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Monthly Magazine



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PREFACE

Current Affairs UPSC CSE Prelims 2025

This high-quality monthly compilation of Current Affairs for Civil Services Exam Prelims 2025 is designed to help Civil Services Exam aspirants by:

1. **Saving preparation time:** Consolidates key current affairs from multiple sources for CSE Prelims.
2. **Reinforcing static concepts:** Links static concepts with current affairs
3. **Enhancing revision:** Combines important current affairs and static concepts for effective revision.

After reading this Current affairs magazine, you can test your concepts by taking our Current Affairs Test Series in Multiple Choice Question format which helps in the following ways:

- Aligns with the CSE prelims exam pattern.
- Aids understanding and recall by offering multiple perspectives on current affairs.
- Saves time, consolidates and aids quick revision

Details of our Current Affairs Test Series are on the back cover and inside this magazine.

Our team of content developers have worked rigorously to create this high-quality compilation, and we hope that all Civil Services and other competitive exam aspirants will make the best use of it. All the Best!

R. C. Reddy IAS Study
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Table of Contents

1. POLITY	(Page 1)
2. ECONOMY	(Page 9)
3. GEOGRAPHY	(Page 26)
4. ENVIRONMENT	(Page 35)
5. SCIENCE & TECHNOLOGY	(Page 43)
6. INTERNATIONAL RELATIONS	(Page 66)
7. ART AND CULTURE	(Page 70)
8. MISCELLANEOUS	(Page 77)



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POLITY

1. Sampoonnata Abhiyan

Context:

Recently, NITI Aayog has launched the 'Sampoonnata Abhiyan' with the aim of achieving saturation in key indicators across Aspirational Districts and Blocks.

About the Sampoonnata Abhiyan:

- It is a three-month campaign, running from July to September 2024, seeking to uplift the relatively backward and remote areas of the country.
- It focuses on six critical Key Performance Indicators (KPIs) in both Aspirational Districts and Aspirational Blocks.
- NITI Aayog collaborates with Central Ministries, State Governments, and Union Territories to ensure effective development. The focus lies on improved planning, capacity building, and sustainable service delivery.

Implementation Strategy:

- To make this initiative successful, districts and blocks will need to:
- Develop a 3-month Action Plan to achieve saturation in the identified indicators.
- Regularly track progress on saturation.
- Conduct awareness and behaviour change campaigns.
- Undertake concurrent monitoring field visits.

2. Expunction

Context:

Recently, Leader of Opposition in Lok Sabha wrote to Lok Sabha Speaker regarding a portion of his speech expunged during Motion of Thanks on the President's address.

About the Expunction

- Expunction refers to the removal or deletion of specific words, phrases, or expressions from the official records of Parliamentary proceedings, as it plays a crucial role in maintaining decorum and ensuring that discussions remain respectful.

- The purpose of expunction is to eliminate content that is deemed 'defamatory, indecent, unparliamentary, or undignified'.

Who Holds the Power to Order Expunction?

- The Chairman of the Rajya Sabha (Upper House Rule 261) and the Speaker of the Lok Sabha (Lower House Rules 380 and 381) have the authority to order the expunction of remarks.

How Does Expunction Work?

- Parliament maintains a verbatim record of everything spoken and transpiring during sessions.
- MPs enjoy certain privileges and freedom of speech under Article 105 of the Constitution. However, these privileges are subject to other constitutional provisions and house rules.
- The Presiding Officer (Chairman or Speaker) can expunge words, phrases, or expressions that violate parliamentary etiquette.
- The Lok Sabha Secretariat maintains a comprehensive list of 'unparliamentary' words and expressions.

3. Money Bill

Context:

The Supreme Court of India agreed to list petitions challenging the Money Bill route taken by the Centre to pass contentious amendments in the Parliament.

- Money Bill
- Article 110 of the Constitution deals with the definition of money bills.

It states that a bill is deemed to be a money bill if it contains 'only' provisions dealing with all or any of the following matters:

- The imposition, abolition, remission, alteration or regulation of any tax;
- the regulation of the borrowing of money or the giving of any guarantee by the Government of India, or the amendment of the law with respect to any financial obligations undertaken or to be undertaken by the Government of India;

- The custody of the Consolidated Fund or the Contingency Fund of India, the payment of moneys into or the withdrawal of moneys from any such Fund;
- the appropriation of moneys out of the Consolidated Fund of India;
- The declaring of any expenditure to be expenditure charged on the Consolidated Fund of India or the increasing of the amount of any such expenditure;
- The receipt of money on account of the Consolidated Fund of India or the public account of India or the custody or issue of such money or the audit of the accounts of the Union or of a State; or
- Any matter incidental to any of the matters specified above.

Passing of Money Bills

- **A Money Bill can be introduced only in the Lok Sabha, only by a minister, and only on the recommendation of the President.**
- **If any question arises whether a bill is a Money bill or not, the decision of the Speaker of Lok Sabha is final.**
- After a Money bill is passed by the Lok Sabha, it is transmitted to the Rajya Sabha.

The Rajya Sabha has very restricted powers w.r.t. Money Bills:

- **Rajya Sabha cannot reject or amend a Money bill.**
- Rajya Sabha can only make recommendations.
- Rajya Sabha must return the bill within 14 days, with or without recommendations.

The Lok Sabha can either accept or reject all or any of the recommendations of Rajya Sabha.

If the Rajya Sabha does not return the bill within 14 days, the bill is deemed to have been passed by both the Houses in the form originally passed by Lok Sabha.

Once a Money Bill is passed by both the Houses, it is presented to the President.

- **He/she may either give the assent or withhold assent, but cannot return the bill for reconsideration by the Houses of Parliament.**

4. Foreigners' Tribunal

Context:

The Supreme Court last week declared Assam resident Md Rahim Ali a citizen of India, throwing out the decision of a Foreigners' Tribunal in the state.

About Foreigners' Tribunal:

- FTs established through the Foreigners (Tribunals) Order, 1964 under the Foreigners Act, 1946.
- **They were established in 1964 by an executive order of the Home Ministry, even though under Article 323B of the Constitution, tribunals may be established by "the appropriate legislature" by "law".**
- **Originally enacted by the Central government, but amended in 2019 to grant states the power to establish FTs.**

Purpose and Need for FT:

- FTs enable state administration to refer suspected foreigners for adjudication.
- Superintendents of police and district commissioners empowered to detect suspected foreigners.
- Election Commission of India can refer cases of Doubtful voters to FTs.
- Persons excluded from the final draft of the National Register of Citizens (NRC) can appeal to FTs to prove citizenship.
- **Currently, FTs exist only in Assam, while in other states, illegal immigrants are dealt with by local courts under the Foreigners Act, 1946.**

5. Article 341 of the Indian Constitution

Context:

Recently, the Supreme Court of India ruled that the states cannot make changes to the Scheduled Caste List published under Article 341 of the Constitution.

About the Article 341 of the Indian Constitution:

- *It is a crucial provision that deals with the identification and recognition of Scheduled Castes (SCs), which are historically marginalised communities that have faced social discrimination and exclusion.*
- *Article 341 empowers the President of India to specify which castes, races, or tribes should be considered as SCs.*
- Once the President issues such a notification (Presidential Order), these communities are entitled to certain protective measures and affirmative action.
- It's important to note that once this list is published, any subsequent changes—whether additions, deletions, or modifications—can only be made through legislation enacted by the Parliament.

State Authority

- *While states play a significant role in implementing policies related to SCs, they do not have the authority to alter the SC list directly. This power rests exclusively with the President and Parliament.*

6. President Assent to Bills reserved by Governor of a state**Context:**

President Droupadi Murmu has refused to clear a Punjab government Bill seeking the removal of Governor Banwarilal Purohit as the Chancellor of state-run universities.

Assent to Bills:

- When a Bill is passed by the Legislative Assembly of a State (or both Houses of the Legislature, in the case of a State with a Legislative Council), it is presented to the Governor.

The Governor has three options:

- Assent: The Governor can declare that they assent to the Bill.

- Withhold Assent: The Governor may withhold assent from the Bill.
- *Reservation for President's Consideration: The Governor can reserve the Bill for the consideration of the President.*
- The reservation is obligatory where the bill endangers the position of the state high court.

President's Role:

- If the Governor reserves a Bill for the President's consideration, the enactment depends on the President's assent or refusal.
- *The President may direct the Governor to return the Bill to the State Legislature for reconsideration (if it's not a Money Bill).*
- The State Legislature must then reconsider the Bill within 6 months, and if passed again, it is presented to the President.
- *In contrast with the power of the Governor regarding a reconsidered Bill, it is not obligatory for the President to give his assent to a reconsidered Bill.*

7. Enemy Property**Context:**

The Indian government has begun to auction properties classified as 'enemy properties.'

About Enemy Property:

- *Enemy property is those immovable and moveable assets which were left behind by people who took citizenship of Pakistan and China after leaving India during the partition and post the 1962 and 1965 wars.*
- Besides real estate, enemy property may also include bank accounts, shares, gold, and other assets of such individuals.
- *The enemy properties are vested with the Custodian of Enemy Property for India (CEPI), an authority created under the Enemy Property Act, 1968.*

- The 2017 amendment to the Act (Enemy Property (Amendment and Validation) Act, 2017) stated that the successors of those who migrated to Pakistan and China ceased to have a claim over the properties left behind in India.
- **The amendment ensured that the law of succession does not apply to enemy property**, that there cannot be a transfer of any property vested in the custodian by an enemy, or enemy subject, or enemy firm, and that the custodian shall preserve the enemy property till it is disposed of in accordance with the provisions of the Act.
- As per CEPI, there are 13,252 enemy properties in India, valued at over Rs1 lakh crore.
- Most of these properties belong to people who migrated to Pakistan, and over 100 to those who migrated to China.
- **Uttar Pradesh (5,982) has the highest number of enemy properties, followed by West Bengal (4,354).**

8. Public Service Commissions in India

Context:

Recently, the chairperson of the Union Public Service Commission (UPSC), has resigned, citing 'personal reasons' for stepping down from his position.

About the Public Service Commissions in India:

- According to the Article-315 of the Constitution, there shall be a Public Service Commission for the Union and for each State.
- **Joint State Public Service Commission:** Parliament may by law provide for the appointment of a Joint State Public Service Commission to serve the needs of those States.
- Two or more States may agree that there shall be one Public Service Commission for that group of States, and if a resolution to that effect is passed by the House or, where there are two Houses, by each House of the Legislature of each of those States.

- The Public Service Commission for the Union, if requested to do so by the Governor of a State, may, with the approval of the President, agree to serve all or any of the needs of the State.

Appointment and Term of Office (Article-316)

- The Chairman and other members of a Public Service Commission shall be appointed, in the case of the Union Commission or a Joint Commission, by the President, and in the case of a State Commission, by the Governor of the State.
- A member shall hold office for a term of six years from the date on which he enters upon his office or until he attains, in the case of the Union Commission, the age of sixty-five years, and in the case of a State Commission or a Joint Commission, the age of sixty-two years, whichever is earlier.
- A person who holds office as a member of a Public Service Commission shall, on the expiration of his term of office, be ineligible for reappointment to that office.

Removal and Suspension (Article-317):

- The Chairman or any other member of a Public Service Commission shall only be removed from his office by order of the President on the ground of misbehaviour after the Supreme Court, on inquiry held in accordance with the procedure prescribed in that behalf under Article 145.

The President may by order remove from office the Chairman or any other member of a Public Service Commission if the Chairman or such other member, as the case may be:

- is adjudged an insolvent; or
- engages during his term of office in any paid employment outside the duties of his office; or
- is, in the opinion of the President, unfit to continue in office by reason of infirmity of mind or body.

Members of the UPSC can submit their resignation directly to the President of India at any time.

Functions of PSCs (Article 320)

- Conduct examinations for appointment to the services of the Union.
- Each state has its own SPSC, which performs similar functions but at the state level.
- PSCs advise the government on matters related to personnel management, promotions, and disciplinary actions.
- Direct recruitment by selection through interviews.
- Appointment of officers on promotion / deputation / absorption.
- Framing and amendment of Recruitment Rules for various services and posts under the Government.
- Disciplinary cases relating to different Civil Services.

9. Article 361**Context:**

The Supreme Court agreed to examine the contours of Article 361 of the Constitution which grants “blanket immunity” to governors from any kind of criminal prosecution.

Background:

- A woman staff member of the West Bengal Raj Bhawan, has accused Governor CV Ananda Bose of sexual harassment.
- The plea challenges the immunity granted to the governor of a state under Article 361 of the Indian Constitution and seeks several directions and investigations.

What is Article 361?

- **The Governors of state receive immunity from legal proceedings over the duration of their term in office under Article 361 of the Constitution.**
- The aim of the Article is to ensure that they are not answerable to any court for the exercise and performance of their official powers and duties, nor for any acts done in the course of these duties.

- **Criminal proceedings: No criminal cases can be initiated or continued against them, and no arrest or imprisonment orders can be issued by any court under Clause (2) of Article 361.**
- **Civil proceedings: The Article mandates a two-month notice for any civil proceedings related to personal acts.**
- Clause (3) of Article 361 restricts any arrest or imprisonment orders during their term.
- The article is an exception to Article 14 (right to equality) of the Constitution and provides that the president or the governor is not answerable to any court for the exercise of the powers and duties of his office.

Immunity power of the Governor

- **Ceases to be in office:** The police can act only after the Governor ceases to be in office, which is when either the Governor resigns or no longer enjoys the confidence of the President.”
- **Rameshwar Prasad v Union of India:** In the landmark 2006 ruling in Rameshwar Prasad v Union of India, that outlined the immunity enjoyed by the Governor “even on allegation of personal malafides,” the Supreme Court held that “the position in law, is that the Governor enjoys complete immunity.”

10. Bhil Pradesh**Context:**

The members of the Bhil tribe have again demanded a separate ‘Bhil Pradesh’.

What is ‘Bhil Pradesh’?

- The Bhil community has been demanding that 49 districts be carved out of the parts of Rajasthan, Madhya Pradesh, Gujarat and Maharashtra to establish Bhil Pradesh.
- Bhil social reformer and spiritual leader Govind Guru first raised the demand for a separate state for tribals back in 1913.

- This was after the Mangarh massacre, which took place six years before Jallianwalla Bagh and is sometimes referred to as the "Adivasi Jallianwala".
- It saw hundreds of Bhil tribals being killed by British forces on November 17, 1913, in the hills of Mangarh on the Rajasthan-Gujarat border.
- Post-Independence, the demand for Bhil Pradesh was raised repeatedly.

Process to form/rename a state in India:

Article 3 authorizes the Parliament to:

- form a new state by separation of territory from any state or by uniting two or more states or parts of states or by uniting any territory to a part of any state;
- increase the area of any state;
- diminish the area of any state;
- alter the boundaries of any state; and
- alter the name of any state.

However, Article 3 lays down two conditions in this regard:

- a bill contemplating the above changes can be introduced in the Parliament only with the prior recommendation of the President;
- and before recommending the bill, the President has to refer the same to the state legislature concerned for expressing its views within a specified period.

The President (or Parliament) is not bound by the views of the state legislature and may either accept or reject them.

Moreover, the Indian Constitution (Article 4) itself declares that laws made for alteration of names of existing states (under Articles 3) are not to be considered as amendments of the Constitution under Article 368

- Such laws can be passed by a simple majority and by the ordinary legislative process.

12. Indian national flag

Context:

India's National Flag Day commemorates the adoption of the Indian national flag on July 22, 1947, by the Constituent Assembly.

About

- **It was designed by Pingali Venkayya.**
- Specifications: The Indian national flag, known as the "Tiranga", features three horizontal stripes of equal width.
- The top stripe is saffron (kesaria), representing courage and sacrifice.
- The middle stripe is white, symbolising peace and truth, with a navy-blue Ashoka Chakra (wheel) at its centre, which signifies the eternal wheel of law.
- The bottom stripe is green, denoting growth and auspiciousness.
- **The flag's proportions are in the ratio of 2:3 and the Ashoka Chakra has 24 spokes, representing continuous progress.**
- **Historical context: The Ashoka Chakra replaced the spinning wheel, or "Charkha," which was a symbol of self-reliance and resistance during the freedom struggle.**
- **This change was suggested by Badr-ud-Din Tyabji and endorsed by Mahatma Gandhi.**
- Ashoka Chakra is similar to the wheel that can be seen on the abacus of Ashoka's Sarnath Lion Capital, with 24 spokes and its diameter is about equal to the width of the white band.
- **The Flag Code of India: The Flag Code of India was modified in 2002, allowing citizens to display and use the national flag on any day and not just National days as was the case earlier, but with respect and dignity.**
- Citizens are permitted to fly the flag throughout the year, provided they adhere to the guidelines, which include hoisting the flag between sunrise and sunset unless adequately illuminated at night.

- **Part IV-A of the Constitution:** According to Article 51A (a), It shall be the duty of every citizen of India to abide by the Constitution and respect its ideals and institutions, the National Flag and the National Anthem.

13. SC Judgement on Power of State Legislature to tax Mining Lands

Context:

A significant judgement delivered in a 8:1 ratio by a nine-judge Constitution Bench headed by Chief Justice of India (CJI) D.Y. Chandrachud held that the power of State Legislatures to tax mining lands and quarries is not limited by the Parliament's Mines and Minerals (Development and Regulation) Act of 1957.

- **Power to Tax Mineral Development:** The 7th Schedule of the Constitution gives states the exclusive power to make laws relating to "Taxes on lands and buildings" (Entry 49) and "Taxes on mineral rights subject to any limitations imposed by Parliament by law relating to mineral development" (Entry 50).
- **Entry 54 of the Union List gives the Centre the power over "Regulation of mines and mineral development".**
- **States' Power to Tax:** The MMDRA does not restrict states' powers to tax mineral rights under Entry 50 of the State List. This is because royalties are not recognized as a form of tax. Entry 49 allows states to tax land where mines and quarries are located.



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14. Rule 267 of Rajya Sabha

Context:

Recently, the Rajya Sabha Chairman informed that the introspection among parliamentarians regarding the frequent use of Rule 267, terming it an 'indiscriminate resort' to the provision.

About the Rule 267 of Rajya Sabha:

- It is nestled within the broader category of 'suspension of rules', empowers any member of the Rajya Sabha to propose the suspension of a specific rule.
- It gives special power to a Rajya Sabha member to suspend the pre-decided agenda of the House, with the approval of the Chairman.
- It allows for the suspension of a day's business to debate the issue suggested by a member.
- By suspending a rule, the Rajya Sabha can fast-track discussions or decisions on specific issues.
- This suspension isn't forever. Once the day's business concludes, the suspended rule reclaims its rightful place.

15. E-Upahaar Portal

Context:

Rashtrapati Bhavan will auction selected gift items, presented to the President and former Presidents on various occasions, through an online portal called E-Upahaar.

About E-Upahaar Portal:

- It is an auction portal of the President's Secretariat (office of the President of India), Rashtrapati Bhavan for auctioning of gift items presented to Hon'ble President and former Presidents of India.
- The portal was launched by the President of India, on July 25, 2024,

- It is conceptualized, designed, developed and hosted by National Informatics Centre (NIC), Ministry of Electronics and Information Technology.
- The aim of this initiative is not only to increase citizen engagement but also to support noble cause. All proceeds from the auction will be donated to help children in need.

Key facts about the National Informatics Centre:

- It was established in 1976 to provide technology-driven solutions to Central and State Governments.
- It works under the Union Ministry of Electronics and Information Technology (MeitY).
- The NIC's primary focus is to provide e-Government solutions and support to various government departments.
- NIC, through its ICT Network, "NICNET", has institutional linkages with all the Ministries /Departments of the Central Government, 36 State Governments/ Union Territories across India.

The following major activities are being undertaken:

- Setting up of ICT Infrastructure.
- Implementation of National and State Level e-Governance Projects/Products.
- Consultancy to the Government departments.
- Research & Development.



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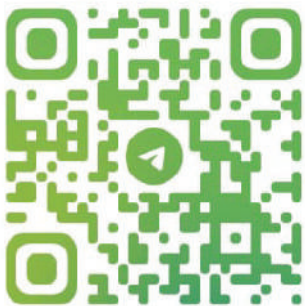
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S.No.	Test Name	Date of Test
1	CA April 2024	18-08-2024
2	CA May 2024	01-09-2024
3	CA June 2024	15-09-2024
4	CA July 2024	29-09-2024
5	CA August 2024	13-10-2024
6	CA September 2024	27-10-2024
7	CA October 2024	17-11-2024
8	CA November 2024	15-12-2024
9	CA December 2024	12-01-2025
10	CA January 2025	16-02-2025
11	CA February 2025	16-03-2025
12	CA March 2025	13-04-2025
13	CA April 2025-20 Days	04-05-2025



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ECONOMY

1. Petrodollars Matter

About:

- **Petrodollars are dollars paid to oil-producing countries for their exports.**
- The petrodollar emerged as an economic concept in the 1970s as growing U.S. imports of increasingly costly crude oil increased the dollar holdings of foreign producers.
- Petrodollar recycling is the reinvestment of crude oil export revenue denominated in dollars.
- The dollar's status as the leading global currency preceded petrodollar's rise and has continued amid increased U.S. energy production and widening current account deficits.

Why Petrodollars Matter:

- **Global oil trade in U.S. dollars:** Since the 1970s, the vast majority of international oil transactions have been conducted in U.S. dollars. This means that countries need to hold U.S. dollars to purchase oil, creating a consistent demand for the currency.
- **Recycling of petrodollars:** Oil-exporting countries often invest their excess U.S. dollars in U.S. Treasury securities and other dollar-denominated assets in order to keep them safe while earning a return. This process, known as petrodollar recycling, helps finance the U.S. government's budget and trade deficits.
- **Increased demand for U.S. dollars:** The global oil trade's reliance on the U.S. dollar increases the currency's demand, helping to maintain its value and status as the world's primary reserve currency.



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- **Lower borrowing costs for the U.S.:** The increased demand for U.S. Treasury securities from oil-exporting countries helps keep U.S. interest rates lower than they might otherwise be, benefiting the U.S. government and consumers. That is because as bond prices like Treasuries are bid up, their yields naturally fall.
- **Geopolitical influence:** The petrodollar system gives the U.S. a degree of leverage over oil-exporting countries, as they rely on the stability of the U.S. dollar and have a vested interest in maintaining the currency's strength.

2. Financial Services Institution Bureau

Context:

Recently, the Financial Services Institution Bureau (FSIB) has selected Challa Sreenivasulu Setty as the next chairman of State Bank of India (SBI).

About the Financial Services Institution Bureau:

- It is an autonomous body of Government of India for developing and implementing appropriate methodologies for making recommendations for appointments, extension and termination of members of the Boards in the institutions specified in the Government of India gazette notification.
- **It was established to replace the Banks Board Bureau (BBB).**
- **Its primary mandate is to recommend candidates for appointment as whole-time directors and non-executive chairpersons on the boards of financial services institutions.**
- Additionally, the FSIB aims to advise on personnel management matters within these institutions.

- **Vision:** Search and select apposite personages for Board of Public Sector Banks, Public Sector Financial Institutions and Public Sector Insurance Companies and recommend measures to improve Corporate Governance in these Institutions.
- **Mission:** To Promote excellence in Corporate Governance in Public Sector Financial Institutions.

Additional Information:

- **Mission INDRADHANUSH was launched in 2015** for the revamp of Public Sector Banks (PSBs), consisting of Appointments; **Bank Board Bureau;** Capitalization; De-stressing PSBs and Strengthening Risk Control measures and NPA Disclosures; Empowerment; Framework of Accountability; and Governance Reforms.
- **BBB, as an autonomous body of the Government of India, was set up in 2016 by way of amendment to the Nationalised Banks (Management and Miscellaneous Provisions) Scheme.**
- Earlier, the Delhi High Court ruled that the BBB lacked competence to select general managers and directors of state-run general insurers.

3. eSankhyiki Portal

Context:

The Ministry of Statistics and Programme Implementation has recently launched eSankhyiki Portal to disseminate real-time inputs for planners, policy-makers and researchers.

About:

- eSankhyiki Portal aims to provide real-time inputs for planners, policy-makers, researchers and the public at large.
- The objective of this portal is to establish a comprehensive data management and sharing system for ease of dissemination of official statistics in the country.
- **eSankhyiki Portal is an initiative of Ministry of Statistics and Programme Implementation (MoSPI).**

The eSankhyiki Portal has two modules:

- Data Catalogue Module
- Macro Indicators Module

Data Catalogue Module – This module catalogues the major data assets of the Ministry at one place for ease of access.

- This module allows users to search within datasets, including within tables and download data of interest to increase its value and re-usability.
- The Data Catalogue section already includes over 2291 datasets along with specific metadata and visualization for each dataset for user convenience.

Macro Indicators Module – This module offers time series data of key macro indicators with features for filtering and visualizing data enabling ease of access for the users.

- The module also allows users to download custom datasets, visualizations and sharing them through APIs, thereby increasing the re-usability of data.

4. Bank for International Settlements

Context:

The Reserve Bank of India (RBI) has joined Project Nexus.

