern border and development of growth centres on "Hub and Spoke Model" through promotion of social entrepreneurship, empowerment of youth and women through skill development and entrepreneurship, leveraging the tourism potential through promotion of local cultural, traditional knowledge and heritage and development of sustainable eco-agribusinesses on the concept of "One village-One product" through community based organisations, Cooperatives, SHGs, NGOs etc.
- Vibrant Village Action Plans will be created by the district adminstration with the help of Gram Panchayats. 100 % saturation of Central and state schemes will be ensured.

Significance:

- Key outcomes that have been attempted are, connectivity with all weather road, drinking water, 24x7 electricty – Solar and wind energy to be given focuseed attention, mobile and internet connectivity. Tourist centers, multi-purpose centers and health and wellness Centers.
- There will not be overlap with Border Area Development Programme. Out of financial allocation of Rs. 4800 Crore 2500 crore rupees will be used for roads.

INDIAN RAILWAYS LAUNCHES RAIL POST GATI SHAKTI EXPRESS CARGO SERVICE (JOINT PARCEL PRODUCT OF RAILWAYS AND INDIA POST)

Why in news?

- Indian Railways and India Posts have formally launched Rail Post Gati Shakti Express Cargo Service, Joint Parcel Product of Railways and India Post.

Details:

- It is an initiative of partnership between Indian Railways and India Posts in providing seamless logistics for the services sector in the country. This is in compliance with the Budget Announcement of FY 2022-23.
- It has been started, on the four sectors -Delhi to Kolkata; Bangalore to Guwahati, Surat to Muzaffarpur and Hyderabad to Hazrat Nizamuddin. However, total 15 sectors have been planned to be covered in the first phase.
- The highlights of this service are Total logistic Service: Pick-Up and Delivery at customer premises, Palletization -Transportation through covered and sealed boxes, Semi-mechanized handling, Time tabled service, Insurance at 0.05% of the declared value of the cargo for loss, damage and deterioration, Integrated Parcel Way Bill.
- Joint Marketing Teams between Posts and Railways have been made to take this initiative forward. Doing away with the slab system of pricing is an innovation herein.

Salient Features for Customers:

- **Door step Pick-Up and Delivery:** India Post will pick up the consignment at the doorstep of the customer and transport to the Railway Station (first mile activity) and at the destination railway station, India Post will transport the consignment from the stationto the destination address and deliver the consignment at the doorstep of the addressee (last mile activity).
- **Flexibility of Quantum of Load:** There is no fixed obligation of loading as party can book small load of 100 kg also.
- **Time Tabled Service:** Parcel Train operated under JPP Scheme is a time tabled train with scheduled departure and arrival of Train at Originating, intermediate and Destination stations which
- **Safe Transmission:** Indian Railways will provide intermediate transmission between origin and destination railway stations (middle mile activity), in secured sealed boxes, ensuring safe and secured passage through time tabled trains.
- **Insurance:** Dept. of Post offers third party insurance facility at an affordable rate of 0.03% of cargo value to the customers availing JPP Service.
- **Affordable Tariff:** First mile and last service charges at Rs 6/- per kg gives competitive and cost effective solution to the customers in comparison to existing road rates.
- **Single Point of Contact:** India Post will be the single point of contact for the customer for the despatch of consignment from pick up till delivery.
- **Mobile Application:** A mobile app is being developed where customers availing JPP service can book the consignment with online payment facility and also can track the status of consignment with live tracking facility.

Background:

- Earlier, a Pilot weekly service was launched on 31st March 2022 from Surat to Varanasi by attaching a VPU to Tapti Ganga Express.
- After the Budget announcement in 2022-23, proof of concept has been conducted on the textile segment from Surat and now after conducting 99 trials on single Parcel Van mode and 16 trials on full train load mode, Railways have decided to launch this combined initiative across the network.

USTAD BISMILLAH KHAN YUVAPURASKAR 2019, 2020 AND 2021

Why in news?

- Recently, the Ustad Bismillah Khan YuvaPuraskar (UBKYP) 2019, 2020 and 2021, were presented at Meghdoot Theatre Complex, Rabindra Bhavan, New Delhi.

Details:

- Sangeet Natak Akademi, the national academy of Music, Dance and Drama, and the apex body of the performing arts in the country, in the meeting of its General Council in November 2022 selected 102 artists (including three joint awards) of India who have made a mark as young talents in their respective fields of performing arts for the Ustad Bismillah Khan YuvaPuraskar 2019, 2020 and 2021.
- 19 artists from the North East region of the country have won the award which shows the changed circumstances of the region.

About Ustad Bismillah Khan YuvaPuraskar:

- The Ustad Bismillah Khan YuvaPuraskar, given to artists up to the age of 40 years, was introduced in the year 2006 with the objective of identifying and encouraging outstanding young talents in diverse fields of the performing arts and giving them national recognition early in their life, so that they may work with greater commitment and dedication in their chosen fields.
- The Ustad Bismillah Khan YuvaPuraskar carries a purse money of Rs 25,000/- (Rupees twenty-five thousand only), an Angavastram and a plaque.

Ustad Bismillah Khan:

- The legendary shehnai player, Ustad Bismillah Khan was one of India's most celebrated classical musicians.
- He brought Shehnai to the center stage of Indian classical music with his concert in the Calcutta All India Music Conference in 1937.
- He was a recipient of many honors and awards. These include: Padma Vibhushan (1980), Padma Bhushan (1968), Padma Shri (1961), Sangeet Natak Akademi Award (1956) etc.
- In 2001, Ustad Bismillah Khan became the third classical musician to be awarded the Bharat Ratna, India's highest civilian honour.

