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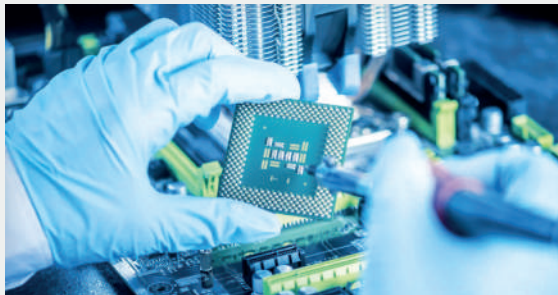
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PREFACE

Current Affairs UPSC CSE Prelims 2026

This high-quality monthly compilation of Current Affairs for Civil Services Exam Prelims 2026 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!

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POLITY

1. Romeo–Juliet Clause

Context: The Supreme Court of India has flagged the misuse of the POCSO Act in cases of consensual adolescent relationships and urged the Union Government to examine the feasibility of introducing a “Romeo–Juliet clause”.

What is a Romeo–Juliet Clause?

- A legal exception, developed in the US and parts of Europe, named after Shakespeare’s teenage lovers.
- It does not lower the age of consent, but shields adolescents close in age from criminal liability for consensual intimacy.
- It seeks to retain a robust child protection framework while recognising the realities of adolescence.

Limitations of the Romeo–Juliet Approach

- Any age-based exemption merely redraws the line, rather than resolving the core issue.
- This clause raises difficult questions like if 16–18-year-olds are exempted, what about those just below 16 or on what principled basis does the same conduct become criminal again?
 - The Romeo-Juliet clause is part of POCSO amendments to avoid criminalizing consensual sexual activity between minors close in age.
 - The law does **not strictly define “close in age” as 5 years**; the interpretation is context-specific and left to judicial discretion.
 - Consensual sex between a minor and an adult above 18/21 **is still punishable**, even if the minor consents.
 - The clause aims to **protect minors from exploitation** while **not criminalizing consensual peer relationships**.

2. Section 17A of the Prevention of Corruption Act 1988

Context: The Supreme Court delivered a split verdict on the legality of a provision in an anti-corruption law which mandates prior sanction before prosecuting public servants.

About

- Justice B.V. Nagarathna concluded that **Section 17A of the Prevention of Corruption Act 1988** was plainly unconstitutional, while Justice K.V. Viswanathan said that sanction must be decided by an independent authority like the Lok Pal or the Lok Ayukta.
 - The **section 17A of Prevention of Corruption Act** has barred the agencies from probing corruption charges against government officials without the Centre’s permission.
 - It provides **protection to public servants** from frivolous investigations related to decisions taken in the discharge of official duties.
- The case will now be referred to the **Chief Justice of India** to be placed before a **Bench of three judges**.

Prosecution of Civil Servants

- It refers to **criminal proceedings initiated against public officials** for acts such as corruption, abuse of power, criminal misconduct, or offences under IPC and special laws, committed during the discharge of official duties.
- **Article 311:** It protects civil servants (Union, State, All-India Services) from arbitrary dismissal, removal, or reduction in rank.
 - **Authority for Dismissal:** A civil servant cannot be dismissed or removed by an authority lower than the one that appointed him/her.
 - **Right to Inquiry:** A civil servant cannot be dismissed, removed, or reduced in rank without being informed of the charges, and

being given a reasonable chance to defend himself/herself in an inquiry.

- **Exceptions:** An inquiry is not necessary in the following cases: Criminal conviction, Impracticable inquiry (authority records holding inquiry is not possible.), state security.
- **Section 197 of CrPC:** Courts cannot take cognisance of certain offences alleged to have been committed by a public servant.
 - Without prior sanction of the appropriate government.
 - When the offence was committed to act in the discharge of official duty.
- **Prevention of Corruption Act, 1988:**
 - **Section 19 Sanction for Prosecution:** Prior sanction required before courts take cognisance of offences under the Act.
 - **Sanctioning authority:** Central/State Government or competent authority.
 - **2018 Amendments Section 17A:** Prior approval required for investigation of decisions taken in official capacity.

3. Press Council of India

Context: Media associations on January 18 urged the government to appoint a new chairperson for the Press Council of India as the post fell vacant after Justice Ranjana Prakash Desai completed her tenure last month.

About Press Council of India

- **The Press Council of India (PCI) is a statutory quasi-judicial autonomous authority, re-established in 1979 under the Press Council Act, 1978.**
- **Its primary objectives are:**
 - Preserving the freedom of the press.
 - Maintaining and improving the standards of newspapers and news agencies in India.
 - Press Council of India Composition
- The Press Council of India seeks to improve the quality and standards of newspapers and news

agencies throughout the country. The Council is a body corporate having perpetual succession consisting of a Chairman and 28 members.

- **Chairman:** The Chairman, typically a retired Supreme Court judge, is nominated by a committee that includes the Chairman of the Rajya Sabha, the Speaker of the Lok Sabha, and an elected representative from the 28 members.
- **Other Members:** Of the 28 members, thirteen represent working journalists, which include six editors and seven other working journalists, other than editors of newspapers.
- Six members represent newspaper owners or managers, with two each from large, medium, and small newspapers.
- One member comes from the news agency sector.
- In addition, the Press Council of India comprises five representatives from Parliament—three nominated by the Speaker of the Lok Sabha and two by the Chairman of the Rajya Sabha.
- **Three members representing education, law, and literature are nominated by the University Grants Commission, Bar Council of India, and Sahitya Akademi.**

4. Election Commission of India

Context: The Election Commission of India (ECI) has informed that the application filed by TVK for allotment of a common symbol to its candidates in the assembly elections has been accepted.

- Under the Election Symbols (Reservation and Allotment) Order, 1968, a recognized State Party can use its symbol in other states where it is not recognized, provided it seeks **prior permission** from the Election Commission of India (ECI) and that symbol is not already reserved by another party in that state.
- While the ECI does use a “first-come, first-served” approach for applications received on different days, it is not an “always” rule. According to the ECI guidelines: If applications from two or more parties for the same free symbol are received on

the same day, the ECI does not use the first-come-first-serve rule. Instead, they may decide based on which party's candidate was a former MP/MLA or, more commonly, by a draw of lots.

5. Justice Mukherjee Commission of Inquiry

Context: The All-India Forward Bloc has urged the government to refrain from bringing back the “so-called” mortal remains of Netaji Subhas Chandra Bose kept at the Renkoji Temple in Tokyo, Japan.

Justice Mukherjee Commission of Inquiry (JMCI):

The **Justice Mukherjee Commission of Inquiry (JMCI)** was constituted by the Government of India in **1999** following a court order, and it submitted its final report in **2005**.

- **Mandate:** Its primary task was to determine whether Netaji Subhas Chandra Bose had actually died in a plane crash in Taihoku (Taiwan) in August 1945, or if he had disappeared/survived.

- **Findings:** The Commission concluded that Netaji **did not die** in the plane crash and that the ashes kept at the Renkoji Temple in Japan were not his.
- **Outcome:** The Government of India, however, **rejected** the findings of the Mukherjee Commission in 2006, continuing to maintain the stance that Netaji passed away in the 1945 crash.



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ECONOMY

1. Market Access Support (MAS) Intervention

Context: The Government of India has launched the Market Access Support (MAS) Intervention under the Export Promotion Mission to strengthen global market access for Indian exporters, especially MSMEs and first-time exporters.

About Market Access Support (MAS) Intervention:
What it is?

- The Market Access Support (MAS) Intervention is a government-backed programme that provides financial and institutional assistance to Indian exporters for accessing and expanding in international markets through curated trade and buyer-engagement activities.

Initiative under:

- Implemented under the NIRYAT DISHA sub-scheme
- Part of the Export Promotion Mission (EPM)

Jointly implemented by: The Department of Commerce, Ministry of MSME, and Ministry of Finance.

Key features:

- Market access activities:** Support for Buyer-Seller Meets (BSMs), Mega Reverse BSMs, international trade fairs, exhibitions and trade delegations.
- Advance planning:** A 3–5 year rolling calendar of approved market access events to ensure continuity and predictability.
- MSME focus:** Mandatory minimum 35% MSME participation in supported events, with prioritisation of smaller and new exporters.
- Financial rationalisation:** Revised cost-sharing norms, event-wise financial ceilings and **partial airfare support** for exporters with turnover up to ₹75 lakh.

- Digital governance:** End-to-end online processes via **trade.gov.in**, including approvals, fund release, monitoring and feedback.
- Outcome tracking:** Mandatory online feedback on buyer quality, leads generated and market relevance, with data-driven refinement of guidelines.
- Technology push:** Upcoming component for **Proof-of-Concepts** and **product demonstrations** in tech-intensive and sunrise sectors.

2. Design Linked Incentive Scheme

Context: The Design Linked Incentive (DLI) Scheme is critical to anchoring India in the most strategic and value-intensive segment of the global semiconductor value chain—chip design.

About Design Linked Incentive Scheme

- It is a key instrument in advancing India's ambition to develop a strong fabless capability.
- It is implemented by the Ministry of Electronics and Information Technology (MeitY) under the Semicon India Programme.**
- Aim:** The scheme aims to reduce import dependence, strengthen supply chain resilience, and enhance domestic value addition.
- Eligibility:** **Start-ups and MSMEs are eligible for financial incentives and design infrastructure support for semiconductor product design & deployment.**
- Other domestic companies are eligible for financial incentives for deploying semiconductor designs.
- The DLI Scheme supports: Semiconductor design across the full lifecycle—from design and development to deployment—covering Integrated Circuits (ICs), chipsets, Systems-on-Chip (SoCs), systems and IP cores.

- **Nodal Agency:** C-DAC (Centre for Development of Advanced Computing).
- Financial Incentives and Design Infrastructure Support under DLI

Product Design Linked Incentive

- **Reimbursement of up to 50% of eligible expenditure.**
- The reimbursement is capped at ₹15 crore per application.
- The support is available to entities involved in semiconductor design for: Integrated Circuits (ICs) Chipsets Systems on Chips (SoCs) Systems & IP Cores Semiconductor-linked designs.

Deployment Linked Incentive

- Incentives of 6% to 4% of net sales turnover are provided for five years.
- The incentive is capped at ₹30 crore per application.
- The minimum cumulative net sales required over Years 1–5 is 1 crore for startups/ ₹ MSMEs and 5 crore for other domestic companies.

3. Payments Regulatory Board

Context: The first meeting of the Payments Regulatory Board (PRB) was held in Mumbai under the chairmanship of Sanjay Malhotra, marking the operationalization of the new payments governance framework.

About Payments Regulatory Board (PRB):

What it is?

- The Payments Regulatory Board (PRB) is the statutory body through which the Reserve Bank of India exercises regulatory and supervisory powers over payment and settlement systems in India, ensuring safety, efficiency, and stability of digital and non-cash payments.

Established in:

- **Created under Section 3 of the Payment and Settlement Systems Act, 2007.**

- **Replaced the earlier Board for Regulation and Supervision of Payment and Settlement Systems (BPSS).**
- Brought into effect from 9 May 2025 following amendments notified by the Government of India.

Member structure:

The PRB is a multi-stakeholder body comprising:

- **Chairperson:** RBI Governor.
- **Members:**
 - RBI Deputy Governor in charge of payments
 - Nominees of the Central Government
 - Experts with experience in payments, fintech, cybersecurity, and financial markets
 - Senior officials linked to digital identity and payment infrastructure (e.g., UIDAI, NPCI)

Key functions:

- **Authorisation & oversight:** Grants, regulates, and revokes authorisation for payment systems (UPI, cards, wallets, RTGS, etc.).
- **Standards setting:** Prescribes technical, operational, and security standards for payment systems.
- **Risk management:** Addresses systemic risk, settlement finality, and consumer protection.
- **Policy direction:** Reviews payment system performance and guides long-term strategy.
- **Supervision & enforcement:** Inspects system providers and issues binding directions under the PSS Act.

4. Regulatory Status of Cryptocurrencies in India

Context: The Financial Intelligence Unit (FIU), has issued revised Anti-Money Laundering (AML) and Combating the Financing of Terrorism (CFT) guidelines for cryptocurrency exchanges.

Regulatory Status of Cryptocurrencies in India

- Cryptocurrencies are **not recognised as legal tender** in India.

- Transactions involving **crypto assets** are **taxed** under the Income-tax Act.
- Cryptocurrency exchanges are classified as **Virtual Digital Asset (VDA)** service providers.
 - All VDA service providers are regulated under the **Prevention of Money Laundering Act (PMLA)**.
- Financial Intelligence Unit (FIU) acts as the **regulator** for crypto exchanges operating in India.

5. Urban Co-operative Banks

Context: Recently, the Reserve Bank of India (RBI) has proposed reopening the licensing window for Urban Co-operative Banks (UCBs) after two decades of halt.

About the Urban Co-operative Banks (UCBs)

- They are **co-operative societies** that engage in **banking activities**, including **accepting deposits and lending money**, mainly to **members of the co-operative** and the **general public** within **urban and semi-urban areas**.
- UCBs are **member-owned**, operating on the principle of '**one member, one vote**', regardless of the amount of share capital held, **unlike commercial banks**, which operate as **joint-stock companies**.

Legal and Regulatory Framework

- **Banking Regulation Act, 1949 (Part V):** It regulates their banking functions such as lending, deposits, liquidity, and prudential norms.
 - It is administered by the **Reserve Bank of India (RBI)**.
- **Co-operative Societies Acts (of respective states or the Central Co-operative Societies Act, 2002):** It governs the registration, management, elections, and audit of UCBs.
 - It is administered by the **Registrar of Co-operative Societies**.

Eligibility Criteria for New Licensing

- The **High-Powered Committee on Urban Co-operative Banks**, led by RBI Deputy Governor,

had recommended that new licenses be issued only to **financially sound and well-managed co-operative credit societies**.

- The RBI proposes restricting eligibility to **large co-operative credit societies** that:
 - Have been **operational for at least 10 years**;
 - Maintain a **good financial track record for at least five years**;
 - Possess a **Capital to Risk-Weighted Assets Ratio (CRAR)** of **not less than 12%**, and;
 - Maintain **Net Non-Performing Assets (NNPA)** at **not more than 3%**.
- According to the RBI, such criteria aim to ensure that **only financially stable and well-governed entities** transition into UCBs.

6. M.S. Sahoo Committee

Context: PFRDA Announces Expert Committee to Develop Framework for Assured Payouts under National Pension System (NPS).

About M.S. Sahoo Committee:

What it is?

- The M.S. Sahoo Committee is a 15-member expert group constituted to design a regulatory and operational framework for providing assured, predictable pension income under the National Pension Scheme (NPS).

Constituted by: Pension Fund Regulatory and Development Authority (PFRDA)

Chairperson: M.S. Sahoo, former Chairperson of the Insolvency and Bankruptcy Board of India (IBBI)

Aim: To create a robust system of assured pension payouts under NPS that reduces market-linked risks and ensures stable and predictable post-retirement income for subscribers.

Key Functions:

- Create clear legal and financial rules for NPS plans that guarantee a fixed or predictable pension after retirement.
- Develop **operational structures**, including:
 - Lock-in periods

- Withdrawal limits
- Pricing mechanisms
- Fee structures
- Create safeguards to prevent **mis-selling**, misleading claims, or unfair practices by pension providers.
- Clearly define what is guaranteed (amount, duration, conditions) so subscribers are not misled about pension security.
- Ensure that NPS shifts from just being a savings product to becoming a **reliable lifelong income system** for retirees.

7. SEBI

Context: The Securities and Exchange Board of India (SEBI) granted in-principle approval to settlement applications by the National Stock Exchange (NSE) in the co-location and dark fibre cases.

- **Implication:** The approval is expected to expedite clearance of the NSE's long-pending **Initial Public Offering (IPO)** application.
- **Co-location:** It is a globally accepted stock exchange service allowing brokers to place servers **inside exchange data centres** to minimise latency (time lag).
- **About the Case:** The case, originating in **2015**, alleged **preferential server access** to select brokers, enabling unfair advantages in high-frequency trading.
- **Dark Fibre:** It refers to **unused fibre-optic cables** leased to create private, high-speed networks for greater control and security.
- **About the Case:** A parallel case alleged that NSE permitted an **unauthorised vendor** to install dark fibre lines, giving select brokers superior data transmission speeds.

8. Social Commerce

Context: In India, despite strong potential, **social commerce contributes only 1–2% of total e-commerce revenue, compared to 30–40% in China and 20–25% in Indonesia.**

What is Social Commerce?

- Social commerce refers to the **buying and selling of goods directly through social media platforms.**
 - Consumers discover products while browsing social media and complete the purchase without shifting to traditional e-commerce platforms.
- It combines **social interaction** (influencers, live videos, community groups) with online shopping.
 - **Influencer-led selling:** Products are promoted by creators whom consumers trust.
 - **Live-stream shopping:** Sellers demonstrate products in real time and interact with buyers.
 - **Community-based selling:** Products are sold through WhatsApp groups, Facebook pages, or regional social networks.
- This is traditional **E-commerce**. It involves a search engine and a dedicated shopping app, not a social interaction platform.
- In these cases, the social platform (Instagram/Facebook) acts as the storefront and the transaction processor.
- In these cases, the social platform (Instagram/Facebook) acts as the storefront and the transaction processor.
- While this is “Social Selling” or “Affiliate Marketing,” it is technically not Social Commerce because the transaction happens on an **external website**, breaking the “in-app” social shopping loop.

9. SARFAESI ACT, 2002

Context: The Union government is considering **amendments to the SARFAESI Act, 2002 to remove legal ambiguities and strengthen regulatory oversight.**

SARFAESI ACT, 2002:

- The **SARFAESI Act, 2002** (Securitisation and Reconstruction of Financial Assets and Enforcement of Security Interest Act) is one of the most powerful legal tools in the Indian banking system. **It allows banks and financial institutions**

to recover their non-performing assets (NPAs) without the time-consuming intervention of a civil court. It is applied to the secured loans only.

How the Recovery Process Works

If a borrower fails to repay a **secured loan**, the bank follows a specific legal timeline:

- **NPA Classification:** The account must first be classified as an NPA according to RBI guidelines.
- **Statutory Notice:** The bank issues a **60-day demand notice** under Section 13(2), asking the borrower to discharge the liability.
- **Possession:** If the borrower doesn't pay within 60 days, the bank can take possession of the secured asset (house, land, or machinery).
- **Sale/Auction:** The bank can then lease, sell, or assign the asset to recover the outstanding debt.

Where it DOES NOT apply

The Act is powerful, but it has strict “no-go” zones:

- **Agricultural Land:** Banks cannot seize or sell agricultural land under this Act.
- **Small Loans:** It does not apply to loans where the principal amount is less than ₹1 Lakh.
- **Significant Repayment:** If the borrower has already repaid **80% or more** of the principal and interest, the Act cannot be invoked.
- **Unsecured Loans:** It only applies to loans backed by collateral (mortgages, hypothecations, etc.).