About Bank for International Settlements (BIS):

- **Established in 1930 with headquartered in Basel, Switzerland.**
- The BIS was created out of the Hague Agreements of 1930 and took over the job of the Agent General for Repatriation in Berlin.
- The goal is to foster international monetary and financial cooperation while serving as a bank for central banks.
- **It aids central banks in their pursuit of monetary and financial stability through international cooperation.**

- It provides a platform for responsible innovation and knowledge-sharing in-depth analysis and insights on core policy issues sound and competitive financial services.
- **This organisation is owned by 63 central banks, including the Reserve Bank of India (RBI) representing countries from around the world that together account for about 95% of world GDP.**

About Project Nexus:

- **Project Nexus is conceptualised by the Innovation Hub of the Bank for International Settlements (BIS).**
- **It is the first BIS Innovation Hub project in the payments area to move towards live implementation.**
- **It seeks to enhance cross-border payments by connecting multiple domestic instant payment systems (IPS) globally.**
- BIS will facilitate central banks and IPS operators of India, Malaysia, the Philippines, Singapore and Thailand as they work towards live implementation in the next phase, with Bank of Indonesia as special observer.
- The platform is expected to go live by 2026.

5. Zinc

Context:

Researchers in France have discovered that zinc plays a crucial role in the health of legume crops.

About Zinc:

- It is a silvery blue-grey metal with a relatively low melting and boiling point.
- **Both lead & zinc are found to occur together in ore along with other metals like silver and cadmium.**
- It is the fourth most widely used metal across the globe, trailing only steel, aluminium and copper. India has self-sufficiency in respect of zinc.

- **In India, Rajasthan is endowed with the largest reserves/resources of lead – zinc ore, followed by Andhra Pradesh (3.03%), Madhya Pradesh (1.98%), Bihar etc.**
- **Global reservoirs of Zinc: Australia accounts for 27% of world's zinc reserves, followed by China (18%), Russia & Mexico (9% each), Peru (8%), Kazakhstan (5%), USA (4%), etc.**

Uses:

- The largest consumer of zinc is the Galvanising Industry. Owing to its corrosion resistance in varied types of environments, zinc is used for protecting steel by way of galvanizing.
- Large quantities of zinc are used to produce die-castings, which are important in the automobile, electrical and hardware industries.
- Zinc oxide is widely used in the manufacture of very many products such as paints and rubber etc.

Biological role

- It is a trace mineral, meaning that the body only needs small amounts, and yet it is necessary for almost 100 enzymes to carry out vital chemical reactions.
- **It is a major player in the creation of DNA, growth of cells, building proteins, healing damaged tissue, and supporting a healthy immune system.**

Key findings:

- It found that zinc in plants aids in nitrogen fixation, a process where atmospheric nitrogen is converted into ammonia, an essential nutrient for plants.
- **Legume crops form a symbiotic relationship with rhizobia, a bacterium that fixes atmospheric nitrogen in root nodules.**
- However, these nodules are sensitive to environmental factors such as temperature, drought, flooding, soil salinity, and high soil nitrogen levels.

- Another vital finding of this study is the identification of a crucial transcription factor that controls nodule breakdown when soil nitrogen levels are high.
- The researchers discovered that legumes also use zinc as a secondary signal to integrate environmental factors and regulate nitrogen fixation efficiency. The mechanism works due to a transcriptional regulator called Fixation Under Nitrate (FUN).
- FUN is inactivated by zinc through the formation of large filament structures, which are dismantled to release active FUN when zinc levels are low.

6. Urban mining

Context:

The ministry of mines is in the initial stages of designing a Production Linked Incentive (PLI) scheme to boost the recycling of critical minerals in India, the process which is popularly known as 'urban mining'.

Urban mining:

- Urban mining refers to the process of reclaiming valuable materials from urban waste streams and obsolete products in cities.

It involves:

- Extracting precious metals and other valuable resources from electronic waste (e-waste) like old phones, computers, and appliances.
- Recycling construction and demolition waste to recover materials like metals, concrete, and wood.
- Recovering materials from municipal solid waste, including plastics, paper, and metals.
- Extracting valuable elements from wastewater and sewage sludge.

The concept aims to:

- Reduce dependence on traditional mining of raw materials
- Decrease waste sent to landfills
- Lower environmental impact of resource extraction
- Conserve natural resources
- Create a more circular economy.

7. District Mineral Foundation

Context:

District Mineral Foundation Gallery Inaugurated at Shastri Bhawan In New Delhi.

About District Mineral Foundation:

- **District Mineral Foundations (DMFs) are non-profit trusts established by state governments in districts affected by mining activities.**
- **Legal Basis: Introduced in 2015 through an amendment to the Mines and Minerals (Development and Regulation) Act, 1957.**
- **Objective:** To work for the interest and benefit of people and areas impacted by mining-related operations.
- **Funding:** DMFs are funded by a portion of the royalty paid by mining leaseholders, contributions from the state government's budget, and donations from private companies.
- **Implementation:** DMFs are governed by a Board of Trustees, which includes representatives from the state government, district administration, local communities, and experts. The Board formulates and approves projects under PMKKKY and other schemes.

8. Steel Slag

Context:

Recently, in the First International Conference on Steel Slag Road jointly organised by CSIR-CRRI and PHDCCI at New-Delhi, the Guidelines was released for Utilisation and Processing of Steel Slag as Processed Steel Slag Aggregates in Road Construction.

About Steel Slag:

- Steel slag is a byproduct generated during the steel-making process, specifically in the production of iron and steel.



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- **Formation:** Steel slag forms when impurities in the molten steel are oxidized and separated from the molten metal. It can include elements like silicon, manganese, phosphorus, and sulphur.
- **Composition:** The composition of steel slag varies depending on the process and type of steel production. It generally consists of lime (CaO), silica (SiO₂), alumina (Al₂O₃), and magnesia (MgO) in varying proportions.
- **Applications:** Road base course material, Raw material for rock wool, Calcium silicate fertiliser, Fine aggregate for concrete, Soil improvement, raw material for cement etc.

9. SEHER Programme

Context:

NITI Aayog's Women Entrepreneurship platform and credit bure have collaborated to launch the SEHER programme.

About SEHER Programme:

- It is a comprehensive credit education program designed to enhance financial literacy and business skills among women entrepreneurs.
- This initiative is expected to enable women to access the financial tools necessary for business growth and job creation.
- It is an initiative of NITI Aayog's Women Entrepreneurship Platform (WEP) and TransUnion CIBIL.
- This initiative supports WEP's goal of improving financing access for women in India's 63 million MSMEs.

Key facts about the Women Entrepreneurship Platform

- It was incubated in NITI Aayog in 2018 as an aggregator platform that transitioned as a public-private partnership in 2022 to build a comprehensive ecosystem supporting women entrepreneurs across India.

- WEP aims at empowering women entrepreneurs by overcoming information asymmetry and providing continuum of support across different pillars - Entrepreneurship promotion, Access to Finance; Market Linkages; Training and Skilling; Mentoring and Networking and Business Development Services.
- For this, WEP adopts a wide array of interventions with a focus on convergence and collaboration with existing stakeholders.

10. Digital Bharat Nidhi

Context:

Recently, the Department of Telecommunications (DoT) released draft rules to operationalise the Digital Bharat Nidhi, in a fresh attempt by the central government at increasing telecom connectivity in rural areas.

About Digital Bharat Nidhi:

- It would replace the erstwhile Universal Service Obligation Fund (USOF), which is a pool of funds generated by a 5 per cent Universal Service Levy charged upon all the telecom fund operators on their Adjusted Gross Revenue (AGR).
- This money would be used to fund the expansion of telecom networks in remote and rural areas.

Working of the Digital Bharat Nidhi:

- As per the Telecom Act, contributions made by telecom companies towards the Digital Bharat Nidhi will first be credited to the Consolidated Fund of India (CFI).
- All revenues that the government receives, including loans raised and all money received in repayment of loans, are credited to the CFI. The government also incurs its expenditures from this fund.
- The Central government will deposit the collected funds to the DBN from time to time.



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The funds under DBN are used for:

- Funds collected under the DBN will be used to support universal service through promoting access to and delivery of telecommunication services in underserved rural, remote and urban areas; fund research and development of telecommunication services, technologies, and products; support pilot projects, consultancy assistance and advisory support for improving connectivity; and for the introduction of telecommunication services, technologies, and products.
- The DBN shall fund schemes and projects for providing targeted access to telecommunication services for underserved groups of society such as women, persons with disabilities and economically and socially weaker sections, as per the draft rules.

Administration: The Centre will appoint an “administrator” who will select “DBN implementers” through “bidding” or invitation of applications from eligible persons.

- This so-called administrator will determine the modalities of providing funding to DBN implementers on a case-by-case basis, including but not limited to full funding, partial funding, co-funding, market risk mitigation, and risk capital.

11. Critical Minerals**Context:**

The Centre may issue so-called composite licences to find and extract critical minerals, in effort to end the fragmented nature of licensing, and tempt mining giants which passed up the blocks that went on auction last year.

About Critical Minerals:

- These minerals are necessary for national security, economic growth, and renewable energy.
- The development of numerous industries, such as high-tech electronics, telecommunications, transportation, and defence, depends on these.
- Critical minerals have no particular definition and countries identify the minerals critical to them using their own criteria.
- The US has identified 50 critical minerals.
- Japan recognizes 31 minerals critical for its economy.

- The UK, EU, and Canada also maintain their unique lists.
- Identified Critical Minerals in India: The Expert Committee under the Ministry of Mines has identified a set of 30 critical minerals for India.**
- These are Antimony, Beryllium, Bismuth, Cobalt, **Copper**, Gallium, Germanium, **Graphite**, Hafnium, Indium, Lithium, Molybdenum, Niobium, **Nickel**, PGE, Phosphorous, **Potash**, REE, Rhenium, Silicon, Strontium, Tantalum, Tellurium, Tin, Titanium, Tungsten, Vanadium, Zirconium, Selenium, and Cadmium.

Mines and Minerals (Development and Regulation) Amendment Act 2023:

- The Act removes minerals such as beryllium and beryl, lithium, niobium, titanium, tantalum, and zirconium from the list of atomic minerals, and the commercial sector is now able to bid for them. Mining and exploration of these minerals will be available to the private sector once they are removed from the list of atomic minerals.**

12. RBI's financial inclusion index**Context:**

The Financial inclusion index, capturing the extent of financial inclusion across the country, rose to 64.2 in March 2024, showing growth across all parameters.

What is RBI's financial inclusion index?

- In 2021, the Reserve Bank of India (RBI) launched a Financial Inclusion Index (FI-Index) to track the process of ensuring access to financial services, timely and adequate credit for vulnerable groups such as weaker sections and low-income groups at an affordable cost.**
- The index incorporates the details of banking, investment, insurance, postal, and pension sectors in consultation with government and respective sector regulators.
- The FI-Index has been constructed without any 'base year'. The FI-Index is published annually in July.**

Range and Parameters of FI-Index:

- The index captures information on various aspects of financial inclusion in a single value ranging between 0 and 100, where 0 represents complete financial exclusion and 100 indicates full financial inclusion.
- The FI-Index comprises three broad parameters, access (35%), usage (45%), and quality (20%), with each of these consisting of various dimensions, which are computed based on a number of indicators.

13. Makhana**Context:**

Makhana has become a popular 'super snack', with prices rising sharply in both domestic and international markets since 2019.

About - Foxnuts or Makhana is an aquatic crop traditionally grown in India.

Common Names- Fox nut, Gorgon nut, Phool Makhana.

Production- Makhana, is mainly cultivated in the states of Bihar, West Bengal, and Assam.

Bihar is the leading producer of makhana accounting for more than 90% of the total production of India. India contributes to 80% of the world's demand.

Climate- Makhana is an aquatic crop and requires a warm, humid climate. It is typically cultivated in areas with temperatures ranging from 20°C to 35°C.

Soil- It thrives in loamy and clayey soils with good water retention capacity. The pH of the soil should be between 5.5 to 7.5.

Nursery Preparation- Seeds are collected from mature Makhana fruits.

- Seeds are soaked in water for 24-48 hours before sowing.
- Seeds are sown in nursery beds or trays filled with a mixture of soil and cow dung.

Main Field Preparation- Select low-lying areas or water bodies like ponds, lakes, or wetlands.

Transplanting- Seedlings are transplanted into the main field after 30-40 days when they are about 15-20 cm tall.

Fertilization- Organic fertilizers like cow dung can be applied. Chemical fertilizers are generally avoided.

Harvesting- Makhana plants take about 4-5 months to mature.

- The seeds are harvested when the fruits start to crack and the seeds float on the water surface.

Nutritional value- The crop is a good source of vegetarian protein, at 10%, and contains five of the nine amino acids.

- There are also quercetin and kaempferol flavonoids, both of which protect against diabetes and obesity.
- It is considered a 'super snack' because they are low in calories, rich in protein, and contain essential nutrients.

Makhana Development Scheme- The Bihar government runs the Makhana Development Scheme that gives a 75% subsidy on the Suvarna Vaidehi variety of seeds, calculated at ₹97,000 per hectare.

- Makhana is approved under the Union government's One District One Product scheme, which provides subsidies to food processors for branding, marketing, and infrastructure development.

14. World Population Prospects Report**Context:**

Recently, the United Nations Department of Economic and Social Affairs (DESA) released the World Population Prospects 2024 report.

About World Population Prospects Report:**Key findings of the report**

- The world's population is expected to continue growing over the coming 50-60 years, reaching a peak of around 10.3 billion people in the mid-2080s, up from 8.2 billion in 2024.
- After peaking, the global population is projected to start declining gradually, falling to 10.2 billion people by the end of the century.
- Fertility Rate: Currently, the global fertility rate stands at 2.25 live births per woman, down from 3.31 births in 1990.

- More than half of all countries and areas globally have fertility below the replacement level of 2.1 live births per woman.
- Life expectancy: Globally, life expectancy at birth reached 73.3 years in 2024, an increase of 8.4 years since 1995. Further reductions in mortality are projected to result in an average longevity of around 77.4 years globally in 2054.
- **India's population in 2024 is projected at 1.45 billion and this will peak to 1.69 billion in 2054.**

Key facts about United Nations Department of Economic and Social Affairs:

- **It works closely with governments and stakeholders to help countries around the world meet their economic, social and environmental goals.**
- It has been helping countries to find common ground on sustainable development, population, social matters, financing for development and many other issues.
- It supports building national strategies and plans to achieve the Sustainable Development Goals (SDGs). UN DESA also plays a key role in assessing progress towards the SDGs through its analytical products, policy advice and technical assistance.
- **Headquarter: New York (USA)**

15. Government e Marketplace

Context:

The Government e Marketplace has reported significant achievements and initiatives in the first quarter of FY 24-25, showing a 136% quarter-on-quarter growth in Gross Merchandise Value compared to last year.

About:

- **Government e Marketplace (GeM) facilitates online procurement of common use Goods & Services required by various Government Departments, Organisations and PSUs.**
- GeM aims to enhance transparency, efficiency and speed in public procurement.

- It provides the tools of e-bidding, reverse e-auction and demand aggregation to facilitate the government users, achieve the best value for their money.
- **The purchases through GeM by Government users have been authorised and made mandatory by Ministry of Finance through General Financial Rules, 2017.**

GeM SAHAYAK – Is a program to reach out to the last mile sellers and simplify public procurement.

- It aims at creating a PAN INDIA network of 6-7000 trained and certified accredited trainers.
- The trainers would offer their services to potential and existing GeM Sellers in navigating on GeM and enhancing business opportunities.
- Buyers too will benefit from the services of these SAHAYAKS in terms of creation of bids and other value-added services.

GeMAI – GeM is all set to deploy its generative AI-based chatbot called “GeMAI” in the coming quarter.

- The AI tool has been trained to provide solutions based on a nuanced analysis of queries raised by Buyers and Sellers through various complaint and feedback mechanisms.
- Conversational analytics and business intelligence using generative AI are also being harnessed to build a robust AI-powered chat bot.

The Aabhar Collection – GeM launched its signature initiative called “The Aabhar Collection” as part of its ‘Vocalforlocal’ outlet store marketplace.

- The Aabhar collection showcases over 120 exquisite and hand-crafted gift items and hampers, featuring select products from One District One Product (ODOP) and Geographical Indication (GI) categories.
- It marks an important milestone in enhancing visibility of indigenous arts & crafts and showcasing the rich tapestry of Indian heritage and culture.

16. AgriSURE

Context:

AgriSURE was recently launched by the NABARD to provide financial support to agricultural start-ups and rural enterprises.

About:

Agri Fund for Start-Ups & Rural Enterprises' (AgriSURE) aids to support start-ups and agripreneurs through investments in:

- Sector-specific, sector-agnostic, and debt Alternative Investment Funds (AIFs) and
- Direct equity support to start-ups working in Agriculture and allied sectors.

It aims to foster innovation and sustainability in India's agricultural sector through the establishment of an Alternative Investment Fund (AIF).

- The fund will offer both equity and debt support, specifically targeting high-risk, high- impact activities in the agriculture value chain.
- The fund will focus on innovation in agriculture, enhancing the farm produce value chain, creating rural infrastructure, generating employment, and supporting Farmers Producer Organizations (FPOs).
- The fund will also encourage IT-based solutions and machinery rental services for farmers.
- **NABVENTURES, a wholly-owned subsidiary of NABARD, will be the Fund manager of AgriSURE.**
- The fund is designed to operate for 10 years, extendable by two or more years.

17. Injection Borewells

Context:

Recently, Citizens adopted the injection borewells to meet growing water needs of Visakhapatnam in Andhra Pradesh.

About the Injection Borewells:

- **These are a smart solution to combat water scarcity and recharge groundwater. These borewells utilise rainwater by channelling it into deep layers of the earth.**

Working:

- **Rainwater Capture:** Injection borewells capture rainwater from large open spaces, terraces, and other surfaces.
- **Unique Technology:** They employ a unique technology that filters and recharges pure rainwater.
- **Deep Recharge:** The water is pumped into underground layers, replenishing the aquifers.

Significance:

- **Rising Water Demand:** As cities expand and populations grow, the demand for water increases.
- **Groundwater Depletion:** Traditional borewells struggle to keep up with this demand, leading to declining groundwater levels.
- **Year-Round Recharge:** Unlike surface water sources that depend on seasonal rains, injection borewells can recharge groundwater even after the rainy season.
- **Cost-Effective:** Groundwater recharge through injection borewells is less expensive than relying solely on surface water.
- **Soil Erosion Reduction:** By directing rainwater underground, these borewells also help prevent soil erosion.



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18. e-FAST India Initiative**About e-FAST India Initiative:**

- *e-FAST was born from the recognition of the urgent need to decarbonize road-based freight transportation in India to realize its 2070 net zero commitments.*
- It was launched in September 2022.
- *It aims to galvanize the transition towards cleaner and greener freight transportation.*
- The platform facilitates active collaborations at both the national and international levels, supports ideation and development of pilot programs on a scalable basis, and explores technology integration and associated research.
- It is a platform that facilitates deliberation, debates and collaboration between different stakeholders including the government, Original Equipment Manufacturers, Logistics Service Providers, Shippers, and industry experts to enable the development and adoption of electric technology in the freight sector at scale.
- It is supported by the collaborative efforts of 12 knowledge partners.

What is NITI GearShift Challenge?

- It was launched by NITI in collaboration with IIM Bangalore, Smart Freight Centre India, CALSTART/Drive to Zero, and WRI India.
- This pioneering hackathon aims to foster innovative business models for the adoption of zero-emission trucks (ZETs) in India, addressing the nation's pressing economic and environmental challenges.
- The NITI GearShift Challenge invites students, transport service practitioners, academics, and researchers to develop innovative business models that address financial, technical, and operational challenges in the adoption of electric trucks.
- The program has garnered participation from e-FAST India knowledge partners, financial institutions, and industry forums.

19. National Skill Development Corporation**Context:**

NSDC has recommended several direct and indirect tax breaks that should be made available to individuals and institutions that are looking for, and providing skill development trainings.

About:

- *National Skill Development Corporation (NSDC) is a not-for-profit public limited company incorporated on July 31, 2008 under section 25 of the Companies Act, 1956 (corresponding to section 8 of the Companies Act, 2013).*
- *NSDC was set up by Ministry of Finance as Public Private Partnership (PPP) model.*
- *The Government of India through Ministry of Skill Development & Entrepreneurship (MSDE) holds 49% of the share capital of NSDC, while the private sector has the balance 51% of the share capital.*

20. Bancassurance**Context:**

Insurance Regulatory and Development Authority (IRDAI) is looking to perk up Bancassurance to meet its objective of 'Insurance for all' by 2047.

About the Bancassurance:

- *It is a strategic partnership between banks and insurance companies, in which insurers can offer their products directly to the bank's customers.*
- *It provides better market access, and cost efficiency directly to customers.*
- But Potential Mis-selling of insurance may take place and IRDAI needs to examine aspects to ensure consumer protection.

Importance:

- **Widening the Safety Net:** According to a National Insurance Academy report, nearly 60 to 70% of Indians remain uninsured. Bancassurance steps in to bridge this gap by leveraging the existing customer base of banks.

- **Customised Solutions:** Banks can tailor insurance products to suit their customers' needs. For instance, many banks offer health insurance to their account holders.
- **Simpler Sales Process:** Since customers already have established relationships with their banks, the sales process becomes smoother.
- Underwriting and KYC (Know Your Customer) procedures are streamlined, reducing costs and risks associated with distribution.
- **Holistic Approach:** Banks can integrate insurance solutions into customers' overall financial planning, that ensures better customer experiences and a more comprehensive understanding of their needs.

21. Master Directions on Fraud Risk Management for Regulated Entities

Context:

Recently, RBI issues revised Master Directions on Fraud Risk Management for Regulated Entities.

About RBI Master Directions on Fraud Risk Management for the Regulated Entities:

- These Master Directions are principle-based and strengthen the role of the Board in overall governance and oversight of fraud risk management in the Regulated Entities (REs).
- These Directions also emphasise the need for instituting robust internal audit and controls framework in the REs.

Scope of Applicability:

- The Master Directions apply to various entities, including (i) Commercial Banks (including Regional Rural Banks) and All India Financial Institutions; (ii) Cooperative Banks (Urban Cooperative Banks / State Cooperative Banks / Central Cooperative Banks); and (iii) Non-Banking Finance Companies (including Housing Finance Companies).

- Regional Rural Banks and Rural Cooperative Banks are also covered, promoting consistency across different types of financial institutions.

Principle-Based Approach:

- These directions emphasize principles rather than prescriptive rules, allowing flexibility while maintaining robust governance.
- The role of the Board within the Regulated Entities (REs) is strengthened, ensuring effective oversight.

Natural Justice and Timeliness:

- REs must comply with principles of natural justice before classifying individuals or entities as fraud cases.
- The time-bound process ensures fairness and due diligence.

22. National Bank for Financing Infrastructure and Development

Context:

The government wants to increase the capital base of the National Bank for Financing Infrastructure and Development, or NaBFID, to 1 trillion through support from banks.

About National Bank for Financing Infrastructure and Development:

- It was set up in 2021, by an Act of the Parliament (The National Bank for Financing Infrastructure and Development Act, 2021).
- It is a specialized Development Finance Institution in India.
- Objectives: Addressing the gaps in long-term non-recourse finance for infrastructure development, strengthening the development of bonds and derivatives markets in India, and sustainably boosting the country's economy.
- Regulated by: It shall be regulated and supervised by RBI as an All-India Financial Institution (AIFI).

- The principal idea behind the setup of NaBFID is to provide a dedicated and specialized institution focused on addressing the long-term financing needs of the infrastructure sector in India.

What is Development Finance Institution?

- These are organizations owned by the government or public institutions to provide funds for infrastructure and large-scale projects, where it often becomes unviable for large banks to lend.
- They provide two types of funds- Medium (1-5 years) and Large (< 5 years).

23. Maize crop

Context:

Recent data showed that the Maize production in India has more than tripled over the last two decades, that has now gone from being a feed crop to a fuel crop.

About:

- Maize, often hailed as the 'queen of cereals', plays a crucial role in India's agricultural landscape.
- India ranks fourth globally in terms of maize cultivation area and seventh in production. Approximately 4% of the world's maize area and 2% of total production come from India.
- The top three producers—namely, the US, Brazil, and Argentina—dominate both production and trade. They export a whopping 197 mt of maize primarily to countries like China, the European Union, Mexico, Japan, South Korea, Vietnam, Iran, and Egypt.
- In India, maize is principally grown in two seasons, rainy (kharif) and winter (rabi).
- Kharif maize represents around 83% of maize area in India, while rabi maize corresponds to 17% maize area.
- Over 70% of kharif maize area is grown under the rainfed condition with a prevalence of many biotic and abiotic stresses.

- The stress prone ecology contributes towards lower productivity of kharif maize (2706 kg/ha) as compared to rabi maize (4436 kg/ha), which is predominantly grown under an assured ecosystem.