PRACTICE QUESTION FOR UPSC PRELIMS EXAM

1. Delta Front Campaign and Delta Top Campaign is associated with
   a) Perseverance rover campaign on Mars.
   b) Polaris program of Venus
   c) Apollo 11 mission of Moon
   d) SpaceX Dragon 2 campaign of Sun
2. Recently, the Union Finance Minister presented the Economic Survey 2022-23 in the Parliament. Consider the following statement:
   1. India failed to achieved its target of 40 per cent installed electric capacity from non-fossil fuels ahead of 2030.
   2. India declared the Net Zero Pledge to achieve net zero emissions goal by 2070.
   3. India to reduce emissions intensity of its GDP by 45% by 2030 from 2005 levels.

   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:
   1. India has become the second-largest mobile phone manufacturer globally.
   2. FDI flows into the Indian Pharma Industry has risen four times in 2022.

   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:
   1. India ranks third globally with respect to the net gain in average annual forest area between 2010 and 2020.
   2. Arunachal Pradesh has the maximum carbon stock in forests.
   3. Jammu & Kashmir contributes the maximum per-hectare carbon stock.

   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:
   1. India now has 75 Ramsar sites for wetlands.
   2. According to economic survey, there has been a decrease in mangrove cover in 2021.

   Choose the correct option from the codes given below:
   a) 1 Only b) 2 Only
   c) 1 and 2 d) None of the above
6. Consider the following statement regarding "NAMASTE Scheme":
   1. It is a self-employment scheme for Rehabilitation of Manual Scavengers (SRMS).
   2. It is a Central Sector Scheme of the Ministry of Social Justice and Empowerment.
   3. It does not provide for capital subsidies to sewer cleaners on the purchase of sanitation machinery.

   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
7. Consider the following statement regarding hydrogen train:
   1. The trains will be introduced in all the metropolitan cities of India by 2025.
   2. The train will use hydrogen as fuel.
   3. The first train will run between Kalka and Shimla.

   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
8. The 2023 Union Budget shines special attention on laboratory-grown diamonds (LGD). Consider the following statement:
   1. LGDs are mostly manufactured throughhigh pressure, high temperature (HPHT) method or Chemical Vapour Deposition (CVD) method.
   2. The duty on seeds for rough LGDs will be reduced from 5% to nil.

   Choose the correct option from the codes given below:
   a) 1 Only b) 2 Only
   c) 1 and 2 d) None of the above
9. Consider the following:
   1. Unleashing the Potential
   2. Green Growth
   3. Youth Power

   Which among the following is included in Union Budget 2023-24 as seven priorities?
   a) 1 and 2 b) 2 and 3
   c) 1 and 3 d) 1, 2 and 3

10. Consider the following statement regarding Dodo:
    1. The last sighting of the bird was reported on the island of Mauritius.
    2. The bird used to reproduce by laying just one egg a year.
    3. It was a vulnerable species.

    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
11. Consider the following statement regarding One District, One Product:
    1. The government launched this initiative to make regional products popular.
    2. Under this scheme, every state has to identify the main product of that district.
    3. The products can only be from agri-produce.

    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
12. Consider the following statement regarding Red Sanders:
    1. It is a vulnerable tree species.
    2. It is restricted to eastern ghat of India.
    3. Under the foreign trade policy of India, the import of Red Sanders is prohibited.

    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:
    1. GI tag is awarded to products that originate within a specific geographical region and possess some unique characteristics and qualities.
    2. This tag assures the buyer that the product originated from a specific area.

    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:
    1. Listed under Schedule IV of the Wildlife Protection Act.
    2. Categorised as endangered as per the IUCN Red List.
    3. Take 25-40 years to attain maturity.

    Which among the following features is mention for Red Sanders?
    a) 1 and 2 b) 2 and 3
    c) 1 and 3 d) 1, 2 and 3
15. Consider the following statement regarding "Green Growth"
    1. Under this scheme 500 new Waste to Wealth plants will be established under the GOBARdhan scheme.
    2. Prime Minister, inaugurated Asia's biggest municipal solid waste based GOBARdhan plant in Gandhinagar.

    Choose the correct option from the codes given below:
    a) 1 Only b) 2 Only
    c) 1 and 2 d) None of the above
16. Consider the following statement regarding Spy Balloons:
    1) It is similar to weather balloons.
    2) These balloons operate 24,000-37,000 meters above the ground.
    3) It has the ability to target limited area and cannot spend more time in a particular targeted area.

    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. Recently, the researchers have successfully split seawater to produce green hydrogen. Consider the following statement:
    1) Sea water is not considered as natural feedstock electrolyte.
    2) The researchers split natural seawater into oxygen and hydrogento produce green hydrogen by electrolysis.
    3) It is not practical for regions where seawater is scarce.

    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:
    1) Ministry of Commerce & Industry is the nodal agency for One District One Product (ODOP).
    2) Its efforts isto promote the growth of micro, small and medium enterprises (MSMEs).

    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. Recently, Ministry of Fisheries, Animal Husbandry and Dairying has launched the 'Sagar Parikrama' program. Consider the following statement regarding its objectives:
    a) To facilitate interaction with fishermen.
    b) To promote responsible fisheries with focus on sustainable balance between the utilization of marine fisheries resources for food security of nation.
    c) Protection of marine ecosystems
    d) All the above
20. Consider the following statement regarding The National Adaptation Fund:
    1) It has seen a constant decline in funding.
    2) It is administered by RBI.