Borrower's Right to Appeal

- While the bank doesn't need a court to act, the borrower isn't entirely defenceless. If a borrower feels the bank's action is wrongful, they can approach the **Debt Recovery Tribunal (DRT)** within 45 days of the bank taking action.

10. Goldilocks economy

Context: India's 2025 agricultural year benefited from a rare “Goldilocks” combination of surplus monsoon rainfall and moderate temperatures, unlike 2024, which was the warmest year on record despite a good monsoon.

Goldilocks economy

- It is an ideal but temporary state of balanced growth, low inflation, and full employment, supported by stable interest rates.
- It offers a favorable environment for investment, particularly in equities
- It is maintained through careful monetary and fiscal policies, with central banks playing a key role in balancing growth and inflation.
 - Goldilocks implies growth **near potential**, not boom or bust.
 - Stable inflation within target reduces need for aggressive monetary action.
 - A **persistently positive and widening output gap** signals overheating, not Goldilocks.
 - Macro stability typically reflects in **low volatility and stable interest rates**.

11. Atal Pension Yojana

Context: The Union Cabinet chaired by the Prime Minister approved the continuation of Atal Pension Yojana (APY) up to FY 2030-31 along with extension of funding support for promotional and developmental activities and gap funding.

About the Atal Pension Yojana (APY)

- **Launch:** APY was launched in **2015** with the objective of providing old-age income security to workers in the **unorganised sector**.
- **Target Group:** Initially available to all citizens of India between 18 and 40 years of age.
 - **With effect from 1st October 2022, individuals paying income tax are not eligible to join the scheme.**
- **Scheme Features:** APY offers a guaranteed minimum pension of Rs.1,000 to Rs.5,000 per month starting at age 60, based on contributions.
- **Administering Body:** Administered by Pension Fund Regulatory and Development Authority (PFRDA).
 - Managed under the **National Pension System (NPS)** architecture.

- **Progress:** As of January, 2026, over 8.66 crore subscribers have been enrolled, making APY a cornerstone of India's inclusive social security framework.
- **Need for Extension:** Sustained government support is essential for continued awareness, capacity building, and bridging of viability gaps to ensure the scheme's sustainability.

12. RBI's Liberalised Remittances Scheme

Context: Analysis of data on the outward remittances under the RBI's Liberalised Remittances Scheme (LRS) shows that the amount of money sent or spent abroad by Indians fell to a two-year low of \$1.94 billion in November 2025, pulled down in large part by a sharp dip in the amount spent on foreign studies.

Types of transactions permitted:

- Opening of a foreign currency account abroad with a bank;
- **Acquisition of immovable property abroad, overseas direct investment (ODI), and overseas portfolio investment (OPI);**
- **Extending loans, including loans in Indian Rupees to non-resident Indians (NRIs) who are relatives as defined in the Companies Act, 2013;**
- Private visits abroad (excluding Nepal and Bhutan);
- Maintenance of relatives abroad;
- Medical treatment abroad;
- Pursuing studies abroad;
- Any other current account transaction that does not fall under the definition of current account (FEMA 199);

Types of transactions not permitted:

- Remittance for purposes specifically prohibited, such as **buying lottery tickets** or restricted items.
- Sending money from India for margins or margin calls to overseas exchanges or parties.
- Remittance for buying **Foreign Currency Convertible Bonds (FCCBs)** issued by Indian companies in the overseas secondary market.

- Sending money for **trading in foreign exchange abroad.**
- Sending money to individuals and entities identified as posing a significant risk of terrorism.
- Sending money to countries identified as "non-cooperative countries and territories" by the Financial Action Task Force (FATF).

13. Tailings

Context: The central government recently announced the country's first tailings policy, setting guidelines for exploration of critical minerals from primary as well as the secondary sources like mine dumps and tailings of existing mines.

About Tailings

- Tailings are the leftover materials from the processing of mined ore.
- They consist of finely ground rock, unrecoverable or uneconomic metals, chemicals, organic matter, and effluent from the extraction process.
- They usually take the form of a liquid slurry made of fine mineral particles, created as mined ore is crushed, ground, and processed.
- Effective tailings management is integral to the safe and sustainable production of metals and minerals.
- Tailings can be stored in a variety of ways; which way depends on numerous factors, for instance, the local topography, how much rainfall an area gets, whether there is regular or irregular seismic activity recorded, the type of mineral being mined, and how close the mine is to populated areas.
- There is no one-size-fits-all solution; each tailings facility (also commonly known as a tailings storage facility) is unique.
- Dams, embankments, and other types of surface impoundments are by far the most common storage methods used today.

14. Insider Trading

Context: The Securities and Exchange Board of India (SEBI) has accused executives from PwC and EY, among others, of breaching insider trading rules involving a 2022 share sale by Yes Bank.

What is Insider Trading?

- Insider trading refers to the **practice of purchasing or selling a publicly-traded company's securities** while in possession of material information that is not yet public information.
- **Material information** refers to any and all information that may result in a substantial impact on the decision of an investor regarding whether to buy or sell the security.
- It is prohibited under the **SEBI (Prohibition of Insider Trading) Regulations, 2015**.
 - Trading **after public disclosure** is permitted (subject to compliance rules).
 - Sharing **unpublished price-sensitive information (UPSI)** with a relative who trades on it is a classic case. (insider trading)
 - Decisions based on **widely available market rumours** are not insider trading.
 - Consultants with access to **UPSI** are deemed insiders under SEBI rules. (insider trading)
 - Technical analysis uses **public information**.

15. Razorpay

Context: Razorpay POS, the offline payments arm of fintech major Razorpay, has secured a licence from the RBI to operate as an offline payment aggregator.

- **Pine Labs:** Pine Labs is one of the leading players in the offline/POS space and has received the PA-Physical (PA-P) authorization.
- **Paytm Payments Bank:** While Paytm's subsidiary, Paytm Payments Services Limited (PPSL), received full authorization for online, offline (PA-P), and cross-border services in December 2025, **Paytm Payments Bank** itself is a separate entity that faced significant regulatory restrictions in

2024 and is not the licensed "payment aggregator" entity.

- **MSwipe:** MSwipe Technologies received its final Payment Aggregator license for both online and **offline (PA-P)** transactions in late 2025/early 2026.
- **Razorpay:** Razorpay (through its offline arm **Razorpay POS**) secured its PA-Physical (PA-P) license from the RBI in January 2026, making it a full-stack aggregator (Online, Offline, and Cross-Border).
- **Innoviti Payments:** Innoviti (a retail SaaS and POS provider) was among the early recipients of the payment aggregator authorization and operates extensively in the offline/physical payment space.

16. Agarwood

Context: Union Minister laid the foundation stone of the ₹80 crore Agarwood Value Chain Development Scheme in Tripura to strengthen the sector from farm to global markets.

About Agarwood:

What it is?

- Agarwood (also called oud, gaharu, aloeswood) is a highly fragrant, resinous heartwood formed in Aquilaria trees when they are wounded and infected by fungi, triggering a defensive resin response.

Origin:

- Mentioned in ancient Ayurvedic texts such as the Susruta Samhita and in early Islamic literature, agarwood has been traded for thousands of years across Asia and the Middle East.

Habitat:

- Found mainly in South and Southeast Asia, including India (Tripura, Assam and the Northeast), Bangladesh, Vietnam, Indonesia, Malaysia and China.
- Aquilaria species thrive in tropical evergreen and semi-evergreen forests.

Key features:

- Resin formation is **rare in nature** (only ~10% of wild trees), making agarwood extremely valuable.
- Natural agarwood can take **20–50 years** to develop, prompting **artificial induction** (biological, chemical and physical methods).
- **Listed under CITES Appendix II** due to **overexploitation and illegal trade risks**.

Applications:

- **Perfumery:** High-end fragrances and essential oils, especially in the Middle East.
- **Incense & rituals:** Widely used in religious and cultural ceremonies.
- **Medicine:** Traditional Ayurvedic, Chinese and Unani systems (bioactive compounds like chromones and terpenoids).
- **Trade & exports:** One of the **most expensive forest products**, with premium agarwood oil fetching very high prices globally.

17. Narayan Ramachandran Committee

Context: The PFRDA has constituted the Committee for Strategic Asset Allocation and Risk Governance (SAARG) to comprehensively review and modernise National Pension System (NPS) investment guidelines. The SAARG committee, chaired by Narayan Ramachandran, will submit its recommendations within 9 months.

About Narayan Ramachandran Committee:**What it is?**

- A high-level expert committee titled Strategic Asset Allocation and Risk Governance (SAARG) to review and reform NPS investment guidelines across Government and Non-Government sectors.

Constituted by: PFRDA, the statutory regulator for pension funds in India.

Aim:

- To strengthen NPS investment architecture by aligning it with global pension best practices, the

evolving Indian capital market, and long-term subscriber needs.

Key functions / mandate:

- **Foundational review & global benchmarking:** Assess adequacy of current NPS guidelines and benchmark them with leading global pension systems.
- **Asset class review & expansion:** Review existing asset classes and recommend **new asset classes** to improve diversification and resilience.
- **Strategic asset allocation:** Propose optimal allocation across equity, debt, money market and alternatives with prudential limits.
- **Performance & accountability:** Reform benchmarking and evaluation methods for Pension Funds under NPS.
- **Risk management & ALM:** Recommend comprehensive market, credit, liquidity and operational risk frameworks aligned with pension liabilities.
- **Governance & intermediaries:** Review custodial architecture and end-to-end investment process across NPS intermediaries.
- **Sustainability integration:** Embed climate transition risks and net-zero pathways into NPS investment decisions.



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INTERNATIONAL RELATIONS

1. Eurozone

Context: Recently, Bulgaria became the 21st country to switch to the euro, nearly 20 years after the Balkan nation joined the European Union (EU).

What is the Eurozone?

- The eurozone, or officially the euro area, refers to the geographic and economic region comprising those members of the EU that have fully adopted the euro as their official currency.
- Composition:** Bulgaria's admission to the eurozone makes it the 21st nation out of 27 EU members to do so.
 - The remaining six use their own currencies instead.
 - Four microstates, Andorra, Monaco, the Vatican City and San Marino, also use the euro through agreements with the EU, while Kosovo and Montenegro use the euro as their sole currency without an agreement. However, none of these countries are not regarded as members of the eurozone.
 - Croatia was the last country to join the eurozone in 2023.
- Eligibility:** To be eligible for eurozone membership, an EU country (except Denmark, which has an opt-out) must meet "convergence criteria" ensuring alignment with other members economically, socially, and politically.
 - This includes adopting the euro, integrating into the common market, and adjusting national laws and monetary policies to comply with EU treaties, ensuring a smooth transition without disrupting the eurozone.

About Bulgaria:

- Bulgaria is a country located in the south eastern region of the European continent, occupying the eastern part of the Balkan Peninsula.

- It is geographically positioned both in the Northern and Eastern hemispheres of the Earth.
- Bulgaria is bordered by 5 countries: **by Romania in the north; by Turkey and Greece in the south; by North Macedonia in the southwest and by Serbia in the west.**
- It is bounded by the Black Sea in the east.



2. Donroe Doctrine

Context: Strike on Venezuela By bombing Venezuela, the U.S. is seeking to reestablish its primacy in the Western Hemisphere, check the influence of its rivals in the region and install a friendly regime in the country which has one of the world's largest proven oil reserves.

The Donroe Doctrine:

- The recently released National Security Doctrine of the Trump administration identifies Latin America and the Caribbean as a strategic

priority - a Trump corollary to the Monroe Doctrine, which American media and experts dubbed the 'Donroe Doctrine', after Donald Trump.

- The document asserts that the U.S. must deny influence or control by outside powers [read China] in Latin America and ensure that the Western Hemisphere remains under American political, economic and military influence.

3. U.S. take-over of Venezuela

Context: Nicolás Maduro was captured in a U.S. military operation and is being held in New York to face narcotics-terrorism charges, triggering a leadership vacuum in Venezuela.

About U.S. take-over of Venezuela:

- Venezuela is a federal multiparty republic in **northern South America**, historically shaped by oil-led growth and, since 1999, by a socialist political project begun under Hugo Chávez and continued by Nicolás Maduro.

Location: Northern end of South America, with coastlines on the Caribbean Sea and Atlantic Ocean.

Capital: Caracas.

Neighbouring countries: Caribbean Sea, Guyana, Brazil and Colombia.

- Venezuela also administers several Caribbean islands (e.g., Margarita, Los Roques) and has a long-running territorial dispute with Guyana over the Essequibo region.

Key features:

- Andes Mountains:** In the northwest (Cordillera de Mérida), including Bolívar Peak.
- Lake Maracaibo Basin:** One of South America's major oil-producing regions.
- Llanos:** Vast tropical plains along the Orinoco River, important for cattle and hydrocarbons.
- Guiana Highlands:** Ancient crystalline uplands in the southeast with **tepui** (tabletop mountains) and **Angel Falls**, the world's highest waterfall.

- Orinoco River System:** Drains most of the country and anchors its ecological and economic geography.



4. China's proposal of the Global Governance Initiative

Context: China has reiterated its four global initiatives with the Global Governance Initiative (GGI) at the core, as a people-centred framework for peace, security, and development.

About China's proposal of the Global Governance Initiative (GGI):

What it is?

- The Global Governance Initiative (GGI) is China's proposal to reform and improve the existing global governance system so that it becomes more inclusive, representative, and people-centred, ensuring that all nations and peoples benefit from globalisation and international cooperation.

Four major proposals:

- **Global Development Initiative (GDI):** Focuses on shared and inclusive development, poverty reduction, livelihood protection, and equitable access to growth, ensuring development outcomes directly benefit people.
- **Global Security Initiative (GSI):** Advocates common, comprehensive, cooperative, and sustainable security, emphasising peaceful dialogue, respect for sovereignty, and non-interference to ensure stability.
- **Global Civilization Initiative (GCI):** Promotes mutual respect among civilisations, cultural dialogue, and rejection of civilisational superiority, recognising diversity as a strength of humanity.
- **Global Governance Initiative (GGI):** Calls for people-centred global governance, greater participation of developing countries, reform of international institutions, and cooperation on climate change, AI, finance, and trade.

5. Noriega trial

Context: When deposed Venezuelan leader Nicolás Maduro makes his first appearance in a New York courtroom January 5 to face U.S. drug charges, he will likely follow the path taken by another Latin American strongman toppled by U.S. forces: Panama's Manuel Noriega.

Noriega trial:

- Manuel Noriega was the de facto leader of Panama who was captured by U.S. forces in 1989.
- His trial in a U.S. federal court (1991–1992) was a landmark case because it challenged the traditional doctrine of **Sovereign Immunity**.
- The court ruled that “Head of State immunity” does not provide a “shield” against prosecution for criminal acts, such as drug trafficking and money laundering.
- This case set a significant precedent for international law, moving toward the modern understanding that leaders can be held

accountable for crimes regardless of their official status, a principle later reinforced by cases like that of Augusto Pinochet.

6. United Nations Department of Economic and Social Affairs

Context: The United Nations Department of Economic and Social Affairs (UNDESA), in its **World Economic Situation and Prospects 2026** report, projected India's GDP growth at 7.4% in 2025–26.

About United Nations Department of Economic and Social Affairs (UNDESA):**What is UNDESA?**

- UNDESA is a core department of the United Nations Secretariat that leads the UN's work on economic, social and environmental development, especially the implementation of the 2030 Agenda for Sustainable Development and the 17 Sustainable Development Goals (SDGs).

Established in:

- **1948** (restructured into its present form in **1997** through mergers of UN development and policy departments)

Headquarters: New York City, United States.

- **Aim:** To support countries in achieving sustainable, inclusive and equitable development by translating global UN commitments into national policies and actions in the economic, social and environmental spheres.

Key functions:

- **Global economic and social analysis:** Produces flagship reports like World Economic Situation and Prospects (WESP) to guide national and global policy.
- **SDG monitoring and coordination:** Tracks progress on the 17 SDGs and supports their implementation across countries.
- **Policy advice and technical assistance:** Helps governments design policies on poverty reduction, inequality, employment, climate action and social protection.

- **Intergovernmental support:** Provides secretariat services to the UN General Assembly, ECOSOC, UN Commissions and High-Level Political Forum (HLPF).
- **Global data and research:** Maintains major development databases and statistical platforms used by policymakers worldwide.

7. K-Street

Context: The Ministry of External Affairs (MEA) faced uncomfortable questions as filings with the U.S. Department of Justice (DoJ) showed that the Indian Embassy in Washington used an American lobby firm for unconventional tasks normally done by diplomats.

K-Street:

- Just as “Wall Street” stands for the financial industry, K-Street is the metonym for the lobbying industry in Washington D.C.
- It is the geographic and symbolic center for firms that represent foreign governments, corporations, and interest groups.
- Indian diplomacy has increasingly engaged with “K-Street” firms to navigate complex bilateral issues such as trade tariffs, immigration (H-1B visas), and defense cooperation.
- News reports have highlighted the Indian Embassy's use of major lobbying firms (like Mercury Public Affairs or SHW Partners) to coordinate high-level meetings with the U.S. administration, manage social media outreach, and track trade negotiations during periods of diplomatic friction.

8. International Renewable Energy Agency

Context: Recently, the Union Minister for New and Renewable Energy delivered India's national statement at the 16th Assembly of the International Renewable Energy Agency (IRENA) in Abu Dhabi, United Arab Emirates.

About International Renewable Energy Agency

- It is an intergovernmental organisation that was founded in 2009 to support countries in their transition to a sustainable energy future.
- It serves as the principal platform for international cooperation, a centre of excellence, and a repository of policy, technology, resource and financial knowledge on renewable energy.
- **Member countries:** It has 170 Members (169 States and the European Union). India is also one of the founder members of IRENA.

Governance of International Renewable Energy Agency

- **Assembly:** It is IRENA's ultimate decision-making authority, made up of one representative from each Member.
- **Council:** It is composed of 21 Member States elected for a two-year term and is accountable to the Assembly.
- Council members serve on a rotating basis to ensure the effective participation of both developing and developed countries and a fair and equitable geographical distribution.
- **Secretariat:** It comprises the Director-General and his staff, provides administrative and technical support to the Assembly, the Council and their subsidiary bodies.
- **Its headquarter is in Abu Dhabi, United Arab Emirates.**
- It is an official United Nations observer.

9. Commonwealth

Context: The Prime Minister recently inaugurated the 28th Conference of Speakers and Presiding Officers of the Commonwealth (CSPOC) in New Delhi, highlighting India's commitment to sharing open-source tech platforms with the Global South.

What is the Commonwealth?

- It is a voluntary association of 56 independent countries, almost all of which were formerly under British rule.