State-wise Maize Production:

- Madhya Pradesh and Karnataka lead in maize cultivation, each accounting for 15% of the total maize area in India.
- Other significant maize-producing states include Maharashtra (10%), Rajasthan (9%), and Uttar Pradesh (8%).
- Bihar, after Karnataka and Madhya Pradesh, stands out as a major maize producer.
- Andhra Pradesh boasts the highest state productivity, with districts like Krishna and West Godavari achieving impressive yields of up to 12 tons per hectare.

24. One nation, one rate (ONOR) Initiative

About 'One nation, one rate' (ONOR) Initiative:

- It seeks to standardize gold price across the country.
- This initiative has been advocated by the All India Gem & Jewellery Domestic Council (GJC).

Reasons for fluctuations in gold price – As India imports most of its gold requirement, the currency exchange rate and various duties further influence the gold price in India.

- If the US dollar strengthens against the rupee, domestic gold prices go up and vice versa.
- Gold prices vary from State to State due to differences in logistical costs, differing demand and supply dynamics.
- These factors create disparities in pricing.

Benefits of ONOR – A single gold rate will guarantee that all customers are treated equally and receive jewellery at the same price regardless of their location.

- Having a single rate across the country will make the gold market more efficient.

- It will create a more transparent and uniform pricing structure.
- Eliminating price disparities could lead to a reduction in gold price.
- It will also help in eliminating opportunities for arbitrage and ensure a fair competitive atmosphere for all jewellers in India.

All India Gem and Jewellery Domestic Council – Is a self-regulated trade body that serve as a bridge between the Government and the trade as well as undertaking various initiatives on behalf of and for the industry.

- It represents the interests of over 6 lakh gem and jewellery businesses from across the country.
- It represents various industry segments such as Manufacturers, Retailers, Wholesalers, Allied, gold, silver, platinum, diamonds, Gem stones, and machinery and so on.
- It undertakes various CSR activities on behalf of the industry workers to promote and ensure safe and secure working environment for its large workforce.

25. NITI Aayog

Context:

The Narendra Modi-led NDA government on July 16 reconstituted the NITI Aayog, with four full-time members and 15 Union Ministers, including from BJP allies, as either ex-officio members or special invitees.

About National Institution for Transforming India (NITI) Aayog:

- **It is a government think-tank formed in 2015 via a resolution of the Union Cabinet, replacing the erstwhile Planning Commission.**



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Composition:

- **Chairperson:** The Prime Minister of India leads NITI Aayog.

Composition of Governing Council:

- **It is chaired by the Prime Minister and comprises Chief Ministers of all the States and UTs with legislatures and Lt Governors of other Union Territories.**
- The council also comprises Vice Chairman, NITI Aayog; Full-Time Members, NITI Aayog; and Special Invitees.
- Ex-officio members include up to four Union Council of Ministers nominated by the PM.
- Special invitees are domain experts and practitioners nominated by the PM.
- Regional Councils: Address specific multi-state or regional issues.

CEO: Appointed by the PM for a fixed tenure, holding the rank of Secretary to the Government of India.

Twin Mandate:

- **SDG Adoption and Monitoring:** NITI Aayog oversees the implementation of Sustainable Development Goals (SDGs) in India.
- **Competitive and Cooperative Federalism:** It promotes collaboration among states and UTs while encouraging healthy competition through transparent rankings.

26. e-mobility

Context:

The Principal Scientific Adviser to Government of India has recently launched report on e-mobility R&D roadmap for India to achieve net-zero targets.

About:

- e-Mobility in general and EVs in particular have started occupying significant mind space in India amongst Policy Makers, Industry and the Mobility Eco-System.

- The report e-mobility R&D Roadmap for India breaks down necessary steps to achieve advanced capabilities in developing the technological knowhow to get a lead in battery technology.
- **It is launched by the Office of the Principal Scientific Advisor (PSA) to the Government of India.**
- It is prepared by the Automotive Research Association of India.

It categorizes research projects into 4 important areas

1. **Energy Storage Cells**
2. EV Aggregates
3. **Materials and Recycling**
4. Charging and Refuelling.

27. Bureau of Pharma PSUs

Context:

Recently, the Union External Affairs Minister of India visited Mauritius and announced that the India-Mauritius health partnership project will supply cost-effective, Made-in-India medicines to augment public healthcare and enhance well-being.

About:

- **Bureau of Pharma PSUs in India (BPPI) are running Jan Aushadhi Kendras as a part of Pradhan Mantri Bhartiya Janaushadhi Pariyojana.**
- These are the centres from where quality generic medicines are made available to all.
- **Recently, the Union External Affairs Minister of India has inaugurated India's first overseas Jan Aushadi Kendra in Mauritius,** testifying to the "close" bilateral cooperation between the two countries, especially in the health sector.

28. Uranium

Context:

- **A new study by scientists from the Bhabha Atomic Research Centre (BARC) has concluded that concentration of uranium, a radioactive substance, up to 60 micrograms per litre (millionth of a gram per litre or µg/l) in drinking water was entirely safe**
- **However, in 2021, Bureau of Indian Standards (BIS) had revised the acceptable level of uranium concentration in drinking water from 60 µg/l to 30 µg/l.**

About

- Uranium (U) is a radioactive chemical element of the actinide series of the periodic table, atomic number 92.
- Uranium is a dense, hard metallic element that is silvery white in colour. It is ductile, malleable, and capable of taking a high polish.
- India produces about 2 percent of the world's uranium. India has no significant reserves of Uranium. All needs are met through imports. India imports thousands of tonnes of uranium from Russia, Kazakhstan, France.
- **Punjab is the worst-affected state in terms of the percentage of wells found to have uranium concentration of more than 30 ppb.**
- **Haryana is the second state in terms of uranium prevalence in groundwater.**
- Uranium contaminates water due to geogenic processes, overexploitation of groundwater and its decline, nitrate pollution etc.
- Uranium creates a lot of adverse impacts on health like cancer, Nephritis etc.



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29. Modified Interest Subvention Scheme

Context:

The Union Government plans to increase the upper limit of the short-term crop loans under the Modified Interest Subvention Scheme (MISS) from Rs 3 lakh to Rs 5 lakh.

About MISS:

- The interest subvention scheme for farmers aims at providing short term credit to farmers at subsidised interest rate.
- The policy came into force with effect from Kharif 2006-07. The scheme is being implemented for the year 2022-23 to 2024-25.
- The interest subvention will be given to Public Sector Banks (PSBs), Private Sector Banks, Small Finance Banks, Cooperative Banks and Regional Rural Banks (RRBs) on use of own funds and to NABARD for refinance to RRBs and Cooperative Banks.
- The scheme is being implemented by NABARD and RBI.

Eligibility: Farmers, individuals/ Joint borrowers who are owner cultivator;

- Tenant farmers, oral lessees & sharecroppers
- Self Help Groups (SHGs) or Joint Liability Groups (JLG)s of farmers including sharecroppers etc.

How does it Work?

- Farmers engaged in Agriculture and other allied activities can acquire Kisan Credit Card loans up to Rs 3 lakh at a benchmark rate of 9%.
- However, the Centre provides 2% interest subvention on the benchmark rate, bringing down the effective rate of interest to 7 percent.
- An additional 3% concession for prompt and timely repayment further reduces it to 4% per year.

30. Tax Incidence

Context:

The Union government recently said Goods and Services Tax (GST) has decreased tax incidence on the common man.

About Tax Incidence:

- Tax incidence (or incidence of tax) is an economic term for understanding the division of a tax burden between stakeholders, such as buyers and sellers or producers and consumers.

There are two forms of tax incidence.

The initial incidence (also called statutory incidence) of a tax is the initial distribution among taxpayers of a legal obligation to remit tax receipts to the government.

- It is established by law and tells us which individuals or companies must physically send tax payments to state and local treasuries.

The final incidence (also called economic incidence) of a tax is the final burden of that particular tax on the distribution of economic welfare in society.

- It is also referred to as the tax burden faced by individuals in their roles as consumers, workers, and investors.
- For example, the legal incidence of corporate income taxes typically falls on companies, but the economic incidence of the tax is shifted forward to others, in the form of higher prices for consumers, lower wages for workers, reduced returns to shareholders, or some combination of the three.

The difference between the initial incidence and the final incidence is called tax shifting.

The tax incidence depends upon the price elasticity of supply and demand.

- If the demand for a good change significantly with a change in price, then a good is elastic—likely a non-necessity like a new car or home goods.
- Little to no change in demand in relation to price means a good is inelastic, and consumers will continue to purchase the good as prices go up. Examples of inelastic goods include petrol and cigarettes.

Taxes on inelastic goods like cigarettes shift the tax incidence to the consumer who will continue to purchase the product, despite the price increase from the tax.

Conversely, if a tax is levied on an elastic good, the tax incidence falls on the producer because the new price increase is likely to reduce the demand for the good.

31. Categorization of Industrial Sectors

Context:

Those industries which are practically non-polluting and categorised under the 'white category' by the Central Pollution Control Board will now not require prior permission of the state pollution control boards to establish and operate under the Air Act, 1981 and Water Act, 1974, according to two separate draft notifications of the Environment Ministry.

Categorization of Industrial Sectors:

- The Ministry of Environment, Forest and Climate Change (MoEFCC) has developed the criteria of categorization of industrial sectors.
- For this purpose, the references are taken from the Water (Prevention and Control of Pollution) Cess (Amendment) Act, 2003, standards so far prescribed for various pollutants under Environment (Protection) Act, 1986 and Doon Valley Notification, 1989 issued by MoEFCC.
- **The Pollution Index (PI) of any industrial sector is a number from 0 to 100 and the increasing value of PI denotes the increasing degree of pollution load from the industrial sector.**
- **It is based on the Pollution Index which is a function of the emissions (air pollutants), effluents (water pollutants), hazardous wastes generated and consumption of resources.**

Classification:

- **Industrial Sectors having Pollution Index score of 60 and above - Red category**
- **Industrial Sectors having Pollution Index score of 41 to 59 – Orange category**
- **Industrial Sectors having Pollution Index score of 21 to 40 – Green category**

- **Industrial Sectors having Pollution Index score of up to 20 - White category.**

32. Indexation

Context:

The changes in the long-term capital gains (LTCG) tax regime, particularly the withdrawal of the indexation benefit, has emerged as one of the most contentious decisions announced in the Union Budget for 2024-25.

About Indexation:

- **It is the process of adjusting the original purchase price of an asset or investment in order to neutralise the impact of inflation on it.**
- Inflation reduces the value of money over time, and therefore, when an asset is sold or an investment is redeemed, **indexation helps in arriving at the cost of acquisition with the impact of inflation over the holding period factored in.**
- The cost of acquisition thus arrived at, is called the indexed cost of acquisition. It resets the base for calculation of gains or losses from the sale or redemption.
- The returns calculated on the indexed cost of acquisition are generally seen as more realistic than absolute gains calculated on the basis of the actual price at the time of purchase.
- Indexation is an efficient way of preventing draining of your returns on investments in the form of taxes.
- Indexation is applicable to long-term investments, which include debt fund and other asset classes. Indexation helps in adjusting the purchase price of the investments.



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33. Liquidity Coverage Ratio

Context:

RBI recently issued the draft guidelines for banks on the Liquidity Coverage Ratio (LCR), essentially asking them to set aside higher stock of liquid securities as a buffer on deposits.

About Liquidity Coverage Ratio (LCR):

- It refers to the proportion of highly liquid assets held by financial institutions to ensure that they maintain an ongoing ability to meet their short-term obligations (i.e., cash outflows for 30 days).
- 30 days was selected because, in a financial crisis, a response from governments and central banks would typically take around 30 days.
- It is intended to make sure that banks and financial institutions have a sufficient level of capital to ride out any short-term disruptions to liquidity.
- LCR in banking resulted from the Basel III agreement, which is a series of measures undertaken by the Basel Committee on Bank Supervision (BCBS).
- In India, RBI issued Basel III liquidity guidelines in 2012.
- RBI implemented LCR in January 2015, and as per a circular in 2020, banks should maintain sufficient HQLA at all times to meet unexpected withdrawals.

Calculation:

- $LCR = \frac{\text{High Quality Liquid Assets (HQLA)}}{\text{(Total net cash outflows over the next 30 calendar days)}}$
- Every asset that can be easily and instantly converted into cash at minimum or no cost of value is a HQLA.
- These assets include cash, reserves with central banks, and central government bonds, which can easily be converted into cash.

- In India, all Statutory Liquidity Ratio (SLR) eligible assets, which need to be maintained by the banks as per the Banking Regulation Act, 1949, are permitted to be considered HQLA under LCR requirements if they are in excess. This helps maintain and optimise both liquidity requirements.



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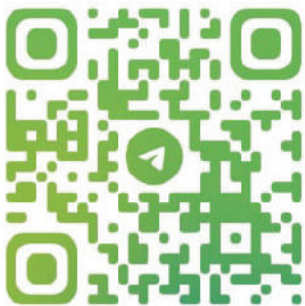
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GEOGRAPHY

1. Location of Austria

Context:

PM is set to visit Russia on July 8-9, followed by Austria on July 9-10. The official announcement is expected to be made this week.



What do we know about Hurricane Beryl?

Hurricane Beryl is the earliest category 4 storm – sustaining winds of at least 130 miles per hour (209 kilometres per hour) – to mark the beginning of the Atlantic hurricane season this year.

2. Tropical cyclones

Context:

The Indian Men's cricket team remains stranded in Barbados following the T20 World Cup win due to a tropical cyclone, Hurricane Beryl, currently surging through the Windward Islands.

About Tropical cyclones:

- **Tropical cyclones are intense low-pressure areas confined to the area lying between 30°N and 30° S latitudes, in the atmosphere around which high-velocity winds blow.** Horizontally, it extends up to 500-1,000 km and vertically from the surface to 12-14 km.

- It is energised by the release of latent heat on account of the condensation of moisture that the wind gathers after moving over the oceans and seas.

Favourable Conditions for the Formation of Tropical Cyclone:

- Large sea surface with temperature > 27° C;
- Presence of the Coriolis force;
- Small variations in the vertical wind speed;
- A pre-existing weak low-pressure area or low-level-cyclonic circulation and
- Upper divergence above the sea level system.
- **Tropical cyclones do not form over the equator because the Coriolis force is zero at the equator. Even though the equator is a zone of wind convergence, it has nothing to do with tropical cyclone as such.**
- **In the South Atlantic and South-Eastern Pacific regions in tropical latitudes, cyclones do not originate because of low sea surface temperatures.**

3. Aphelion

Context:

Earth reaches aphelion on 5th July.

About Aphelion:

- The word aphelion is derived from the Greek words apo, which means away or apart, and helios, which is the Greek God of the Sun. Therefore, aphelion means "apart from the Sun".
- **At aphelion, Earth's distance from the Sun is about 152.1 million km.**
- Six months later, in early January, Earth reaches perihelion — the point at which it is closest to the Sun.
- At perihelion, the distance between Earth and the Sun is roughly 147.1 million km (see illustration).

- **Aphelion is when Earth is farthest from the Sun, not closest.**
- **When Earth is at aphelion, it is at its farthest point from the Sun in its orbit. As a result, the Sun appears slightly smaller in the sky compared to when Earth is at perihelion (closest point to the Sun).**
- Aphelion occurs in early July, during summer in the Northern Hemisphere.
- **Aphelion occurs once per year, not twice.**

4. Location of Sierra Leone

Context:

The president of Sierra Leone signed a law that banned marriage for children ages 18 and younger.



5. Groynes

Context:

In a bid to resolve the extensive coastal erosion in Poonthura region in Kerala, the irrigation department is all set to construct eight groynes at a cost of Rs 17.5 crore.

About Groynes:

- **These are active structure extending from the shore into the sea, most often perpendicular or slightly oblique to the shoreline.**
- **They're usually made of wood, rock, or sometimes concrete and metal.**
- **They are designed to trap sediment, dissipate wave energy and restrict the transfer of sediment away from the beach through longshore drift.**
- Longshore drift is caused when prevailing winds blow waves across the shore at an angle which carries sediment along the beach. Groynes prevent this process and therefore slow the process of erosion at the shore.

Advantages:

- Groynes are easy to construct. They have long term durability and are low maintenance.
- They reduce the need for the beach to be maintained through beach nourishment and the recycling of sand.
- It traps sediment, leading to beach widening, reduced erosion and greater wave energy dissipation.
- It serves as a robust structure (if designed and maintained properly) that can be used for long-term stabilization of coastlines used for societal activities.

6. Earth's core

Context:

Research by scientists has revealed that the rotation speed of Earth's core is slowing down and has even reversed, a phenomenon called 'backtracking'.

Earth's core:

- The inner part of the planet can be divided into three different layers: crust, mantle, and core.
- Earth's core is the hottest part of the planet, equivalent to that of the Sun's surface.
- It is around 5,180 kilometres deep inside the Earth and consists mainly of iron and nickel.

- The inner core is surrounded by a liquid metal outer core, which acts as a barrier with the rest of the Earth.
- This barrier allows Earth's core, like a hot solid ball of metal, to spin independently and not necessarily align with the rest of the planet.

Rotation of inner core:

- Earth's magnetic field pulls on the solid ball of hot metal, causing it to spin.
- Also, the gravity and flow of the fluid outer core and mantle exert a drag on the core.
- The push and pull of these forces have resulted in variations in the core's rotational speed.

Impact:

- When the core spins more slowly, the mantle speeds up. This shift makes Earth rotate faster, and the length of a day shortens.
- But such rotational shifts translate to mere thousandths of a second in day length.

7. Volcano in news

Context:

Recently, Italy's Mount Etna and the smaller Stromboli volcano spewed hot ash and lava, raising alert levels on the Mediterranean island of Sicily.

- Mount St. Helens - United States (active)
- Mount Vesuvius - Italy (dormant)
- Mount Etna - Italy (active)
- Mauna Loa - Hawaii, USA (active)
- Mount Fuji - Japan (dormant)

About Mount Etna:

- It is Europe's most active volcano and one of the largest in the world.
- Its recorded volcanic activity dates back to 1500 B.C.
- Location: It is on the eastern coast of Sicily.

- It is the highest Mediterranean island mountain and the most active stratovolcano in the world.
- It is about 3,326 metres high and is the highest peak in Italy South of the Alps.

8. Location of Lebanon

Context:

The UN voiced deep concern at the increase in the intensity of exchanges of fire across the Blue Line, which separates Lebanese and Israeli armed forces.



9. Major Rivers of the world

Context:

Canada's longest river, the Mackenzie, is experiencing historically low water levels.

Major Rivers	Drains into
1. Mackenzie River	Arctic Ocean
2. Orange river	Atlantic Ocean
3. Yangtze River	East China Sea
4. Orinoco River	Atlantic Ocean





10. Colombia

Context:

Following a peace agreement between the Colombian government and the FARC rebels, Colombia has witnessed a fall in demand for cocaine.

About

- Colombia is the global nexus of the cocaine industry, where Pablo Escobar became the world's best-known criminal, and which still produces more of the drug than any other nation.
- The country is facing shifts in the industry due to domestic and global forces.
- The impact on the cocaine industry is an unintended consequence of a landmark peace deal eight years ago with the country's largest armed group.

Consequences

- Other countries have become important competitors and have contributed to changes in Colombia's drug market.
- Ecuador has emerged as a top cocaine exporter, while cultivation of coca leaf has increased in Peru and Central America.
- It has helped push global cocaine production higher than it has ever been.
- Cocaine consumption is growing in Europe and Latin America and emerging in other regions, like Asia.



11. Microcontinent**Context:**

A microcontinent has been recently discovered in the Davis Strait, between Canada and Greenland.

About the newly discovered Microcontinent:

- The discovery was made around the Davis Strait, a large stretch of water located between Canada's Baffin Island and Greenland.
- The strait was formed millions of years ago when the tectonic plates between the two islands shifted, reconfiguring the Earth's crust.
- This resulted in the formation of a thick continental crust in the ocean, which has now been declared a newly discovered primitive microcontinent.
- It has been named the Davis Strait proto-microcontinent since it formed owing to the tectonic evolution of the strait in the region.
- The microcontinent is 19–24 km thick thinned continental crust and is surrounded by two narrow bands of thin (15–17 km) continental crust.

Key Facts about Davis Strait:

- **Also known as the northern arm of the Atlantic Ocean, the Davis Strait is situated north of the Labrador Sea amidst southwestern Greenland and southeastern Baffin Island in Nunavut, Canada.**
- It separates the depths of northern Baffin Bay from the southern Labrador Sea and forms an important part of the Northwest passage route going through the Canadian Arctic Archipelago and connecting the Atlantic and Pacific Oceans.
- Baffin Bay is situated between Baffin Island and Greenland's west coast.
- Defined as a marginal sea of the Arctic Ocean, it is also considered a small sea of the North Atlantic.
- It is not navigable during the winter months due to the thick ice cover, floating icebergs and heavy fog.
- The Davis Strait is approximately 400 miles (650 km) north to south and 200 to 400 miles wide.
- It has a water depth ranging from 1000 to 2000 metres, and is comparatively shallower than the southern Labrador Sea.

- The Davis Strait is home to complex geological formations such as underwater basins and ridges that were created due to the strike-slip faulting along the **Ungava fault Zone** around 45 to 62 million years ago.
- **It triggered plate tectonic movements in the Labrador Sea and the Baffin Bay, leading to the formation of the Strait.**
- **Two different ocean currents are active in the Davis Strait**, with contrasting temperatures leading to varying concentrations of ice on the eastern and western sides of the Strait.
- **From the shores of Greenland, the western Greenland current carries comparatively warmer waters towards the east, while the Labrador current pushes iceberg-filled water southward along the Canadian coast, the Labrador Sea, and subsequently the Atlantic.**
- Ice conditions reflect this flow regime, with heavy ice movement and icebergs along the western shore contrasting sharply with more open water along the Greenland side

12. Rwanda**Context:**

Rwanda's President Paul Kagame has smashed his own record by winning recent elections with more than 99% of the vote.

About Rwanda:

- **It is a landlocked country located south of the equator in east-central Africa.**
- **It is part of the Great Rift Valley region of Africa.**



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- Often referred to as the “land of a thousand hills”, Rwanda’s landscape is mostly hilly and mountainous.
- It covers an area of 26,338 sq. km.
- **Borders: Rwanda shares a border with the four nations of Burundi, Tanzania, Uganda, and the Democratic Republic of the Congo.**
- Capital: Kigali

Population:

- It is one of the continent’s most densely populated, with approximately a thousand people per square mile.
- The Hutu and Tutsi ethnic groups make up most of the country’s population.
- The majority of both groups practice Christianity.
- Government: In 2003, Rwanda adopted a constitution mapping out a presidential system of government.
- Major Mountain Ranges: Albertine Rift and Virunga.

Major Rivers:

- Two major African rivers, the Nile and the Congo, flow through Rwanda.
- Other major rivers are Kagera, Nyabarongo, Ruzizi, Luhwa, and Akanyaru.
- 80% of Rwanda's rivers drain into the Nile through Lake Victoria, while the remaining 20% drain into the Congo via the Rusizi River which also has the lowest elevation in Rwanda at 950 m.

**13. Bagmati River****Context:**

Bihar Chief Minister Nitish Kumar has “repeatedly” raised his concerns about the annual flooding of the Bagmati river with multiple leaders from Nepal.

About Bagmati River:

- It is a river in south-central Nepal and northern Bihar state, India.
- The Bagmati River is considered holy by both Hindus and Buddhists.
- **The Bagmati River originates from the Bagdwar area in the Shivapuri Hills, located in the northwestern part of Kathmandu Valley, central Nepal.**
- It is fed by springs and monsoon rainfall and a number of tributaries as it flows down from the Kathmandu valley floor and passes through the valley at Chovar.
- It flows southward through the Shivalik Range, the southernmost range of the Himalayas. It continues across the plains of Tarai into Bihar.
- **The Bagmati River flows south-eastward to enter the Burhi Gandak River in Bihar, India, after traversing a distance of 225 miles (360 km).**
- **The temple of Pashupatinath, a UNESCO World Heritage Site, is located on an outcrop above the Bagmati River north of Kathmandu. It is an important holy place for Hindus.**

14. Location of Liberia**Context:**

Severe flooding in Liberia has led a group of senators to propose relocating the capital city away from Monrovia.

About:

- **Liberia is situated on the west coast of Africa north of the equator, with Guinea on the north, Sierra Leone on the west, Côte d’Ivoire on the east and the Atlantic Ocean on the south.**
- Main resources: iron ore, timber, diamonds and gold.

Geographical Features:

- **Highest point Mount Wuteve.**
- **Rivers: the Mano the Cavalla ,the Lofa, St. Paul, St. John and Cestos River.**

**15. Grasslands in India****Context:**

The Central Zoo Authority (CZA) has given its final approval for a cheetah conservation breeding centre in Gujarat's Banni grasslands, paving way for reintroduction of the big cat to the state after decades of its absence.