Choose the correct option from the codes given below:
a) 1 Only b) 2 Only
c) 1 and 2 d) None of the above

21. Consider the following statement regarding World Wetlands Day:
1. It is observed on 2nd February every year.
2. India is a party to the Convention since 1982.
3. India has the third largest network of Ramsar Sites in Asia.
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. IIT Ropar has developed an innovative green technology air nano bubble. Consider the following statement:
1. The technology is based on nano bubbles of nitrogen and hydrogen.
2. These bubbles are of a size equivalent to 1/10000th times of human hair.
3. Water after processing with a nano bubble machine can be reused.
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 Great Indian Bustard (GIB):
1. It is India's most critically endangered bird.
2. It is considered the flagship grassland species.
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:
1. Water and food security.
2. Conservation of species of local, national and international significance.
3. Recognition, conservation and celebration of cultural heritage.
Which among the above statement is supported under Mission Sahbhagita?
a) 1 and 2 b) 2 and 3
c) 1 and 3 d) 1, 2 and 3

25. Consider the following statement:
1. The Global Mangrove Alliance releases the 'State of World Mangroves 2022' report.
2. Mangroves in India are distributed across nine States and three Union Territories.
3. Odisha is having the highest mangrove cover.
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 the recent released ground water report:
1. Delhi and Haryana have high groundwater abstraction rates.
2. The average storage decline in Uttar Pradesh, Bihar and West Bengal.
3. Rajasthan is showing no improvement in ground water level.
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 Muons:
1. They are highly stable sub-atomic particles and exist for just 2.2 microseconds.
2. They are subatomic particles raining from space.
3. These particles resemble electrons but are 207 times as massive.
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:
1. The Sixth Schedule of India's Constitution protects tribal populations.
2. Currently, ten Autonomous Development Councils exist in the tribal areas.
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 the melting of glacial in Ladakh:
1. Lose potable water
2. Agriculture practices threatened
3. Impact the biodiversity of the area
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 Muography:
1. It is used by researchers to analyse Mount Vesuvius.
2. Scientists used the technique to look inside the Fukushima nuclear reactors after the 2011 earthquake and tsunami in Japan.
3. It has been used in customs security, internal imaging of volcanoes and others.
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 Guaranteed Pension Scheme (GPS):
    1. This system is started by Andhra Pradesh government.
    2. The schemeoffers a guaranteed pension of 33 per cent of the last drawn basic pay without any deduction to the state government employees.
    3. The market conditions will influence the pension under GPS.

    Choos 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. An earthquake of magnitude 7.8 struck Turkiye. Consider the following statement:
    1. The epicentre wasKusadasi
    2. Turkiyesits between three major tectonic plates.
    3. Collisions between the Arabian and African plates with Eurasia typically result in earthquakes.

    Choos 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 voice deepfake:
    1. It is one that closely mimics a real person's voice.
    2. AI and robust computing power is used to generate such voice clones.

    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 Self Employed Women's Association (SEWA):
    1. It was founded by Ela Bhatt
    2. Textile Labour Association (TLA) founded by Anasuya Sarabhai and Mahatma Gandhi.
    3. SEWA Bank was recognised by International Labour Organisation.

    Choos 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. The Anatolian plate is divided into three major fault zones. Which among the following is not one among them?
    a) North West Anatolian fault Zone (NWAFZ)
    b) North Anatolian Fault Zone (NAFZ)
    c) East Anatolian Fault Zone (EAFZ)
    d) South Eastern Anatolian Thrust Zone (SAT)
36. Consider the following statement regarding the allocation of budget for minorities in 2023-24:
    1. There has been a reduction of 38% in funds for the Ministry of Minority Affairs.
    2. Maulana Azad National Fellowships for higher education had been scrapped.
    3. The Nai Udaan Scheme for conservation of minorities' culture and heritage had been given boost.

    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:
    1. National Career Service (NCS) portal is for skilled workers only.
    2. The Udyam, e-Shram and NCS portals have been interlinked.
    3. The ASEEM portal acts as a directory that matches supply of the skilled workforce with the market demand.

    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:
    1. OPEC is a permanent intergovernmental organisation consisting of 13 major oil-exporting countries.
    2. OPEC+consisting of the 13 OPEC members and 10 other non-OPEC members.

    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:
    1. Nai Manzil
    2. USTTAD
    3. Padho Pardesh

    Which among the following scheme is related to skill development?

    a) 1 and 2 b) 2 and 3
    c) 1 and 3 d) 1, 2 and 3
40. Consider the following statement regarding CAR T-cell therapies:
    1. In this therapy, patient's blood is drawn to harvest T-cells which are immune cells that play a major role in destroying tumour cells.
    2. Presently it has been approved for leukaemiasand lymphomas.
    3. This therapy does not use patient's own cell.

    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 United Nations Convention against Transnational Organised Crime (UNTOC):
    1. It is also known as the Palermo Convention.
    2. It enables cooperation between member states for tackling international organized crime.

3. The nodal agency for all dealings with UNTOC is National Investigating Agency (NIA).
   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. "Operation Dost" is related to
   a) India sending relief package to Ukraine
   b) India sending relief package to Syria and Turkey.
   c) Evacuation of Indian from Ukraine
   d) A joint military exercise between Indian army and Indian Airforce.