- It differs from other international bodies such as the United Nations or the World Trade Organization.
- It has no formal constitution or bylaws.
- The members have no legal or formal obligation to one another; they are held together by shared traditions, institutions, and experiences as well as by economic self-interest.
- Commonwealth action is based upon consultation between members, which is conducted through correspondence and through conversations in meetings.
- **The values and aspirations which unite the members of the Commonwealth are reflected in the Commonwealth Charter, adopted in December 2012.**
- The Charter expresses the commitment of Commonwealth members to the development of free and democratic societies, good governance, human rights, the rule of law, sustainable development, and the promotion of peace and prosperity.
- The work of the Commonwealth is administered by the Commonwealth Secretariat based in London.
- **The last countries to join the Commonwealth were Gabon and Togo in 2022.**
- **There are four countries that were not former British colonies and are the members of Commonwealth. Besides Mozambique and Rwanda, Togo and Gabon joined in 2022.**
- **The British Monarch is the Head of the Commonwealth (a symbolic role).**
- India is the largest member state of the Commonwealth, with nearly 60% of the total population of the association.

10. United Nations Economic and Social Council

Context: The United Nations Economic and Social Council (ECOSOC) completed 80 years of its functioning.

About

- It is one of the **six principal organs of the United Nations**, acting as the central forum for international economic, social and environmental policy coordination.
- It was **established in 1945 under the UN Charter**.
- ECOSOC functions as a unique bridge **between governments and non-state actors, with over 6,500 NGOs** having consultative status, enabling civil society, youth and other stakeholders to participate in global policymaking.
- During the 2000s, ECOSOC emerged as a key forum to review progress on the Millennium Development Goals (MDGs) and, since 2015, the Sustainable Development Goals (SDGs) through mechanisms like the High-Level Political Forum (HLPF).
 - ECOSOC **cannot issue legally binding resolutions**; its decisions are **recommendatory**.
 - ECOSOC coordinates the work of UN specialized agencies.
 - ECOSOC can **establish functional and regional commissions** (e.g., Commission on the Status of Women, Statistical Commission).
 - ECOSOC has **54 members elected for three-year terms**, with **immediate re-election allowed** (staggered elections ensure continuity).

11. European Union's Anti-coercion instrument

Context: The French President mentioned activating the EU's anti-coercion instrument, after US President's tariffs threats regarding Greenland.

European Union's Anti-coercion instrument

- It is a **trade tool** that the bloc adopted in **2023** but has never used.
- **Aim:** To respond to any country using trade weapons to pressure an EU member state.

- **Measures:**
 - The armoury allows the EU to take measures such as import and export restrictions on goods and services in its single market.
 - It also limits American companies' access to public procurement contracts in Europe.
- **Establishment:** The instrument's creation came after Lithuania accused China of banning its exports because it allowed a Taiwanese diplomatic representation to be opened in 2021.
- **Implementation Process:** Both the commission and member states have the right to seek its activation.
 - It would need the approval of at least 55% of the member countries voting in favour, representing 65% of the bloc's population.

12. Ukraine-Russia

Context: As the United States, Russia and Ukraine met in Abu Dhabi for peace talks, Russia and Ukraine remain sharply divided over the future of Donetsk.

- While the Donetsk People's Republic (DPR) and Luhansk People's Republic (LPR) were self-proclaimed entities since 2014, **Kherson** was never a "republic" - it was a Ukrainian oblast directly occupied and then annexed in 2022.
- These regions were part of the Ukrainian SSR and became part of independent Ukraine in 1991.

They never existed as separate independent states following the fall of the Soviet Union.

- These areas (along with Zaporizhzhia) are internationally recognized as sovereign Ukrainian territory (oblasts). In September 2022, Russia conducted what it called "referendums" in these occupied or partially occupied territories. These were widely condemned by the United Nations and the international community as "sham" votes held under military occupation.
- The Minsk II Agreement (2015) attempted to create a ceasefire and a "special status" for parts of Donbas (Donetsk and Luhansk), but it did not include Kherson, and the agreement effectively collapsed with the full-scale invasion in 2022.



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In 2021, I finally received the interview call and scored 201 marks in the interview. Mock interviews and guidance at R.C. Reddy IAS Study Circle proved to be of immense help. R.C. Reddy Sir also gave me many valuable suggestions.

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SCAN TO REGISTER

ENVIRONMENT

1. Amazon's Stingless Bees

Context: Amazonian stingless bees have become the first insects in the world to be granted legal rights after Peruvian municipalities passed a landmark ordinance recognizing their right to exist and flourish.

About Amazon's Stingless Bees:

What they are?

- Stingless bees are a group of bees that either lack stingers or have non-functional stingers, making them harmless to humans. They are crucial pollinators in tropical ecosystems.

Origin:

- Among the **oldest bee species on Earth**, existing for nearly **80 million years** since the time of dinosaurs.
- Around **500 species globally**, with nearly **half found in the Amazon**.

Habitat:

- Tropical forests across the world.
- Particularly abundant in the **Amazon rainforest**, especially in **Peru**, which hosts over **170 species**.

Key features:

- Primary rainforest pollinators, responsible for pollinating over 80% of Amazonian flora.
- Support globally important crops such as coffee, cacao, avocados and blueberries.
- Deeply embedded in the cultural, medicinal and spiritual traditions of Indigenous communities like the Asháninka and Kukama-Kukamiria.

About Amazonian stingless bees first insects to get legal rights:

What it means?

- The legal recognition grants stingless bees inherent rights, including the right to exist,

maintain healthy populations, regenerate natural cycles, live in pollution-free habitats, and be legally represented when threatened.

2. Climate-Resilient Agriculture

Context: India is accelerating efforts to scale Climate-Resilient Agriculture (CRA) as climate change intensifies risks to food security, rainfed farming, and farm incomes.

About India needs Climate-Resilient Agriculture (CRA):

What is Climate-Resilient Agriculture?

- Climate-Resilient Agriculture refers to farming systems that sustainably increase productivity, enhance adaptation to climate variability, reduce greenhouse gas emissions where possible, and ensure food security.
- It integrates biotechnology (climate-tolerant and genome-edited crops), bio-inputs (biofertilisers, biopesticides), precision irrigation, soil health management, and AI-based advisories.

Trends / data points:

- 51% of India's net sown area is rainfed, contributing nearly 40% of food production, making it highly climate-vulnerable.
- Over 75% of annual rainfall is concentrated in just 4 monsoon months, increasing drought–flood cycles.
- Rising heat stress, erratic rainfall, floods, droughts, and salinity are lowering yield stability.

Need for Climate-Resilient Agriculture (CRA):

- **Food security pressure:** Stable yields are required to feed a population projected to reach 1.7 billion, protecting against 10–40% projected losses in staples like wheat.

- **Rainfed vulnerability:** With 60% of Indian farmland being rainfed, CRA provides a lifeline for marginal farmers against increasingly erratic monsoon cycles.
- **Resource sustainability:** Transitioning to CRA halts the alarming depletion of groundwater and restores soil organic carbon, ensuring the long-term viability of land.
- **Income stability:** Diversified systems and stress-tolerant crops shield farmers from "poverty traps" caused by total crop failure during extreme weather events.
- **Environmental protection:** CRA practices like zero-tillage reduce methane emissions and residue burning, turning farms from carbon sources into vital carbon sinks.

Climate resilient agriculture methods:

- **Agroforestry:** Trees act as carbon sinks, improve soil structure, and provide a micro-climate buffer against extreme heat.
- **Conservation Tillage:** Minimizing soil disturbance helps retain moisture and organic matter, making the land more resilient to droughts.
- **System of Rice Intensification (SRI):** This method significantly reduces water consumption and methane emissions compared to traditional flooding.
- **Cover Cropping:** Protects the soil from erosion during off-seasons and improves nutrient cycling.
- **Integrated Farming Systems (IFS):** Combining crops with livestock or aquaculture ensures food security even if one component fails due to climate stress.

While,

- **Monoculturing:** This is the opposite of resilience. Relying on a single crop makes the entire system vulnerable to specific pests or weather events.
- **Vertical Farming:** While it is a high-tech solution for space and water efficiency, it is typically classified as "Controlled Environment Agriculture" (CEA). In the context of CRA (which

focuses on landscape-level ecological adaptation), it is generally not included as it is detached from natural soil ecosystems.

3. Secondary pollutants

Context: Recent analysis by the Centre for Research on Energy and Clean Air (CREA) shows that secondary pollutants now contribute nearly one-third of Delhi's annual PM_{2.5} load.

What are secondary pollutants?

- Secondary pollutants are **not emitted directly**.
- They are formed in the atmosphere when primary pollutants (gaseous precursors) undergo chemical reactions.
- These reactions depend on sunlight, humidity, temperature, and wind conditions.
- Unlike direct emissions, they accumulate over time and space, often far from the original source, making regulation difficult.

Types

- **Inorganic aerosols:** Ammonium sulfate (from SO₂ + NH₃), ammonium nitrate (from NO_x + NH₃).
- **Organic aerosols:** Secondary organic aerosols (SOA) from volatile organic compounds (VOCs) oxidation.
- **Ground-level ozone:** From NO_x and VOCs photochemical reactions.

Pollutant	Type	Precursor / Formation Process
Ozone (O ₃)	Secondary	NO _x + VOCs + Sunlight
PAN	Secondary	Hydrocarbons + NO _x + Sunlight
Acid Rain	Secondary	SO ₂ / NO _x + H ₂ O
NO ₂	Secondary	NO _x + O ₂
Ammonium Salts	Secondary	NH ₃ + Sulfuric/Nitric Acids

4. Mudumalai Tiger Reserve

Context: Wildlife enthusiasts recently confirmed the presence of an Eastern Imperial Eagle visiting the Mudumalai Tiger Reserve (MTR) during the winter migratory season.

Mudumalai Tiger Reserve (MTR)

- It is located in the Nilgiris District of Tamil Nadu, spread over 321 sq. km. at the tri-junction of three states, viz., Karnataka, Kerala, and Tamil Nadu.
- It lies on the northeastern and northwestern slopes of the Nilgiri hills, which is a part of the Western Ghats.
- It is part of the Nilgiris Biosphere Reserve, the first biosphere reserve in India.
- The name Mudumalai means “the ancient hill range”. Indeed, it is as old as 65 million years, when the Western Ghats were formed.
- **Habitat:** A variety of habitats ranging from tropical evergreen forest, moist deciduous forest, moist teak forest, dry teak forest, secondary grasslands, and swamps are found here.
- **River:** The Moyar River runs through the reserve.
- The Oscar-winning ‘Elephant Whisperers’ was filmed at the Theppakadu Elephant Camp, located inside the Mudumalai Tiger Reserve.

Flora:

- It has tall grasses, commonly referred to as “Elephant Grass”, bamboo of the giant variety, and valuable timber species like teak, rosewood, etc.
- It has wild relatives of cultivated plants, viz., wild rice, ginger, turmeric, cinnamon, etc.
- The habitat also has swampy areas (Vayals) and grasslands.

Fauna:

- The faunal assemblage includes: elephant, gaur, sambar, four-horned antelope, spotted deer, barking deer, blackbuck, wild pig, mouse deer,

and predators like tigers, leopards, and wild dogs.

- Around 8% of the total bird species in India can be found in the region.

5. Double-Humped Bactrian Camel

Context: Ladakh’s double-humped Bactrian camels are set to debut at the 77th Republic Day parade.

About Double-Humped Bactrian Camel

- It is scientifically known as *Camelus bactrianus*.
- Its large even-toed ungulates are renowned as Ladakh’s “silent warriors”.

Distribution

- **They are native to the harsh and arid regions of Central Asia.**
- They occupy habitats in Central Asia from Afghanistan to China, primarily up into the Mongolian steppes and the Gobi Desert.
- **Small populations of these camels are found in high altitude cold deserts of Ladakh’s Nubra Valley.**

Characteristics of Double-Humped Bactrian Camel

- The two humps serve as a reservoir of fat that can be converted into water and energy during long treks where food is scarce.
- They possess thick, shaggy coats that fluctuate with the seasons, growing dense to withstand temperatures as low as minus 40 degrees Celsius.
- Their nostrils are sealable to block out frozen dust, while their broad feet act like natural snowshoes.
- They are among the few land animals that can survive by eating snow to meet their hydration needs.
- **Diet:** Bactrian camels are omnivores but primarily herbivores and eat various types of plants.
- **Conservation Status:** IUCN Red List: Critically Endangered.

6. Chilika Lake

Context: The Odisha government is preparing a new action plan for the protection of Chilika Lake's biodiversity and the development of its surrounding areas.

About Chilika Lake

- It is a brackish water lake and a shallow lagoon with estuarine character spread across the districts of Puri, Khurda, and Ganjam in the state of Odisha.
- It is Asia's largest brackish water lake.
- Located at the mouth of the Daya River, Chilika Lake is the second-largest brackish water lagoon in the world, after the New Caledonian barrier reef in New Caledonia.
- The water spread area of Chilika varies between 900 to 1165 sq. km. during summers and monsoons, respectively.
- It is connected to the Bay of Bengal by a 32 km long and 1.5 km wide channel that mostly runs parallel to the Bay, separated by a narrow spit.
- **Chilika Lake has several islands, such as:**
 - Nalabana Island – Declared a Bird Sanctuary (1987)
 - Kalijai Island – Known for the Kalijai Temple
 - Other islands include Honeymoon Island, Breakfast Island, Beacon Island, Satpada Island, etc.
- In 1981, Chilika Lake was designated the first Indian wetland of international importance under the Ramsar Convention.

7. Global Environment Facility

Context: The Global Environment Facility has approved US\$52.8 million for four new UN Environment Programme-led projects at its 70th Council meeting.

About Global Environment Facility (GEF):

What it is?

- The Global Environment Facility (GEF) is a multilateral environmental financing mechanism that provides grants and blended finance to developing countries and economies in transition to address global environmental challenges.

Established in: 1991, ahead of the 1992 Rio Earth Summit

Aim:

- To support country-driven projects that generate global environmental benefits
- To integrate action on climate change, biodiversity, land degradation, oceans, chemicals, and pollution
- To strengthen environmental governance while promoting sustainable development

Conventions covered (Financial mechanism for):

- Convention on Biological Diversity (CBD)
- United Nations Framework Convention on Climate Change (UNFCCC)
- United Nations Convention to Combat Desertification (UNCCD)
- Stockholm Convention on Persistent Organic Pollutants
- Minamata Convention on Mercury
- Biodiversity Beyond National Jurisdiction (BBNJ) Agreement
- Also supports implementation of the Montreal Protocol

Key functions:

- Provides grants and concessional finance for environmental projects.
- Mobilises large-scale co-financing from public and private sources.
- Supports capacity building, technology transfer, and policy coherence.
- Funds climate reporting and transparency mechanisms under the Paris Agreement.

- Operates through a structured governance system (Assembly, Council, Secretariat, STAP, IEO).

Note: Basel Convention (Indirect support only); Rotterdam Convention (Indirect support only) are not financed directly.

8. Melghat Tiger Reserve

Context: Recently, the Bombay Natural History Society (BNHS) has released 15 critically endangered Indian vultures at the Melghat Tiger Reserve in Maharashtra.

About Melghat Tiger Reserve

- Location:** It is situated in the state of Maharashtra.
- It is located on the southern offshoot of the Satpura Hill Range in Central India, called Gavilgarh Hill.
- It was the first tiger reserve in Maharashtra.
- The name 'Melghat' means the confluence of various 'ghats' or valleys, as is typical from the landscape of this tiger reserve.
- Vegetation:** The forest is tropical dry deciduous in nature, dominated by teak.
- Rivers:** The reserve is a catchment area for five major rivers: the Khandu, Khapra, Sipna, Gadga, and Dolar, all of which are tributaries of the river Tapti.
- Boundaries:** The Tapti River and the Gawilgad ridge of the Satpura Range form the boundaries of the reserve.
- Tribes:** The Korkus are the largest tribal community in Melghat. Other communities include the Gawli community, the Gond tribe,
- Flora:** Some of the common species are teak, Lagerstroemia Parviflora, Terminalia Tomentosa, Ougeinia Oojeinensis, Emblica Officinalis, Bamboo, etc.
- Fauna:** Sloth Bear, Indian Gaur, Sambar deer, Leopard, Nilgais, dhole, hyena, jungle cat, langur, etc.
- It is considered a stronghold of the critically endangered forest owl.

9. Thanthai Periyar Wildlife Sanctuary

Context: Recently, the first phase of the All-India Tiger Estimation-2026 (AITE-26) commenced in the Thanthai Periyar Wildlife Sanctuary.

About Thanthai Periyar Wildlife Sanctuary

- Location:** It is located in Bargur Hills in Erode District of Tamil Nadu.
- It is located between the Sathyamangalam Tiger Reserve of Tamil Nadu and the Male Mahadeshwara Wildlife Sanctuary and the Cauvery Wildlife Sanctuary of Karnataka.
- It is one of the tiger corridors identified by the National Tiger Conservation Authority.
- The region is also part of the Nilgiris Elephant Reserve.
- These forests occupy a prominent position in the Eastern Ghats as they merge with the Western Ghat at the Nilgiris.
- Rivers:** It is the catchment of the Palar River that drains into the Cauvery River.
- Fauna:** It is home to a healthy population of large herbivores including elephants and the Indian Gaur.

10. United Nations Framework Convention on Climate Change

Context: U.S. President Donald Trump's decision to withdraw the United States from a bedrock climate treaty was slammed on January 8 by the EU, which vowed to keep tackling the crisis with other nations.

- The withdrawal process from the **United Nations Framework Convention on Climate Change (UNFCCC)** is governed by **Article 25** of the Convention. It is a formal legal procedure that takes exactly one year to finalize once initiated.
- ### 1. Eligibility (The "Three-Year" Rule)
- A country cannot withdraw immediately after joining. According to Article 25(1), a Party may only initiate withdrawal after three years have

passed from the date the Convention entered into force for that specific country.

2. Formal Notification

- To start the process, the country must provide written notification to the Depositary, which is the Secretary-General of the United Nations (currently António Guterres).

3. The One-Year Waiting Period

The withdrawal is not instantaneous. Under Article 25(2), the exit only takes effect:

- **One year** after the date the Secretary-General receives the notification; **OR**
- On a **later date** if specifically requested in the notification.

4. Automatic "Chain Reaction" Withdrawal

- A crucial technicality of Article 25(3) is that if a country withdraws from the UNFCCC (the "parent" treaty), it is **automatically considered to have withdrawn** from any protocols it has signed under it. This includes:
 - **The Paris Agreement**
 - **The Kyoto Protocol.**

11. Ratapani Tiger Reserve

Context: Madhya Pradesh Chief Minister recently announced that the newly designated Ratapani Tiger Reserve will be named after the renowned archaeologist and Padma Shri awardee Dr Vishnu Shridhar Wakankar.

About Ratapani Tiger Reserve

- It is situated in the Raisen and Sehore districts of Madhya Pradesh.
- This forest is spread over hills of the Vindhya ranges.
- It is spread over an area of 1,271 sq.km.
- It runs parallel on the northern side of the Narmada River. The Kolar River forms the western boundary of the reserve.
- Two large reservoirs, namely Barna Reservoir and Ratapani Dam (Barrusot Lake) are among

the major water bodies adjacent to or inside the reserve.