Grasslands	Located in
1. Vidi Grasslands	Gujarat
2. Bahaks Grasslands	Jammu and Kashmir
3. Ukhrul Grasslands	Manipur
4. Saramati Grasslands	Nagaland

Grasslands:

- Banni and Vidi Grasslands: Gujarat
- Phumdis or Floating Grasslands: Loktak Lake, Manipur
- Margs or Bahaks Grasslands: Jammu and Kashmir
- Bugyal and Dzukou Grasslands: Uttarakhand and Nagaland

- Khajjiar Grasslands: Himachal Pradesh
- Saramati Grasslands: Nagaland
- Ukhrul Grasslands: Manipur
- Shola Grasslands: Western Ghats, Kerala and Tamil Nadu

16. Moons in the Solar System**Context:**

Does Uranus's moon Ariel also have an underground ocean?

Moons in the Solar System	Associated Planet
1. Ariel	Uranus
2. Phobos	Mars
3. Mimas	Saturn
4. Triton	Neptune

- **Why Triton rotates in the direction opposite to its host planet, Neptune, although a recent study found an answer: Triton and Pluto had a common origin before Neptune pulled Triton to itself.**
- **Another mystery in the Solar System may be coming to a similar close. Astronomers have been curious why the surface of Uranus's moon Ariel has frozen carbon dioxide (CO₂).**
- Recent research suggests that beneath its icy surface, Ariel may harbour a subsurface ocean of liquid water.
- This finding is based on observations and data from various space missions and studies that indicate the presence of a warm, liquid layer beneath the moon's icy crust.
- This subsurface ocean could be a potential habitat for microbial life, similar to other icy moons in the Solar System, such as Europa and Enceladus.

17. Bohai Gulf



About Bohai Gulf:

It is the innermost gulf of the Yellow Sea on the coast of Northeastern and North China.

- It is sometimes called Bohai Sea, or Bo Hai for short; in earlier times it was called the Gulf of Chili or the Gulf of Pechili.
- It is approximately 78,000 sq.km in area, and its proximity to Beijing, the capital of China, makes it one of the busiest seaways in the world.
- The Bohai Gulf is enclosed by the Liaodong Peninsula (northeast) and the Shandong Peninsula (south).
- Among the most important cities on the Bohai Gulf are Dalian and Tianjin; its shores form three of the most famous bays in the country: Liaodong Bay, Bohai Bay, and Laizhou Bay.
- The Yellow River, China's second longest river, discharges into the gulf.
- There are both onshore and offshore petroleum deposits, and several oil refineries are located there as well as other industries.

Key Facts about Yellow Sea:

- **It is a marginal sea of the western Pacific Ocean.**

Location:

- It is situated between mainland China to the west and north, the Korean Peninsula to the east, and the Shandong Peninsula and Liaodong Peninsula to the south.
- **It connects with the Bohai Sea to the northwest.**
- **Size:** Also referred to in China as Huang Hai and in North and South Korea as the West Sea, the Yellow Sea is 870 kilometres long and 556 kilometres wide.
- **Depth:** It is one of the largest shallow areas of continental shelf in the world, with an average depth of 44 metres and a maximum depth of 152 metres.
- **Inflow:** Several major rivers, including the Yellow River and the Yangtze River, discharge into the Yellow Sea.
- **Islands:** The Yellow Sea is dotted with numerous islands, the largest of which include Jeju Island (South Korea), the Shandong Peninsula islands (China), and Ganghwa Island (South Korea).
- **Climate:** The climate is characterized by very cold, dry winters and wet, warm summers.

Currents:

- The warm current of the Yellow Sea is a part of the Tsushima Current, which diverges near the western part of the Japanese island of Kyushu and flows at less than 0.5 mile (0.8 km) per hour northward into the middle of the sea.
- Along the continental coasts, southward-flowing currents prevail, which strengthen markedly in the winter monsoon period, when the water is cold, turbid, and of low salinity.



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18. Jabiluka site, Australia**Context:**

Australia Banned Uranium Mining at Jabiluka site, which is home to one of the world's largest deposits of high-grade uranium.

About

- The Jabiluka site is surrounded by Kakadu National Park.
- Archaeologists discovered a buried trove of stone axes and tools near the Jabiluka site in 2017, which they dated at tens of thousands of years old.
- The Jabiluka site became the focus of intense legal wrangling between the Mirarr people and mining companies after the uranium deposit was discovered there in the early 1970s.

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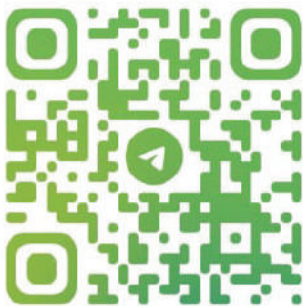
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ENVIRONMENT

1. Great Indian Bustard

Context:

- The Ministry of Environment, Forest and Climate Change (MoEFCC) has approved Rs 56 crore for the next phase of the conservation of Great Indian Bustard (GIB) and Lesser Florican.
- The plan includes habitat development, in-situ conservation, completion of the conservation breeding centre, releasing captive-bred birds and habitat development among other things.

About

Scientific Name: *Ardeotis nigriceps*.

Appearance: The great Indian bustard can easily be distinguished by its black crown on the forehead contrasting with the pale neck and head.

- The body is brownish and the wings are marked with black, brown and grey.

Diet: They feed on grass seeds, insects like grasshoppers and beetles, and sometimes even small rodents and reptiles.

Habitat: Flat open landscapes with minimal visual obstruction and disturbance, therefore adapt well in grasslands.

Distribution: Its population is confined mostly to Rajasthan and Gujarat. Small population occur in Maharashtra, Karnataka and Andhra Pradesh.

Threats:

- Poaching outside Protected Areas,
- collisions with high tension electric wires, fast moving vehicles and free-ranging dogs in villages,
- habitat loss.

Conservation Status:

- Listed in Schedule I of the Indian Wildlife (Protection) Act, 1972.
- Appendix I of CITES.
- Critically Endangered on the IUCN Red List.

It is the state bird of only state Rajasthan. Its population of about 150 in Rajasthan accounts for 95% of its total world population.

2. Water Hyacinth

Context:

District Panchayat of Kottayam (Kerala) have constituted the technical committee to address the menace of water hyacinth.

Water Hyacinth

- Scientific name: *Eichhornia crassipes*
- It is a fast-growing aquatic plant that grows from seed and through vegetative reproduction.
- It is native to Brazil, and has spread to other parts of the world including India.

Concerns:

- Water hyacinth can form dense mats that spread out across water surfaces eventually choking the entire water body.
- It cuts off sunlight as well as reduces oxygen level in the water, making it unfit for commercial use.
- It is also known as the "terror of Bengal" due to its invasive growth tendencies.
- It makes the water bodies unsuitable for commercial fishery, transportation and recreation.



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3. Pacific Decadal Oscillation

Context:

A major icefield spanning the United States' Alaska and Canada's British Columbia could reach an irreversible tipping point sooner than predicted, with its glaciers rapidly receding since 2005, according to a new study. The researchers linked this with predominantly positive values in the Pacific Decadal Oscillation (PDO).

About Pacific Decadal Oscillation (PDO):

Definition: A long-term ocean fluctuation of the Pacific Ocean with phases lasting 20 to 30 years.

Phases:

Warm or Positive Phase:

- **Sea surface temperatures (SSTs) are warmer than average along the western coast of North America.**
- Cooler SSTs in the central and western Pacific.
- Associated with wetter conditions in the western US and Alaska.

Cool or Negative Phase:

- SSTs are cooler than average along the western coast of North America.
- Warmer SSTs in the central and western Pacific.
- Associated with drier conditions in the western US and Alaska.

Impacts:

- Influences marine ecosystems, fish populations, and climate conditions.
- Alters precipitation patterns and temperature anomalies.
- Affects the intensity and frequency of El Niño and La Niña events.

Detection: Identified through statistical analysis of long-term sea surface temperature records in the North Pacific Ocean.

Importance: Understanding PDO helps in predicting climate variations and managing water resources, fisheries, and agriculture.

Unlike some climate oscillations like El Niño-Southern Oscillation (ENSO), which have relatively predictable cycles, the PDO does not have a regular or predictable pattern. It operates on decadal time scales but can vary in intensity, duration, and spatial extent.

4. Eocene Thermal Maximum 2 (ETM-2) period

Context:

Researchers from Birbal Sahni institution of Palaeosciences conducted the study by using the fossil pollen and carbon isotope data from the Eocene Thermal Maximum 2 (ETM-2) period.

Researchers from the Birbal Sahni Institution of Palaeosciences (BSIP) conducted the study, focusing on the Panandhro Lignite Mine in Gujarat, India.

- **The study used fossil pollen and carbon isotope data from the Eocene Thermal Maximum 2 (ETM-2) period, which occurred about 54 million years ago.**
- **It is also known as H-1 or Elmo.**

Key findings of the study:

- High atmospheric CO₂ concentrations (over 1000 ppmv) near the palaeo-equator led to significant decreases in rainfall.
- This decrease in rainfall caused an expansion of deciduous forests.

Implications for the present and future:

- Unprecedented increases in greenhouse gases could lead to decreased rainfall in equatorial regions.
- This could cause a shift in vegetation patterns.
- India's biodiversity hotspots (Western Ghats, northeast India, and the Andamans) could see evergreen forests replaced by deciduous forests.
- The study highlights the importance of understanding the relationship between CO₂ levels and the hydrological cycle for future conservation efforts in biodiversity hotspots.

- This research is particularly relevant because the Indian plate was near the equator during the ETM-2 period, making it a valuable “natural laboratory” for studying equatorial climate-vegetation relationships.
- Birbal Sahni Institution of Palaeosciences (BSIP) – Is an autonomous institute of Department of Science and Technology.

5. People's Biodiversity Register

Context:

In Kerala four Grama panchayats have submitted the updated version of the People's Biodiversity Register (PBR) to the Kerala State Biodiversity Board (KSBB).

About

- **The Biological Diversity Act (2002) mandates development of Peoples' Biodiversity Registers (PBRs) at local level to document as well as safe guard bioresources and associated knowledge.**
- The document details the region's biodiversity, including the identification of resources, discoveries, traditional knowledge, ongoing changes, and the impact of climate change.
- **Based on the register, the local body prepares various projects in agriculture, drinking water, and waste management, among other sectors, with a focus on biodiversity conservation and equitable sharing of benefits.**
- **Kerala was the first State in the country to publish the first volume of the PBR across all local bodies.**

6. Right to Repair Portal

Context:

The Union government recently collaborates with automobile associations and partner companies to onboard them onto the Right to Repair Portal in India.

About- The Right to Repair Portal India aims to empower consumers by

- Providing easy access to repair information,
- Promoting reuse,
- Contributing to the circular economy, and
- Reducing e-waste efficiently.

Nodal office- Department of Consumer Affairs.

Nodal Ministry- Ministry of Consumer Affairs, Food and Public Distribution.

Aim- To uphold consumer rights and respond to evolving concerns regarding hassle free product repairs.

- Under this framework, it would be mandatory for manufacturers to share their product details with customers so that they can either repair them by self or by third parties, rather than only depending on original manufacturers.

7. Biosphere reserves

Context:

The UN Educational, Scientific and Cultural Organisation (UNESCO) has designated 11 new biosphere reserves, recognising their importance for conserving biodiversity and cultural heritage.

More about the News:

The new designations are in Colombia, the Dominican Republic, Gambia, Italy, Mongolia, Philippines, South Korea and Spain.

Additionally, and for the first time, the list includes two transboundary reserves, spanning Belgium and the Netherlands, and Italy and Slovenia.

The 11 newly designated biosphere reserves are:

- Kempen-Broek Transboundary Biosphere Reserve (Belgium, Netherlands)
- Darien Norte Chocoano Biosphere Reserve (Colombia)
- Madre de las Aguas Biosphere Reserve (Dominican Republic)

- **Niumi Biosphere Reserve (Gambia)**
- **Colli Euganei Biosphere Reserve (Italy)**
- Julian Alps Transboundary Biosphere Reserve (Italy, Slovenia)
- **Khar Us Lake Biosphere Reserve (Mongolia)**
- Apayaos Biosphere Reserve (Philippines)
- Changnyeong Biosphere Reserve (South Korea)
- Val d'Aran Biosphere Reserve (Spain)
- **Irati Biosphere Reserve (Spain).**

What are Biosphere Reserves?

- Biosphere reserves are designated under the intergovernmental MAB Programme by the Director-General of UNESCO following the decisions of the MAB International Coordinating Council (MAB ICC). Their status is internationally recognised.
- The Man and Biosphere (MAB) Programme, launched in 1971, is an international scientific initiative that aims to foster a harmonious relationship between humans and their environment.

They integrate three main functions:

- Conservation of biodiversity and cultural diversity.
- Economic development that is socio-culturally and environmentally sustainable.
- Logistic support, underpinning development through research, monitoring, education and training.

Biosphere Reserves' three main zones:

- **Core Areas:** It comprises a strictly protected zone that contributes to the conservation of landscapes, ecosystems, species and genetic variation
- **Buffer Zones:** It surrounds or adjoins the core area, and is used for activities compatible with sound ecological practices that can reinforce scientific research, monitoring, training and education.

- **Transition Area:** It is where communities foster socio-culturally and ecologically sustainable economic and human activities.

India has 18 biosphere reserves, 12 of which are recognized under this program, with the Nilgiri Biosphere Reserve being the first.

8. Biodiversity Beyond National Jurisdiction Agreement

Context:

The Union Cabinet, chaired by Prime Minister Narendra Modi, has approved India to sign the Biodiversity Beyond National Jurisdiction (BBNJ) Agreement.

About Biodiversity Beyond National Jurisdiction (BBNJ) Agreement:

- The High Seas Treaty, also known as the Biodiversity Beyond National Jurisdictions (BBNJ) Agreement, represents a significant milestone in global efforts to safeguard marine biodiversity and promote sustainable use of ocean resources beyond national boundaries.
- **It is an international treaty under the UNCLOS.**
- It aims to address the growing concerns over the long-term protection of marine biodiversity in the high seas.
- **The treaty deals only with oceans that are outside the national jurisdiction i.e. 200 nautical miles. Parties cannot claim or exercise sovereign rights over marine resources derived from the high seas and ensure fair and equitable sharing of benefits.**
- It follows an inclusive, integrated, ecosystem-centric approach based on the precautionary principle and promotes using traditional knowledge and the best available scientific knowledge.
- The BBNJ Agreement was agreed upon in March 2023 and is open for signature for two years starting September 2023.

- **It will be an international legally binding treaty after it enters force 120 days after the 60th ratification, acceptance, approval or accession.**
- As of June 2024, 91 countries have signed the BBNJ Agreement, and eight Parties have ratified it.

9. FishMIP Initiative

Context:

The report produced by the Ecosystem Model Intercomparison Project (FishMIP) projects that exploitable fish biomass declined more than 10 per cent, particularly under the high-emissions scenario, by mid-century for many regions of the world.

About FishMIP Initiative:

- Fisheries and Marine Ecosystem Model Intercomparison Project (FishMIP) was officially launched in 2013.
- **It provides knowledge to industry and governments to support effective planning for adaptive and resilient seafood sectors under climate change.**
- It has a network of more than 100 marine ecosystem modellers and researchers from around the world.
- The FishMIP and Food and Agriculture Organization (FAO) collaborated to understand the long-term impacts of climate change on marine ecosystems and fisheries through a set of state-of-the-art numerical models.
- In 2024, FishMIP2.0 was established to increase the reliability of modelling projections and to answer a broader set of policy-related questions relevant to food security and marine resource management, with climate change remaining the overarching theme.

Key facts about Food and Agriculture Organization:

- **It is a specialized agency of the United Nations that leads international efforts to defeat hunger and improve nutrition and food security.**

- Its goal is to achieve food security for all and make sure that people have regular access to enough high-quality food to lead active, healthy lives.
- **Member countries:** With 195 members - 194 countries and the European Union.
- Its sister bodies are the World Food Programme (WFP) and the International Fund for Agricultural Development (IFAD).
- **Reports published by the FAO:** The State of the World's Forests (SOFO), The State of World Fisheries and Aquaculture (SOFIA), The State of Agricultural Commodity Markets (SOCO), The State of Food Security and Nutrition in the World (SOFI)
- **Headquarter:** Rome (Italy).

10. UN Water Convention

Context:

Recently, Ivory Coast joined the United Nations Water Convention, becoming the 10th African nation to do so.

About UN Water Convention:

- It is also known as the Convention on the Protection and Use of Transboundary Watercourses and International Lakes which was adopted in Helsinki in 1992 and entered into force in 1996.
- **It is a unique legally binding instrument promoting the sustainable management of shared water resources, the implementation of the Sustainable Development Goals,** the prevention of conflicts, and the promotion of peace and regional integration.

History

- **It was originally negotiated as a regional framework for the pan-European region.**
- Following an amendment procedure, since March 2016 all UN Member States can accede to it.

- Chad and Senegal have become the first African Parties in 2018.
- Iraq acceded in March 2023 as the first country from the Middle East, Namibia in June 2023 as the first country from Southern Africa and Panama in July 2023 as the first country from Latin America.
- It requires Parties to prevent, control and reduce transboundary impact, use transboundary waters in a reasonable and equitable way and ensure their sustainable management.
- Parties bordering the same transboundary waters have to cooperate by entering into specific agreements and establishing joint bodies.
- As a framework agreement, the Convention does not replace bilateral and multilateral agreements for specific basins or aquifers; instead, it fosters their establishment and implementation, as well as further development.
- **Significance:** It is a powerful tool to promote and operationalize the achievement of the 2030 Agenda for Sustainable Development and its SDGs.
- **The United Nations Economic Commission for Europe (UNECE), which services the UN Water Convention.**

11. Snakes

- **Snakes are ectothermic (cold-blooded) animals, which means they rely on external sources of heat to regulate their body temperature.** This adaptation allows them to tolerate a wide range of temperatures, including high temperatures that might be challenging for mammals and birds.
- **Snakes are known for their efficient reproductive strategies.** Many species have high reproductive rates, producing large numbers of offspring in a single reproductive event. This rapid reproduction allows snake populations to potentially increase quickly under favourable conditions.

- **In terms of growth efficiency, snakes are carnivorous predators that typically consume whole prey items.** This diet is highly efficient in converting food into energy and growth. Compared to traditional sources of animal protein (such as livestock like cows or pigs), snakes require less food input to achieve rapid growth due to their metabolic efficiency.

12. Zebra Mussel

Context:

Zebra mussel, an invasive species capable of wiping out entire aquatic ecosystems, has been found for the first time in the Colorado River, the most important river in the American Southwest.

About Zebra Mussel:

- Zebra mussels are an invasive, fingernail-sized mollusk.
- Scientific Name: *Dreissena polymorpha*

Distribution:

- They are native to the Caspian and Black Seas, south of Russia and Ukraine.
- They entered the Great Lakes of North America in the late 1980s through ballast water discharged from ships.
- Since then, they have spread through much of eastern Canada and the United States.

Habitat: They live underwater, attached to natural and manmade substrates such as rocks, wood, plants, native mussels, pipes, docks, boat lifts, swim rafts, moored watercraft, and other debris.

- They are easy to identify, with a distinct, flat-bottomed 'D' shape to their shells that allows them to sit flat against a solid surface, and black, zigzag stripes against a cream background that earned them their name.
- They grow around two inches long at most, and are microscopic in their larval stage, which is known as a "veliger."
- They are short-lived (between two and five years), and begin reproducing at two years of age.

Impacts:

- They are filter feeders that attach themselves to virtually any surface.
- They breed very quickly, as females can release up to one million eggs each breeding season.
- They disrupt food webs by wiping out phytoplankton.
- Zebra Mussels are especially harmful for native mussels, many of which are species at risk. They outcompete these species for food and will attach themselves to native mussels, suffocating them.
- Their massive clustering on water-intake valves and pipes, bridge abutments, and other structures can cause severe commercial damage.

13. National Projects (NP) scheme**Context:**

The Polavaram project was declared a national project despite there being no efforts to address the project-displaced people, rehabilitation issues etc.

Eligibility criteria for inclusion of a project under National Projects (NP) scheme:

- International projects, where usage of water in India is required by a treaty or where planning and early completion of the project is necessary in the interest of the country. or
- Inter-State projects which are dragging on due to non-resolution of Inter-State issues relating to sharing of costs, rehabilitation, aspects of power production etc., including river interlinking projects. or
- Intra-State projects with additional irrigation potential of more than two lakh hectare and with no dispute regarding sharing of water and where hydrology is established. or
- Extension, renovation and modernization (ERM) projects envisaging extension/ restoration of irrigation potential of 2 lakh hectare.

However, mere eligibility of a project does not entitle its inclusion under the NP scheme. Inclusion is also dependent upon approval of Advisory Committee on Irrigation, Flood Control and Multipurpose projects of DoWR, RD&GR as per laid down procedure, investment clearance, recommendations by High Powered Steering Committee, availability of funds as well as Government priorities at that time, etc.

About Polavaram Project:

- It is an under-construction multi-purpose irrigation project on the Godavari River in the Eluru District and East Godavari District in Andhra Pradesh.
- The project has been accorded National project status by the Union Government of India
- It is being constructed based on the recommendations of the Godavari Water Disputes Tribunal (1969), which issued its final award in 1980.
- The reservoir also spreads to Telangana, Odisha, and Chhattisgarh.
- It covers the Papikonda National Park of Andhra Pradesh.
- It will facilitate inter-basin water transfer from the Godavari to the Krishna through a link canal.

14. Carbon Border Adjustment Mechanism**Context:**

The Economic Survey has raised concerns over the forthcoming Carbon Border Adjustment Tax (CBAT) by the European Union.

Carbon Border Adjustment Mechanism (CBAM)

- CBAM is the European Union's 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.
- CBAM is one of the elements of the EU Green Deal, the goal of which is to reduce GHG emissions by 55% by 2030.

- **CBAM is aimed at equalizing the price of carbon paid for EU products operating under the EU Emissions Trading System (ETS) and imported goods.**
- **It refers to a phenomenon where an EU manufacturer moves carbon-intensive production to countries outside the region with less stringent climate policies.**
- **CBAM does not exempt all developing countries. While there may be some considerations for certain countries, CBAM is designed to ensure that carbon-intensive imports face similar carbon costs as those produced within the EU, regardless of the country of origin. This aims to prevent carbon leakage and encourage global reductions in carbon emissions.**

Implementation of CBAM:

- The CBAM system is expected to come into force on January 1, 2026.
- The CBAM will initially apply to imports of Cement, Iron and steel, Aluminium, and Electricity, as these sectors have a high risk of carbon leakage and high carbon emissions.
- EU importers will have to buy carbon certificates corresponding to the carbon price that would have been paid in the EU, if the goods had been produced locally.
- The price of the certificates would be calculated according to the auction prices in the EU carbon credit market.
- Once a non-EU producer can show that they have already paid a price for the carbon used in the production of the imported goods in a third country, the corresponding cost can be fully deducted for the EU importer.
- CBAM will apply on: In principle, imports of goods from all non-EU countries will be covered by the CBAM. Certain third countries who participate in the ETS or have an emission trading system linked to the Union's will be excluded from the mechanism. This is the case for members of the European Economic Area and Switzerland.

15. Climate Finance Action Fund

Context:

Azerbaijan, which will host the 29th Conference of Parties to the United Nations Framework Convention on Climate Change, announced the Climate Finance Action Fund to help developing countries fight climate change.

About Climate Finance Action Fund:

- The fund will receive annual contributions from fossil fuel-producing countries and companies. Initial fundraising aims for \$1 billion.
- The fund will target climate projects in developing countries, meeting the next generation of national climate plans to limit global warming to 1.5 degrees Celsius, and addressing the consequences of climate change-fuelled disasters.



Border length:

- Armenia: 1,007 km
- Iran: 765 km
- Georgia: 480 km
- Russia: 390 km
- Turkey: 11 km



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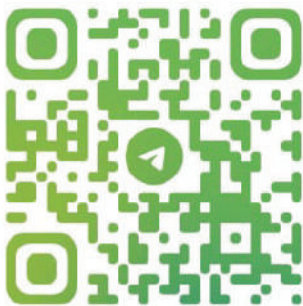
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SCIENCE & TECHNOLOGY

1. AI washing

Context:

There is a new and growing question – whether companies are making over-inflated claims about their use of AI.

Tech companies and startups marketing themselves as using AI, but not doing so forms the basis of 'AI washing'.

About

- AI washing is a term derived from greenwashing, where companies exaggerate their environmental friendliness to appeal to customers.
- Similarly, businesses that claim to have integrated AI into their products, when they're actually using less sophisticated technology, can be accused of AI washing.
- When it comes to AI washing, there are several types.
- Some companies claim to use AI when they're actually using less-sophisticated computing, while others overstate the efficacy of their AI over existing techniques, or suggest that their AI solutions are fully operational when they are not.
- **Concerns:** AI washing can have concerning impacts for businesses, from overpaying for technology and services to failing to meet operational objectives the AI was expected to help them achieve.
- For investors it can make it harder to identify genuinely innovative companies.



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2. Project-76

Context:

The Defence Research and Development Organisation (DRDO) has taken up a preliminary study on the design and development of an indigenous conventional submarine under Project-76.