43. Consider the following statement regarding Skye UTM:
   1. It is a Cloud-based aerial traffic management system.
   2. It has been built towards providing situational awareness, autonomous navigation and risk assessment.
   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 Water Survival Test Facility:
   1. It provides realistic training of aircrew for escape from a ditched aircraft under varied simulated.
   2. It simulates different sea state conditions.
   3. These trials assist in validating the training recovery teams as well as the flight crew.
   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 Blue Credit:
   1. Itallows businesses to achieve net-zero greenhouse gas emissions by purchasing carbon credits.
   2. Credits will be generated to conserve blue carbon ecosystems.
   3. Blue carbon ecosystems include fresh water and glacial 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

46. Consider the following statement:
   1. Pakistan
   2. Peru
   3. Afghanistan
   Which among the following above is the most dangerous glacial basin?
   a) 1 and 2 b) 2 and 3
   c) 1 and 3 d) 1, 2 and 3

47. "SahiFasal" and "Water Talk" comes under which among the following mission?
   a) Atal Bhujal Yojana
   b) National Water Mission
   c) Har Khet Ko Pani
   d) Jal Jeevan Mission

48. Consider the following statement:
   1. Dust launched from the surface of the Moon could reduce enough solar radiation.
   2. It could be a unique solution to prevent the planet from overheating.
   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:
   1. Banks
   2. Bankers
   3. Fintech company
   DigiDhan Awards is given to which of the above category?
   a) 1 and 2 b) 2 and 3
   c) 1 and 3 d) 1, 2 and 3

50. Consider the following statement regarding GedizVallis:
   1. It is an ancient valley that could harbour clues to the planet's watery past.
   2. Wet landslides also occurred here.
   3. It is a valley formed in Moon.
   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:
   1. Eurasian Curlew
   2. Lesser Sand Plover
   3. Kingfishers
   Which among the following is the threatened bird species of Sundarban?
   a) 1 and 2 b) 2 and 3
   c) 1 and 3 d) 1, 2 and 3

52. Consider the following statement regarding Lithium:
   1. It does not react with water.
   2. The element was first discovered in 1817 by Johan August Arfvedson.
   3. Scientists have suggested that this is a cosmic element that formed from the bright stellar explosions called novae.
   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. Malaria is a mosquito-borne disease caused by parasite.
   2. The parasite grows in the red blood cells.

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. Which among the following is/are part of India-ASEAN Digital Work Plan 2023?
a) Artificial Intelligence in Cyber Security
b) Sustainable Data and Transport Network for Future
c) 5G technologies for IoT and future trends
d) All the above

55. Consider the following:
1. Stanley Whittingham
2. John Goodenough
3. John F. Clauser
Which among the following scientist had been awarded Noble prize for their work on lithium-ion battery?
a) 1 and 2 b) 2 and 3
c) 1 and 3 d) 1, 2 and 3

56. Recently, Union Minister of State for Earth Sciences said in Rajya Sabha that about 28.81 km of coastline in Visakhapatnam is prone to erosion. Consider the following statement:
1. The erosion and deposition of sand are primarily due to the high wave action.
2. The beaches act as cushion between the high wave action of the sea and the landmass.
3. Beaches are dynamic landforms and are treated as part of the land 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

57. Consider the following statement regarding "quasicrystals":
1. Its atom are arranged in a pattern that does not repeat itself in a regular interval.
2. Researchers reported that its remains was spotted in the first nuclear test conducted in 1945.
3. Its sample was also evident in the sample of red trinitite.
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 "Free Float":
1. It refers to the proportion of the total outstanding shares of a publicly listed company that is readily available for trading in the market.
2. It can sometimes give investors a rough idea about the likely liquidity of the company's shares in the public market.
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:
1. Avian influenzais a highly contagious viral infection.
2. H5N1 is a highly pathogenic subtype of avian influenza.
3. The H5N1 subtype has the potential to spill over to other mammals.
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 the recent earthquake in Turkey and Syria:
1. The bulk of Turkey sits on the Anatolian Plate.
2. Geologists say that the earthquakes were from a 'strike-slip'.
3. Turkey and Syria lie at the confluence of the Arabian Plate and the Anatolian Plate 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

61. Consider the following statement:
1. Manure and synthetic fertilisers emit the equivalent of 2.6 gigatonnes of carbon per year.
2. Emissions from the production of synthetic fertilisers is partly due to chemical reactions used in the production process.
3. Fertilizers are not responsible for greenhouse gas emission.
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 HLFT-42:
1. It is the 4.5th Generation fighter aircraft developed by HAL
2. Its design is inspired from the Tejas Light Combat Aircraft programme.
3. The new aircraft will be equipped with modern avionics.
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 Maharishi Dayanand Saraswati:
1. He was the first to give the call for "Swarajya".
2. Sri Aurobindo and S. Radhakrishnan was the followers of Dayananda Saraswati.
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 microLED:
    1. The basis of its technology are sapphires.
    2. Its displays are brighter, have better colour reproduction and provide better viewing angles.
    3. It has limitless scalability.

    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 River Cities Alliance (RCA):
    1. It was a dedicated platform for river cities in Indiafor sustainable management of urban rivers.
    2. The Alliance focuses on Networking, Capacity Building and Technical Support.
    3. It is an initiative of Ministry of Jal Shakti 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
66. Consider the following statement:
    1. Article 164(1) does not prescribe any disqualification for the appointment of a Chief Minister.
    2. Article 173, disqualifies a person with prior conviction from being a member of the Legislature.
    3. The oath to be taken by a judge of a High Court under Schedule IV of the Constitution.

    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 Agricultural and Processed Food Products Export Development Authority (APEDA):
    1. It was established under Ministry of Agriculture.
    2. It was established under the act of Parliament in 1986.
    3. It replaced the then existing Processed Food Export Promotion Council (PFEPC).