- The landscape is undulating, with hills, plateaus, valleys, and plains.
- The reserve has Bhimbetka, a group of rock shelters and rock paintings, which is one of the "World Heritage Sites" declared by UNESCO.
- It also encompasses many other historical and religious destinations like Ginnourgarh Fort, POW camp, Keri Mahadeo, Ratapani Dam, Jholiyapur Dam, etc.
- **Flora:** The forest of Ratapani is a dry deciduous and moist deciduous type, with teak (*Tectona grandis*) as the main tree species. About 55% of the area is covered by teak.
- **Fauna:**
 - The regal striped cat is the apex predator, and estimates suggest that 40 tigers roam these forests.
 - Chinkara, an endangered species, is also found in the reserve.
 - It is also home to animals like the Panther, Hyena, Jackal, Indian Fox, Wild Dog, Jungle Cat, Small Indian Civet, Blue Bull, Chinkara, Black Buck, Chausingha, Spotted Deer, Barking Deer, etc.

12. Article 6 of the Paris Agreement

Context: At COP29, carbon markets under Article 6 (A6) of the Paris Agreement were made fully operational to improve the delivery and efficiency of climate finance.

What is Article 6 of the Paris Agreement?

- Article 6 creates a framework that allows countries to cooperate voluntarily to achieve their Nationally Determined Contributions (NDCs) through two main routes:
 - **Article 6.2:** Enables bilateral or plurilateral cooperation through the trading of emission reductions, called Internationally Transferred Mitigation Outcomes (ITMOs).
 - **Article 6.4:** Establishes a centralized Paris Agreement Crediting Mechanism (PACM),

evolved from the earlier Clean Development Mechanism (CDM), to validate and verify projects generating carbon credits.

- Both mechanisms are backed by strong accounting rules to avoid double counting and ensure transparency and environmental integrity.

Note: Dropping Article 6 would **undermine carbon trading mechanisms**, reduce financial flows to developing countries, and limit technology transfer and cooperation.

13. Valley of Flowers National Park

Context: With forest fire raging in the Valley of Flowers, a UNESCO heritage site, for the last five days, the Uttarakhand Disaster Management Department has sought the Indian Air Force's (IAF) help to douse the inferno.

About Valley of Flowers National Park

- It is located in the Chamoli district of Uttarakhand.
- It is spread over an area of 87 sq.km.
- The valley is believed to have been discovered in 1931, when three British mountaineers – led by Frank S. Smythe – lost their way and chanced upon this spectacular valley.
- It is a UNESCO World Heritage Site and forms one of the two core zones (the other being the Nanda Devi National Park) of the Nanda Devi Biosphere Reserve.
- The gentle landscape of the Valley of Flowers National Park complements the rugged mountain wilderness of Nanda Devi National Park.
- Together they encompass a unique transition zone between the Zaskar and Great Himalayan ranges.
- It is famed for its vibrant alpine meadows, rich biodiversity, and breathtaking scenic beauty.
- It has snow-capped peaks of the Himalayas as a backdrop.

- It remains covered with a thick blanket of snow during the winter season.

• **Flora:**

- Exotic flowers (over 600 species) like orchids, poppies, primulas, marigolds, daisies, and anemones are an eye-catching spectacle.
- The valley also abounds in medicinal plants and herbs.
- Sub-alpine forests birch and rhododendron cover parts of the park's area.

- **Fauna:** It is home to such rare and amazing wildlife species like the gray langur, the flying squirrel, the Himalayan weasel, black bear, the red fox, the lime butterfly, and the snow leopard.

14. Miyawaki Method

Context: The Miyawaki method can be used in cities where green space has thinned out over decades.

About Miyawaki Method

- This method of afforestation was developed by renowned Japanese botanist Akira Miyawaki in the 1970s.
- It is a revolutionary method for creating dense forests in limited spaces.
- **It is often referred to as the 'pot plantation method', it involves planting trees and shrubs close to one another to accelerate their growth.**
- The competition for sunlight encourages trees to grow more vertically and less laterally.
- It emphasises planting only plant species native to the local area. This fosters a more resilient and naturally balanced ecosystem.
- **Plants grow 10 times faster with this technique, making it a practical solution for urban areas.**
- They are much denser and house much more biodiversity - just like ancient, primordial forests.
- For the first two to three years, the forest requires regular watering, weeding, and monitoring.

- After this period, the forest becomes self-sustaining and requires minimal intervention.

Advantages:

- It improves soil quality, enhances biodiversity, and accelerates forest development.
- Trees planted using the Miyawaki technique absorb more carbon, grow faster, and support richer biodiversity compared to traditional forests.
- In urban settings, this technique has transformed polluted, barren lands into green ecosystems.
- It has successfully managed industrial waste, reduced dust and foul odours, and curbed air and water pollution.
- **Additionally, it prevents soil erosion and promotes ecological balance, making it an effective tool for environmental restoration.**

Note: Because the trees are planted so densely, they often lack the deep root systems and the massive trunk girth of trees in a natural forest. Additionally, their lifespan can be shorter due to intense competition for resources within the small plot. Hence not suitable for long-term restoration.

15. Gharial

Context: Despite significant existential threats, a comprehensive survey across the Ganga River basin recently revealed a population of 3,037 gharials (*Gavialis gangeticus*), the critically endangered fish-eating crocodile, inhabiting 13 of the surveyed rivers.

About Gharial

- It is a freshwater crocodile belonging to the Crocodylia Order and Crocodylidae Family.
- Scientific Name: *Gavialis gangeticus*
- The name 'gharial' comes from the Hindi word ghara, meaning pot or vessel, referring to the bulbous snout tip of adult males, which resembles an inverted pot.
- Gharial Distribution

- Its range spanned the rivers of Bangladesh, Bhutan, India, Myanmar, Nepal, and Pakistan.
- Their major population occurs in three tributaries of the Ganga River: the Chambal and Girwa Rivers in India and the Rapti-Naryani River in Nepal.
- The Gharial reserves of India are located in three States: Uttar Pradesh, Madhya Pradesh, and Rajasthan.
- While the Ganga River system is their primary stronghold, they are not only found there. They are also found in the **Chambal River** (the largest population), the **Girwa River** (UP), the **Son River** (MP), and the **Mahanadi River** (Satkosia, Odisha). Historically, they were found in the Indus and Brahmaputra, though they are now largely restricted to India and Nepal.
- Only the **adult male** gharial develops a large, bulbous growth at the tip of its snout, called a "**Ghara**: (named after the Indian earthen pot). The female has a long, thin snout but **lacks** this round bulb.
- Despite successful captive breeding and reintroduction programs (like those at Tikarpada and Kukrail), the Gharial remains listed as **Critically Endangered** on the IUCN Red List. It has not yet recovered enough to be downgraded to "Vulnerable."

16. Kawal Tiger Reserve

Context: Forest officials are gearing up to conduct the wildlife census at the Kawal Tiger Reserve.

About Kawal Tiger Reserve

- Location: It is located in the state of Telangana.
- It is along the banks of river Godavari, forming part of the Deccan peninsula-central highlands.
- The reserve is nestled in the Sahyadri Mountain Ranges.
- The government of India declared Kawal Wildlife Sanctuary a Tiger Reserve in 2012.
- Rivers: The reserve is the catchment for the rivers Godavari and Kadam, which flow towards the south of the sanctuary.

- Geographically, the reserve is situated at the southernmost tip of the Central Indian Tiger Landscape, having linkages with the Tadoba-Andhari (Maharashtra) and Indravati (Chhattisgarh) tiger reserves.
- Habitat:** It has diverse habitats comprising dense forests, grasslands, rivers, streams and water bodies.
- Vegetation:** Southern Tropical Dry Deciduous Forest.
- Flora:** It consists of teak along with Bamboo and other species like *Anogeissus latifolia*, *Mitragyna parviflora*, *Terminalia crenulata*, *Terminalia arjuna*, *Boswellia serrata*, etc.
- Fauna:** The major wild animals include: nilgai, chousinga, chinkara, black buck, sambar, spotted deer etc.

17. Kruger National Park

Context: Kruger National Park was temporarily shut to day visitors after severe flooding caused multiple rivers to overflow due to prolonged heavy rainfall.



- The **Drakensberg** (meaning "Dragon's Mountains") is the highest mountain range in Southern Africa. It stretches for over 1,000 kilometers and forms the mountainous core of the enclave kingdom of **Lesotho**, as well as parts of the South African provinces of KwaZulu-Natal, Free State, and Eastern Cape.
- The **Orange River** (the longest river in South Africa) forms the natural international border between **South Africa and Namibia** to the west, and **South Africa and Lesotho** to the east.

18. National Board for Wildlife

Context: Apex wildlife body readies guidelines on 'religious structures' in sanctuaries

About National Board for Wildlife

- It is a statutory body constituted by the Central Government in 2003 under Section 5A of the Wildlife (Protection) Act, 1972.
- NBWL is India's top-level advisory body to the government on matters pertaining to wildlife conservation, particularly within Protected Areas (PAs).
- It is responsible for guiding the government's decisions on matters related to wildlife conservation and issuing approvals for projects in PAs.

National Board for Wildlife Organisation Structure

- It is a 47-member committee, headed by the Prime Minister and the Minister of Environment, Forest, and Climate Change as vice chairperson.
- In addition to offices and institutions directly involved in conservation and protection of wildlife, the NBWL also has the chief of army staff, defence secretary, expenditure secretary to the Government of India as members.
- Further, the central government nominates 10 members who are eminent conservationists, ecologists, and environmentalists.
- The Additional Director General of Forests (WL) & Director, Wildlife Preservation is the Member-Secretary to the Board.

Standing Committee of National Board for Wildlife

- It is an independent body under NBWL.
- It comprises not more than 10 members of the NBWL.
- **The Minister of Environment, Forest, and Climate Change chairs the Standing Committee.**
- The difference between the standing committee and the National Board is that the Standing Committee regulates land diversion within protected areas and eco-sensitive zones, making it a purely project clearance body.
- The NBWL, on the other hand, has the power to deal with policy-level decisions on wildlife.

19. Environmental Protection Fund

Context: The Union Government has notified detailed rules for the utilisation and administration of the Environmental (Protection) Fund, operationalising provisions introduced under the Jan Vishwas Act, 2023.

About Environmental Protection Fund:**What it is?**

- The Environmental (Protection) Fund is a statutory fund of the Government of India created to utilise penalties imposed for violations of environmental laws for pollution control, environmental restoration, monitoring, research, and capacity building.

Established in:

- **Provided for under the Environment (Protection) Act, 1986.**
- Operationalised through rules notified in **January 2026**
- Strengthened by the **Jan Vishwas Act, 2023**, which decriminalised several environmental offences while retaining monetary penalties

Nodal authority:

- Administered by the **Ministry of Environment, Forest and Climate Change (MoEFCC)** or any body notified by the Central Government

Key features:

- **Source of funds: Penalties under the Air (Prevention and Control of Pollution) Act, 1981, the Environment (Protection) Act, 1986, interest from investments, and other prescribed sources.**
- **Permitted uses (11 activities):** Pollution prevention and mitigation, remediation of contaminated sites, environmental monitoring equipment, clean technology research, IT-enabled systems, laboratory infrastructure, and capacity building of regulatory bodies.
- **Revenue sharing:** 75% of penalty proceeds transferred to the Consolidated Fund of the State/UT, 25% retained by the Centre.
- **Governance mechanism:** Creation of dedicated Project Management Units at Central and State levels.
- **Oversight & transparency:**
 - **Comptroller and Auditor General of India (CAG) to audit the Fund.**
 - Central Pollution Control Board (CPCB) to develop and maintain a centralised online portal for fund implementation

20. Kumbhalgarh Wildlife Sanctuary

Context: The Centre recently declared the biodiversity-rich area, ranging from zero to one kilometre around Kumbhalgarh Wildlife Sanctuary, located in one of the most fragile ecosystems of the Aravali Range in Rajasthan, as an eco-sensitive zone (ESZ).

About Kumbhalgarh Wildlife Sanctuary

- It is situated in the Rajsamand district of Rajasthan.
- It spreads in an area of 610.5 sq.km. stretching across the Aravalli ranges.
- It covers four hill and mountain ranges of the Aravallis – the Kumbhalgarh Range, the Sadri Range, the Desuri Range, and the Bokhada Range.
- Once the hunting grounds of royals, this area was declared a wildlife sanctuary in 1971.

- It encompasses the historic Kumbhalgarh Fort and is also named after the fort.
- The sanctuary's landscape is varied. The eastern part has hills ranging from 500 to 1300 meters high, while the western part borders the Marwar plains.
- Drainage:
 - The eastern section is the starting point for the Banas River, which flows into the Bay of Bengal.
- Meanwhile, rainwater from the western slopes forms small rivers like Sukdi, Sumer, Mithdi, and Kot, all of which are tributaries of the Luni River that eventually flow into the Arabian Sea.
- **Flora:** The flora of the sanctuary is mainly herbs. The species of Churel, Dhok, Khair, and Salar grow abundantly. among others.
- **Fauna:** The sanctuary provides a natural abode to many creatures like Wolf, Leopards, Sloth bear, Hyena, jackal, Jungle cat, Sambhar, Nilgai, Chausingha (the four horned antelope), Chinkara and Hare.

21. Bacillus Subtilis

Context: The Government of Kerala has officially declared *Bacillus subtilis* as the State Microbe and dedicated the Centre of Excellence in Microbiome (CoEM) to the people.

Bacillus Subtilis:

- **Bacillus subtilis:** It is a type of probiotic or "good" bacteria found widely in the environment and naturally in the gut of humans as well as in fermented foods.
- **1st in the country:** Kerala, the first State in the country to officially declare its own State microbe.

22. Madras Hedgehog

Context: For the first time, the Tamil Nadu forest department has begun a study on the rare mammal species Madras Hedgehog at the Theri forests in the district.

About Madras Hedgehog

- Madras Hedgehog, locally known as Mulleli is a tiny mammal.
- It is also known as the bare-bellied hedgehog, discovered in 1851.
- **It has sharp spines on its back and soft white fur on its belly.**
- Its spines offer protection from predators such as foxes, jackals and mongooses.
- It is a nocturnal species curls into a ball to protect itself from danger.
- It has mastered survival in some of the harshest and driest landscapes.
- Habitat: The species prefers dry scrublands, thorn forests, grasslands and the edges of farmlands.
- Distribution: It is found only in peninsular India, primarily across Tamil Nadu, Kerala, Andhra Pradesh and parts of Karnataka.
- **Diet: It feeds on insects such as beetles, ants, earthworms and termites, apart from plants.**
- **Conservation Status: IUCN: Least Concern**
- Threats: Its population declined largely due to hunting driven by mythical beliefs that its quills and meat have medicinal value.

23. Pygmy Hog

Context: India's pygmy hog is vanishing from its grasslands, just as it is needed the most

About Pygmy Hog

- It is the smallest and rarest species of wild pig in the world.
- It is one of the very few mammals that build its own home, or nest, complete with a 'roof'.
- It is an indicator species as its presence reflects the health of its primary habitat.
- Habitat: It prefers undisturbed patches of grassland dominated by early succession riverine communities, typically comprising dense tall grass intermixed with a wide variety of herbs, shrubs and young trees.
- Currently, they survive only in the grasslands of Assam's Manas and Orang national parks.

Ecological Role of Pygmy Hog

- Using its snout, it digs for roots, tubers, wild fruits, termites, earthworms, eggs and other food sources found in the grasslands.
- This digging aerates the soil and enhances its quality.
- It also helps disperse seeds through its dietary and foraging habits.

Conservation Status of Pygmy Hog

- **IUCN: Critically Endangered.**
- The Wildlife Protection Act, 1972: Schedule I.

24. Day Zero

Context: The concept of “Day Zero” has re-entered global focus as the United Nations warned that worsening climate change, groundwater depletion, and weak water governance could push many cities - including in India - towards acute water collapse.

About Day Zero:

What it is?

- “Day Zero” refers to the point at which a city or region’s usable water supply falls below a critical threshold, forcing authorities to shut off regular tap water and supply water only through rationed emergency distribution points.

Origin of the term:

- The term gained global prominence during **Cape Town’s near Day Zero crisis in 2018**, when

reservoir levels dropped to dangerously low levels.

- Since then, UN agencies have adopted the term to describe **systemic urban water collapse**, not just temporary droughts.

Key features of Day Zero:

- **Suspension of normal water supply** to households.
- Water prioritised for **essential services** such as hospitals, sanitation, and firefighting.
- **Rationing of water** through public collection points with strict per-person limits.
- Triggered by **long-term stressors**, not a single bad monsoon or drought year.
- Often linked to **over-extraction of groundwater**, poor planning, and climate variability.



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1	CA April 2025	27.07.2025
2	CA May 2025	10.08.2025
3	CA June 2025	24.08.2025
4	CA July 2025	07.09.2025
5	CA August 2025	21.09.2025
6	CA September 2025	12.10.2025
7	CA October 2025	16.11.2025
8	CA November 2025	14.12.2025
9	CA December 2025	12.01.2026
10	CA January 2026	15.02.2026
11	CA February 2026	15.03.2026
12	CA March 2026	12.04.2026
13	CA April 2026-20 days	10.05.2026

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SCIENCE AND TECHNOLOGY

1. Pralay Missile

Context: DRDO has successfully conducted a salvo launch of two Pralay missiles in quick succession from the same launcher off the Odisha coast, marking a key milestone in user evaluation trials.

About Pralay Missile:

What it is?

- Pralay is an indigenously developed solid-propellant, quasi-ballistic surface-to-surface missile designed for high-precision conventional strikes against a wide range of targets.

Key features:

- Quasi-ballistic trajectory:** Makes interception difficult for enemy air defence systems.
 - Range:** ~150 km to 500 km
 - Type:** Quasi-ballistic surface-to-surface missile
- Solid propellant:** Ensures quick launch readiness and high reliability.
- Advanced guidance and navigation:** Delivers high precision against diverse targets.
- Multiple warhead capability:** Can carry different types of warheads for varied mission requirements.
- Salvo launch capability:** Ability to fire multiple missiles in quick succession from the same launcher, enhancing saturation attack potential.

	Missiles	Types/specifications
1	Pralay	Quasi-ballistic missile
2	Nirbhay	Subsonic cruise missile
3	Akash	Surface-to-Air Missile
4	Rudram	Anti-Radiation Missile

2. PathGennie

Context: Recently, the Ministry of Science and Technology has developed new open-source software called PathGennie.