About Project-76:

- Under Project 76, the Warship Design Bureau of the Indian Navy is working on designing and developing the country's first indigenously conventional diesel-electric submarine.
- The Indian Navy wants to build 12 submarines under Project 76.
- Envisioned as air-independent propulsion (AIP)-equipped diesel-electric attack submarines, these submarines, expected to have a submerged displacement of 3,000 tons, represent a leap beyond their foreign-designed predecessors like Project-751 (India) and Project-75 submarines.
- It aims to succeed the renowned Sindhughosh (Kilo) class, emphasizing the Navy's commitment to maintaining a robust 3,000-ton class of submarines.
- It is expected to feature some of the most advance features such as, indigenous Weapon Control system and Lithium-ion batteries.
- It represents a pivotal milestone in India's pursuit of maritime supremacy, amalgamating top-tier French technology from Project 75 and the expertise of German/Spanish collaboration from Project 751 (India).
- The objective is to initiate the construction of the prototype by 2028.

- **This undertaking holds immense significance for India's submarine-building capabilities, aiming to reduce reliance on foreign Original Equipment Manufacturers (OEMs) for submarine design.**

3. Low-Frequency ARray (LOFAR)

Context:

Astronomers recently discovered a new radio galaxy using the Low-Frequency ARray (LOFAR).

About Low-Frequency ARray (LOFAR):

- **It is a highly innovative, pan-European distributed radio interferometer and the first of its kind.**
- It observes the Universe at low radio frequencies, close to the FM radio band, from 90 to 200 MHz.
- **It was developed by the Dutch Institute for Radio Astronomy (ASTRON) with the goal of exploring the early, distant universe, solar activity, and the terrestrial atmosphere.**
- LOFAR can observe in several directions simultaneously, which allows for a multi-user operation.
- For this reason, LOFAR is novel in its design because it is the first telescope that can look at the entire sky at the same time, unlike other telescopes which you have to point.
- LOFAR does not have moving parts; steering and tracking across the sky are achieved by treating the signal from the individual antennas in each station with advanced digital beam-forming techniques that make the system agile, allowing for rapid repointing of the telescope as well as giving the potential for multiple simultaneous observations in different directions.
- The LOFAR main core is based in the north of the Netherlands, with other stations located in France, Germany, and the United Kingdom.

What are Radio Galaxies?

- **Radio Galaxies, also known as radio-luminous galaxies or radio-loud galaxies, are a particular type of active galaxy that emits more light at radio wavelengths than at visible wavelengths.**

- These happen through the interaction between charged particles and strong magnetic fields related to supermassive black holes at the galaxies' centre.
- They are driven by non-thermal emissions.
- They are much bigger than most of the other galaxies in the universe.
- The first radio galaxy to be discovered, and still the brightest, is called Cygnus A.

4. Syntrichia caninervis

Context:

Scientists have identified a species of desert moss called 'Syntrichia caninervis' that could be a game-changer for future space exploration and colonisation efforts.

About Syntrichia caninervis:

- It is one of the most abundant desert mosses in the world.

It possesses remarkable tolerance to multiple environmental stress factors (drought, cold, and radiation).

- **Extreme desiccation tolerance:** recover within seconds after >98% water loss.
- **Extraordinary freezing tolerance:** withstand -196°C ultra-low temperature.
- **Super resistance to gamma radiation:** with half-lethal dose estimated to be 5,000 Gy.

Distribution:

- It has a wide spread global distribution.
- It is predominant in dryland regions, including the Gurbantunggut and Tengger Deserts in China and the Mojave Desert in the United States.
- S. caninervis crusts are also present in mountainous regions of the Pamir, Tibet, Middle East, Antarctica, and circumpolar regions.

What is a Moss?

- A moss is a flowerless, spore-producing plant - with the spores produced in small capsules.
- Mosses are distributed throughout the world except in salt water and are commonly found in moist shady locations.
- They are best known for those species that carpet woodland and forest floors.
- Ecologically, mosses break down exposed substrata, releasing nutrients for the use of more-complex plants that succeed them.
- They also aid in soil erosion control by providing surface cover and absorbing water, and they are important in the nutrient and water economy of some vegetation types.
- Economically important species are those in the genus Sphagnum that form peat.

5. Nova Explosion**Context:**

Global professionals and amateur astronomers are waiting for a once-in-a-lifetime nova explosion which will occur in September, 3,000 light-years from the Earth.

About Nova Explosion:

- *It is the dramatic instance of a star exploding as it interacts with another, nearby star.*
- *It's a one of many, repeated moments during the long, slow, death of two neighbouring stars in the same system.*
- Astronomers are waiting for the fiery explosion of T Coronae Borealis, also dubbed the "Blaze Star" and known to astronomers as "T CrB".
- For T CrB, this nova event happens roughly every 80 years — it's like Halley's Comet event every 76 years — so, astronomers call T CrB a "recurrent" nova.
- They believe T CrB's prior eruptions were observed as long ago as December 1787 and even in October 1217 AD.
- When T CrB erupts, its luminosity will increase dramatically, making it visible to the naked eye for several days.

Process

- The system contains two stars — a white dwarf and a red giant.
- The white dwarf is an incredibly dense remnant of a once larger star. It's about the size of planet Earth but with the same mass as our sun.
- Its neighbour, the red giant, is in its final years of existence and is slowly being stripped of hydrogen by the gravitational pull of the denser white dwarf.
- This star "cannibalism" causes a tremendous buildup of pressure and heat, which eventually triggers a huge thermonuclear explosion.
- The explosion doesn't completely destroy the stars, however, and so this event repeats over time. It can carry on for hundreds of thousands of years.
- Different nova events have different cycles, ranging from a few years to hundreds of thousands of years.

6. Snowblind malware**Context:**

A new banking malware called 'Snowblind' is targeting Android users to steal banking credentials.

About:

- *Snowblind malware is a new Android malware that uses a built-in Android security feature to bypass anti-tamper mechanisms and steal banking credentials.*
- This malware exploits a built-in security feature to bypass anti-tamper protection in apps handling sensitive information.
- It works by repacking an app so it is unable to detect the use of accessibility features that can be used to extract sensitive information like login credentials and get remote access to the app.

7. Rudram-1

Context:

India successfully test-fires new generation anti-radiation missile 'Rudram-1'

About Rudram-1:

- *It is the first indigenous anti-radiation missile developed by the DRDO for the Indian Air Force (IAF).*

Key Features:

- Launch Platform: Sukhoi-30MKI fighter jets
- Guidance System: Inertial Navigation Systems (INS)-GPS navigation and Passive Homing Head for final attack
- Range: 100-250 km
- Speed: Up to Mach 2 (twice the speed of sound)

Significance

- **Enhances IAF's Suppression of Enemy Air Defence (SEAD) Capability:** Rudram-1 allows the IAF to conduct SEAD operations deep within enemy territory, neutralizing critical air defense installations and paving the way for other aircraft to operate safely.
- **Force Multiplier:** The missile acts as a force multiplier by enhancing the survivability and effectiveness of air operations.
- **Indigenous Development:** Its indigenous development is a significant step towards self-reliance in defense technology.



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8. Light Fidelity (Li-Fi) Technology

Context:

Recently, the Ministry of Defence, under the Innovations for Defence Excellence (iDEX) initiative, granted the Li-Fi Technology to address the Indian Navy's communication challenges.

About Light Fidelity (Li-Fi) Technology:

- *It is a wireless communication technology that uses visible light to transmit data.*
- Unlike traditional radio frequency-based Wi-Fi, which relies on radio waves, Li-Fi leverages Light-emitting Diodes (LEDs) to create a high-speed, secure, and energy-efficient communication channel.

Working

- **LEDs as Data Transmitters:** Li-Fi uses LEDs (such as those used for lighting) to transmit data. These LEDs can be modulated at high speeds to encode information.
- **When an electrical signal is applied to an LED, it emits light. By varying the intensity of the light rapidly, data can be transmitted.**
- **Photodetectors as Receivers:** Devices equipped with photodetectors (such as smartphones, laptops, or IoT devices) receive the modulated light signals.
- The photodetectors convert the received light into electrical signals, which are then processed as data.

Advantages

- **High Speed:** Li-Fi can achieve data rates of several gigabits per second (Gbps), surpassing traditional Wi-Fi.
- **Security:** Since Li-Fi operates within the visible light spectrum, it does not penetrate walls, making it inherently secure against eavesdropping.
- **No Interference:** Li-Fi does not interfere with radio frequencies used by Wi-Fi or cellular networks.
- **Energy Efficiency:** LEDs are energy-efficient, contributing to overall energy savings.

Challenges and Considerations

- **Line of Sight:** Li-Fi requires a direct line of sight between the transmitter (LED) and receiver (photodetector).
- **Indoor Use:** Li-Fi is ideal for indoor environments, such as offices, hospitals, and smart homes.
- **Integration:** Integrating Li-Fi with existing infrastructure and devices remains a challenge.

Applications:

- **Internet Connectivity and Indoor Communication:** Li-Fi can provide high-speed internet access in offices, homes, and public spaces.
- **Secure Environments:** Military bases, hospitals, and data centres benefit from Li-Fi's security features.
- **Underwater Communication:** Li-Fi can be used for underwater communication, where RF signals are ineffective.

9. Metal-Organic Frameworks

Context:

Researchers have carried out an in-depth analysis of the mechanisms underlying the flexibility of crystals of Metal-organic frameworks (MOFs) and introduced a novel quantitative measure of mechanical flexibility for crystals.

About Metal-Organic Frameworks (MOFs):

- **MOFs are a class of porous, crystalline materials with a broad range of applications.**
- They are composed of metal ions or clusters, which act as the joints, bound by multidirectional organic ligands, which act as linkers in the network structure.
- **These crystalline materials possess the remarkable ability to absorb gases, such as carbon dioxide, and store them as well as act as filters for crude oil purification.**
- MOFs derive their ability from the presence of nanopores, enhancing their surface areas that, in turn, make them adept at absorbing and storing gases.

- Flexibility in crystals has been assessed in terms of a parameter called elastic modulus, which is a measure of a material's resistance to strain-induced deformation.

New quantitative measure of mechanical flexibility

- New study proposes a unique theoretical measure based on the fractional release of elastic stress or strain energy through internal structural rearrangements under symmetry constraints.
- This new metric can be readily calculated using standard techniques of simulation and can rate the flexibility of a crystal on a scale of zero to one, zero signifying the least flexibility while one indicates maximum flexibility.

They have limited stability and mechanical weakness which has hindered their broader applications.

10. Junk DNA

Context:

Using artificial intelligence, researchers have found potential cancer drivers hidden in so-called 'junk' regions of DNA.

About Junk DNA:

- **In genetics, the term junk DNA refers to regions of DNA that are noncoding.**
- DNA contains instructions (coding) that are used to create proteins in the cell.
- However, the amount of DNA contained inside each cell is vast, and not all of the genetic sequences present within a DNA molecule actually code for a protein.
- **Some of this noncoding DNA is used to produce non-coding RNA components such as transfer RNA, regulatory RNA and ribosomal RNA.**
- **However, other DNA regions are not transcribed into proteins, nor are they used to produce RNA molecules, and their function is unknown. These are known as junk regions of DNA.**

- The proportion of coding versus noncoding DNA varies significantly between species.
- In the human genome, for example, almost all (98%) of the DNA is noncoding, while in bacteria, only 2% of the genetic material does not code for anything.
- **However, over the years, researchers have found evidence to suggest that junk DNA may provide some form of functional activity.**
- Some lines of evidence suggest that fragments of what were originally non-functional DNA have undergone the process of exaptation throughout evolution.
- Exaptation refers to the acquisition of a function through means other than natural selection.

11. Technology Development Fund (TDF) scheme

Context:

Technology Development Fund (TDF) scheme playing a crucial role in promoting 'Atma Nirbharta' in defence

About Technology Development Fund (TDF) scheme:

- **The TDF scheme is a flagship programme of the Ministry of Defence executed by Defence Research and Development Organisation (DRDO) under the 'Make in India' initiative.**
- **The main objectives:** To provide Grant in Aid to Indian industries, including MSMEs & start-ups, as well as academic and scientific institutions for the development of defence and dual use technologies that are currently not available with the Indian defence Industry.
- To engage with the private industries, especially MSMEs and start-ups, to bring in the culture of Design & Development of Military Technology and support them with Grant in Aid.
- To focus on Research, Design & Development of Niche technologies which are being developed for the first time in the country.

12. Transplantation of Human Organs Act

Context:

Health Ministry to MHA, MEA: Inform foreigner about organ transplant law

- **The Transplantation of Human Organs Act (THOA) was indeed first enacted in 1994. This act provides the primary legal framework for organ donation and transplantation in India.**
- **The law allows for both living and deceased organ donation.** Living donors can donate certain organs (like a kidney) or parts of organs (like a portion of the liver) while alive. Deceased donation occurs after brain death or cardiac death.
- **Commercial organ trading is strictly prohibited in India.** The law explicitly bans the sale and purchase of human organs. This prohibition is aimed at preventing exploitation of vulnerable populations and ensuring ethical organ donation practices.
- **Brain death is recognized as a form of death for organ donation purposes.** This is a crucial aspect of the law as it allows for the donation of vital organs like the heart and liver, which must be transplanted quickly after death.

13. Biodosimetry

Context:

The time required to identify those individuals who have received a significant dose of radiation is crucial as treatments for radiation are more effective the earlier, they are administered, as per a study.

About Biodosimetry:

- **It is a method used to estimate the amount of radiation a person has been exposed to.**
- **Purpose:** Determine radiation exposure based on biological changes.
- Biological Samples Used: Blood, urine, hair.

- **Application:** Particularly useful in radiological events without personal radiation monitoring devices.

14. Axiom-4 mission

Context:

2 Gaganyaan astronauts to go to ISS aboard the Axiom-4 mission

- Axiom-4 (also written as Ax-4) is a private space mission organized by Axiom Space, a commercial spaceflight company. It's part of a series of missions aimed at advancing commercial human spaceflight and space tourism.

Key points about the Axiom-4 mission:

- **Purpose:** It's a commercial mission to the International Space Station (ISS), combining scientific research with space tourism.
- **Crew:** The mission typically involves a professional commander (often a former NASA astronaut) and paying customers who undergo training to become "private astronauts."
- **Duration:** These missions usually last about 10-14 days, including travel time and stay on the ISS.
- **Launch:** The mission uses SpaceX's Crew Dragon spacecraft launched on a Falcon 9 rocket.

15. 3D Hologram Technology

Context:

Japan issued its first new banknotes in two decades, yen packed with 3D hologram technology to fight counterfeiting.

About 3D Hologram Technology:

- It is a virtual three-dimensional image created by the interference of light beams that reflect real physical objects. Holograms preserve the depth, parallax, and other properties of the original item.
- Unlike conventional 3D projections, holograms can be seen with the naked eye.

- **Principle:** It uses the principles of interference and diffraction of light waves to record and reconstruct 3D images of objects.
- There are two methods for creating holograms: computer-generated holograms for augmented reality glasses and actual holograms for optical displays.
- **Application:** It has a wide range of applications in medicine, the military, weather forecasting, virtual reality, digital art, and security.

How do holograms prevent counterfeiting?

- Holograms prevent counterfeiting because of their complexity, making them difficult to replicate using traditional methods.
- Holograms' intricate patterns and properties make them difficult to duplicate completely, which deters counterfeiters.
- Additionally, holograms are designed to be easily recognizable by trained individuals, facilitating quick identification of genuine products versus fake ones.

16. Launch Modes of Indian Missiles

Context:

Indian "Iron-Dome" Akash Surface-to-Air Missile (SAM) is competing against Chinese-made Sky Dragon-50 air defense systems to secure an order from Brazil.

Indian Missile	Launch mode
1. Prithvi	Surface-to-Surface
2. Akash	Surface-to-Air
3. Helina anti-tank missile	Air-to-Surface
4. K-15 ballistic missile	Submarine-launched

About Akash Surface-to-Air Missile (SAM):

- It is a Short-Range Surface-to-Air Missile system to protect vulnerable areas and vulnerable points from air attacks.

- It was indigenously designed and developed by India's Defence Research and Development Organisation (DRDO) and is produced by Hyderabad-based Bharat Dynamics Ltd (BDL).
- It is designed to protect vulnerable areas from multifarious air threats.
- It has the capability to neutralise aerial targets like fighter jets, cruise missiles, and air-to-surface missiles, as well as ballistic missiles.
- It is in operational service with the Indian Army and the Indian Air Force.

Features:

- It is 5.8 m long, has a diameter of 350 mm and a wingspan of 1,105mm.
- It has a launch weight of 720 kg.
- The missile can fly at a speed of up to Mach 2.5 and has a height ceiling of 18 km.
- It can target aircraft up to 45 km away.
- The most important element of the Akash SAM system battery is its high-power, multi-function Rajendra phased array radar.
- The 3D passive electronically scanned array Rajendra radar (PESA) can electronically scan and guide the missile towards targets. It provides information on the range, azimuth, and height of a flying target.
- The AKASH Weapon System can simultaneously engage Multiple Targets in Group Mode or Autonomous Mode.
- It has built-in Electronic Counter-Counter Measures (ECCM) features.

Guidance System: Command Guidance

- It is fully automatic, with a quick response time from target detection to kill.
- The entire weapon system has been configured on mobile platforms.
- It has an open-system architecture that ensures adaptability to existing and futuristic air defence environments.

17. Transposons**Context:**

Scientists at the Carnegie Institution found that some genes were able to move around within the genome. These genes were called Jumping genes or transposons.

- Transposons challenged the traditional view of static genomes, demonstrating that genetic material can be dynamic.
- The IS110 system, utilizing RNA bridges, offers a more flexible approach to gene editing compared to CRISPR-Cas9 due to its ability to target and insert specific DNA sequences.
- Transposons are not stable but rather mobile genetic elements.
- RNA bridges are involved in DNA rearrangement, not protein synthesis.

About:

- Transposons influence the effects of genes and are called the tools of evolution, for their ability to rearrange the genome and introduce changes.
- More than 45% of the human genome consists of transposable elements.
- They create mutations in genes and lead to diseases.
- However, most of the transposons have themselves inherited mutations and have become inactive, and thus can't move around within the genome.

Jumping genes (Transposons)

- The name of the jumping gene is IS110, which stands for Insertion Sequence, and such sequences are found in an array of life-forms, including bacteriophages, bacteria, plants, worms, fruit flies, mosquitos, mice, and humans.

- They roam around the body, cutting and pasting themselves, repairing DNA and modifying it daily.

What is Bridge RNA?

- Bridge RNA refers to a type of RNA (Ribonucleic Acid) molecule that plays a crucial role in the process of DNA rearrangement in certain organisms.
- Bridge RNAs act as molecular bridges between different DNA segments during this intricate process of DNA rearrangement.

Significance of Jumping genes

- The IS110 bridge recombination system expands the diversity of nucleic-acid-guided systems beyond CRISPR and RNA interference.

It offers a unified mechanism for the three fundamental DNA rearrangements — insertion, excision and inversion — that are required for genome design.

- DNA insertion is a genetic process in which a segment of DNA is added to a different DNA segment,
- Excision is a mechanism in which a damaged DNA segment is removed, and
- Inversion is a method in which a piece of DNA in a chromosome gets reversed.

With bridge RNA, researchers can program both the target and the donor sequence of DNA so they can mix and match any two that they want, whereas the guide RNA in CRISPR-Cas9 systems can specify only the target DNA sequence to be cut, not the one to be added in.

18. Braking

Context:

Recently, applications of Regenerative braking and alternative energy recovery methods have been highlighted

What is braking?

Braking is the mechanism by which an automotive vehicle in motion slows down.

- A vehicle moving faster has more kinetic energy than a vehicle moving slower, so the process of braking removes (mostly) kinetic energy from the vehicle.
- The law of energy conservation means this removed energy has to go somewhere

Regenerative Braking:

- **Regenerative braking is a system in electric vehicles that converts kinetic energy from braking into electrical energy, which is stored in batteries or used immediately.**
- **It involves the electric motor functioning as a generator to capture kinetic energy back into the vehicle's energy system.**
- **Mechanism:** The electric motor in the vehicle reverses its role during braking, turning mechanical energy from the wheels into electrical energy.
- **This energy is either stored for later use or fed back into the vehicle's traction system.**
- **Comparison:** Regenerative braking is part of dynamic braking, contrasting with rheostatic braking where excess energy is dissipated as heat.

Limitations:

- It is a simple energy recovery mechanism which has some downsides.
- It alone cannot fully halt a vehicle and is supplemented by traditional braking systems that dissipates some of the kinetic energy as heat.
- Efficiency drops at lower speeds, and it does not prevent vehicles from rolling back on inclines.

Solutions:

- The design of a regenerative brake depends on the energy form to which the mechanical energy from the wheels is to be converted.

- An electric vehicle funnels it into a generator and obtains a current, which is stored in a battery or a supercapacitor.
- Similarly, the mechanical energy can be used to increase the angular momentum of a rotating flywheel.
- Flywheels are especially useful because they can receive energy much faster than other such systems.
- For every unit increase in speed, they also store exponentially more energy.
- The flywheel can be linked to a reciprocating engine to manage or augment its output, like in Formula One racing, or to a gyroscope to help submarines and satellites navigate.
- Recovered kinetic energy can also be fed to a pump that compresses air, which can be useful to start internal combustion engines.

19. CubeSat Radio Interferometry Experiment

Context:

NASA is set to launch a groundbreaking CubeSat Radio Interferometry Experiment (CURIE) mission to unravel the mysteries of solar radio waves.

About CubeSat Radio Interferometry Experiment (CURIE):

- *It aims to investigate the enigmatic origins of radio waves emanating from the Sun, a phenomenon first observed decades ago.*
- The mission employs an innovative technique called low frequency radio interferometry, marking its first use in space.
- CURIE consists of two miniature spacecraft, collectively no larger than a shoebox, which will orbit Earth approximately two miles apart.
- This separation enables the instruments to detect minute differences in radio wave arrival times, pinpointing their exact solar origin.

Working:

- This spacecraft will measure radio waves in the 0.1-to-19-megahertz range, frequencies blocked by Earth's upper atmosphere, necessitating space-based observations.
- CURIE will orbit 360 miles above Earth's surface to obtain an unobstructed view of the Sun's radio emissions.
- Once in orbit, the two CURIE spacecraft will separate, deploy their eight-foot antennas, and begin collecting data.
- This mission not only promises to advance our understanding of solar phenomena but also paves the way for future space-based radio astronomy endeavours.
- It is sponsored by NASA's Heliophysics Flight Opportunities for Research and Technology (H-FORT) Program.

20. Mitochondrial Donation

Context:

Recently, a new In vitro fertilisation (IVF) procedure known as Mitochondrial Donation gave families affected by certain forms of Mitochondrial disease (or Mito) hope that they can have children who are genetically related to them without Mito.

About the Mitochondrial Donation:

- *It is an IVF-based assisted reproductive technology designed to prevent the transmission of mitochondrial disease from mothers to their biological children.*
- It ensures that only healthy mitochondria are passed on to embryos, minimising the risk of severe mitochondrial disease.
- It involves several techniques aimed at creating embryos with healthy mitochondria.
- Severe mitochondrial disease can have devastating effects on families, including premature child mortality, debilitating suffering, and poor quality of life.

Working

- **In-Vitro Fertilisation (IVF):** The process begins with IVF, where eggs are fertilised outside the body.
- **Nuclear DNA from Both Parents:** The embryo contains nuclear DNA from both the prospective mother and father.
- **Mitochondria from a Donor:** Healthy mitochondria are introduced by using an egg donated by another woman (the mitochondrial donor).

Significance

- **Prevent Transmission:** Mitochondrial donation reduces the risk of mothers passing on mitochondrial disease to their children.
- **Alleviate Suffering:** Children born with healthy mitochondria will be spared the suffering caused by this life-threatening condition.

21. Scientific Deep-Drilling**Context:**

Under Borehole Geophysics Research Laboratory (BGRL) in Karad, Maharashtra, the aim is to drill the earth's crust to a depth of 6 km and conduct scientific observations and analysis to help expand the understanding of reservoir-triggered earthquakes in the active fault zone in the Koyna-Warna region of Maharashtra.

About Scientific Deep-Drilling:

- Scientific deep-drilling is the enterprise of strategically digging boreholes to **observe and analyse deeper parts of the earth's crust.**
- Scientific drilling also provides exact, fundamental, and globally significant knowledge of the composition of the earth's crust, structure, and processes, and helps confirm or reject models on surface studies.
- It can provide information to inform a range of societal problems related to geohazards and geo-resources in India.
- Scientifically drilled boreholes to great depths, which when instrumented with sensors serve as geological observatories.

- **They can be a hub of direct, in-situ experiments and observations and strategically monitor a region's fault lines and earthquake behaviour (including nucleation, rupture, and arrest).**
- **It offers opportunities and access to study earthquakes and expands our understanding of the planet's history, rock types, energy resources, life forms, climate change patterns, the evolution of life, and more.**

22. Bacteriophages**Context:**

Researchers recently developed a simple new way to store, identify, and share phages, making them more accessible to patients who need them.