    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:
    1. Geoheritage sites are natural rock-sculptures of national and international interest.
    2. Geo-relics are any relic or material of geological significance.

    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 measures required for flood proofing Indian cities:
    1. Enhancing sewerage and stormwater drain networks.
    2. Rivers that overflow need to be desilted regularly.
    3. Protecting "blue infra" 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
70. Consider the following statement:
    1. Saketi Fossil Park is in Himachal Pradesh.
    2. Rahioli Dinosaur Park is in Gujarat.
    3. GSI has identified 40 geo-heritage sites

    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 Marburg disease:
    1) The disease was associated to African green monkeys.
    2) The disease causes haemorrhagic fever.
    3) Marburg virus disease results from prolonged exposure to viral disease

    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:
    1) Article 178 contains the corresponding position for Speaker and Deputy Speaker of the Parliament.
    2) Election of Speaker and deputy speaker is mandatory under the constitution.
    3) Once elected, the Deputy Speaker usually continues in office for the entire duration of the House.

    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 International Solar Alliance:
    1) It promotes the use of solar energy in the Agriculture, Health, Transport and Power Generation sectors.
    2) It is partnering with multilateral development banks (MDBs)to deploy cost-effective and transformational solutions.

    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. Aubrites contain sulfides of
a) Chromium b) Manganese
c) Titanium d) All the above'

75. Recently Geological survey of India discovered lithium in Jammu and Kashmir. Consider the following statement:
1) With this discovery Indian government aims to achieve 30% EV penetration in private cars.
2) China currently controls 77% of the global lithium-ion battery manufacturing capacity.
3) India currently imports all of its Li from China.
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 "Vibrant Villages Programme" (VVP):
1. Improving the quality of life
2. Reversing the outmigration
3. Will be implemented in all the Sates and Union territory 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

77. Consider the following statement regarding MQ9B Sea Guardian:
1. It is not used in anti-surface warfare mission.
2. It has a 3600 maritime surveillance radar.
3. It is the maritime variant of the Predator MQ9 Unmanned Aerial Vehicle (UAV)
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:
1. The beetle is important for forensic science as it helps detect the time of death of an animal or human.
2. The bug was discovered byZoological Survey of India.
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 Muscat Conference regarding Antimicrobial Resistance:
1. It recognised the need to accelerate political commitments in the implementation of One Health action for controlling the spread of AMR.
2. It also recognised the need to address the impact of AMR not only on humans but also on animals.
3. It deals with areas of environmental health, food security and economic growth and development.
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. Recently, a new beetle species has been discovered in India. Consider the following statement:
1. The new species belongs to the Trogidae family.
2. The beetles of this group are sometimes called hide beetles.
3. They are photogenic.
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

81. Consider the following statement:
1. Deep sea mining could affect aquatic ecosystems.
2. International Seabed Authority (ISA) headquarter is located in France.
Choose the correct option from the codes given below:
a) 1 Only b) 2 Only
c) 1 and 2 d) None of the above

82. Recently, the Ustad Bismillah Khan YuvaPuraskar was awarded Consider the following statement
1. Ustad Bismillah Khan was a famous Sarangi player.
2. The award was given to artists up to the age of 40 years.
3. He was a recipient of Sangeet Natak Akademi Award and Bharat Ratna.
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 Carbon Border Tax:
1. European Union will impose this tax from 2026.
2. Under this, border tax will be imposed on imports of carbon-intensive goods such as steel, aluminum, cement, fertilizers and electricity.
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 "EX DHARMA GUARDIAN":
1. The 4th edition of this exercise was held in India.
2. India and Australia jointly conducted this exercise.
Choose the correct option from the codes given below:
a) 1 Only b) 2 Only
c) 1 and 2 d) None of the above

85. Consider the following statement regarding Leprosy:
1. It is a chronic bacterial infection.
2. It affects skin, nerves, lungs and eyes
3. India achieved zero leprosy case in 2005.
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 Pangolins:
1. They are nocturnal, toothless mammals.
2. Chinese Pangolin are 'Critically Endangered'
3. Indian Pangolin is recognised as 'Vulnerable'.
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 Global Entrepreneurship Monitor (GEM):
1. This report is released by World Bank.
2. India has been ranked fourth out of 51 countries.
3. It also discusses results from the Adult Population Survey (APS).
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:
1. India is a dialogue partner at the Pacific Islands Forum (PIF).
2. India establishes the Forum for India-Pacific Islands Cooperation (FIPIC) in 2014.
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:
1. Pangolin play a vital role in the ecosystem management.
2. They also keep in check the population of certain insects they prey on.
3. The burrows made by pangolins also get utilised as shelters by other species within their ecosystem.
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 Cheetah:
1. It is the world's fastest mammal.
2. It is endemic to the savannahs of Africa.
3. In southern Africa, Cheetah is declared extinct.
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 rhododendrons in India:
1. Maximum type of rhododendrons found Sikkim.
2. Darjeeling and Sikkim Himalayas comprise only 0.3% of India's geographical area.
3. Sikkim is home to one third of rhododendrons in India alone.
Choose the correct option from the codes given below:
a) 1 and 2 b) 2 and 3
c) 1and 3 d) 1, 2 and 3

92. Consider the following statement regarding Poliovirus:
1. It invade the circulatory system.
2. There is no cure for polio.
3. Jonas Salk developed the first polio vaccine.
Choose the correct option from the codes given below:
a) 1 and 2 b) 2 and 3
c) 1and 3 d) 1, 2 and 3