About PathGennie

- It is a novel computational framework developed by scientists that can significantly accelerate the simulation of rare molecular events.
- It is open-source software developed for fast tracking of drug discovery.
- It is aimed at fast-tracking the drug discovery process by accurately tracking molecular unbinding pathways.
- It addresses a long-standing challenge in molecular simulations - accurately modelling how drug molecules detach from their target proteins.
- This process, known as ligand unbinding, plays a key role in determining a drug's "residence time", which is often more relevant to therapeutic effectiveness than binding strength alone.
- It predicts the potential drugs unbind from their protein targets without the artificial distortions commonly used in standard methods.
- It mimics natural selection on a microscopic scale instead of forcing the molecule to move.

Features of PathGennie

- It captures rare molecular events without artificial acceleration.
- It generates multiple competitive unbinding pathways.
- It estimates residence time of drug molecules.
- It eliminates bias introduced by external force-based simulations
- Potential Applications of PathGennie
- It addresses problems such as chemical reactions, catalytic processes, phase transitions, or self-assembly phenomena.
- It is also compatible with modern machine-learning techniques which ensures integration into diverse simulation pipelines.

3. Lab-grown Diamonds

Context: India's lab-grown diamond market is entering a high-growth phase as demand accelerates and funding surges amid the expansion.

Lab-grown Diamonds

- **Lab-grown diamonds** (also called synthetic or cultured diamonds) are real diamonds that are manufactured in **laboratories using advanced technology** that replicates the natural conditions under which diamonds form inside the Earth.
- **Composition:** Pure carbon
- **Crystal structure:** Same as natural diamonds (cubic crystal lattice)
- **Physical, chemical, and optical properties:** Identical to mined diamonds.
- They are made using technologies like the **chemical vapour deposition (CVD)** and **high-pressure high temperature (HPHT)**.
- **HPHT (High Pressure High Temperature)**
 - Mimics the Earth's mantle conditions.
 - Carbon is subjected to extremely high pressure and temperature to form diamonds.
- **CVD (Chemical Vapour Deposition)**
 - Carbon-rich gas (like methane) is broken down in a vacuum chamber.
 - Carbon atoms deposit layer by layer on a diamond seed crystal.
- **How are they different from Natural?** The natural diamonds contain **small traces of nitrogen**, whereas the lab-grown diamonds are **nitrogen-free**.
 - Lab-grown diamonds are **eco-friendly and conflict-free**. Unlike mined diamonds, which displace up to 250 tonnes of earth and emit greenhouse gases, lab-grown diamonds use less water and energy.
- **Market of Lab Grown Diamonds:** As of 2024 around **90% of the world's diamonds are processed in India**, accounting for approximately **75% of global turnover by value**.

- The lab-grown diamond market is expected to make up 16% of the global diamond market by 2029 from 12% in 2024.

- Lab-grown diamonds are chemically, physically, and optically identical to natural diamonds. They share the exact same cubic crystal **lattice structure** and the same **refractive index (2.42)**. Because they are 100% pure carbon, they exhibit the same fire, brilliance, and sparkle as mined diamonds.
- The Kimberley Process Certification Scheme (KPCS) was established specifically to prevent "conflict diamonds" (blood diamonds) from entering the mainstream rough natural diamond market. Since lab-grown diamonds are created in a controlled laboratory environment and do not involve mining or the funding of rebel movements in conflict zones, they fall outside the scope of the Kimberley Process.

4. ANEEL (Advanced Nuclear Energy for Enriched Life)

Context: Chicago-based Clean Core Thorium Energy (CCTE) has partnered with NTPC Ltd to deploy thorium-based nuclear fuel in India's existing PHWRs, marking a new phase in India-US civil nuclear cooperation.

About

- CCTE has developed a fuel that **blends thorium with HALEU (high-assay low-enriched uranium)**, enabling its use in India's existing **Pressurised Heavy Water Reactors (PHWRs)**.
- The fuel, called **ANEEL (Advanced Nuclear Energy for Enriched Life)**, allows large-scale thorium deployment in PHWRs, enhancing energy security, reactor safety, and proliferation resistance

What is Thorium?

- Thorium is a **radioactive metallic element** found naturally in the Earth's crust.
- It is **fertile, not fissile**, meaning it cannot sustain a nuclear chain reaction on its own.

- **Thorium Availability in India:** Thorium is primarily **extracted from monazite sands**. India possesses one of the largest thorium reserves globally.
- **Major deposits are found in:**
 - **Coastal sands** of Kerala, Tamil Nadu, Odisha, Andhra Pradesh, Maharashtra and Gujarat.
 - **Inland riverine sands** of Jharkhand and West Bengal.

Popular Thorium mining sites in India:

Site	State	Type of Deposit
Chavara	Kerala	Coastal Beach Placer
Chhatrapur	Odisha	Coastal Beach Placer
Manavalakurichi	Tamil Nadu	Coastal Beach Placer
Kalingapatnam	Andhra Pradesh	Coastal Beach Placer
Purulia	West Bengal	Inland Placer

5. VoWiFi

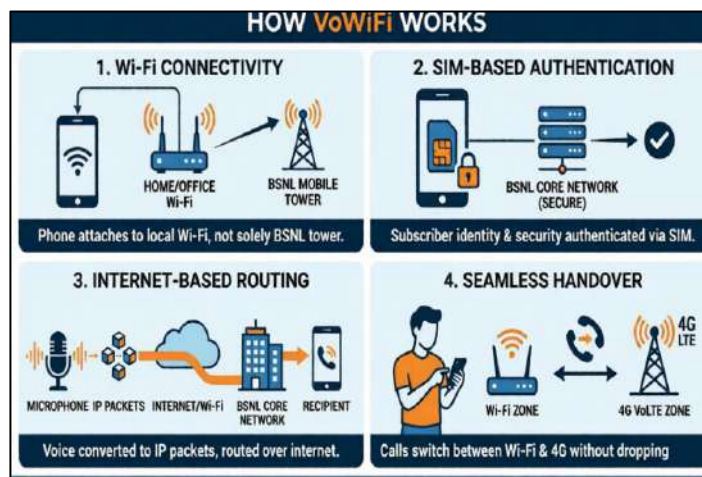
Context: State-owned telecom operator **Bharat Sanchar Nigam Limited (BSNL)** has launched **Voice over WiFi (VoWiFi)** services nationwide across all telecom circles, allowing users to make voice calls and send SMS over Wi-Fi networks.

What is VoWiFi?

- Voice over WiFi (VoWiFi) is a technology that enables users to:
 - Make and receive voice calls and SMS using a Wi-Fi network instead of a mobile tower.
 - Use the same mobile number and default phone dialer.
 - Operate without any third-party app.
- It is built on IMS (IP Multimedia Subsystem) architecture, ensuring carrier-grade call quality and security.
- The primary purpose of VoWiFi is to provide coverage in “dark spots” (like basements or

remote areas) where cellular towers are unreachable but a WiFi router is available.

- Unlike VoIP services (WhatsApp, Telegram, Skype), VoWiFi is a **carrier-native** technology. It uses the phone's built-in dialer and your existing mobile number. You do not need to download any extra apps; you simply toggle the feature on in your phone's settings.



- VoWiFi is designed to work in tandem with VoLTE. If you start a call on WiFi and walk out of range, the call will “hand over” to the 4G/LTE network automatically, provided both services are enabled.
- VoWiFi is highly secure because it uses the **IP Multimedia Subsystem (IMS)** and your SIM card for authentication, rather than a simple username/password login used by many third-party apps.

6. Microlensing

Context: A study recently used microlensing to weigh a rogue planet, i.e. not orbiting a star.

About Microlensing

- It is a fascinating phenomenon where the light of a background star is deflected by the gravity of a foreground object towards an observer, temporarily magnifying the star as the foreground object crosses the observer's line of sight.

- It occurs due to gravitational lensing, predicted by Einstein's General Theory of Relativity.
- The intervening object acts as a gravitational lens, bending the background light.
- We don't need to receive any light at all from the foreground object, and still we can use microlensing to measure its properties, like mass and distance.
- This makes it a great way to find objects that are too far away to be visible, like distant planets, brown dwarfs, and neutron stars, and even those that are entirely invisible, like isolated black holes.
- Microlensing events are transient and generally unpredictable.
- Some events last for just 1 day, while others can continue for months or even years, and they can result in very sudden and dramatic changes in brightness.
- Microlensing depends on gravity rather than luminosity, it is one of the few techniques capable of finding objects like rogue planets (planets floating in space without a host star), brown dwarfs, or black holes.
- According to General Relativity, any mass acts as a gravitational lens. When a dark object (the lens) passes in front of a distant star (the source), the lens's gravity focuses the source's light, making it appear temporarily brighter to observers on Earth.

7. Wolf Supermoon

Context: The January 2026 Wolf Supermoon occurred recently.

About

- A **Wolf Supermoon** combines two distinct concepts: **Wolf Moon** and **Supermoon**.
 - **Wolf Moon:**
 - The term refers to the **full moon occurring in January**. Such traditional names for full moons originated from seasonal patterns and were popularised through folklore

and almanacs to mark time before modern calendars.

- The name is associated with winter stories of wolves being heard more frequently, though it has **no astronomical significance**.
- **Supermoon:**
 - A supermoon is an **astronomical phenomenon** that occurs when a full moon coincides with the Moon's closest approach to Earth, known as **perigee**.
 - The Moon follows an **elliptical orbit**, with its farthest point called **apogee**.

Key Features

- During a Wolf Supermoon, the Moon appears slightly larger and brighter than a typical full moon.
- An associated visual effect is the Moon Illusion, where the Moon appears larger near the horizon due to human perception, not actual size change.

8. Mpemba Effect

Context: Recently, researchers from Jawaharlal Nehru Centre for Advanced Scientific Research have used supercomputers to develop the first simulation of ice formation proving the Mpemba effect of water.

About Mpemba Effect

- Mpemba effect is a paradoxical phenomenon in which a hot liquid can cool or freeze faster than a cold liquid under certain conditions.
- The effect described by Aristotle, in his book Meteorologica.
- It is named after Tanzanian student Erasto Mpemba, who brought attention to this counterintuitive phenomenon in 1969, making for curious observations.

Possible Explanations

- **Micro bubbles:** One cause, scientists have posited, is micro bubbles left suspended in water that has been heated by boiling.

- These cavities promote convection and transfer heat faster as the water cools.
- **Evaporation:** as warmer water evaporates more, it also takes away some heat (evaporation is inherently endothermic, which is how sweat cools your skin).
- Both convection and accelerated heat transfer are enhanced in warmer water because such water is less dense.
- **Presence of frost in cold water:** Frost is an insulator and could slow the loss of heat.
- Scientists have also considered whether compounds in water like calcium carbonate could be precipitated by boiling, and then dissolve, thus increasing the water's freezing point.

Recent Findings related to Mpemba Effect

- The researchers also found that the Mpemba effect is not unique to water.
- The simulation demonstrates that similar behavior can occur during fluid-to-solid phase transitions in other materials.

9. Dust Experiment

Context: Recently, the Indian Space Research Organisation confirmed through its first-ever Dust Experiment (DEX) that an interplanetary dust particle enters Earth's atmosphere approximately every 1,000 seconds.

About Dust Experiment (DEX)

- It is the first Indian-made instrument to hunt for these high-speed Interplanetary Dust Particles (IDPs).
- It is the first-of-its-kind instrument designed to detect such high-transient particles.
- It is developed by the Physical Research Laboratory, Ahmedabad.
- It was flown on PSLV Orbital Experimental Module (POEM) of the PSLV-C58 XPoSat Mission on January 1, 2024.

Features of Dust Experiment (DEX)

- It is a compact instrument tuned to hear impacts, capturing vital data.
- At the core of the experiment lies a 3-kilogram dust detector based on the cutting-edge hypervelocity principle designed to capture high-speed space dust impacts with only 4.5 W power consumption.
- It rocketed to an altitude of 350Km.
- DEX is a blueprint of the detector which can study the cosmic dust particle at any planet having an atmosphere or no atmosphere.

Significance of the Dust Experiment (DEX)

- Its data redefines our understanding of the universe and charts the path for safe human deep-space missions.
- Understanding and collecting data on interplanetary dust in Earth's atmosphere will also be valuable for planning Gaganyaan missions.

What are Interplanetary Dust Particles (IDPs)?

- Interplanetary dust refers to micrometer-scale particles originating from the solar system.
- These are microscopic shrapnel from comets and asteroids that form our atmosphere's mysterious "meteor layer", and show up as "shooting stars" at night.
- These can be analyzed to gain insights into their origins, formation mechanisms, and the processes that occurred in early solar and presolar environments.

10. W Ursae Majoris (W UMa) Stars

Context: A study of a type of stellar twin called W Ursae Majoris-type contact binaries that orbit each other closely gives new insights into how binary stars evolve and their eventual fate.

What Are W Ursae Majoris (W UMa) Stars?

- W Ursae Majoris (W UMa) stars are **short-period, dumbbell-shaped binaries** in which the two stars are in contact.

- These stars are so close that they share a **single outer atmosphere** and they orbit around each other.
- **Significance:** These stars act as “natural laboratories” as they assist in precise determinations of fundamental stellar parameters such as **masses, radii, and temperatures**, crucial for testing theories about how stars evolve over time.

What Are Stellar Twins?

- Stellar twins are **stars that are very similar in their fundamental physical properties**, such as mass, radius, temperature, chemical composition, and age.
- Because of these similarities, they are extremely valuable for studying stellar evolution and testing astrophysical theories.
- **Types of Stellar Twins:**
 - Binary Stellar Twins
 - Solar Twins
 - Spectroscopic Twins

11. Long Range Anti-Ship Missile

Context: India's indigenous LR-ASHM missile will be on display at the Republic Day parade on January 26, highlighting the country's growing maritime strike capability.

About Long Range Anti-Ship Missile (LRASHM)

- It is a **hypersonic glide missile developed by the Defence Research and Development Organisation (DRDO)**.
- Hypersonic glide vehicles (HGVs) like the LRASHM differ from traditional ballistic missiles, which follow a fixed trajectory.
- HGVs are launched on a rocket, ascend to the upper atmosphere, and then glide towards their target in an unpredictable manner.
- This combination of exceptional speed and maneuverability makes them extremely difficult to intercept with existing air defense technologies.

- It outperforms similar missiles like China's DF-17 in terms of range and technology.
- It is being built for anti-ship roles (to target enemy warships and carrier groups) and may also evolve into a land-attack variant.
- The missile's radio frequency (RF) seeker, designed to operate effectively at hypersonic speeds, ensures accurate strikes against moving targets, such as warships, a capability that very few weapons possess.
- It is capable of carrying various payloads, including both conventional and nuclear warheads.

12. Radiative effect of water vapour

Context: As per the recent study, water vapour contributes more to atmospheric heating than aerosols, highlighting its dominant role in the regional climate system.

Key Points

- The **radiative effect of water vapour** is strongly modulated by aerosol presence, indicating a tight aerosol–water vapour coupling.
- **Water vapor radiative effects (WVRE)** is strongest in clean (low-aerosol) atmospheric conditions, both at the surface and within the atmosphere.
- **The Indo-Gangetic Plain (IGP)** is a global hotspot of aerosol loading due to:
 - High population density;
 - Industrial and vehicular emissions;
 - Biomass burning and dust transport.

Water Vapour

- Water vapour is the most abundant greenhouse gas in the atmosphere.
- It is a condensable gas, easily changing from gas to liquid.
- Its concentration decreases with altitude and from the equator towards the poles.
- It can constitute up to 4% of air by volume in warm tropical regions.

- In cold, dry deserts and polar regions, it may be less than 1%.
- A recent study indicates that the **Water Vapor Radiative Effect (WVRE)** is “strongest in clean (low-aerosol) atmospheric conditions.” Since the Indo-Gangetic Plain (IGP) is identified as a “global hotspot of aerosol loading,” the WVRE would naturally be more pronounced in remote, pristine (clean) regions by comparison.
- The study mentions a “tight aerosol–water vapour coupling” and notes that the radiative effect is “strongly modulated” by aerosols. The various sources mentioned (industrial, vehicular, biomass burning) are what create this high aerosol loading.

13. Medical Uses of Ethylene Glycol

Context: The Telangana Drug Control Administration (DCA) on Saturday issued a stop-use notice for a batch of Almont-Kid Syrup contaminated with the toxic ethylene glycol (EG).

Medical Uses of Ethylene Glycol

While primarily an industrial chemical, ethylene glycol has three specific applications in medicine and biotech:

- **Cryoprotectant:** Its most critical use. It is added to biological samples (embryos, eggs, and sperm) during **IVF** to prevent ice crystal formation during freezing, protecting the cell membranes from rupture.
- **Chemical Intermediate:** It is a key building block for producing **Polyethylene Glycol (PEG)**. PEG is used in drug delivery (PEGylation) to make medicines last longer in the bloodstream and in common laxatives.
- **Solvent:** Used in trace amounts in certain lab reagents and topical medical formulations to maintain moisture (humectant).
 - Ethylene glycol is **not** an antidote for methanol poisoning; it is actually a **toxic substance** itself. Using it would only add more poison to the patient's system. The

standard antidotes for methanol poisoning are **Fomepizole** or **Ethanol** (medical-grade alcohol).

- While the subject (Ethylene glycol) is the wrong choice for treatment, the **biological mechanism** described is technically how an antidote works. Alcohol dehydrogenase (ADH) is the enzyme that breaks down both methanol and ethylene glycol into toxic acids. An antidote works by **competitively inhibiting** this enzyme so the toxins are excreted safely before they can be metabolized.

14. Insights from ISRO's Aditya-L1 Solar Mission on Solar Storms

Context: The Indian Space Research Organisation (ISRO) on January 10 said its Aditya-L1 solar mission had provided new insights into how a powerful solar storm could impact earth's magnetic shield.

Insights from ISRO's Aditya-L1 Solar Mission on Solar Storms

- **Mission Update:** ISRO's **Aditya-L1** solar mission provided new insights into how **powerful solar storms impact Earth's magnetic shield**.
- **Severe Effects:** The **most intense impacts** occurred during the **turbulent region** of the solar storm.
- **Research Publication:** A **breakthrough study** was published in The Astrophysical Journal (December 2025), analyzing a **major space weather event** that struck Earth in **October 2024**.
- **Data Sources:** Study used observations from **Aditya-L1** (India's first solar observatory) and **other international space missions** to understand the effect of **massive solar plasma eruptions**.

Space Weather and Its Effects

- **Definition:** Space weather refers to **conditions in space caused by transient solar activity**, such as **solar plasma eruptions**, which can affect:

- Satellites
- Communication and navigation systems
- Power grid infrastructure on Earth
- **Magnetic Shield Impact:** During the turbulent phase of the solar storm:
 - Earth's **magnetic field was strongly compressed**, moving unusually close to Earth.
 - **Some geostationary satellites** were briefly exposed to **harsh space conditions**.
- **Occurrence:** Such phenomena happen **only during severe space weather events**.
- **Auroral Currents:** The study revealed that **currents in the auroral region** (high latitudes) **super-intensified**, which:
 - Can **heat the upper atmosphere**
 - May lead to **enhanced atmospheric escape**
- ISRO's Aditya-L1 observations confirm that severe solar storms can **push Earth's magnetic field unusually close**, exposing geostationary satellites to extreme space conditions.
- The **turbulent regions of solar plasma eruptions** interact with Earth's magnetosphere, leading to geomagnetic compression and disturbances.