About:

- While bacteriophages have potential applications in other areas, their primary and most well-established use is in treating bacterial infections. This is known as phage therapy. **Bacteriophages are viruses that specifically target and kill bacteria, making them a promising alternative to antibiotics, especially in cases of antibiotic resistance.**
- **Producing antibiotics: While bacteriophages can be used to discover new antibiotic compounds, they are not themselves antibiotics.**
- **Gene therapy for humans: This is a potential future application, but it is still in the experimental stages and not a current use of bacteriophages.**

About Bacteriophage:

- A bacteriophage is a type of virus that infects bacteria.
- The word "bacteriophage" literally means "bacteria eater," because bacteriophages destroy their host cells.
- They are the most common biological entities in nature.

- Also known as phages, these viruses can be found everywhere bacteria exist, including, in the soil, deep within the earth's crust, inside plants and animals, and even in the oceans.
- Thousands of varieties of phages exist, each of which may infect only one type or a few types of bacteria or archaea.
- All bacteriophages are composed of a nucleic acid molecule that is surrounded by a protein structure.
- The nucleic acid may be either DNA or RNA, and it may be double-stranded or single-stranded.

How does it infect bacteria?

- A bacteriophage attaches itself to a susceptible bacterium and infects the host cell.
- Following infection, the bacteriophage hijacks the bacterium's cellular machinery to prevent it from producing bacterial components and instead forces the cell to produce viral components.
- Eventually, new bacteriophages assemble and burst out of the bacterium in a process called lysis.
- Bacteriophages occasionally remove a portion of their host cells' bacterial DNA during the infection process and then transfer this DNA into the genome of new host cells. This process is known as transduction.

23. Heat Dome Effect

Context:

The entire western US is facing a massive heatwave that began last week. The heat dome effect is considered to be the possible reason for unprecedented higher temperatures.

- **A heat dome occurs when a high-pressure system traps hot air over an area. This is the fundamental definition of a heat dome.**
- **Heat domes typically form in mid-latitude regions, not polar regions. They are most common in summer months in areas like North America, Europe, and parts of Asia.**

- **The phenomenon can indeed lead to prolonged periods of extreme temperatures, often lasting for several days or even weeks.**
- **Heat domes are generally associated with dry conditions and reduced precipitation, not increased precipitation. They often exacerbate drought conditions.**

About the Heat Dome

- A heat dome is like nature's version of a pressure cooker lid. Imagine a high-pressure system in the atmosphere acting as that lid, trapping warm air underneath it for an extended period.
- As a result, the air near the surface doesn't get a chance to rise upward.

Effects

Clear Skies: Since the warm air doesn't ascend, the sky remains clear.

- Clouds typically form when rising warm air cools down and its water content condenses. However, under a heat dome, the lack of upward movement means fewer clouds.

Intense Heating: With the high-pressure system in place, more sunlight reaches the Earth's surface. It leads to significant warming and drying of the soil. Less evaporation occurs, reducing the chances of rain cloud formation.

Persistent Heat: The longer the heat dome lingers, the hotter it gets. It's like leaving a lid on a simmering pot—each day adds a little more heat.

- Heat domes are responsible for heat waves, but interestingly, they can occur even without a heat dome being present.

Role of the Jet Stream:

- A jet stream is a fast-moving ribbon of air high in the atmosphere that usually helps move weather systems around. When the jet stream forms elongated waves (like a snake slithering across the sky), it can slow down and even stall.

- **Stuck High-Pressure Systems:** If the jet stream's waves become big and elongated, they can trap a high-pressure system in place. This stationary high-pressure area creates a heat dome.
- **El Niño Connection:** The jet stream's behavior is linked to larger climate patterns. For instance, during La Niña years (when cooler waters spread across the equatorial Pacific), heat waves can extend further south into peninsular India.
- And when La Niña transitions to El Niño (warmer waters spreading west-east), heat waves tend to concentrate over northwest India.

Climate Change and Heat Domes:

- Climate change is making heat domes more intense, frequent, and longer-lasting.
- As our planet warms, extreme weather events become more pronounced.
- So, while heat domes have always been part of Earth's weather repertoire, they're now cranking up the heat.

24. Ortho-Chloro Benzylidene Malononitrile

Context:

India has seized Pakistan-bound consignment, consisting of internationally banned chemicals used for tear gas and riot control agents, from China at a port in Tamil Nadu.

About:

- Chinese firm had shipped a consignment of "Ortho-Chloro Benzylidene Malononitrile" to Pakistan.
- The chemical consignment was seized under the provisions of the Customs Act, 1962, and the Weapons of Mass Destruction and Delivery Systems (Prohibition of Unlawful Activities) Act, 2005.
- Ortho-Chloro Benzylidene Malononitrile (CS) is a listed substance under the Wassenaar Arrangement.
- India is a signatory to the Wassenaar Arrangement, China and Pakistan are not.

Multilateral Export Control Regimes:

Wassenaar Arrangement: Established in 1996, this regime focuses on conventional weapons and dual-use goods and technologies (items with both civilian and military applications).

- It establishes lists of items for which member countries are to apply export controls.

Nuclear Suppliers Group: Formed in 1974, this regime seeks to prevent nuclear proliferation by controlling the export of materials, equipment, and technology that can be used to manufacture nuclear weapons.

Australia Group: It was established in 1985 prompted by Iraq's use of chemical weapons during the Iran-Iraq War (1980-1988).

- Australia, concerned with Iraq's development of chemical weapons, recommended harmonization of international export controls on chemical weapons precursor chemicals.

Missile Technology Control Regime: Founded in 1987, this regime aims to limit the proliferation of missiles and unmanned aerial vehicles capable of delivering weapons of mass destruction.

- India joined the MTCR in 2016.

25. NASA's CHAPEA Project

Context:

After a year-long simulated Mars mission as part of the CHAPEA project, a Nasa crew emerged from their 17,000 sq. ft habitat at Johnson Space Centre.

About NASA's CHAPEA Project:

- Crew Health and Performance Exploration Analog (CHAPEA) is a series of analog missions conducted by NASA that will simulate year-long stays on the surface of Mars.
- It aims to assess and collect data regarding NASA's food system and physical and behavioural health patterns in humans, which will help during future space missions.

- Each mission will consist of four crew members living in Mars Dune Alpha, an isolated 1,700-square-foot habitat.

Mars Dune Alpha is a 3D-printed structure located at Johnson Space Center in Houston, Texas.

It simulates a realistic Mars habitat to support long-duration, exploration-class space missions.

- Mars Dune Alpha features include:
- Four private crew quarters
- Dedicated workstations
- Dedicated medical station
- Common lounge areas
- Galley and food-growing stations

The analog mission will be as Mars-realistic as feasible, which may include environmental stressors such as resource limitations, isolation, equipment failure, and significant workloads.

During the mission, the crew will conduct simulated spacewalks and provide data on a variety of factors, which may include physical and behavioural health and performance.

After the successful completion of this mission recently, two more are scheduled for 2025 and 2026.

26. Glacial Geoengineering

Context:

Scientists call for studies on risks and benefits of glacial geoengineering to slow sea-level rise.

Glacial Geoengineering:

- **Glacial geoengineering involves deliberate interventions aimed at mitigating the effects of climate change on glaciers and ice sheets.**
- The primary goals are to slow down ice melt, stabilize glaciers, and reduce sea level rise.
- While various climatic geoengineering approaches have been considered, serious consideration of geotechnical approaches has been limited.

Here are some key methods and concepts which can be used in Glacial geoengineering:

- **Draining or freezing the bed.**
- **Altering surface albedo.**
- **Creating obstacles: retaining snow.**
- **Stiffening shear margins with ice.**
- **Blocking warm sea water entry.**
- **Thickening ice shelves (increasing buttressing, and strengthening fractured shelves against disintegration).**
- **Using regional climate engineering or local cloud seeding to cool the glacier or add snow.**

27. Chaperones

Context:

A team at the S.N. Bose National Centre for Basic Sciences is using a Covalent Magnetic Tweezer (CMT) fabricated in their lab, to study physical and chemical properties of protein molecules and action of chaperones on how these molecules fold and function.

About Chaperones:

- **Chaperones are a group of proteins that have functional similarity and assist in protein folding.**
- **They are proteins that have the ability to prevent non-specific aggregation by binding to non-native proteins.**
- After the new protein chain has been shaped correctly, chaperones move on. Or else the new chain is eliminated.
- Without chaperones, newly synthesised proteins would soon become a tangled mess of insoluble aggregates, hindering cellular processes.
- Chaperones are needed under physiological conditions too, for normal cellular function.

- There are several families of chaperones and each possesses different functions. Example of chaperon proteins are the “heat shock proteins” (Hsps).
- Major chaperones in humans include HSP70, HSC70 and HSP90: the numbers express the size of the proteins in kilodaltons.
- In normal cells 1%–2% of all proteins present are heat shock proteins. This number rises threefold during stressful conditions.

Misfolding of proteins can cause a number of diseases namely:

- **Parkinson's disease:** In which Alpha-synuclein protein, present in neurons, is wrongly folded.
- **Alzheimer:** Brains of Alzheimer's patients have plaques formed from aggregates of amyloid beta-peptide. This accumulation of amyloid fibrils is toxic, leading to widespread destruction of neurons – a 'neurodegenerative' disorder.
- **Autosomal dominant congenital cataract:** In the eye lens, an abundant subset of proteins called alpha-crystallins themselves serve as chaperones – a single R116G mutation in human alpha crystallin is responsible for this.

28. APSTAR-6E Satellite

Context:

China's APSTAR-6E satellite has officially begun operating after successfully passing technical reviews both in orbit and on the ground in Hong Kong.

About APSTAR-6E Satellite:

- **It is China's first all-electric propulsion communication satellite.**
- **Developed by the China Aerospace Science and Technology Corporation (CASC), this satellite operates in geostationary orbit.**
- Launched via a Long March-2C rocket from the Xichang Satellite Launch Center on January 13, 2023, APSTAR-6E completed its journey to geostationary orbit after separating from its independent propulsion module.

- As the first in its series, APSTAR-6E holds the distinction of being the world's initial telecommunication satellite to autonomously transfer from low Earth orbit to geostationary orbit using electric propulsion, marking a significant technological achievement.
- It is designed to last 15 years.
- Its primary mission is to deliver efficient and high-capacity broadband communication services across Southeast Asia, aiming to provide reliable connectivity at a competitive cost.

29. Srijan Portal

Context:

Recently, the Department of Defence Production (DDP), Ministry of Defence has notified the fifth Positive Indigenisation List (PIL) consisting of 346 items. The items will only be procured from the Indian Industry after the timelines of indigenisation as indicated in the list available on the Srijan portal.

About Srijan Portal:

- **It is an indigenization portal developed by the Department of Defence Production.**
- It will give information on items that can be taken up for indigenization by the private sector.
- On this portal, DPSUs/OFB/SHQs can display the items which they have been importing or are going to import which the Indian Industry can design, develop and manufacture as per their capability or through a joint venture with OEMs.
- The Indian Industry will be able to show their interest. The concerned DPSUs/OFB/SHQs, based on their requirement of the items and their guidelines & procedures will interact with the Indian industry for indigenization.
- **Nodal Ministry: Ministry of Defence.**

What is a Positive Indigenisation List?

- It is an important initiative to encourage domestic defence production.
- Several government policies and activities are being implemented in conjunction with the PIL to promote a domestic ecosystem for defence manufacturing.
- The Positive Indigenisation List (PIL) is one such initiative, with four lists released to date. The first list with 351 items was released in December 2021.
- The list includes Highly complex systems, sensors, weapons and ammunition have been included in the list.
- All these items will be procured from indigenous sources as per provisions given in Defence Acquisition Procedure 2020 in a staggered timeline.

30. Coalition of Epidemic Preparedness Innovation**Context:**

Recently, union Minister for the Ministry of Science & Technology inaugurated Asia's first health research-related "Pre-clinical Network Facility" under the Coalition of Epidemic Preparedness Innovations (CEPI) in Faridabad.

About Coalition of Epidemic Preparedness Innovation:

- It was launched in 2017 as an innovative partnership between public, private, philanthropic and civil organisations.
- It was founded in Davos (Switzerland) by the governments of Norway and India, the Bill & Melinda Gates Foundation, the Wellcome Trust, and the World Economic Forum.
- **Mission:** Its mission is to accelerate the development of vaccines and other biologic countermeasures against epidemic and pandemic threats so they can be accessible to all people in need.
- CEPI has supported the development of more than 50 vaccine candidates or platform technologies against multiple known high-risk pathogens or a future Disease X.

- Central to CEPI's pandemic-beating five-year plan for 2022-2026 is the '100 Days Mission' to compress the time taken to develop safe, effective, globally accessible vaccines against new threats to just 100 days.

India- CEPI:

- The Department of Biotechnology, Ministry of Science and Technology, Government of India is supporting the implementation of the Ind-CEPI Mission, "Epidemic preparedness through rapid vaccine development: Support of Indian vaccine development.
- It is done through a dedicated Program Management Unit (PMU) at Biotechnology Industry Research Assistance Council (BIRAC).

31. Cold fusion technology**Context:**

Hyderabad-based start-up HYLENR demonstrated how cold fusion technology can be used to generate Clean Energy.

About:

- Cold fusion is nuclear fusion at room temperature and normal pressure.
- HYLENR's reactors utilize Low Energy Nuclear Reactors by applying milligrams of hydrogen and a small volume of electricity to stimulate and generate excess heat through fusion.
- The heat produced is used for space applications (MMRTG), steam generation for multiple applications, room heating across cold regions globally, and induction heating for domestic and industrial requirements.

Nuclear fusion:

- It is a process in which two light atomic nuclei combine to form a heavier nucleus, releasing a significant amount of energy in the process.
- This process is the same as what powers stars, including our sun.

- The most common fusion reaction involves the isotopes of hydrogen: deuterium and tritium.
- When these isotopes fuse, they form helium and release a neutron, along with a large amount of energy.

32. Gaia Spacecraft

Context:

Recently, Gaia spacecraft has faced and overcome significant challenges in its mission to map over a billion stars in the Milky Way.

About Gaia Spacecraft:

- It was launched by the European Space Agency (ESA) in December 2013.
- It is located 1.5 million kilometres from Earth at the second Sun-Earth Lagrange point (L2).

Mission:

- It monitors each of its target stars about 14 times per year. It is precisely charting their positions, distances, movements, and changes in brightness.
- It is expected to discover hundreds of thousands of new celestial objects, such as extra-solar planets and brown dwarfs, and observe hundreds of thousands of asteroids within our own Solar System.
- The mission is also studying more than 1 million distant quasars and providing stringent new tests of Albert Einstein's General Theory of Relativity.

It contains two optical telescopes that work with three science instruments to precisely determine the location of stars and their velocities, and to split their light into a spectrum for analysis.

It is creating an extraordinarily precise three-dimensional map of nearly two billion objects throughout our Galaxy and beyond, mapping their motions, luminosity, temperature and composition.

This huge stellar census is providing the data needed to tackle an enormous range of important open questions relating to the origin, structure and evolutionary history of our Galaxy.

33. Radome

About Radome:

- A radome is a protective enclosure designed to shield a radar or antenna system from environmental elements without interfering with electromagnetic signal transmission.
- These enclosures are made of either rigid, self-supporting materials or air-inflated, flexible fabrics. An assortment of shapes exists to match the specific applications.
- The radome helps to maintain the performance and functionality of the antenna by reducing the impact of environmental factors on the antenna's signal transmission and reception.
- It is also used to conceal the antenna's electronic equipment from public view for security purposes.
- In addition to this, radomes are useful in situations where rotating antennas might accidentally collide with other nearby objects or equipment, resulting in damages.
- It ensures durability and performance efficiency of the antenna it houses.

Fused silica radomes of DMRL:

- Fused silica is the ideal material for radomes because of its exceptional electromagnetic and mechanical properties, along with its ability to withstand sudden temperature changes.
- By effectively mastering cold isostatic pressing (CIP) technology, the DMRL can now produce these crucial components with high success rates and the desired properties.
- CIP is a technique that involves applying high pressure from all directions to compress powdered materials evenly.
- This process helps in shaping the material and creating a dense, uniform structure with improved strength and properties.

- DMRL uses CIP technology to compress powdered fused silica, shaping it according to requirements.
- Through a process called sintering, the material is then transformed into a strong and compact structure.

34. Brown dwarfs

Context:

Researchers have used James Webb Space Telescope observations to conduct detailed examinations of the atmospheric conditions on pairs of brown dwarfs.

About Brown dwarfs:

- **These are celestial bodies bigger than a planet but smaller than a star**
- These objects have a size between that of a giant planet like Jupiter and that of a small star.
- Brown dwarfs accumulate material like a star, not like a planet.
- They can also have clouds made out of precipitates in their atmospheres. However, while we have water clouds on Earth, the clouds on brown dwarfs are much hotter and likely made up of hot silicate particles
- Thus, they hold onto their lighter elements (hydrogen and helium) more effectively than planets and have a relatively low metal content.
- **However, brown dwarfs do not have enough mass for their cores to burn nuclear fuel and radiate starlight. This is why they are sometimes referred to as "failed stars."**

Key facts about James Webb Space Telescope:

- It was launched in 2021 as a joint endeavour of the USA, European and Canadian space agencies.
- It is a large infrared telescope with an approximately 6.5meter primary mirror.
- It does not orbit around the Earth like the Hubble Space Telescope; it orbits the Sun 5 million kilometres away from the Earth at what is called the second Lagrange point or L2.

- It was designed specifically to see farther across the cosmos and further back in time than any previous astronomical tool.
- One of its key objectives was to find the very first stars to ignite in the nascent Universe.

35. Rapid Apophis Mission for Space Safety

Context:

The European Space Agency recently announced that its new Ramses spacecraft may accompany the asteroid Apophis before and after its safe, albeit rather close, pass of Earth.

About Rapid Apophis Mission for Space Safety (RAMSES):

- **It is a planetary defence mission of the European Space Agency (ESA).**

It will intercept the asteroid 99942 Apophis and accompany it through its safe but exceptionally close flyby of Earth in 2029.

- Roughly 375 m across, Apophis will pass within 32,000 km from Earth's surface on 13 April, 2029.
- It will be the closest approach of an asteroid of this size that humankind has ever known about in advance.
- For a short time, Apophis will be visible to the naked eye in clear, dark skies for about 2 billion people across much of Europe, and Africa, and parts of Asia.
- Apophis will miss Earth. Astronomers have ruled out any chance that the asteroid will collide with our planet for at least the next 100 years.

But the Apophis flyby in April 2029 is an extremely rare natural phenomenon.

Researchers will study the asteroid as Earth's gravity alters its physical characteristics.

Their findings will improve our ability to defend our planet from any similar object found to be on a collision course in the future.

RAMSES will work in synergy with the NASA mission OSIRIS-APEX that will arrive at Apophis a few days after the closest approach of the asteroid to the Earth, allowing a comparison of the asteroid properties measured by the two missions.

36. Clarion-Clipperton Zone

Context:

- India will apply to the UN-backed International Seabed Authority (ISA) for licences to explore for deep-sea minerals of Clarion-Clipperton Zone in the Pacific Ocean.
- India also expects to receive two more exploration permits from the ISA this year for the Indian Ocean, focused on the Carlsberg Ridge and Afanasy-Nikitin Seamount regions, known for polymetallic sulphide deposits and ferromanganese crusts

About

- India will focus on the Clarion-Clipperton Zone, a vast plain between Hawaii and Mexico known to hold large volumes of polymetallic nodules. It was first discovered by British sailors in 1873.
- Polymetallic nodules deposits contain metals such as copper, gold, silver and zinc. Ferromanganese crusts are known for cobalt, nickel, manganese, platinum and rare earth elements among other resources.

Significance

- India relies on imports of raw materials such as copper and lithium, and has listed 24 minerals as “critical” for energy transition. This will help India in meeting its rising green energy requirements.

37. Dyson spheres

About:

- Dyson spheres are hypothetical megastructures built around a star to harness its entire energy output.
- Named after physicist Freeman Dyson, these structures would collect all of a star’s radiant energy.

- Detecting a Dyson sphere could indicate a technologically advanced alien civilization that prefers not to communicate.
- Earth receives 1,361 watts per square meter from the sun, a tiny fraction of the sun’s total energy output of 380 billion quadrillion watts per second.
- A Dyson sphere would capture all this energy that otherwise radiates into space.
- Search for Extra-terrestrial Intelligence is a scientific endeavour to detect advanced civilizations in the universe.
- Infrared Detection is the primary method proposed to detect Dyson spheres, as they would emit excess heat.
- It can be detectable through their infrared emissions, as they would radiate excess heat from the star.
- **Project Hephaistos is a recent scientific effort to search for Dyson spheres using data from multiple space telescopes.**
- Boyajian’s Star is a star with unusual light fluctuations that was briefly considered as a potential Dyson sphere candidate.
- **The concept of Dyson spheres raises questions about extreme technological advancement and energy utilization.**

38. Air Breathing Propulsion System

Context:

Indian Space Research Organisation (ISRO) successfully carried out the second experimental flight for the demonstration of Air Breathing Propulsion Technology.

Air Breathing Propulsion System:

- In this system the rocket will carry its fuel, but will not carry an on-board oxidiser.

- Instead, this system will utilise atmospheric oxygen as an oxidiser to burn the fuel. This makes rockets significantly lighter and more efficient.
- However, such air-breathing technologies can be used only within the denser layers of the Earth's atmosphere, where there is an adequate supply of oxygen.
- Such technologies might be feasible in the denser layers of Earth's atmosphere (up to 70kilometres altitude), and thereafter the rocket must switch to another stage that has both fuel and an on-board oxidizer.

Types of air-breathing propulsion

- **Ramjet: It is an air breathing propulsion engine operating on the principle of supersonic combustion. It has the absence of any rotator and relies solely on the forward motion of the engine to compress incoming air.**
- **Scramjet: It is an upgraded version of the Ramjet and generates thrust through supersonic air flow and combustion. It moves at hypersonic speed and performs best at high speeds, greater than Mach 5.**
- In 2023, India became the fourth country to successfully demonstrate the flight testing of a Scramjet Engine.
- **Dual-Mode Ramjet (DMRJ):** It is a jet engine where a ramjet transforms into a scramjet over Mach 4-8 range and it can efficiently operate both in subsonic and supersonic combustor modes.

39. GM crops

Context:

The Supreme Court pronounced a split verdict on the validity of the Centre's 2022 decision granting conditional approval for environmental release of genetically modified (GM) mustard crops.

What are GM crops?

- Crops that have undergone genetic engineering processes to alter their DNA are referred to as genetically modified crops.

- This alteration is done to introduce desirable traits such as resistance to pests or herbicides, improved nutritional content, or increased yield.
- The process of creating GM crops typically involves: identification of desired traits, isolation of genes, insertion into crop genome, and expression of the trait.
- The techniques used in GM crops are: gene guns, electroporation, microinjection, agrobacterium etc.
- The types of modification are: transgenic, cis-genic, subgenic and multiple trait integration.
- The main trait types in GM crops are herbicide tolerance (HT), insect resistance (IR), Stacked traits etc.

Indian Scenario in GM crops

- Bt Cotton: In 2002, the GEAC had allowed the commercial release of Bt cotton.
- Bt cotton has two alien genes from the soil bacterium *Bacillus thuringiensis* (Bt) that allows the crop to develop a protein toxic to the common pest pink bollworm.
- It is the only GM crop that is allowed in India.
- Many varieties of GM crops are under different stages of development, like Bt brinjal and DMH-11 mustard.

Regulatory framework in India:

- The Genetic Engineering Appraisal Committee (GEAC): It under the Ministry of Environment, Forest and Climate Change (MoEF&CC), is responsible for the assessment of proposals related to the commercial release of GM crops.

Acts and rules that regulate GM crops in India are:

- **Environment Protection Act, 1986 (EPA)**
- **Biological Diversity Act, 2002**
- **Plant Quarantine Order, 2003**
- **GM policy under Foreign Trade Policy**
- **Food Safety and Standards Act, 2006**
- **Drugs and Cosmetics Rule (8th Amendment), 1988.**

40. Dark oxygen**Context:**

Scientists have discovered “dark oxygen” being produced in the deep ocean.

About:

- A study found that oxygen is being produced in complete darkness nearly 4,000 meters below the ocean surface.
- According to the National Oceanic and Atmospheric Administration (NOAA), around half of the Earth’s oxygen comes from the ocean.

Production of dark oxygen:

- The production of oxygen at such depths is thought to be impossible because there isn’t enough sunlight for plants to do photosynthesis.
- The study explains that in this case oxygen is not produced by the plants, instead it comes out of metallic “nodules” that are similar in resemblance to lumps of coal.
- They are splitting H₂O molecules into hydrogen and oxygen.

41. Integrated Disease Surveillance Programme**Context:**

A total of 1,862 disease outbreaks were reported to the Integrated Disease Surveillance Programme last year, with the highest number being reported from Kerala, the Lok Sabha was informed recently.