93. Consider the following statement:
1. Underwater sound pressure levels in the Indian waters are 102-115 decibels.
2. The East Coast level is slightly higher than that of the West.
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:
1. The Union government announced the first National Polio Immunisation Day in 1995.
2. The last case of poliovirus was recorded in West Bengal.
3. According to WHO, Afghanistan and Pakistan had cases of wild poliovirus type 1.
Choose the correct option from the codes given below:
a) 1 and 2 b) 2 and 3
c) 1and 3 d) 1, 2 and 3

95. Consider the following statement regarding Rhododendron:
1. Its meaning is rose tree in Greek.
2. It is an indicator species for climate change.
3. It was first discover in Sikkim.
Choose the correct option from the codes given below:
a) 1 and 2 b) 2 and 3
c) 1and 3 d) 1, 2 and 3

96. Recently Nepal and India have inked an agreement to increase the power import and export capacity. Consider the following:
1. Tanakpur-Mahendranagar
2. Butwal-Gorakhpur transmission line
3. Baharampur-Bheramara
Which among the following is the proposed transmission line to be set up between India and Nepal?
a) 1 and 2 b) 2 and 3
c) 1 and 3 d) 1, 2 and 3

97. Consider the following statement regarding Teja Variety of Red Chilli:
    1. Chittoor district in Andhra Pradesh is the largest producer of this variety.
    2. The huge demand for oleoresin, a natural chilli extract from this variety.
    3. The paste extracted from the pungent fruit is also in demand for its use as a protective layer beneath ships.

    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 Uroosi:
    1. It is a Mughal-era home architectural element.
    2. It is believed to be a Persian term meaning 'hidden bride'.

    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 Sickle Cell Anaemia:
    1. Haemoglobin which is tasked with carrying oxygen to all parts of the body.
    2. It is common among Tribal population.
    3. SCA is prevalent in communities residing in areas where malaria is endemic.

    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 regarding PM KUSUM:
    1. It aims to help farmers access reliable daytime solar power for irrigation.
    2. is one of the largest initiatives of the world to provide clean energy.
    3. The Ministry responsible for this scheme is Ministry of Trade and Commerce.

    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 Exercise 'DUSTLIK':
    1. It is a military exercise between India and Uzbekistan.
    2. This is the first exercise held between the two army.

    Choose the correct option from the codes given below:
    a) 1 Only
    b) 2 Only
    c) 1 and 2
    d) None of the above
102. Consider the following statement:
    1. NASA has named a mountain on the Mars in the honour of mathematician Melba Mouton.
    2. The lunar South Pole is a target for landing the Artemis missions.
    3. The flat moon mountain is located near the water-rich lunar South Pole.

    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 Autism spectrum disorder (ASD):
    1. It is a neural disorder
    2. It impaired social interactions, lack verbal and nonverbal communication skills, and display restricted and repetitive behaviours.

    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 "JaduiPitara":
    1. It is developed under the National Curriculum Framework.
    2. It is to be developed in 13 language.
    3. These resources should be made digitally available on DIKSHA platform.

    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 International Mother Language
    1. UNESCO recognised the importance of this day at the General Assembly in 1999.
    2. The theme of 2023 is 'multilingual education - a necessity to transform education'.
    3. India is the first country to initiate the celebration of International Mother Language Day.

    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 Vostro Account:
    1. It is an account that domestic banks hold for foreign banks in the former's domestic currency.
    2. It is an integral offshoot of correspondent banking that entails a bank to facilitate wire transfer.
    3. It does not help domestic banks gain wider access to foreign financial markets and serve international clients

    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. Recently, the Supreme Court has held in a judgment that children cannot be mechanically subjected to DNA tests in each and every case between warring parents as a short-cut to establish proof of infidelity. Consider the following statement:
1. A child's genetic information is not the part of his fundamental right to privacy.
2. DNA tests would also harm the reputation and dignity of the mother.
3. Children have the right not to have their legitimacy questioned frivolously before a court of 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

108. Consider the following statement:
1. Singapore is the first country with which cross border Person to Person (P2P) payment facility has been launched.
2. Recently, real time payment linkage between the Unified Payments Interface (UPI) of India and PayNow of Singapore was launched.
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 New START Treaty:
1. It was signed between US and Erstwhile USSR.
2. It is a measure for the further Reduction and Limitation of Strategic Offensive Arms.
3. The US and Russia Federation subsequently agreed to extend the treaty through February 4, 2026.
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:
1. Spain has become the first country in the world to introduce paid menstrual leave.
2. Russian workers in the 1920s first pioneered the concept.
Choose the correct option from the codes given below:
a) 1 Only b) 2 Only
c) 1 and 2 d) None of the above

111. Consider the following statement regarding Law Commission of India:
1. Commission consists of chairman and four full time members.
2. The Commission was originally constituted in 1955.
3. The commission is a statutory body.
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. A Japanese startup is going to launch commercial space viewing balloon flights. Consider the following statement:
1. It is filled with Neon gas.
2. The balloon is able to carry a pilot and a passenger.
Choose the correct option from the codes given below:
a) 1 Only b) 2 Only
c) 1 and 2 d) None of the above