15. Vehicle-To-Vehicle Communication Technology

Context: The Government of India is preparing to roll out Vehicle-to-Vehicle (V2V) communication technology by the end of 2026.

About Vehicle-To-Vehicle Communication Technology

- It is defined as a direct communication method that allows vehicles to exchange information with one another,
- It enhances driver awareness of their surroundings through wireless technologies.
- It allows vehicles to communicate directly with each other without the need for a network.
- The initiative aims to strengthen road safety and reduce accidents across the country.

- **Functioning:** The system will function through a device similar to a SIM card, which will be installed in vehicles.

Features of Vehicle-To-Vehicle Communication Technology

- Vehicles will receive real-time alerts when another vehicle comes too close from any direction.
- Each vehicle equipped with V2V technology continuously broadcasts and receives data such as speed, location, direction, acceleration and braking status.
- When a potential risk is detected, the system alerts the driver, giving them extra time to react.
- The technology will provide alerts related to safe vehicle distance and will also warn drivers about nearby roadside or stationary vehicles.
- The system will provide signals from all sides of the vehicle, ensuring 360-degree communication.
- It will work in coordination with Advanced Driver Assistance Systems (ADAS).
- **Advantage:** This feature will be extremely useful during foggy conditions when visibility between vehicles drops to almost zero.
- V2V does **not require line-of-sight (LOS)** because it relies on **wireless communication** (radio signals) to transmit information. Vehicles can exchange alerts even if there are obstacles like trucks, buildings, or curves.
- V2V uses DSRC or C-V2X protocols to share real-time data like speed, braking, and heading.
- V2V can provide a **360-degree awareness mesh network**, allowing vehicles to "see" around corners or obstructions by sharing information from other connected vehicles.
- V2V is different from LiDAR, Radar, or cameras, which perceive the immediate environment. V2V shares information that other vehicles "know" but a car's sensors cannot detect, like a car braking beyond a blind corner.

16. Nitrogen-vacancy (NV) centres

Context: Researchers have discovered that tiny defects in diamonds, called nitrogen-vacancy (NV) centres can be harnessed for powerful quantum technologies.

Nitrogen-vacancy (NV) centres

- All diamonds are made of a rigid grid of carbon atoms.
- Nitrogen-vacancy (NV) centres occur when a carbon atom in a diamond is replaced by nitrogen, leaving an adjacent vacancy.
- These “perfect defects” act like single atoms trapped in a solid cage, retaining quantum spin coherence.
- NV centres are highly sensitive to magnetic and electric fields, making them precise quantum sensors.
- They can operate at room temperature, unlike most quantum systems requiring extreme cooling.
- **Latest Developments**
- Researchers from Austria and Japan have demonstrated that by using around 9 trillion nitrogen-vacancy (NV) centres in a superconducting microwave cavity could generate a continuous microwave beam, creating a diamond maser—a microwave equivalent of a laser.
- The process relies on a “bucket brigade” mechanism, where energy is transferred between interacting spins through magnetic dipole-dipole interactions, sustaining continuous emission.
- This discovery shows that spin interactions, previously seen as disruptive, can be harnessed to develop quantum devices and enhance understanding of collective emission in many-body solid-state systems.

Potential applications

- Potential applications include highly stable superradiant masers with narrow linewidths, efficient narrow-band microwave amplifiers,

ultra-stable frequency sources for quantum technologies and precision sensing, and enhanced quantum sensors, benefiting fields such as medical imaging, materials science, and environmental monitoring.

17. Man Portable Anti-tank Guided Missile Weapon System

Context: Recently, the Defence Research and Development Organisation & Indian Army conducted successful trials of indigenous Man Portable Anti-tank Guided Missile Weapon System.

About Man Portable Anti-tank Guided Missile Weapon System

- It is indigenously designed and developed by Defence Research & Development Organisation (DRDO).
- The system consisted of the MPATGM, Launcher, Target Acquisition System, and the Fire Control Unit.
- **It is the third-generation “fire and forget” missile.**
- Features of Man Portable Anti-tank Guided Missile Weapon System
- It incorporates cutting-edge indigenous technologies, including;
- an Imaging Infrared (IIR) homing seeker, all-electric control actuation system, advanced fire control system, tandem warhead, propulsion system and a high-performance sighting system.
- The IIR seeker provides robust day-and-night operational capability.
- The tandem warhead is designed to defeat modern main battle tanks equipped with advanced armour protection.
- The missile can be launched from a tripod-mounted system as well as from a military vehicle-based launcher, enhancing its operational flexibility.
- Bharat Dynamics Limited (BDL) and Bharat Electronics Limited (BEL) are the development-cum-production partners (DcPP) for the MPATGM.

18. Greenwald Limit

Context: China's EAST fusion reactor has achieved stable plasma densities up to 65% beyond the Greenwald limit, a long-standing barrier in nuclear fusion research.

About Greenwald Limit:

What it is?

- The Greenwald limit is a theoretical density ceiling for plasma in a tokamak (fusion reactor), beyond which the plasma becomes unstable and collapses.
- It links the maximum safe plasma density to the plasma current and size of the reactor.

Why it is important?

- Fusion reactions require very high plasma density, temperature, and confinement time.
- The Greenwald limit has long been a major bottleneck, preventing reactors from packing enough fuel to reach self-sustaining fusion (ignition).

19. Ultracold

Context: Ultracold atoms sit at the heart of the quantum-technology revolution. India has built a strong and steadily growing presence in cold and ultracold-atom research.

1. How Cold is "Ultracold"?

- In this field, "cold" usually refers to temperatures in the range of **microkelvin** or **nanokelvin**. For perspective, these atoms are millions of times colder than deep space (which is about 2.7 K).

2. Key Quantum Phenomena

When atoms reach these temperatures, they undergo a transformation based on their quantum statistics:

- **Bose-Einstein Condensate (BEC):** Occurs in "Bosons" (atoms with even total protons + neutrons). The atoms lose their individual identity and collapse into a single "super-atom"

or a giant matter wave. All atoms occupy the lowest possible energy state simultaneously.

- **Degenerate Fermi Gas:** Occurs in "Fermions" (atoms with odd total protons + neutrons). Due to the Pauli Exclusion Principle, these atoms cannot occupy the same state, so they stack up like a "ladder" of energy levels even at absolute zero.

3. Cooling Techniques

- **Laser Cooling (Doppler Cooling):** Lasers are used to "bombard" the atoms from all sides. When an atom moves toward a laser, it absorbs a photon and receives a "kick" in the opposite direction, slowing it down. This is often called **Optical Molasses**.
- **Evaporative Cooling:** Once the atoms are pre-cooled by lasers, they are trapped in a magnetic or optical bowl. The "hottest" (fastest) atoms are allowed to escape, lowering the average temperature of the remaining atoms-much like how a cup of coffee cools as steam leaves it.

4. Why Do We Study Them?

Ultracold atoms are the ultimate "quantum simulators." Because they move so slowly, scientists can manipulate them with extreme precision to study:

- **Superfluidity:** Substances that flow with zero friction.
- **Quantum Computing:** Using trapped ions or neutral atoms as "qubits."
- **Atomic Clocks:** These are the most accurate timekeeping devices in existence, used for GPS and deep-space navigation.
- **Precision Measurement:** Detecting tiny changes in gravity or magnetic fields that could reveal "Dark Matter" or "Dark Energy."
 - Magnetic and optical traps are standard tools in ultracold atom experiments.
 - Bose-Einstein Condensation is a hallmark phenomenon in ultracold bosonic systems.
- Ultracold atoms are widely used for **quantum simulation** of complex systems such as lattice models and strongly correlated matter.

20. BSL-4 Facility

Context: The Union Home Minister laid the foundation stone for a Bio-Safety Level 4 (BSL-4) Containment Facility and laboratory in Gandhinagar, describing it as a “health shield” for India.

BSL-4 Facility

- Bio-Safety Level 4 (BSL-4) labs represent the highest level of biological containment.
- It is designed to safely study the world’s most dangerous and highly infectious pathogens that often lack vaccines or treatments.
- Scientists conduct advanced research, develop diagnostics, vaccines, and therapeutics, and carry out rapid outbreak investigation and response under strictly controlled and internationally monitored conditions.

Preset status in India

- **Currently, there is only one civilian BSL-4 laboratory functional in India, located at the National Institute of Virology (NIV) in Pune, Maharashtra.**
- However, in late 2024, the Defence Research and Development Organisation (DRDO) under the Defence Ministry set up its own BSL-4 lab in Gwalior, Madhya Pradesh.
- The **Ministry of Health and Family Welfare** had established a network of Virus Research and Diagnostic Laboratories (VRDL) under the central sector scheme “Setting up of a Nationwide Network of Laboratories for Managing Epidemics and National Calamities.”
 - **Under this scheme, 165 biosafety laboratories, including 11 BSL-3 level labs and 154 BSL-2 level labs, have been approved.**

New laboratory in Gujarat

- The BSL-4 laboratory coming up in Gandhinagar, along with an Animal Bio-Safety Level (ABSL) facility, will be a strategic national asset where research is conducted on the deadliest pathogens known to mankind, including the

Ebola virus, Marburg virus, Crimean-Congo Hemorrhagic Fever (CCHF) virus, Kyasanur Forest Disease virus, and Nipah virus, among others.

21. Indelible Ink in Indian Elections

Context: Maharashtra’s State Election Commission has decided to revert to traditional indelible ink for zilla parishad and panchayat samiti elections after complaints that marker-pen ink used in municipal polls could be wiped off.

Traditional Indelible Ink in Indian Elections

What is Indelible Ink?

- **Indelible electoral ink** is a **semi-permanent dye** applied to a voter’s finger during elections to indicate that the person has already cast their vote. It helps prevent **multiple voting** and electoral fraud.

Purpose and Significance

- The primary purpose of indelible ink is to ensure **one-person-one-vote** by marking the finger of every voter. Once applied, the mark is meant to **last several days to weeks** so that a person cannot vote again at another polling station.

History in India

- **Indelible ink was first used in Indian elections in 1962 during the third general elections. Since then it has become a symbol of India’s democratic process.**

Composition

- The ink contains **silver nitrate**, which reacts with the skin and nails to produce a dark stain that is resistant to soap, water, and most cleaning agents.

Who Makes It?

- **The formula for the ink was developed by the National Physical Laboratory (NPL), New Delhi.**
- The **sole manufacturer** of the indelible ink for Indian elections is **Mysore Paints and Varnish**

Ltd. (MPVL), a Karnataka government undertaking.

Application in Elections

- At the polling station, after a voter's identity is verified, election staff apply the ink to the **left index finger**, typically across the nail and skin near the base.

How Long Does the Mark Last?

- The stain from the ink typically remains visible for a **few weeks on the fingernail** and several days on the skin, fading only as the outer skin cells wear away.

Note: The use of indelible ink is indeed governed by the Conduct of Elections Rules, 1961 (specifically Rule 37 and Rule 49K). It is mandatory for General (Lok Sabha) and State Assembly elections to mark the left forefinger of the voter.

22. National Cyber Crime Reporting Portal

Context: The Ministry of Home Affairs (MHA) approved a new Standard Operating Procedure (SOP) for the Cyber Financial Crime Reporting and Management System (CFCFRMS).

- Objective:** The SOP aims to enhance public trust in digital payments and ensure faster relief for victims of cyber financial fraud.
- Operational Modules:** Two digital modules—one for grievance redressal and another for money restoration will be developed under the National Cybercrime Reporting Portal (NCRP).

National Cyber Crime Reporting Portal (NCRP):

- It is an initiative to facilitate victim's complainants to report cybercrime complaints online.
- Established on** – 2019, under Indian Cybercrime Coordination Centre (I4C) to deal with all types of cybercrime in the country.

- Objective** – To enable public to report incidents of cyber-crimes, with special focus on cyber-crimes against women and children.
- Nodal Ministry** – Ministry of Home Affairs.
- Statutory backing** – Cyber-crime cases are handled under
 - Bhartiya Nyaya Sanhita (BNS), 2023
 - Protection of Children from Sexual Offences Act 2012
 - Information Technology Act, 2000 (IT Act).
- The revamped version of the portal allows reporting of all types of Cybercrimes.
- Monitoring Agency** – The States/UTs are primarily responsible for the prevention, detection, investigation and prosecution of crimes including cyber-crime through their Law Enforcement Agencies (LEAs).
- Features:**
 - Special focus on content reporting of online Child Sex Abuse Material/Rape-Gang Rape incidents.
 - National/State/District-Level monitoring dashboards.
 - Online status tracking facility for the complainant.
 - Cyber Volunteers registered as Cyber Awareness Promoters.

23. Three-body problem in astrophysics

Context: Indian Deep Space Network (IDSN) data showed that the discarded propulsion module of Chandrayaan-3 had an orbit-altering close encounter with the Moon.

Key Details

- After Chandrayaan-3 mission completion, ISRO placed the discarded propulsion module in an elliptical Earth orbit of about **125,000 km perigee and 305,000 km apogee**.
- The module entered the Moon's **sphere of influence from November 4-14**, with two close lunar flybys at around **3,740 km and 4,537 km** from the lunar surface.

- Lunar gravity reshaped its orbit, with the **apogee rising to ~727,000 km** and the perigee to **~409,000 km**, close to Moon's average distance from the Earth of **~384,000 km**.
- The orbit was also tilted by about **22°**, reflecting a **three-body problem** in which combined Earth-Moon gravitational pulls caused a chaotic orbital change.

What is three-body problem?

- The **three-body problem in astrophysics** refers to the challenge of predicting the motion of **three celestial bodies** that interact with each other **only through gravity**.

What makes it a "problem"?

- For **two bodies** (like Earth and the Sun), Newton's laws give **exact, simple solutions**.
- When a **third body** is added, the gravitational interactions become **highly complex**.
- In most cases, there is **no exact analytical solution**, the motion can become **chaotic** and extremely sensitive to initial conditions.

L4 Lagrange points:

- **L4 is a Lagrange point**, where:

- Gravitational forces from the two stars
- plus the **centrifugal force** in the rotating frame **exactly balance**.
- As a result, the planetoid can remain at a **fixed position relative to both stars**, even though everything is orbiting the system's centre of mass.
- This is a **classic three-body problem configuration**, not a two-body one.



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GEOGRAPHY AND MAPPING

1. Gulf of Finland and Gulf of Riga

Context: Finland has seized a ship suspected of damaging an undersea telecom cable in the Baltic Sea, amid heightened NATO alert following repeated incidents targeting critical subsea infrastructure since the Ukraine conflict.

Gulf of Finland and Gulf of Riga:

- **Gulf of Finland:** This is the easternmost arm of the Baltic Sea. It is bordered by **Finland** to the north, **Estonia** to the south, and **Russia** at its eastern tip (near St. Petersburg).
- **Gulf of Riga:** This is a large bay of the Baltic Sea located further south. It is bounded by **Estonia** to the north and east, and **Latvia** to the south.
- Hence, among the countries listed, **Estonia** is the only one that shares a coastline with both the Gulf of Finland and the Gulf of Riga.



2. Bomb Cyclone

Context: A powerful winter storm, Winter Storm Ezra, rapidly intensified into a bomb cyclone over the US, disrupting peak holiday travel with mass

flight cancellations, blizzards, power outages, and hurricane-force winds across multiple states.

About Bomb Cyclone:

- A bomb cyclone is a powerful mid-latitude weather system that undergoes explosive cyclogenesis, marked by an exceptionally rapid fall in central air pressure within 24 hours, resulting in severe and wide-ranging weather impacts.

Mechanism of formation:

- Bomb cyclones form when **cold, dense polar air** collides with **warm, moisture-rich air**, typically over oceans where sharp temperature contrasts provide abundant latent heat energy.
- The rapid upward movement of warm air lowers surface pressure sharply, drawing surrounding air inward at high speeds and causing the storm to intensify explosively.

Key features:

- **Rapid pressure fall:** A defining characteristic is a pressure drop of **24 millibars or more in 24 hours**, reflecting extreme atmospheric instability rather than gradual storm development.
- **Extreme weather:** The intense pressure gradient generates blizzards, freezing rain, flooding rainfall and hurricane-force winds, often producing life-threatening whiteout conditions.
- **Sharp temperature swings:** The advancing cold front can cause abrupt temperature drops of **40–50°F within hours**, severely stressing human health, transport systems, and energy demand.
- **Large spatial impact:** Bomb cyclones span hundreds of kilometres, simultaneously disrupting aviation, road transport, shipping routes and electricity networks across multiple regions.

3. Savannas

Context: As per the study of medieval Marathi literature Savannas in western Maharashtra are far older than commonly believed and should not be treated as degraded forests.

Savannas

- A savanna is typically defined as a **mixed tree-grass system** with **scattered trees amidst a continuous layer of grass**.
 - They are characterized by **widely spaced trees, a continuous grass layer, and a distinct wet and dry season**.
 - It is a type of ecosystem found in **tropical regions**.
- **Unlike dense forests**, trees in the savanna are spread out, allowing plenty of sunlight to reach the ground, which supports a wide range of grasses and herbivores.
- **Savannas occur where** there isn't enough rain to support a tropical rainforest, but there is enough to keep it from becoming a desert.
- **Some examples of savanna habitat** are the East African plains, the South American pampas, and the open woodlands of northern Australia.
- **Savannas in India: Deccan Plateau:** Rain-shadow regions of Maharashtra, Telangana, and Karnataka (Semi-arid).
 - **Terai Region:** The Terai-Duar Savanna and Grasslands at the foothills of the Himalayas are highly productive tall-grass ecosystems (home to the Rhinoceros and Tiger).
 - **Western India:** Parts of Rajasthan and Gujarat (Banni Grassland) (transitioning to Thorn Forests).

Note: The Deccan Plateau (specifically parts of Maharashtra, Karnataka, and Telangana) contains "wooded savannas." This landscape is the primary habitat for the Indian Wolf, Blackbuck, and the Great Indian Bustard.

4. Indonesia

Context: Indonesia's long-awaited new Criminal Code, which has come under fire for its bans on pre-marital sex and insults to the state, comes into effect on January 3.

- While the Equator does pass through Borneo (specifically the Indonesian provinces of Kalimantan), it does not pass through Java. Java is located entirely in the Southern Hemisphere, south of the Equator. The major Indonesian islands crossed by the Equator are Sumatra, Borneo (Kalimantan), Sulawesi, and Halmahera.
- The Savu Sea is an internal sea within Indonesia, bounded by the Lesser Sunda Islands (Flores to the north, Sumba to the west, and Timor and Savu to the south). The body of water that actually separates Indonesia from Australia is the Timor Sea and the Arafura Sea.



5. Popocatepetl Volcano

Context: Recently, a team of scientists obtained the first 3D images from inside Mexico's Popocatepetl volcano.