About Integrated Disease Surveillance Programme (IDSP):

- It is a decentralized, state-based surveillance programme in the country.
- It was launched with World Bank assistance in November 2004 by the Ministry of Health and Family Welfare, Government of India.
- Objectives: To strengthen/maintain a decentralized laboratory-based IT enabled disease surveillance system for epidemic-prone diseases to monitor disease trends and to detect and respond to outbreaks in the early rising phase through trained Rapid Response Teams (RRTs).

Programme Components:

- **Integration and decentralization of surveillance** activities through the establishment of surveillance units at the Centre, State, and District levels.
- **Human Resource Development:** Training of State Surveillance Officers, District Surveillance Officers, RRT, and other medical and paramedical staff on principles of disease surveillance.
- **Use of Information Communication Technology** for collection, collation, compilation, analysis, and dissemination of data.
- **Strengthening of public health laboratories.**
- **Inter sectoral coordination for zoonotic diseases.**

Data Management:

- Under IDSP, data is collected on epidemic-prone diseases on a weekly basis (Monday–Sunday).
- **The information is collected in three specified reporting formats, namely “S”(suspected cases), “P” (presumptive cases), and “L” (laboratory confirmed cases), filled by Health Workers, Clinicians, and Laboratory staff, respectively.**
- IDSP receives disease outbreak reports from the States/UTs on a weekly basis. Even NIL weekly reporting is mandated, and compilation of disease outbreaks/alerts is done on a weekly basis.
- The weekly data gives information on the disease trends and seasonality of diseases.
- Whenever there is a rising trend of illnesses in any area, it is investigated by the RRTs to diagnose and control the outbreak.
- Data analysis and actions are being undertaken by respective State/District Surveillance Units.

42. GROWTH-India Telescope**Context:**

Recently, the GROWTH-India Telescope made a remarkable observation, capturing a 116-meter, building-sized asteroid as it made its closest approach to Earth.

About GROWTH-India Telescope:

- *It is India's first fully robotic optical research telescope.*
- *The telescope's primary mission is to observe explosive transients and variable sources, including near-Earth asteroids.*

Location: The telescope is located at the Indian Astronomical Observatory site at **Hanle, Ladakh**. Situated at 4500 meters above mean sea level, this is one of the highest observatory sites in the world and one of the best telescope locations in the country.

- It joins The Himalayan Chandra Telescope (HCT) the gamma-ray array telescope (HAGAR), and the imaging Cherenkov telescope (MACE) at this site.

It was constructed through a partnership between the Indian Institute of Astrophysics (IIA) and the Indian Institute of Technology Bombay (IITB), with support from the Department of Science and Technology (DST) and the Indo-US Science and Technology Forum.

GROWTH-India project is part of an international network of observatories, known as the Global Relay of Observatories Watching Transients Happen (GROWTH).

- It aims to provide continuous monitoring of interesting celestial events. The network's collaborative approach ensures that observations are not interrupted by daylight, allowing for comprehensive data collection.



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43. Feedstock for ethanol production**Context:**

Cereal Grains have overtaken sugarcane as the primary feedstock for the production of ethanol used in blending with petrol.

About:

- In the current supply year 2023- 2024, sugar mills and distilleries supplied 401 crore liters of ethanol to oil marketing companies.
- Of that, 211 crore liters or 52.7% was ethanol produced using maize and damaged foodgrains (mainly broken/ old rice not fit for human consumption), while sugarcane-based feedstocks (molasses and whole juice/ syrup) accounted for the remaining 190 crore liters.
- This is the first time that the contribution of grains to India's ethanol production has surpassed 50%.

Why is maize being promoted to produce ethanol?

- **Till 2017-18, ethanol was being produced only from molasses, the dense dark brown liquid byproduct containing sucrose that mills cannot economically recover and crystallize into sugar.**
- *However, Sugarcane is a water-guzzling crop. A NITI Aayog report says that just one litre of ethanol produced from sugarcane consumes at least 2,860 litres of water.*
- *India will require 1320 million tons of sugarcane, 19 million hectares of additional land and 348 billion cubic meters of extra water to produce enough ethanol to meet the 20% ethanol blending target of 2025.*
- Further the Food Corporation of India's (FCI) has restricted the use of rice on concerns over cereal inflation and hence maize has emerged as the top ethanol feedstock.

44. Defence Acquisition Council

Context:

The Defence Acquisition Council (DAC) recently approved amendments to the deal for 31 MQ-9B High Altitude Long Endurance (HALE) UAVs from General Atomics of the US.

About Defence Acquisition Council (DAC):

- **It is the highest decision-making body of the defence ministry on procurement.**
- The main objective of the DAC is to ensure expeditious procurement of the approved requirements of the armed forces in terms of capabilities sought and time frame prescribed by optimally utilizing the allocated budgetary resources.
- **Formation: It was formed after the Group of Minister's recommendations on 'Reforming the National Security System', in 2001, post-Kargil War (1999).**

Composition:

- **The defence minister is the chairman of DAC.**
- Its members include the Chief of Defence Staff (CDS) and chiefs of the Army, Navy, and Air Force.

Its functions include:

- Give in principle approval of a 15 years Long Term Integrated Perspective Plan (LTIPP) for defence forces.
- Accord of acceptance of necessity to acquisition proposals.
- Categorisation of the acquisition proposals relating to 'Buy', 'Buy & Make', and 'Make'.
- Look into issues relating to single vendor clearance.
- Take decisions regarding 'offset' provisions in respect of acquisition proposals above Rs 300 crore.
- Take decisions regarding the Transfer of Technology under the 'Buy & Make' category of acquisition proposals.
- Field trial evaluation.

45. Molten Salt Reactor Power Station

Context:

China plans to start building the world's first molten salt reactor power station next year in the Gobi Desert.

About:

- The Thorium Reactor is scheduled to be completed in 2029, generating heat at a maximum power of 60 megawatts.
- Currently, the only operating thorium reactor on Earth is located in the Gobi Desert.
- This experimental reactor can only produce 2 MW of thermal power and does not generate electricity.
- **Applications:** The reactors have some potential military applications due to their compact structure and safety, such as powering naval ships, submarines and even aircraft.

Working of the Reactor?

- **Molten salt carrying thorium fuel enters the reactor core through pipes to undergo a chain reaction.**
- After the temperature rises, it flows out the other side and transfers heat to the molten salt without thorium that is circulating in a separate loop.
- **The hot but non-radioactive molten salt flows into the electricity plant next to the reactor to drive a carbon dioxide-based gas turbine for power generation.**
- The reactor does not need water for cooling because it uses liquid salt and carbon dioxide to transfer heat and generate electricity.

Advantage:

- **Currently, most Uranium Fuel Reactors using water for cooling have the risk of explosion if the pumps malfunction.**
- **But in the Thorium Reactor, the molten salt can drop into a container below the reactor, posing no threat to the surrounding environment.**



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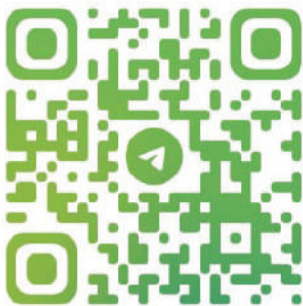
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5	CA August 2024	13-10-2024
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INTERNATIONAL RELATIONS

1. India and Togo

Context:

India and Togo have reviewed bilateral relations and discussed ways to further strengthen bilateral ties between the two countries.

About:

- India and Togo have cordial bilateral relations. India recognized the Togolese Republic since it attained Independence in 1960.
- The bilateral trade and Indian investment in Togo have been growing steadily and bilateral trade registered 6.58 billion dollars during 2022-23.
- Development Partnership: India has extended five Lines of Credit (LOCs) worth around US\$150 million bilaterally to Togo for various projects.
- Indian Technical and Economic Cooperation (ITEC) Programme: India offers training for Togo officials in human resource development under the ITEC program.
- Indian Community: The Indian community in Togo is small and about 1,000 Indians are living in the country.



2. NATO (North Atlantic Treaty Organization)

Context:

Russia's aggression has revitalized NATO, reaffirming its relevance as it celebrates 75 years of establishment in 2024.

The original founding members of NATO (North Atlantic Treaty Organization) are:

- Belgium
- Canada
- Denmark
- France
- Iceland
- Italy
- Luxembourg
- Netherlands
- Norway
- Portugal
- United Kingdom
- United States

About NATO:

- **NATO, or the North Atlantic Treaty Organization, is a military alliance of countries.**
- **Establishment:** It was founded in 1949 with the signing of the North Atlantic Treaty, more popularly known as the Washington Treaty.
- **Aim:** To ensure the security and defence of its member countries through collective defence.
- **Founding Members:** The original members of NATO were Belgium, Canada, Denmark, France, Iceland, Italy, Luxembourg, the Netherlands, Norway, Portugal, the United Kingdom, and the United States.

- **Collective Defence:** The cornerstone of NATO is Article 5 of the North Atlantic Treaty, which states that an armed attack against one or more of its members is considered an attack against all members.
- **Decision-Making:** Decisions within NATO are made on the basis of consensus among member countries.
- **The North Atlantic Council,** which includes the ambassadors of all member countries, is the principal political decision-making body.
- **Members:** It has 32 member countries, Finland and Sweden became the 31st and 32nd members respectively.
- **On signing the Treaty,** countries voluntarily commit themselves to participating in the political consultations and military activities of the Organization.

3. BRICS

Context:

BRICS is attracting Southeast Asian countries, with Thailand and Malaysia being the latest to express their interest in joining the bloc.

About BRICS:

- **Formation of BRICS:** The acronym was first introduced in 2001 by Jim O'Neill, to denote the group of fastest-growing economies that would dominate the world economy by 2050.
- **Members: It consists of Brazil, Russia, India, China, South Africa, Egypt, Ethiopia, Iran, Saudi Arabia, and the United Arab Emirates.**
- **Last year, 5 new members joined BRICS viz. Egypt, Ethiopia, Iran, Saudi Arabia, and the United Arab Emirates. Effective from 1 Jan 2024.**
- **The first BRIC Summit was held in 2009 in Russia.**
- BRICS countries are united by their shared economic potential and their desire to play a more prominent role in the global economy.
- They are united by their common challenges, such as poverty, inequality and climate change.

4. U.S.-India Business Council

Context:

A USIBC delegation, led by its Executive Vice Chairman, met with the Union Minister in Delhi to discuss various collaboration opportunities.

About U.S.-India Business Council (USIBC):

- **Background - It was formed in 1975 at the request of the U.S. and Indian governments.**
- **About- It represents top global companies operating across the United States and India, creating connections between businesses and governments in both countries.**
- **Aim - The Council aims to create an inclusive trade environment between India and the US by representing industry, connecting businesses with governments, and supporting long-term partnerships.**
- **Membership - It has around 200 member companies of which 70% are from the United States and the remaining 30% are from India.**
- **Headquarters - Washington D.C.**
- **It has offices in Delhi, Mumbai, and Bengaluru.**
- **The USIBC is also part of the U.S. Chamber of Commerce.**

Key Points of the meeting

- **Green initiatives - Deployment of Greenfield renewable energy, battery storage, and emerging green technologies.**
- **Advanced technologies - Focus on quantum technology, artificial intelligence, critical metals, and semiconductors.**
- **Anusandhan NRF - Introduction of a research foundation in India similar to the US National Research Foundation.**
- **Biotech growth - In India, this industry has reached \$140 billion with over 4,000 companies.**
- **Space collaboration - NISAR mission with NASA and ISRO highlights India's space sector prowess.**

5. Mutual Recognition Agreement with Taiwan

Context:

Recently, the Mutual Recognition Agreement (MRA) for organic products between India and Taiwan has been implemented.

About Mutual Recognition Agreement with Taiwan:

- **The implementation of the MRA between India and Taiwan is a landmark achievement as it is the first bilateral agreement for organic products.**
- The implementing Agencies for the MRA are Agricultural and Processed Food Products Export Development Authority (APEDA), Ministry of Commerce and Industry, India and Agriculture and Food Agency, Ministry of Agriculture (AFA), Taiwan.
- Under this agreement, agricultural products produced and handled organically in conformity with the National Programme for Organic Production (NPOP) and accompanied by an organic demonstration document issued by an accredited certification body under NPOP are allowed for sale in Taiwan as organically produced including display of the "India Organic" logo.

Significance:

- It will ease the export of organic products by avoiding dual certifications; thus, reducing compliance cost, simplifying compliance requirement by adhering to only one regulation and enhancing trade opportunities in the organic sector.
- It will pave the way for the export of major Indian organic products such as Rice, Processed Food, Green/Black and Herbal Tea, Medicinal plant products etc to Taiwan.

6. BIMSTEC

Context:

Recently, External Affairs Minister Dr. S. Jaishankar hosted his counterparts for the 2nd BIMSTEC Foreign Ministers' Retreat in New Delhi

About BIMSTEC:

- The Bay of Bengal Initiative for Multi-Sectoral Technical and Economic Cooperation (BIMSTEC) is a multilateral regional organization established to accelerate shared growth and cooperation between littoral and adjacent countries in the Bay of Bengal region.
- The first edition of the BIMSTEC Foreign Ministers' Retreat was held in Bangkok, Thailand on 17 July 2023.
- **It has a total of seven member countries – five from South Asia, including Bangladesh, Bhutan, India, Nepal, and Sri Lanka, and two from Southeast Asia, including Myanmar and Thailand.**

7. SEATO

About:

- The purpose of the organization was to prevent communism from gaining ground in the region.

The members of the SEATO includes:

1. The United States
 2. France
 3. UK
 4. New Zealand
 5. Australia
 6. The Philippines
 7. Thailand
 8. Pakistan
- **Although called the "Southeast Asia Treaty Organization," only two Southeast Asian countries became members.**

- The Philippines joined in part because of its close ties with the United States and in part out of concern over the nascent communist insurgency threatening its own government.
- Thailand, similarly, joined after learning of a newly established “Thai Autonomous Region” in Yunnan Province in South China, expressing concern about the potential for Chinese communist subversion on its own soil.
- The rest of the region was far less concerned about the threat of communism to internal stability.
- Burma and Indonesia both preferred to maintain their neutrality rather than joining the organization.

8. India-Saudi Arabia High Level Task Force

Context:

The inaugural meeting of the India-Saudi Arabia High Level Task Force on Investments was held virtually.

Key Outcomes:

- The meeting reviewed prior discussions by the technical teams of the Task Force.
- Constructive discussions took place on bilateral investment opportunities in sectors including refining and petrochemical plants, new and renewable energy, power, telecom, and innovation.
- The Principal Secretary to the PM affirmed India’s commitment to support Saudi investments worth US\$ 100 billion.

Thus, the minimum number of countries crossed (excluding Saudi Arabia and India) would be 3: Iraq, Iran, and Pakistan.



9. International Court of Justice

Context:

The International Court of Justice (ICJ), the United Nations’ principal judicial organ, said on July 19 that Israel’s occupation of the West Bank and East Jerusalem violated international law, and its presence in Palestinian territories should come to an end “as soon as possible”.

What is an ‘occupation’ in international law?

The most widely accepted definition of occupation comes from Article 42 of the “Hague Convention (IV) respecting the Laws and Customs of War on Land and its annex”, 1907. ***It says that a “territory is considered occupied when it is actually placed under the authority of the hostile army.”***

Importantly, an occupation must only be temporary, and cannot involve any transfer of sovereignty to the occupying power.



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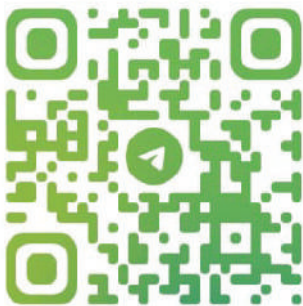
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ART AND CULTURE

1. Moidams of Assam

Context:

The Moidams of Assam have been recommended for UNESCO World Heritage status by ICOMOS.

Moidams of Assam:

- Moidams are significant cultural heritage sites found primarily in Assam.
- Period- Between 13th CE to 17th CE.
- **History- The Moidams situated in Charaideo are the burial grounds of Ahom kings and queens.**
- These are comparable to the pyramids of Egypt and substances of wonder seen through the brilliant architecture and expertise of the artisans and masons of Assam of the medieval era.
- **It is famously called as the Pyramids of Assam.**
- **Distribution- Moidams are primarily associated with Assam and neighbouring regions influenced by the Ahom kingdom, such as parts of Arunachal Pradesh and Nagaland.**
- Construction- Moidams are typically made of earth and stone, sometimes reinforced with bricks or terracotta.
- Management- The site is jointly managed by 2 separate entities namely, the Archaeological Survey of India (ASI) and the Assam Government's Directorate of Archaeology (DoA).
- It is the only applicant from India which is set to be evaluated at the 46th ordinary session of the World Heritage Committee.

2. International Council on Monuments and Sites

Context:

The Moidams of Assam have been recommended for UNESCO World Heritage status by ICOMOS.

International Council on Monuments and Sites (ICOMOS):

About- ICOMOS is a global non-governmental organization dedicated to the conservation and protection of cultural heritage places.

- **Establishment- In 1965, Warsaw, Poland.**
- **Headquarters- Paris.**

Objective- To promote the application of theory, methodology, and scientific techniques in the conservation of architectural and archaeological heritage.

Role- It has a wide range of activities related to heritage conservation, including

- Advising UNESCO on World Heritage nominations and management.
- Developing international standards, guidelines, and charters for conservation practice.
- Conducting research, training, and capacity building in heritage conservation.
- Advocating for the protection of cultural heritage at global, regional, and national levels.

3. Project PARI

Context:

The Ministry of Culture initiates Project PARI for the 46th World Heritage Committee Meeting.

About

- **Project PARI (Public Art of India), seeks to bring forth public art that draws inspiration from millennia of artistic heritage while incorporating modern themes and techniques.**
- Artists from all over the country have come together to create the various wall paintings, murals, sculptures and installations being prepared under this project.

The creative canvas inspired by the styles of;

- Phad paintings (Rajasthan), Thangka painting (Sikkim/Ladakh), Gond art (Madhya Pradesh), Tanjore paintings (Tamil Nadu), and
- Kalamkari (Andhra Pradesh), Alpona art (West Bengal), Cheriya painting (Telangana), Pichhwai Painting (Rajasthan), Lanjia Saura (Odisha), and
- Pattachitra (West Bengal), Bani Thani Painting (Rajasthan), Warli (Maharashtra), Pithora Art (Gujarat), Aipan (Uttarakhand), Kerala Murals (Kerala), Alpana art (Tripura) and more.

4. Chandravalli Cave

About Chandravalli Cave:

- It is located in the state of Karnataka.
- The cave complex is also known as the Ankali Math, named after a saint from Ankalagi in Belagavi district who is believed to have come and settled here.
- The cave has many chambers such as a puja place with a shivlinga, a drawing room, a bedroom, and a water outlet that connects to a tank inside.

Historical significance:

- Excavations around this site surrounded by three hills have revealed coins, painted bowls, and earthen pots dating back to various dynasties such as the Hoysala, the Satavahana and the Vijayanagara.
- There is also a rock inscription of Mayurasharma, the founder of the first Kannada dynasty — the Kadamba dynasty — dating back to AD 450.
- The region had connections with Rome and China, as some coins found here reveal. Some of the walls are adorned with paintings done in organic paint.

Key facts about Kadamabas:

- The Kadamabas of Goa were the subordinates of Chalukyas of Kalyana.

- Chalukya emperor Tailapa II appointed Kadamba Shasthadeva as ahamandaleshwara of Goa for his help in overthrowing the Rashtrakutas.
- Kadamba Shasthadeva conquered the city of Chandavara from the Shilaharas in 960 A.D.
- Later, he conquered the port of Gopakapattana (present Goa).
- Gundayya, the son of Talara Nevayya, may have participated in this battle, and won the port at the cost of his life.

5. Classical Language Status

Context:

The Central Government recently decided to tweak the criteria for giving classical language status.

About Classical Language Status:

- The current criteria evolved by the government to determine the declaration of a language as a classical language are
- It should have high antiquity in its early texts/recorded history over a period of 1,500-2,000 years.
- A body of ancient literature or texts that is considered a valuable heritage by generations of speakers.
- The literary tradition should be original and not borrowed from another speech community.
- The said language and literature should be distinct from its modern format; there may also be a discontinuity between the classical language and its later forms or its offshoots.
- Once a language is notified as a classical language, the Education Ministry provides certain benefits to promote it, which include two major annual international awards for scholars of eminence in the said languages.

Classical Languages in India:

- Till date, six languages have been conferred the status of 'Classical Language' in India.
- The first language to be accorded that status is Tamil, which was declared a classical language back in 2004.
- In the following year, Sanskrit was accorded with the status.
- In 2008, Telugu and Kannada were conferred with the status, followed by Malayalam in 2013.
- Odia is the latest addition to the list and received status in 2014.

6. Mahabodhi Temple Complex:

- It is one of the four holy sites related to the life of the Lord Buddha, marking the spot of the Buddha's Enlightenment (Bodhi).
- It is located in Bodh Gaya, in central Bihar, on the banks of the Niranjana River.
- It is one of the few surviving examples of early brick structures in India.
- The first temple was built by Emperor Asoka in the 3rd century B.C., and the present temple dates from the 5th or 6th centuries.
- It is one of the earliest Buddhist temples built entirely in brick, still standing from the late Gupta period, and it is considered to have had a significant influence in the development of brick architecture over the centuries.
- The sculpted stone balustrades are an outstanding early example of sculptural reliefs in stone.
- It was recognized as a UNESCO World Heritage Site in 2002.

Features:

- The present Temple Complex comprises the 50-meter-high grand Temple, six sacred places within an enclosed area, and a seventh one, the Lotus Pond, just outside the enclosure to the south.

- The most important of the sacred places is the giant Bodhi Tree. This tree is to the west of the main temple and is supposed to be a direct descendant of the original Bodhi Tree, under which the Buddha had his enlightenment.
- Ashoka's stone slab purporting to mark the exact position where the Buddha sat is traditionally called the Buddha's vajrasana (literally "diamond throne" or "thunder seat").
- The grand temple's pyramidal shikhara (tower) comprises several layers of niches, arch motifs, and fine engravings.
- Four towers, each identical to its central counterpart but smaller in size and topped with an umbrella-like dome, adorn the corners of the two-story structure.
- A shrine inside the temple holds a yellow sandstone statue of the Buddha encased in glass.
- The 4.8-hectare (11.9-acre) complex also includes ancient shrines and modern structures built by Buddhist devotees.

7. Martial Art Forms in India**Context:**

The Union Minister for Youth Affairs and Sports stated in the Lok Sabha that the Ministry has recognised the Indian Kalarippayattu Federation as the Regional Sports Federation to promote 'Kalarippayattu' in the country.

Martial art	Associated State
1. Lathi Khela	West Bengal
2. Mallakhamb	Madhya Pradesh
3. Sqay	Kashmir
4. Kalarippayattu	Kerala

Lathi Khela – West Bengal

- Lathi is a wooden weapon to fight and is an ancient weapon used in martial arts in India.

- Lathi or stick are used in martial arts in the state of Punjab and Bengal.
- Lathi is also popular for its utility in sports specially in the Indian villages.
- A practitioner is known as lathial.

Kalaripayattu – Kerala

- Kalaripayattu is a martial art based on the ancient knowledge of the human body.
- It originated in Kerala during 3rd century BC to the 2nd century AD. It is now practiced in Kerala and in some parts of Tamil Nadu.
- The place where this martial art is practiced is called a 'Kalari'. It is a Malayalam word that signifies a kind of gymnasium. Kalari literally means 'threshing floor' or 'battlefield'. The word Kalari first appears in the Tamil Sangam literature to describe both a battlefield and combat arena.
- It is considered to be one of the oldest fighting systems in existence.
- It is also considered as the father of modern Kung – Fu.

Mallakhamb- Madhya Pradesh

- Mallakhamb is a traditional sport, originating from the Indian subcontinent, in which a gymnast performs aerial yoga or gymnastic postures and wrestling grips with a vertical stationary or hanging wooden pole, cane, or rope.
- The name Mallakhamb derives from the terms malla, meaning wrestler, and khamb, which means a pole. Literally meaning "wrestling pole", the term refers to a traditional training implement used by wrestlers.
- Madhya Pradesh and Maharashtra have been the hotspots of this sport.

Sqay – Kashmir

- Sqay is a martial art that belongs to Kashmir.
- It is a kind of sword-fighting.
- A curved single-edged sword and a shield are used by armed sqay.

- Armed sqay can use one sword in each hand.
- Kicks, punches, locks, and chops are examples of unarmed tactics.
- Various approaches are used by Sqay. Techniques and lessons in both freehand and sword for single and double swords.

8. Temples and their locations

Context:

Recently, the finance minister announced during her Union Budget speech that corridor projects will be built for the Vishnupad Temple at Gaya and the Mahabodhi Temple at Bodh Gaya in Bihar.