113. Consider the following statement:
1. France had signed a military agreement with Burkina Faso.
2. The agreement ended because of France failure to counter insurgency operation in Sahel region.
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 the significance finding at Keeladi:
1. It is located along the Vaigai river.
2. It has all the characteristics of an urban civilisation.
3. It provides the missing link between Iron age and Early Historic Period.
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. Researchers trying to uncover the secrets of Earth's geology have revealed the fifth layer of the planet. Consider the following statement:
1. Crust, mantle, outer core, and inner core are the identified structure of the Earth.
2. Anisotropy is used to describe how seismic waves speed up or slow down through the material of the Earth's inner core.
3. New structure lies between outer and inner core.
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 MRSAM:
1. It is an advanced air and missile defence system.
2. It is capable of taking down multiple aerial targetswithin a 70km range.
3. It is jointly developed in collaboration of Indian and US Airforce.
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. Recently it is proposed to establish an India Centre for Lab grown Diamond (InCent-LGD). Consider the following statement:
1. The Gems and Jewellery sector contribute to more than one tenth to India's total merchandise export.
2. LGD has vast application in field of defence, optics, thermal and medical industry.
3. Indian market to lab grown diamond jewellery is expected to exceed by $ 15 billion by 2035.
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:
1. The 18th UIC World Security Congress was jointly organized by Railway Protection Force (RPF) and the International Union of Railways (UIC).
2. International Union of Railways (UIC) headquarter is in Paris.
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:
1. India is now home to the third-largest startup ecosystem in the world.
2. The electric vehicle (EV) industry comes under sunrise sector.
3. FAME scheme is to incentivise EV adoption.
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:
1. Bhakra Dam: Sutlej
2. Ranjit Sagar: Ravi
3. Pandoh: Brahmaputra
Which among the following is correctly matched?
a) 1 and 2 b) 2 and 3
c) 1 and 3 d) 1, 2 and 3

121. Consider the following statement:
1. Garcinia pedunculata is a medicinal plant.
2. It is commonly called 'Borthekera' in the Assamese language.
3. It is very protective medicinal plant for diabetic.
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 International IP Index:
1. It is released by World Bank.
2. It evaluates the protection of IP rights.
3. India ranks 42nd among 55 leading global economies.
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 Etherican brown bear:
1. It is a female bear.
2. It was found east of the Bolshoy Etherican 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

124. Consider the following:
1. Coastal Erosion.
2. Accretion
3. Tropical cyclone
Which among the following may be the cause for decreasing World's Shoreline?
a) 1 and 2 b) 2 and 3
c) 1 and 3 d) 1, 2 and 3

125. Consider the following statement:
1. Andaman and Nicobar Islands have the longest eroding coastline.
2. Andhra has the highest percentage of accreting coastline.
3. The percentage of eroding shoreline is highest for Gujarat.
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. Recently, India's Unified Payments Interface (UPI) and Singapore's PayNow were officially connected to allow for "real-time payment linkage". Consider the following statement:
1. Singapore is the first country with which cross-border Person-to-Person (P2P) payment facilities have been launched.
2. India has also considered allowing UPI remittances from United Arab Emirates.
3. Axis Bank and DBS India will only facilitate outward remittances
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 Venice:
1. Venetian lagoon is separated from the Aegean Sea.
2. It is a collection of over 118 small islands spread over a lagoon.
Choose the correct option from the codes given below:

a) 1 Only b) 2 Only
c) 1 and 2 d) None of the above

128. Consider the following statement:
1. Basolateral Amygdala (BLA) is a region in brain.
2. It is an essential region for fear.
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:
1. The strawberry harvest is possible in tropical deciduous forest.
2. Most people in Sunabeda are from the ChuktiaBhunjia tribe.
3. Sunabeda plateauis found along the Odisha-Chhattisgarh boundary.
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 One District One Product (ODOP) programme:
1. It is aimed at creating sustainable employment at the district level while promoting holistic socio-economic development.
2. It comes under ministry of Finance.
Choose the correct option from the codes given below:
a) 1 Only b) 2 Only
c) 1 and 2 d) None of the above

131. Which among the following country is not the part of Exercise Cobra Warrior?
a) Australia b) India
c) South Africa d) Singapore

132. UN Women was established by merging four previously distinct parts of the UN system. Which among the the following is not one among them?
a) Division for the Advancement of Women
b) Basic right of women safeguards
c) Office of the Special Adviser on Gender Issues and Advancement of Women
d) United Nations Development Fund for Women

133. Consider the following statement:
1. Global warming tends to warm the upper atmosphere faster than the air near the surface.
2. Sinking air is warmer due to global warming, and thus produces heat waves.
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 Heat wave:
1. A region has a heat wave if its ambient temperature deviates by at least 4.5-6.4°C from the long-term average.
2. Heat waves tend to be confined to north and northwest India in El Niño years.
3. The last three years have been La Niña years.
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 Atacama Large Millimetre/submillimetre Array (ALMA):
1. It is a state-of-the-art telescope that studies celestial objects.
2. It helps astronomers examine dim and distant galaxies and stars.
3. It fails to detect extremely faint radio signals.
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 Khondalite Stones and choose the incorrect option:
a) It was widely used as a pillar of Jagannath Temple in Puri.
b) State government under ABADHA scheme will transform Puri in World Heritage City in three years.
c) Stones are proposed to be used widely to maintain aesthetic value.
d) Sukhuapada was the biggest of six Khondalite stone blocks.

137. Consider the following statement regarding CD4 immune cell:
1. This cell in human body is primary target of Cancer.
2. The virus enters the body through the CCR5 receptors on the surface of CD4 immune cells.
3. Just one per cent of the world's population has the CCR5-delta 32 mutation.
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 Blue Economy:
1. It promotes the sustainable use of marine and freshwater resources while conserving their environments.
2. It is being intrinsically linked to the Sustainable Development Goal (SDG) 14
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 regarding Yellow River:
1. It is the sixth-longest river in the world.
2. This River is also known as Huang He.
3. It originates in the province of Qinghai, flows through the Loess Plateau.