About Popocatepetl Volcano

- Popocatepetl means "Smoking Mountain" in the Aztec Nahuatl language.
- Location: It is located in central Mexico roughly 45 miles (72 kilometers) southeast of Mexico City.
- It is on the border of the states of México and Puebla.
- The volcano lies on the Trans-Mexican Volcanic Belt, which is the result of the small Cocos Plate subducting beneath the North American Plate.
- It is one of Mexico's most active volcanoes, with recorded eruptions since 1519.
- Elevation: It is a steep-sided stratovolcano that rises to an elevation of 5452 m (17,883 ft) above sea level.
- Popocatepetl is one of the most dangerous volcanoes in the Ring of Fire.

	Volcanoes	Locations
1	Mount Merapi	Indonesia
2	Mount Mayon	Philippines
3	Mount Etna	Italy
4	Popocatepetl	Mexico

6. Bavarian Alps

Context: Anger is simmering in parts of Berlin where an arson attack claimed by a far-left group has caused a blackout that has plunged tens of thousands into icy darkness in mid-winter.

Bavarian Alps:

- The **Bavarian Alps** (Bayerische Alpen) comprise the German section of the **Northern Limestone Alps**. Stretching roughly 110 km (70 miles) along the border between southern Germany (Bavaria) and northern Austria, they are world-renowned

for their dramatic limestone peaks, glacial lakes, and fairytale-like castles.



7. Hungary

Context: The celebrated Hungarian filmmaker Béla Tarr, director of such works as *Sátántangó* and *The Turin Horse* and the recipient of numerous awards for his long and often darkly comic films, has died at 70.



Hungary:

- **Hungary is a landlocked Central European Nation, situated in the Carpathian Basin.**
- It is geographically positioned both in the Northern and Eastern hemispheres of the Earth.
- **It is bordered by 7 Nations: by Slovakia in the north; Ukraine in the northeast; Romania in the east; Serbia and Croatia in the south; Slovenia in the southwest and Austria in the west.**

8. Great Australian Bight

Context: Australia's south eastern state of Victoria is facing severe bushfires, with authorities issuing a "catastrophic" fire danger rating amid temperatures crossing 40°C.

**The great Australian Bight:**

- The Bight is characterized by the Bunda Cliffs, which are part of the world's longest continuous line of sea cliffs, stretching for about 100 km and reaching heights of 60 to 120 meters.
- The area sits adjacent to the Nullarbor Plain, the world's largest single exposure of limestone bedrock.
- It is a critical "marine nursery," hosting the world's largest breeding colony of Australian Sea Lions and serving as a major calving ground for the Southern Right Whale.

- In recent years, it has been the subject of significant "No Oil" campaigns to protect its unique deep-water ecosystems from offshore drilling.

9. Luxembourg

Context: External Affairs Minister S Jaishankar's first official visit for 2026 began in Europe, with a visit to Paris and Luxembourg, against the backdrop of major shifts in global politics.

**Luxembourg:**

- Luxembourg is a small landlocked western European Nation.
- It is positioned in the Northern and Eastern hemispheres of the Earth.
- Luxembourg is bordered by 3 Nations: Germany in the East and Northeast; by France in the south; and by Belgium in the North and West.

10. Barak River

Context: The Senapati Forest Division recently launched Participatory Rural Appraisal (PRA) exercises as a pilot initiative to rejuvenate the Barak River watershed while simultaneously strengthening local livelihoods.

About Barak River

- It is a river in northeastern India that flows through Manipur, Mizoram, and Assam before entering Bangladesh.
- It is the second largest river in Northeast India after the Brahmaputra.

Course:

- It rises from the Manipur hills, south of Mao in the Senapati district of Manipur, at an elevation of 2,331 m.
- It flows then along the Nagaland-Manipur border through hilly terrains and enters Assam.
- In Assam, the Barak Valley gets its name from the river and includes the districts of Cachar, Hailakandi, and Karimganj, forming the southernmost part of the state.
- Just before flowing into the neighboring country of Bangladesh, the Barak splits into the Surma River and the Kusiara River.
- These two rivers meet to form the Meghna River, which flows southward, joins the Padma River, and finally drains into the Bay of Bengal.
- **Tributaries:** The principal tributaries of the Barak are Jiri, Chiri, Modhura, Jatinga, Harang, Dhaleswari, Singla, Longai, Sonai, and Katakhal.

Note: Kameng, and Dhansiri are the tributaries of Brahmaputra River.

11. Shaksgam Valley

Context: India has reiterated that Shaksgam Valley is part of its sovereign territory and rejected the 1963 China – Pakistan Boundary Agreement, calling it illegal and invalid. India also reaffirmed its opposition to the China–Pakistan Economic Corridor (CPEC) as it passes through Indian territory under illegal occupation.

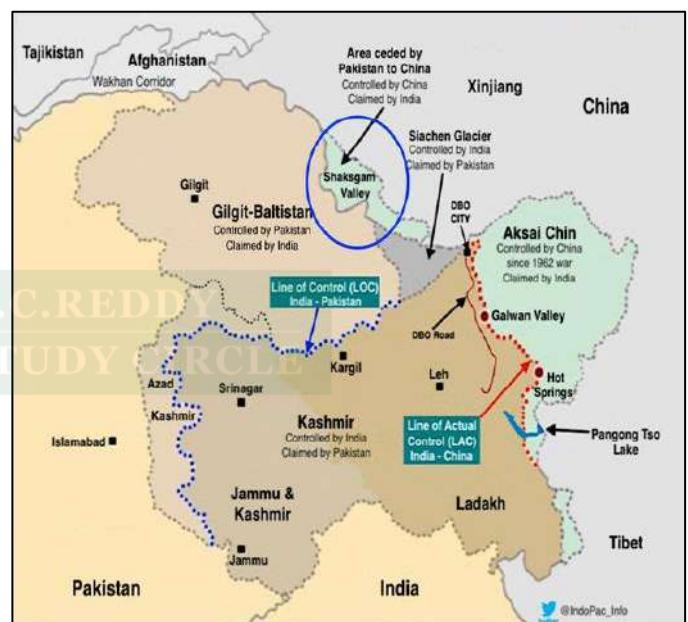
About Shaksgam Valley

- Also known as the **Trans-Karakoram Tract**.
- Lies north of the Siachen Glacier, in the region of Ladakh.

- Historically part of the former princely state of Jammu and Kashmir.
- Currently under Chinese control, Pakistan illegally ceded Shaksgam Valley to China following the **1963 China–Pakistan Boundary Agreement**.

Geographical position:

- **To its South:** The towering peaks of the Karakoram (including K2).
- **To its North:** The Aghil Mountains.
- **To its West:** The Shaksgam River flows toward the Yarkand River in Xinjiang.

**12. Weimar Triangle**

Context: India participated for the first time in the Weimar Triangle format, a significant diplomatic development.

About the Weimar Triangle

- It is a trilateral political and diplomatic grouping of **France, Germany & Poland** established in 1991 named after Weimar, where the three foreign ministers of these nations first met.
- It aims to build a united, secure, and resilient Europe & strengthen political, security, and economic cooperation among Western and Central European powers.

Why Does India's Participation Matters?

- Reflects India–Europe strategic convergence, beyond bilateral ties.
- Indicates European support for India's:
 - Energy security needs
 - Independent foreign policy decisions
- Expands India's engagement with key European security platforms, even outside formal EU structures.

Country share border with France, Germany, and Poland:

- Countries common to **France & Germany** → Belgium, Luxembourg, Switzerland
- Countries common to **Germany & Poland** → Czech Republic
- **No single country** borders **all three**: France, Germany, and Poland.



13. Germany

Context: India and Germany signed agreements spanning sectors such as defence, technology, health, energy and human resources.

- The **Danube River**, Europe's second-longest river, originates in the **Black Forest**

(Schwarzwald) mountains of southwestern Germany. It is formed by the confluence of the two smaller rivers, the Brigach and the Breg, near the town of Donaueschingen.

- The **Bavarian Alps** form a natural border between **Germany and Austria**, not France. The natural border between Germany and France is primarily formed by the **Rhine River** and the **Vosges Mountains**.



14. Neighbour of Gambia

Context: Myanmar deliberately targeted the Rohingya minority with "horrific violence" in a bid to destroy the community, Gambia's Justice Minister told the International Court of Justice (ICJ) on January 12 at the start of a genocide hearing.

Neighbour of Gambia:

- The Gambia is one of the most unique countries in the world in terms of its borders.
- It is a long, narrow strip of land that follows the Gambia River.

- The Gambia is almost entirely surrounded by Senegal.
- It shares its entire land border (North, East, and South) with Senegal, effectively forming an enclave within it.



15. Havana Syndrome

Context: Havana Syndrome, officially termed Anomalous Health Incidents (AHIs), refers to a set of unexplained neurological and physical symptoms first reported in 2016 by US diplomats in Havana, Cuba, and later by intelligence and military personnel across the world.

- The **Equator** does not pass through Cuba. In fact, it is nowhere near the island. Cuba is located in the northern hemisphere, significantly north of the Equator. The major line of latitude closest to Cuba is the **Tropic of Cancer (23.5°N)**, which passes just north of the island through the Straits of Florida.
- The **Cayman Trench** (also known as the Bartlett Deep) is a complex transform fault zone and pull-apart basin on the floor of the western

Caribbean Sea. It is located exactly between **southeastern Cuba and Jamaica**. It contains the deepest point in the Caribbean Sea.



16. Japan

Context: The Japanese Foreign Minister met Prime Minister Narendra Modi ahead of his talks with Jaishankar.



- **Nagoya** is indeed one of Japan's most important port cities and a major industrial hub (often called the "Detroit of Japan"). However, it is located on the **Pacific Coast (Eastern/Southern Coast)** of Honshu, situated on Ise Bay. Most of Japan's major "Pacific Belt" cities, including Tokyo, Yokohama, and Nagoya, are on the eastern/southern side.
- The **Bonin Islands** (also known as the **Ogasawara Islands**) are located in the Pacific Ocean, roughly 1,000 km south of Tokyo; they are **not disputed** and belong to Japan.

17. Finke River

Context: The Finke River, known to the Arrernte people as Larapinta, is believed to be the world's oldest river system.

About Finke River

- It is a major but intermittent river of central Australia.

Course:

- It starts in the MacDonnell Ranges in the Northern Territory.
- The river forms where two smaller creeks, Davenport and Ormiston, meet.
- It flows for about 600 kilometers (370 miles) towards the Simpson Desert in South Australia.
- It is often called "the oldest river in the world."
- A combination of geological records, weathering profiles, and radionuclide measurements in the surrounding sediments and rocks has enabled scientists to date this river system to the Devonian (419 million to 359 million) or Carboniferous (359 million to 299 million) period.
- Most of the time, the Finke River looks like a series of waterholes. But after heavy rains, it can turn into a powerful, fast-flowing river.
- During big floods, its water can even reach the Macumba River and eventually Lake Eyre.
- Some of its main smaller rivers that flow into it are Ellery Creek and the Palmer and Hugh Rivers.

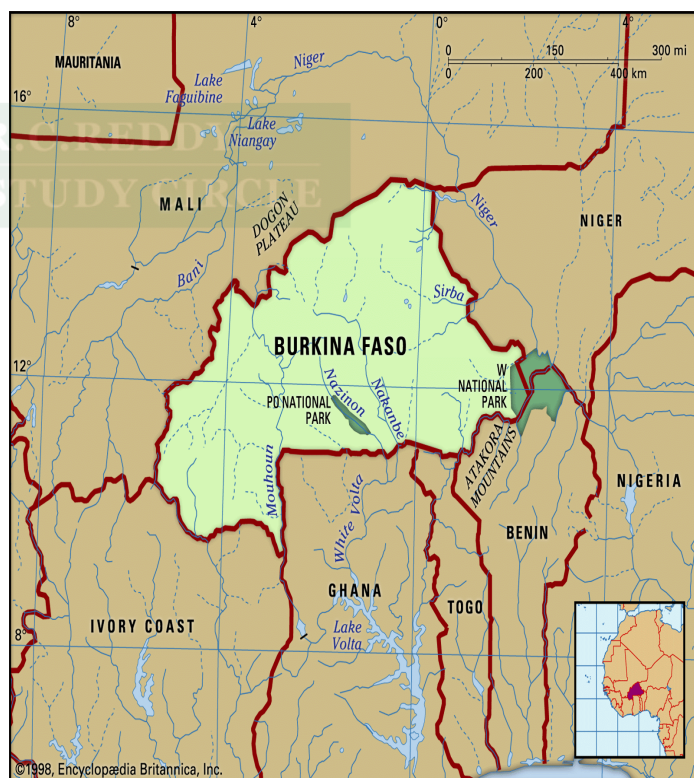
18. Neighbours of Burkina Faso

Context: Burkina Faso said in January month, it had foiled an assassination attempt on military leader **Captain Ibrahim Traore**, but analysts - sceptical after a long series of increasingly unbelievable plots - wondered if the junta has cried wolf too many times.

Neighbours of Burkina Faso:

Burkina Faso shares land borders with the following six countries:

- Mali
- Niger
- Benin
- Togo
- Ghana
- Côte d'Ivoire (Ivory Coast)



19. Uganda

Context: Ugandan President Yoweri Museveni won a seventh term in office on January 18 after an election marred by violence and an Internet shutdown, with African observers saying arrests and abductions had "instilled fear".

Uganda:

- Uganda is a landlocked country located in East-Central Africa in the African Great Lakes region.
- It is located in the Eastern Hemisphere of the Earth.
- **The Equator passes through Uganda (roughly middle of Uganda).**
- Thus, the country has territory in both the Northern and Southern Hemispheres.
- Being a landlocked nation, it is bordered by neighboring countries on all sides.
- It shares its borders with five African countries. South Sudan bounds it to the north, Kenya to the east, Tanzania to the south, the Democratic Republic of the Congo to the west, and Rwanda to the south-west.
- **Lake Victoria is shared by Uganda, Kenya, and Tanzania. Uganda has a significant portion of Lake Victoria along its southern boundary.**

**20. Neighbours of Belarus**

Context: Belarusian Opposition leader Svetlana Tikhanovskaya and her team will leave Lithuania for Poland.

Neighbours of Belarus:

Belarus is a **landlocked country in Eastern Europe** and shares borders with **five countries**:

- **Russia** (east and northeast)
- **Ukraine** (south)
- **Poland** (west)
- **Lithuania** (northwest)
- **Latvia** (north)

**21. Pratas Islands**

Context: A Chinese reconnaissance drone briefly flew over the Taiwan-controlled Pratas Islands at the top end of the South China Sea recently, in what Taiwan's defence ministry called a "provocative and irresponsible" move.

About Pratas Islands

- The Pratas Islands, also known as the Dongsha Islands, are a small group of three islands located in the northern part of the South China Sea.

- These islands are characterized by a circular atoll structure, with Dongsha Island being the only island above sea level, while the other two are submerged.
- They are composed primarily of clastic coral and reef flats approximately 15 miles (24 kilometers) in diameter, enclosing a lagoon about 10 miles (16 kilometers) in diameter.
- Once discovered during the ancient Han Dynasty, Dongsha Island became an important point along trade and fishing routes through the Taiwan Strait, which separates Taiwan from mainland China, and the Bashi Channel between Y'Ami Island of the Philippines and Orchid Island of Taiwan.
- They are strategically important positions along the major sea route connecting the Pacific and Indian ocean.
- It lies approximately 445 km southwest of Kaohsiung, Taiwan, and 320 km southeast of Hong Kong.



22. Spain

Context: Spanish Prime Minister Pedro Sanchez said a U.S. invasion of Greenland “would make Putin the happiest man on earth” in a newspaper interview published on January 18.

Spain:

- Spain is a country located on the Iberian Peninsula in southwestern Europe.
- It is situated in both Northern and Eastern hemispheres of the Earth.

- Spain is bordered by 5 countries: by Portugal in the west, by France and Andorra in the northeast, by Gibraltar and Morocco (the Spanish territories of Ceuta and Melilla in North Africa), in the south.
- The country is bounded by the Mediterranean Sea in the east and southeast, by the Atlantic Ocean in the northwest and southwest and by the Bay of Biscay in the north.
- Spain shares its maritime borders with Algeria and Italy.
- The **Prime Meridian** (0° longitude) passes through the eastern part of Spain. It enters the country through the Pyrenees and passes through several regions, including Aragon and the Valencian Community.
- Spain shares land borders with five entities: France, Portugal, Gibraltar (UK), Morocco (via the exclaves of Ceuta and Melilla), and **Andorra**.



23. Iraqi cities

Context: Baghdad says former US military sites to ‘come under the full control of Iraqi security forces,’ some two years after the US reached a deal to pull forces from Iraq

North to South Sequence

- **Mosul:** Located in the far north of Iraq, it is the capital of the Nineveh Governorate and sits near the border with Turkey and Syria.
- **Kirkuk:** Situated south of Mosul and north of Baghdad, this city is a major hub for Iraq's northern oil fields.
- **Baghdad:** The capital city, located in the central part of the country along the Tigris River.
- **Al Basrah (Basra):** The southernmost major city, serving as Iraq's main port city near the Shatt al-Arab waterway and the Persian Gulf.



24. UAE Cities

Context: President of the United Arab Emirates Sheikh Mohamed bin Zayed Al Nahyan paid an official visit to India.

West to East Sequence

- **Abu Dhabi:** The capital is located furthest west and south among this group, situated on a T-shaped island extending into the Gulf.
- **Dubai:** Moving northeast along the coast from Abu Dhabi, you reach Dubai.

- **Sharjah:** Directly adjacent to Dubai's northeastern border. The two cities are so close they form a single continuous metropolitan area.
- **Ajman:** Located immediately to the northeast of Sharjah. It is the smallest emirate and follows Sharjah in the coastal line.



25. Important Peninsula

Context: Kamchatka, Russia, faces an unprecedented blizzard, burying towns under snow as tall as two storeys. Vehicles and streets vanish beneath white drifts while emergency crews work tirelessly, and authorities urge locals to remain indoors.

Sr no.	Peninsulas	Associated countries
1	Cape York Peninsula	Australia
2	Labrador Peninsula	Canada
3	Jutland Peninsula	Denmark, Germany
4	Kamchatka Peninsula	Russia

26. Rivers and associated States

Context: The National Green Tribunal (NGT) recently directed the Udupi DC and the Chairman of the Karnataka Urban Water Supply and Drainage Board (KUWSDB) to file a detailed report outlining proposed action along with approximate estimates and timelines to stop the flow of wastewater into the Sauparnika River in Kollur.

River	State	Flow Direction	Outlet
Souparnika	Karnataka	West	Arabian Sea
Kallada	Kerala	West	Arabian Sea
Sharavathi	Karnataka	West	Arabian Sea
Sarada	Andhra Pradesh	East	Bay of Bengal

27. Muna Island

Context: The painted outline of a human hand inside a cave on the Indonesian island of Muna represents what researchers are calling the oldest example of rock art in the world, created at least 67,800 years ago.