Temples	Located in
1. Vishnupad Temple	Bihar
2. Sangameswara temple	Andhra Pradesh
3. Bhimashankar Temple	Maharashtra
4. Mookambika Temple	Karnataka

About Vishnupad Temple:

- It is in the state of Bihar and dedicated to Lord Vishnu.
- It was built in 1787 on the orders of Queen Ahilyabai Holkar of Ahmadnagar.
- It is located on the banks of the Falgu River.
- Architecture: Architecturally, the temple is around 100 feet tall and has 44 pillars.
- Devotees visit the temple during pitra paksh, a period in the Hindu calendar when people take part in rituals to remember their ancestors.

Key facts about Mahabodhi Temple:

- The temple stands to the east of the Mahabodhi Tree, where Gautam Buddha is believed to have attained nirvana. The temple has a unique shape and a height of 170 feet.

- It is located in Bodh Gaya, in central Bihar, on the banks of the Niranjana River.
- The Mahabodhi Temple Complex is the first temple built by Emperor Asoka in the 3rd century B.C., and the present temple dates from the 5th–6th centuries.
- It is one of the earliest Buddhist temples built entirely in brick, still standing, from the late Gupta period and it is considered to have had significant influence in the development of brick architecture over the centuries.
- It was recognized as a UNESCO World Heritage Site in 2002.

9. Cultural Property Agreement

Context:

First ever 'Cultural Property Agreement' signed by the India and United States of America.

It was signed on the sidelines of the 46th World Heritage Committee, New Delhi.

About the Agreement:

- **Aim:** to prevent and curb the illicit trafficking of antiquities from India to the USA.
- CPA restricts the importation into the United States of certain archaeological material and ethnological material of Indian origin.
- It shall be helpful in quick seizure of Indian antiquities at US Customs and their repatriation back to India.
- **Significance:** cultural diplomacy, promotes tourism, education enrichment, etc.

Efforts to prevent smuggling of antiquities:

At Global level

- **Article 9 of the 1970 UNESCO Convention on the Means of Prohibiting and Preventing the Illicit Import, Export and Transfer of Ownership of Cultural Property.**

- **The Kashi Culture Pathway, the Outcome Document of the G20 Culture Working Group endorsed an effective global coalition to bolster the fight against illicit trafficking.**

At National level

- **Section 3 of the Antiquities and Art Treasure Act, 1972 prevents export of antiquities outside India.**
- If an antiquity is traced, the Archaeological Survey of India (ASI) is responsible for coordination with the other country and recovery of antiquities.
- ASI has retrieved 357 antiquities from foreign countries from the year 1976.

10. Tell Umm Amer Heritage site

Context:

The World Heritage Committee (WHC) decided to include the Palestinian site of Tell Umm Amer in both the UNESCO World Heritage Site List and the List of World Heritage in Danger during its 46th session in New Delhi.

About Tell Umm Amer Heritage site:

- **It is situated on the coastal dunes of the Nuseirat Municipality, just 10 km south of Gaza city.**
- It is an ancient Christian monastery founded in the fourth century by Hilarion the Great (291-371 CE).
- It is also known as the 'Monastery of Saint Hilarion.'
- It was the first monastic community in the Holy Land, laying the groundwork for the spread of monastic practices in the region.
- The monastery occupied a strategic position at the crossroads of major trade and communication routes between Asia and Africa.

Key facts about UNESCO

- UNESCO stands for United Nations Educational, Scientific and Cultural Organization.
- It is a specialized agency of the United Nations (UN).
- The constitution, which entered into force in 1946, called for the promotion of international collaboration in education, science, and culture.
- The agency's permanent headquarters are in Paris, France.
- Parent Organisation - United Nations Economic and Social Council
- The primary goals of UNESCO are to contribute to peace and security by promoting collaboration among nations through education, science, and culture, and to promote sustainable development and intercultural dialogue.
- UNESCO believes that these areas are crucial for building a more just, peaceful, and inclusive world.

11. Humayun's Tomb World Heritage Site Museum**Context:**

Union Minister of Culture and Tourism, inaugurated the Humayun's Tomb World Heritage Site Museum at the Humayun's Tomb, a UNESCO World Heritage site in New Delhi.

About:

- It is the country's first sunken museum that displays over 500 never-before-seen artefacts.
- The layout is inspired by the medieval 'baolis', or traditional water tanks, showcases the legacy of Mughal emperor Humayun.
- **Background:** It is an UNESCO recommendation that interpretation centres/ site museums be provided at the entrance zone of significant World Heritage Sites to provide the cultural context of the heritage site and thus significantly enhance the visitor experience.

- The Museum is designed to be underground so as to retain the visual integrity of the monuments located in the complex.

Humayun's Tomb

- *The tomb of Humayun, second Mughal Emperor of India, was built by his widow, Biga Begum (Hajji Begum), in 1569-70, 14 years after his death.*
- *The architect was Mirak Mirza Ghiyath.*
- *Humayun's garden-tomb is also called the 'dormitory of the Mughals' as in the cells are buried over 150 Mughal family members.*
- The tomb stands in an extremely significant archaeological setting, centred at the Shrine of the 14th century Sufi Saint, Hazrat Nizamuddin Auliya.
- *It was the first garden-tomb on the Indian subcontinent.*
- It inspired several major architectural innovations, culminating in the construction of the Taj Mahal.

12. National Culture Fund**Context:**

Union Minister for Culture and Tourism Shri Gajendra Singh Shekhawat informed Lok Sabha about National Culture Fund (NCF) in a written reply.

About National Culture Fund (NCF):

- *Government has set up National Culture Fund (NCF) as a Trust on 28th November, 1996 under the Charitable Endowment Act, 1890 with a view to mobilise extra resources through Public Private Partnerships (PPP) towards promoting, protecting and preserving India's tangible & intangible cultural heritage.*

Features:

- The NCF is managed and administered through a Governing Council chaired by the Hon'ble Minister of Culture. The council comprises up to 25 members who decide on policies.
- An Executive Committee, headed by the Secretary (Culture), executes **these policies**.
- **Tax Benefits: Donations to the NCF are eligible for 100% tax benefit under Section 80G (ii) of the Income Tax Act, 1961.**
- **CSR Contribution: NCF's activities fall under Schedule VII No. (v) of the Companies Act, 2013. This makes it a valid recipient of Corporate Social Responsibility (CSR) contributions.**
- The focus areas include protecting national heritage, restoring historical buildings and sites, setting up public libraries, and promoting traditional arts and handicrafts.
- **Annual Audits: The NCF's annual accounts are audited by the Comptroller and Auditor General of India.**



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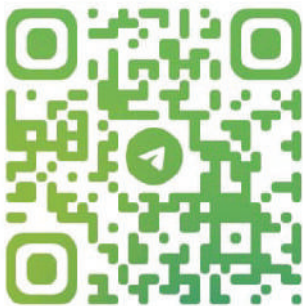
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7	CA October 2024	17-11-2024
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MISCELLANEOUS

1. Tribal Development Fund

Integrated Tribal Development Programme:

- **It is a flagship programme of NABARD for sustainable tribal livelihoods.**
- It is based on 'wadi' model of tribal development, which has evolved with the support of national and international development agencies.
- **Projects under this programme are funded through Tribal Development Fund.**

The objective of the Fund is to:

- create replicable models of integrated development of tribal families on participatory basis, through adoption of sustainable income generating activities based on potential of the area and the tribal needs;
- build and strengthen tribal institutions, which would enable the communities to be partners in policy formulation, execution of programs and improve social and economic status; and build and strengthen producers' organizations

Key facts about NABARD

- **It is a financial institution that was set up by the Indian government to promote sustainable agriculture and rural development in the country.**
- **It is the main regulatory body in the country's rural banking system.**

Formation:

- **It was established in 1982 as a central regulating body for agriculture financing and the rural section.**
- The government of India established NABARD under the outlines of the National Bank for Agriculture and Rural Development Act 1981.
- **Objective:** Promoting agriculture and rural development through participative financial and non-financial interventions, innovations, technology and institutional development for securing prosperity.

- Activities undertaken by NABARD for rural development include: Provision of refinance support, Improving rural infrastructure and Supervision of Regional Rural Banks (RRBs) and Cooperative Banks etc.

2. Durand Cup Tournament

Context:

Recently, the President of India has unveiled the Trophies of the Durand Cup Tournament 2024.

The Trophies unveiled include the Durand Cup, the President's Cup and Shimla Trophy.

Durand Cup Tournament:

- **Organized by the Indian Armed Forces, it is Asia's oldest and the world's third oldest football tournament.**
- **Inaugurated in Shimla in 1888 as an Army Cup and only open to British Indian Army troops in India, later opened up to civilian teams.**
- It is named after its founder, Sir Mortimer Durand, Foreign Secretary of British India.
- Mohun Bagan Super Giant are the defending champions, having won the tournament for a record 17th time, the most by any team.

3. Operation Green Hunt

Context:

As of July 9, 162 Maoist deaths were reported in India in 2024. Of these, 141 deaths were reported from Chhattisgarh alone. This is among the highest number of casualties suffered by the extremists in the largely tribal State since the formation of the Communist Party of India (Maoist) in 2004. The highest number of clashes between the Maoists and security forces this year took place in Bijapur district, south Chhattisgarh, resulting in 74 Maoist deaths.

- The Maoist deaths in 2024 are the highest since 2009, when 154 insurgents were killed.
- That was also the year when the Indian government banned the group and launched a military offensive code-named 'Operation Green Hunt', involving the Central Reserve Police Force's CoBRA force and the Chhattisgarh police in "search and comb" operations.

4. Operation Amanat

Context:

The Railway Protection Force (RPF) recently conducted a successful operation named "Amanat," resulting in the retrieval of lost or left-behind luggage and valuable articles.

About Operation Amanat:

- Under the Operation Amanat initiative, the Railway Protection Force has taken a novel initiative to make it easier for the passengers to get back their lost luggage.
- It helps to track lost belongings of passengers.
- The details of lost luggage along with photos are uploaded by RPF personnel of the respective Divisions. The details are uploaded in the web portal <https://wr.indianrailways.gov.in/> in the tab of divisions under the link "Mission Amanat – RPF".
- Passengers can check whether their luggage which went missing or was lost in railway premises or trains is available at the Lost Property Office centres at stations.

Key facts about Railway Protection Force (RPF):

- RPF is a security force of India entrusted with protecting railway passengers, passenger area and railway property of the Indian Railways.
- It was established by the Railway Protection Force Act, 1957.
- This is only central armed police force (CAPF, commonly known as Para-Military force) which has power to arrest, investigate and prosecute criminals.

- All the officers of RPF are members of the Indian Railway Protection Force Service (IRPFS) and are recruited through UPSC Civil Services Examination.
- It is headed by the Director General (DG). However, the post of Director-General of RPF is held on deputation by a senior Indian Police Service (IPS) officer.

5. Computer Emergency Response Team (CERT-In)

Context:

Two key ministries, Information Technology and Home Affairs, are making a strong pitch for the ownership of Computer Emergency Response Team (Cert-In), the country's nodal cybersecurity watchdog.

- At present, Cert-In comes under the administrative control of the IT Ministry.

About the Indian Computer Emergency Response Team (CERT-In):

- It is an office, established in 2004, within the Ministry of Electronics and Information Technology of the Government of India.
- It's the national nodal agency for handling computer security incidents.
- It is dedicated to preventing, detecting, and responding to cybersecurity incidents.
- It plays a crucial role in incident reporting and alerting organizations about malware. Its technical expertise is invaluable in safeguarding India's digital infrastructure.

Why do CERTs Matter?

- **Rapid Response:** When a cyber-attack strikes, time is of the essence. CERTs leap into action, minimizing damage and restoring order.
- **Collaboration:** They're not lone wolves. CERTs collaborate globally, sharing threat intel and best practices. It's like a digital Avengers team-up.
- **Prevention:** CERTs help us stay one step ahead. Their alerts and guidelines keep us informed and secure.

Key Players Involved and Associated Challenges:

Information Technology (IT) Ministry: Currently, CERT-In operates under the administrative umbrella of the IT Ministry.

- The Information Technology (Amendment) Act 2008, designated CERT-In to serve as the national agency to perform key functions in the area of cybersecurity including the collection, analysis and dissemination of information on cyber incidents; forecast and alerts of such events; prescribing emergency measures for handling them; and coordinating cyber incident response activities, among other things.

Home Affairs Ministry (MHA): The MHA, with its broader law enforcement mandate, believes that bringing CERT-In directly under its control would enhance investigative capabilities in cyberspace.

6. Chromium Contamination of Groundwater**Context:**

Recently, the National Green Tribunal (NGT) ordered the Central Ground Water Board (CGWB) to investigate the chromium contamination of groundwater in the Sukinda Valley of Odisha's Jajpur district and file its affidavit within the next four weeks.

Valleys	Located in
Patratu Valley	Jharkhand
Sukinda Valley	Odisha
Pangi Valley	Himachal Pradesh
Johar valley	Uttarakhand

Chromium:

- It is a naturally occurring element found in rocks, animals, plants, soil, and in volcanic dust and gases.
- It is a very hard gray solid with a metallic luster.
- There are two forms: trivalent chromium, which is safe for humans, and hexavalent chromium, which is a toxin.

Properties:

- It does not tarnish in air, when heated it burns and forms the green chromic oxide.
- Chromium is unstable in oxygen; it immediately produces a thin oxide layer that is impermeable to oxygen and protects the metal below.

Applications:

- Chromium use in iron, steel, and nonferrous alloys enhances hardenability and resistance to corrosion and oxidation.
- The use of chromium to produce stainless steel and nonferrous alloys are two of its more important applications.
- Other applications are in alloy steel, plating of metals, pigments, leather processing, catalysts, surface treatments, and refractories.

Sukinda Valley

- It is in the State of Orissa.**
- It contains 97% of India's chromite ore deposits and one of the largest open cast chromite ore mines in the world.
- Approximately 70% of the surface water and 60% of the drinking water contains hexavalent chromium.
- The Brahmani River is the only water source for the residents and treatment facilities are extremely limited.**

7. Pradhan Mantri Gram Sadak Yojana (PMGSY)**Context:**

The Union government plans to launch the fourth phase of Pradhan Mantri Gram Sadak Yojana (PMGSY).

About

- It will be launched to connect 50,000 habitations having population above 250 in plain areas and 100 in special category states with all-weather roads,

Pradhan Mantri Gram Sadak Yojana (PMGSY)

- **It is a centrally Sponsored Scheme, launched in the year 2000.**
- **Objective: It aims to provide all-weather road connectivity to all eligible unconnected habitations in rural areas of the country.**
- **The Ministry of Rural Development is the nodal ministry for this scheme.**

Phases of the scheme

- The second phase of the scheme was launched in 2013.
- After the two phases, another component of the PMGSY, Road Connectivity Project for Left Wing Extremism Affected Areas (RCPLWEA), was launched in 2016 for construction of rural roads in LWE areas.
- The third phase was launched in 2019.

8. Mashco Piro tribes**Context:**

Indigenous rights NGO Survival International has released rare pictures of the Mashco Piro tribespeople, one of the world's 100-odd uncontacted tribes.

About

- **They are Nomadic hunter-gatherers who inhabit the remote regions of the Amazon rainforest.**
- They live in Manú National Park in the Madre de Dios Region in Peru.
- The Mashco-Piro tribe speaks a dialect of the Piro language.

Amazon Rain Forests:

Location: The region belongs to nine nations of the South American continent.

- It is bounded by the Guiana Highlands to the north, the Andes Mountains to the west, the Brazilian central plateau to the south, and the Atlantic Ocean to the east.

Area Covered: The majority of the forest, 60%, is in Brazil, followed by Peru with 13%, Colombia with 10%, and with minor amounts in Bolivia, Ecuador, French Guiana, Guyana, Suriname and Venezuela.

9. PM-SVANidhi**Context:**

Madhya Pradesh has secured the first place under the Best Performing State category in the Prime Minister SVANidhi scheme.

About PM-SVANidhi:

It is a Central Sector Scheme, launched by the Ministry of Housing and Urban Affairs to provide financial assistance to street vendors.

Aim: To empower street vendors by facilitating access to formal credit, enabling them to improve their business and livelihoods.

- The scheme was announced to provide economic stimulus under the Atmanirbhar Bharat Abhiyan, implemented from 1st June 2020.

Implementation Partner:

SIDBI: Along with the Ministry of Housing and Urban Affairs, the Small Industries Development Bank of India (SIDBI) will be implementing the scheme.

Urban Local Bodies (ULBs): Helps beneficiaries by reaching them to connect under the scheme efficiently.

It's a collateral-free loan of up to Rs 50,000 in incremental tranches for eligible street vendors.

- **First tranche of Rs 10,000 (The Initial working capital loan is upto `10,000/- for a tenure of one year).**
- Second tranche of Rs 20,000 subject to repayment of the first tranche.
- Third tranche of Rs 50,000 after the repayment of the second tranche.

Breaking community barriers: It connected marginalised urban vendors, in which more than 75% of loans were given to non-general categories.

Interest subsidy: It offers an interest subsidy of 7% per annum on regular loan repayment.

No penalty on early repayment: No penalty will be made on clearance of debt before the scheduled time.

Eligibility:

- All the beneficiaries belonging to those States/UTs, notified under Rules and Street Vendors (Protection of Livelihood and Regulation of Street Vending) Act 2014, are eligible under the scheme. Even the vendors from Meghalaya, the state having its own state street vendors act, are eligible under the PM-SVANidhi.

10. Olympic Order

Context:

- Abhinav Bindra has been honoured with the Olympic Order for his outstanding contributions to the Olympic movement.
- He is the first Indian to receive this prestigious award.

About the Olympic Order:

- It is the highest award presented by the International Olympic Committee (IOC).
- Established in 1975, it is awarded to individuals who have rendered distinguished service to the Olympic Movement.
- It can be bestowed upon IOC members, athletes, and other individuals who have made significant contributions to the development and promotion of the Olympic Games and its ideals.
- The award comes in three grades: gold, silver, and bronze, with the gold medal being the most prestigious.
- The recipients of the Olympic Order are chosen by the IOC's Executive Board.
- The award symbolizes the recipient's dedication to the Olympic spirit and their contributions to promoting the values of excellence, friendship, and respect in sports.

- Abhinav Bindra holds the distinction of being India's first individual gold medallist at the Olympics, securing the gold at the 2008 Beijing Olympics in the men's 10-meter air rifle event.
- He won the gold medal at the 2006 World Championships in the 10m air rifle event, and gold medals in the Commonwealth Games in 2002, 2006, and 2010 in pairs events.

11. Pradhan Mantri-Surya Ghar Muft Bijli Yojana

Context:

Union Finance Minister Nirmala Sitharaman announced the launch of Pradhan Mantri-Surya Ghar Muft Bijli Yojana (PM Free Electricity scheme), to promote rooftop solar (RTS) installations in India.

About Pradhan Mantri-Surya Ghar Muft Bijli Yojana (PM Free Electricity scheme):

- It is a government scheme that aims to provide free electricity to households in India.
- The scheme was launched by Prime Minister Narendra Modi on February 15, 2024.
- The scheme is expected to benefit 1 crore households across India
- Under the scheme, households will be provided with a subsidy to install solar panels on their roofs.
- Each month, homeowners will be able to receive 300 units of free power.
- The subsidy covers up to 40% of the cost of the solar panels.

Eligibility:

- The household must be an Indian citizen.
- The household must own a house with a roof that is suitable for installing solar panels.
- The household must have a valid electricity connection.
- The household must not have availed any other subsidy for solar panels.

12. India at Olympics

About:

- India at Olympics – India's Olympic journey has evolved significantly since its debut at the Paris Olympics in 1900 with just one participant.
- A landmark moment arrived at the Antwerp Games in 1920 when India sent its first official contingent, marking a century of notable achievements.
- India secured its first Olympic gold medal at the Amsterdam 1928 Olympics by Indian men's hockey.
- At the Helsinki 1952 Olympics, wrestler KD Jadhav made history by clinching India's first individual Olympic medal, a bronze.
- Karnam Malleswari in 2000 Olympics by becoming India's first woman to win an Olympic medal with her bronze in weightlifting.
- Abhinav Bindra secured the nation's first individual gold medal in Beijing 2008 Olympics.
- Neeraj Chopra clinched India's first track-and-field gold in javelin throw at Tokyo Olympics, 2020.

The Olympic game originated in 776 BC, were held every four years in honour of the god Zeus, featuring not only athletic contests but also artistic events such as music, poetry and theatre.

In the late 19th century, attempts to revive international sporting events were met with challenges due to disorganization within the global sporting community.

This changed when Baron Pierre de Coubertin convened the first Olympic Congress in Paris.

First Olympic Games – Of the modern era took place in Athens (Greece), the birthplace of the ancient Olympics, in April 1896.

It was known as the Games of the I Olympiad, this historic event saw the participation of 241 athletes from 14 nations.

Women in the Olympic Games – The Paris 1900 Olympic Games saw women compete for the first time.

British tennis player Charlotte Cooper, a five-time Wimbledon champion, became the first female Olympic champion.

- Female participation in the Olympics has steadily increased over the decades, from 13% in 1964 to approximately 48.9% in the 2020 Tokyo Games.

- In Rio 2016, 45% of athletes were women, a trend that continued in Tokyo, making it the most gender-balanced Olympics yet with nearly half of all athletes being women.

13. Asian Disaster Preparedness Centre

Context:

Recently, in a significant development, India has taken over as the Chair of the Asian Disaster Preparedness Centre (ADPC) for the period 2024-25, marking India's commitment to disaster risk reduction and climate resilience in the Asia-Pacific region.

About the Asian Disaster Preparedness Centre (ADPC):

- It is an autonomous international organisation dedicated to cooperation in Disaster Risk Reduction (DRR) and the enhancement of climate resilience across Asia and the Pacific.
- ADPC's founding members include India, Bangladesh, Cambodia, China, Nepal, Pakistan, the Philippines, Sri Lanka, and Thailand.
- These countries collaborate to strengthen disaster preparedness, response, and recovery efforts across the region.
- **ADPC's mission revolves around building robust systems, institutional mechanisms, and capacities to withstand various hazards—ranging from floods and landslides to earthquakes and cyclones.**

Leadership Transition:

- As China's tenure came to an end, India stepped up to lead ADPC. It reflects India's proactive stance in disaster risk reduction.
- Notably, India championed the establishment of the Coalition for Disaster Resilient Infrastructure (CDRI), emphasising the importance of resilient infrastructure in mitigating the impact of disasters.

14. Paramparagat Krishi Vikas Yojana

Context:

Minister of State for Chemicals and Fertilizers recently released a report on Paramparagat Krishi Vikas Yojana (PKVY) and Mission Organic Value Chain Development in the Northeast Region.

Paramparagat Krishi Vikas Yojana (PKVY):

- *The Paramparagat Krishi Vikas Yojana (PKVY) is an extended component of Soil Health Management (SHM) under the National Mission on Sustainable Agriculture (NMSA).*
- *Launched in- 2015.*
- *Scheme type- Centrally Sponsored Scheme (CSS).*
- *Aim- It aims at supporting and promoting organic farming, in turn resulting in the improvement of soil health.*
- To reduce the cost of agriculture to farmers through sustainable integrated organic farming systems thereby enhancing farmer's net income per unit of land.
- To protect the environment from hazardous inorganic chemicals by adopting eco-friendly low-cost traditional techniques and farmer-friendly technologies
- **Objective-** To produce agricultural products free from chemicals and pesticide residues by adopting eco-friendly, low-cost technologies.
- **Funding pattern-** Under the scheme in the ratio of 60:40 by the Central and State Governments respectively.
- In the case of North Eastern and Himalayan States, Central Assistance is provided in the ratio of 90:10 (Centre: State) and for Union Territories, the assistance is 100%.
- **Target-** The Scheme targets to form 10,000 clusters of 20 ha each and bring nearly two lakh hectares of agricultural area under organic farming by 2017-18.
- **Exclusions-** All farmers with less than 2 ha of land are eligible for applying to the scheme.

- **Participatory Guarantee System-** The scheme supports Participatory Guarantee System (PGS-India) for organic certification, which relies on mutual trust and local relevance, involving both producers and consumers.
- **PGS-India operates independently of Third-Party Certification.**



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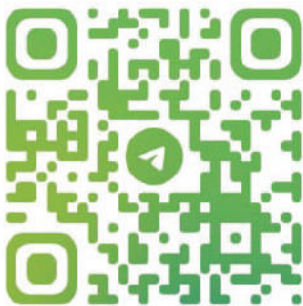
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3	CA June 2024	15-09-2024
4	CA July 2024	29-09-2024
5	CA August 2024	13-10-2024
6	CA September 2024	27-10-2024
7	CA October 2024	17-11-2024
8	CA November 2024	15-12-2024
9	CA December 2024	12-01-2025
10	CA January 2025	16-02-2025
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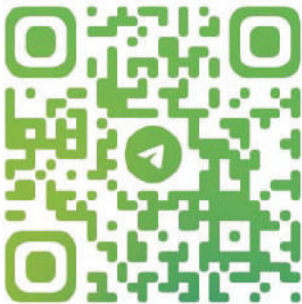
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