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 SAI20:
1. It is a group of Supreme Audit Institutions of G20 countries.
2. The establishment of SAI20 was initiated by Indonesia during its 2022 G20 Presidency.
3. Japan will takes it chairmanship in Dec 2022.

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. What are its implications of new Sino-Russian alliance for India? If the growing relationship develops into a Russian dependency on China, discuss how it will constrain India's options.
2. 'Faced with the challenge of increasing infrastructure spending while continuing with fiscal consolidation, the Finance Minister's balancing act has given India a well-crafted Budget'. Comment.
3. It was the robustness of the infrastructure sector that helped the Indian economy withstand the peril in the economy brought down by the pandemic. In successive budgets, the infrastructure sector has stayed at the core of policy announcements and fund allocations. Highlight the steps taken by the FY24 Budget to further boost the infrastructure sector.
4. 'The Union Budget 2023 provides a boost to the energy transition but fails to address the critical need to synergise climate adaptation with India's development goals'. Comment.
5. Why have mangroves got a Budget push? How many varieties grow in India? What is the ecosystem required to grow and sustain mangrove forests?
6. India's G-20 presidency is an opportunity to negotiate a deal for itself while also shaping international cooperation on just energy transitions. What can India offer and seek from a multilateral JET-Partnership?
7. 'The Assam government should use a mass campaign to educate parents, rather than a coercive criminal law, to deal with the problem of child marriages. Instead of criminalising child marriage. Assam CM should heed PM Modi's call of Beti Bachao Beti Padhao'. Elaborate.
8. 'In light of the Russia-Ukraine war, new global defence engagements open up possibilities for modernising India's defence industrial base in partnership with friendly states'. Comment.
9. The Nordic countries are ready to offer their technologies and expertise to India as it moves towards a green, digital, and innovative future. Discuss how Nordics and India can deliver key technologies and solutions to stop climate change and boost green growth?
10. 2023 marks 25 years of India and France's strategic partnership. France has not only consistently backed India's position on various international issues, but has also established itself as India's second-largest defense supplier. Give a brief account of their bilateral relations and upcoming further collaborations.
11. 'India's urban centres are ailing due to lack of funds. A multi-pronged strategy including fiscal stimuli, civic action needs to be deployed to bridge the gap'. Illustrate.
12. Is a rupture between multiple tectonic plates responsible for the widespread devastation in Turkey? What is a strike-slip fault? What can quake-prone regions learn from Chile and Japan?
13. 'Religious groups are vested with rights so that independent members can come together to fulfil collective desires. At the heart of this guarantee is the individual. Therefore, howsoever essential a practice might be to faith, it cannot be allowed to undermine the dignity of the individual'. Discuss the above statement in the light of recent reconsideration of 1962 judgment in Sardar Syedna Taher Saifuddin Saheb v. State of Bombay and the right of Dawoodi Bohra community to excommunicate its members.
14. 'Whether or not disaster risk is factored into investment decisions in urban development will have a decisive influence on the future of disaster risk reduction. India's flawed urban journey points to the need for having a multi- generational process in place'. Comment.
15. What is the significance of the new resources of lithium discovered in Jammu & Kashmir? What are the environmental concerns around its extraction procedure? What are the geostrategic implications considering the geopolitical sensitivity of the area?
16. 'As the current G-20 president, and as a vulnerable country, India has a key role in ensuring that Antimicrobial Resistance (AMR) remains high on the global health agenda'. Elaborate.
17. In a democratic set-up, the Parliamentary Constituencies (PCs) offer a natural unit for policy deliberation and governance. Discuss how timely and accessible data at the PC-level can transform the work of MPs by bringing to light the most critical issues and at-risk populations in need of targeted interventions.
18. What is the regulatory framework in place to protect investors from share market volatility? Does the Securities and Exchange Board of India have the powers to act in the interest of investors? What are the laws to help SEBI? When can it step in?
19. 'The new organ donation guidelines by the Union Health and Family Welfare Ministrywill help, but to see a meaningful difference, India needs many more donors'. Comment.
20. 'For an equal, gender-balanced workplace in India, there is dire need to improve the workplace environment for women. Addressing the deep-rooted structural and cultural violence which puts women in a disadvantageous position is an

essential prerequisite'.

21. 'The Constitution recognises the importance of the office of the Deputy Speaker. Therefore, the House cannot treat it as a post of no importance or redundant'. Comment.
22. India is one of the recognized mega-diverse countries of the world and the sum and variation of biodiversity, is essential to the future of planet Earth. Highlight some of the key programs taken by the government to promote green growth and biodiversity conservation.
23. 'Startup20, a ground-breaking initiative under the G20, aims to create a global platform for startups to thrive. Whether it's climate change, poverty, or inequality, Startup20 empowers startups to make a real impact and drive positive change'. Elaborate.
24. 'The frequency and targets of cyberattacks on India reflects still-inadequate protection measures afforded to critical information infrastructure in India. India's G-20 presidentship and summit 2023 are ideal opportunities for the crafting of a comprehensive domestic and global cyber security framework'. Discuss.
25. Why are Dalit rights activists calling the Seattle City Council ban on caste discrimination historic? How will it impact movements across America and the world for equal rights? What are the anti-caste laws in India?
26. 'Technical innovation in India's renewable energy policy is deepening a highly uneven energy landscape'. Critically analyse the given statement in the light of recent launch of Indian Oil Corporation's patented solar cook-stove at the India Energy Week 2023.
27. What is the New START treaty? What does Russia's decision mean for the global arms control architecture? Will it start an arms race?

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.	(d)
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.	(b)
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)

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