About Muna Island

- It is situated in the Southeast Sulawesi province of Indonesia.
- With an area of 1,704 sq.km., it has a hilly surface, rising to 1,460 feet (445 metres). The north and northeast have teak forests.
- It is known for its diverse culture and natural beauty, including lush forests and pristine beaches.
- The island is home to the Muna people, who have a rich cultural heritage and are known for their traditional crafts and dances.
- The economy of Muna Island is primarily based on agriculture, fishing, and local crafts.
- The main town and principal port is Raha, on the northeastern coast across the Strait of Buton from the neighbouring island of Buton to the east.

- One of the most famous natural attractions on Muna Island is the Liangkobori Cave, which contains prehistoric paintings.
- Additionally, there is Napabale Lake, which has a natural tunnel connecting it directly to the sea.

28. Mozambique

Context: Mozambican rights activist and humanitarian Graca Machel has been selected for the Indira Gandhi Prize for Peace, Disarmament and Development for 2025, announced by the Indira Gandhi Memorial Trust.



Mozambique:

- Mozambique is a country in Southern Africa and is located in the Southern and Eastern Hemispheres of the Earth.
- It is bordered by six countries. These are Tanzania to the north, Zambia and Malawi to the northwest, and Zimbabwe to the west.
- South Africa and Eswatini border Mozambique to the southwest.
- The country also has a coastline on the Indian Ocean to the east.

- The island countries and territories of Madagascar, Comoros, and Mayotte are separated from Mozambique by the Mozambique Channel.
- The Zambezi is the fourth-longest river in Africa. It enters Mozambique from the west (bordering Zambia and Zimbabwe) and flows across the country's central region. It eventually empties into the **Indian Ocean** through a massive delta. The Cahora Bassa Dam, one of Africa's largest hydroelectric projects, is located on this river within Mozambique.
- The Tropic of Capricorn (approximately 23.5°S latitude) passes through the southern part of Mozambique. Specifically, it crosses the provinces of **Inhambane** and **Gaza**.

29. Chile

Context: Chile's far-right President-elect José Antonio Kast has named two lawyers who once represented the U.S.-backed dictator Augusto Pinochet to serve in his Cabinet.



Chile:

- Chile is a country located in the southwestern part of South America.
- It is geographically positioned both in the Western and Southern hemispheres.
- Chile occupies a long, narrow coastal land strip wedged between the Andes Mountains to the east and the South Pacific Ocean to the west.
- It is bordered by Peru to the north; by Bolivia to the northeast; by Argentina to the east and by the Drake Passage to the south.

30. Western Disturbance

Context: A powerful Western Disturbance has arrived and impacted northern India, bringing widespread rainfall, heavy snowfall, and thunderstorms to the region.

What is a Western Disturbance?

- A Western Disturbance (WD) is an **extra-tropical weather system** that originates outside India and moves from west to east, bringing rain, snowfall, and storms to northern parts of the Indian subcontinent, especially during winter and early spring.
- **Origin and Formation:**
 - Western disturbances originate over the **Mediterranean region, Black Sea, or Caspian Sea**.
 - They form when **cold polar air interacts with warmer, moist air**, creating **low-pressure systems**. These systems are carried eastward by westerly winds in the upper atmosphere, particularly the subtropical westerly jet stream.
- **Regions Affected in India:** Jammu & Kashmir, Himachal Pradesh, Uttarakhand, Punjab, Haryana, Delhi, Rajasthan and Western Uttar Pradesh.
 - Western Disturbances bring winter rainfall to Punjab, Haryana, Rajasthan and western UP.
 - They cause snowfall in the western Himalayas (J&K, Himachal Pradesh, Uttarakhand).

- Cloud cover and cold winds can trigger cold wave and foggy conditions in the plains.
- Moderate rainfall is beneficial for Rabi crops like wheat and mustard.
- Western Disturbances have no role in the onset of the Southwest Monsoon.

31. Deltas and rivers

Context: An international research team has found a systemic drop in land elevation across India's river deltas driven mostly by human activities.

Sr no.	Deltas	Examples
1	Arcuate Delta	Nile River Delta
2	Bird's Foot Delta	Mississippi River Delta
3	Cuspate Delta	Ebro River Delta
4	Estuarine Delta	Seine River Delta

32. Vietnam

Context: Vietnam's ruling Communist Party "unanimously" re-elected To Lam as general secretary on January 20, confirming the former security enforcer as the country's top leader for the next five years and backing his vision for growth-oriented change.



Vietnam:

- Vietnam is situated in Southeast Asia along the eastern coast of the Indochinese Peninsula.
- It is located in the Northern and Eastern hemispheres of the Earth.
- Vietnam has land borders with three countries; China to the north, and Cambodia and Laos to the west.
- The Gulf of Tonkin with the Island of Hainan Dao (China) lies to the northeast of Vietnam.
- To the south and east, the country is bordered by the South China Sea, and the Gulf of Thailand lies to the southwest.

33. Jose Jeri

Context: Jose Jeri is under scrutiny for clandestine encounters with Chinese businessmen that triggered a criminal probe and calls for his removal



- The Equator (0° latitude) does not pass through Peru. It passes through Peru's northern neighbor, Ecuador (which is actually named after the line), as well as Colombia and Brazil. Peru lies entirely in the Southern Hemisphere, with its northernmost point being just south of the Equator.

- While Peru does share Lake Titicaca, it only shares it with Bolivia. Chile does not border Lake Titicaca; it is located further south and is separated from the lake by both Peruvian and Bolivian territory.

34. Indonesia Islands

Context: Indonesia's main island of Java has been recently hit by a massive landslide in which at least 8 people have been reported to be killed.

Arrangement:

- Java Island:** westernmost
- Bali Island:** east of Java
- Lombok Island:** east of Bali
- Flores Island:** east of Lombok



35. Neighbours of South Sudan

Context: Renewed fighting in South Sudan has displaced more than 1,80,000 people, with witnesses describing indiscriminate use of barrel bombs and civilians fleeing into swamps as the country's fragile peace unravels.

Neighbours of South Sudan:

- A landlocked country, South Sudan is located in East-Central Africa in the Northern and Eastern Hemispheres of the Earth.
- Six countries border South Sudan.
- These are Sudan to the north, Ethiopia to the east, Kenya to the southeast, Uganda to the south, Democratic Republic of the Congo to the southwest, and Central African Republic to the west.



36. Mountain Passes

Context: Recently, the Border Roads Organisation (BRO) successfully carried out a high-altitude rescue and road restoration operation under Project Sampark at Chatergala Pass.

	Mountain passes	Locations
1	Jelep La	Sikkim
2	Debsa Pass	Himachal Pradesh
3	Se La Pass	Arunachal Pradesh
4	Chatergala Pass	Jammu and Kashmir

37. Philippines

Context: A ferry with more than 350 people on board sank early on January 26 near an island in the southern Philippines, killing at least 18 people,

officials said. Rescuers saved hundreds more, while a fleet of coast guard and naval ships searched for those still missing. The cause of the sinking was not immediately clear.



- **Luzon** is indeed the largest and most populous island in the Philippines. It is where the capital, Manila, is located. The three main island groups are Luzon, Visayas, and Mindanao.
- The Philippines lies **entirely north of the Equator** (roughly between 5°N and 21°N latitudes).
- Positioned on the western edge of the Pacific Ocean, along the Ring of Fire, The Philippines is the 2nd largest archipelago in the world, with over 7,641 individual islands.
- The **Sulu Sea** is located in the southwestern area of the Philippines. It separates the Philippine islands (specifically Palawan and the Sulu Archipelago) from the Malaysian state of Sabah on the island of Borneo.

38. Argentina

Context: Recently, raging wildfires in the Argentine Patagonia have blazed through nearly 12,000 hectares of scrubland and planted and native forests.

- The **Tropic of Capricorn** passes through the northern provinces of Argentina, specifically across **Jujuy, Salta, and Formosa**. It marks the northernmost part of the country's temperate zone and the beginning of the sub-tropical regions.
- **Staten Island** (known in Spanish as Isla de los Estados) is located off the eastern tip of Tierra del Fuego. It is separated from the main island by the Le Maire Strait and is part of the Argentine province of **Tierra del Fuego, Antártida e Islas del Atlántico Sur**. It is famous for being the setting of Jules Verne's novel, The Lighthouse at the End of the World.



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ART AND CULTURE

1. Nritya Kalanidhi Award

Context: Renowned Bharatanatyam dancer Urmila Satyanarayanan was conferred the prestigious Nritya Kalanidhi award, one of the highest recognitions in the field of Indian classical dance. The award acknowledges decades of dedication to preserving and propagating Bharatanatyam in its traditional and scholarly form.

More on the news:

- This honour places her among an elite group of artistes who have made lasting contributions to India's cultural heritage.
- The recognition also underlines the continued relevance of classical dance in contemporary India.

About the Nritya Kalanidhi Award

- The **Nritya Kalanidhi** title is conferred annually by the **Madras Music Academy**, Chennai. It is traditionally awarded to senior dancers who demonstrate excellence in performance, teaching, and scholarship.
- The award is considered the dance equivalent of the Sangeetha Kalanidhi title in Carnatic music. It is usually presented during the Academy's annual music and dance conference held in December.
- The **Nritya Kalanidhi** award is conferred by the **Madras Music Academy** (Chennai). It is presented every year as part of their annual dance festival.
- **Nritya Kalanidhi** award is specifically for **Classical Dance**. While the Music Academy has a strong connection to Carnatic traditions, the Nritya Kalanidhi has been awarded to exponents of various classical forms (though Bharatanatyam is most frequent).

2. Malawi

Context: Archaeologists have found an ash and charcoal feature dating to about 9,500 years ago in Malawi, with burnt bone fragments from a small adult within, making it the earliest evidence of an in situ adult pyre yet.

About Malawi:

- Malawi, located in southeastern Africa, is one of the smaller nations in the continent and covers an area of 118,484 sq. km.
- Completely landlocked, Malawi's main body of water is the enormous lake from which the nation gets its name. For access to the ocean, it relies on rail lines that run into port cities of Mozambique.
- Despite being surrounded by neighboring countries, it only shares 3 borders—a very small one with Tanzania and two others with Mozambique and Zambia.



3. Puppetry

Context: In Jaipur nearly 250 families carry forward one of Rajasthan's oldest folk art forms, Kathputli.

Sr no.	Puppetry	Countries	Types of puppetries
1	Wayang Kulit	Indonesia	Shadow Puppetry
2	Kathputli	India	String Puppetry
3	Guignol	France	Rod and Glove Puppetry

4. Important Tribes

Context: While attacks by Israeli settlers affect communities across the West Bank, the semi-nomadic Bedouins are among the territory's most vulnerable, saying they suffer from forced displacement due in large part to a lack of law enforcement.

Sr no.	Tribes/Communities	Associated countries
1	Yanomami Community	Brazil/Venezuela
2	San Community	Botswana/Namibia
3	Bedouin community	Saudi Arabia, Yemen, Oman, UAE
4	Chakma Community	Bangladesh

5. Piprahwa Relics

Context: After being dispersed for over a century, ancient gems, charged by their proximity to the historical Buddha's corporeal remains, have been reunited with some other extraordinary relics excavated at Piprawaha, Uttar Pradesh.

About Piprahwa Relics

- The Piprahwa Relics are a collection of sacred artifacts discovered in 1898 at the Piprahwa Stupa in Uttar Pradesh, India.
- It is the site believed to be associated with ancient Kapilavastu, the homeland of Gautama Buddha.

- These relics are of immense archaeological and religious importance, as they are believed to be associated with Lord Buddha himself.
- These relics, unearthed by British colonial engineer William Claxton Peppé in 1898, include bone fragments believed to be those of Lord Buddha, along with crystal caskets, gold ornaments, gemstones, and a sandstone coffer.
- An inscription in Brahmi script on one of the caskets links the relics directly to the Sakya clan, to which Buddha belonged, indicating that these remains were enshrined by his followers around the third century BC.
- The British crown claimed Peppé's find under the 1878 Indian Treasure Trove Act, with the bones and ash presented to the Buddhist monarch King Chulalongkorn of Siam.
- Most of the 1,800 gems went to what is now the Indian Museum in Kolkata, while Peppé was permitted to retain approximately a fifth of them.
- Piprahwa Relics are classified as 'AA' antiquities under Indian law, prohibiting their removal or sale.
- Further excavations by the Archaeological Survey of India between 1971 and 1977 uncovered additional steatite caskets containing 22 sacred bone relics, which are now preserved at the National Museum in New Delhi.

6. 2nd Global Buddhist Summit

Context: The International Buddhist Confederation (IBC), in collaboration with the Ministry of Culture, will organise the 2nd Global Buddhist Summit (GBS) in New Delhi.

2nd Global Buddhist Summit:

- Its theme, "Collective Wisdom, United Voice, and Mutual Coexistence", reinforces the relevance of Buddhist philosophy in social harmony and global dialogue.
- The summit will showcase **NORBU** (Neural Operator for Responsible Buddhist Understanding), an **AI model** designed to engage youth with Buddhist teachings.

- **Significance:** The summit strengthens **India's cultural diplomacy** by projecting India as the global hub of Buddha Dhamma.

About International Buddhist Confederation (IBC)

- The IBC is the **largest global Buddhist umbrella organisation**, headquartered in **New Delhi, India**.
- **Establishment:** It was conceived in **2011** and formally established in **2012** under the **Ministry of Culture**.
- **Objective:** Integrate **Buddhist values into global discourse** to address contemporary challenges.
- **Membership:** It comprises over 320 organisations across 39 countries.
- **Structure:** It is governed by a **Council of Patrons**, a **Dhamma Council**, and a **General Assembly** that elects office bearers every 3 years.
- **Key Initiatives:** It organised the 1st Asian Buddhist Summit in **2024** and is developing the India International Centre for Buddhist Culture and Heritage (**IICBCH**) at **Lumbini, Nepal**.

7. Lakkundi Excavation

Context: Recent excavations at Lakkundi in Karnataka have unearthed Neolithic-era artefacts, strengthening the State's push to include Lakkundi in UNESCO's World Heritage Site list.

About Lakkundi Excavation:

What it is?

- An Archaeological Survey of India (ASI)–supervised excavation at the Kote Veerabhadreshwar (Veerabhadraswamy) Temple, aimed at uncovering buried structures and cultural layers to support heritage conservation and UNESCO nomination.

Located in:

- Lakkundi village, Gadag district, Karnataka, about 12 km from Gadag town; historically known as Lakkigundi.

History of the place:

- A major economic, religious and cultural centre from the 10th–13th centuries.
- Flourished under the Kalyana Chalukyas and later the Hoysalas; famous as the “village of a hundred wells and temples”.
- Associated with Queen Attimabbe (11th century), noted Jain patron and philanthropist.
- Home to Hindu temples, Jain basadis, stepwells, and later even a Muslim dargah, reflecting religious pluralism.
- Known for the “Lakkundi school” of Chalukyan temple architecture.

Discoveries made at Lakkundi:

- **Neolithic artefacts:** broken grey clay pot, **stone axe**, cowrie shells, cross-shaped pedestal.
- **Early historic–medieval finds:** stone pedestal carved with a **Jina figure**, inscriptions, buried temple remains.
- Confirms **continuous human occupation** from prehistoric to early medieval periods.

Significance:

- Pushes Lakkundi's history far beyond the medieval period, adding prehistoric depth to its heritage value.
- Strengthens Karnataka's case for UNESCO World Heritage nomination of a group of monuments at Lakkundi.



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4	CA July 2025	07.09.2025
5	CA August 2025	21.09.2025
6	CA September 2025	12.10.2025
7	CA October 2025	16.11.2025
8	CA November 2025	14.12.2025
9	CA December 2025	12.01.2026
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MISCELLANEOUS

1. Live Events Development Cell

Context: The Information and Broadcasting Ministry recently established a Live Events Development Cell (LEDC) to facilitate the expansion of the “concert economy”, boosting employment and tourism in the country.

About Live Events Development Cell

- It was established by the Ministry of Information & Broadcasting, Government of India.
- **Objective:** Support the structured growth of India’s rapidly expanding live entertainment industry and strengthen the country’s emerging concert economy.
- The LEDC will function as a single-window facilitation mechanism aimed at streamlining processes for the sector and positioning India among the world’s leading live entertainment destinations by 2030.
- It brings together representatives from the Central and State governments, industry bodies, and major event companies to coordinate policy support and sectoral expansion.

Key Focus Areas:

- Single-Window Clearance System being developed on India Cine Hub (ICH) for permissions (fire, traffic, municipal, etc.) to ensure faster approvals and investor-friendly processes.
- Model SOPs for States and removal of redundant permissions.

2. BioHappiness

Context: The M.S. Swaminathan Research Foundation has begun work on a project on Biohappiness in Keyi Panyor district of Arunachal Pradesh.

BioHappiness

- It is a term coined by late **agricultural scientist Dr. M.S. Swaminathan**.
- It is a state of well-being and fulfillment achieved by conserving and using biodiversity to improve human health, nutrition, and livelihoods, fostering harmony between people and nature, as explained in his book *In Search of Biohappiness: Biodiversity and Food, Health and Livelihood Security*.
- The new Biohappiness Project in Keyi Panyor district of Arunachal Pradesh would look at the livelihoods of the residents, the agro-biodiversity of the district, and other ecological aspects within its boundaries.

3. National Quality Assurance Standards

Context: Recently, a total of 50,373 public health facilities across all States and Union Territories have been certified under the National Quality Assurance Standards (NQAS).

About National Quality Assurance Standards

- It is a comprehensive quality framework established by the Ministry of Health and Family Welfare (MoHFW).
- It is aimed at ensuring and enhancing the quality of healthcare services provided at public health facilities.
- The NQAS began in 2015 with just 10 certified healthcare facilities.
- It was initially focusing on District Hospitals to ensure safe, patient-centric, and quality-assured services.
- NQAS are currently available for District Hospitals, Sub-District Hospitals, Community Health Centres, Ayushman Arogya Mandir–PHCs, AAM–UPHCs, and AAM–Sub Health Centres.
- **Purpose:** These standards are primarily meant for providers to assess their own quality for

improvement through pre-defined standards and to bring up their facilities for certification.

- These are broadly arranged under 8 “Areas of Concern” namely;
- Service Provision, Patient Rights, Inputs, Support Services, Clinical Care, Infection Control, Quality Management and Outcome.

4. Directorate General of Mines Safety

Context: The Directorate General of Mines Safety (DGMS) recently celebrated its 125th Foundation Day at its Headquarters in Dhanbad, Jharkhand.

About Directorate General of Mines Safety (DGMS)

- It is the Regulatory Agency under the Ministry of Labour & Employment, Government of India, in matters pertaining to occupational safety, health, and welfare of persons employed in mines.
- It has its headquarters at Dhanbad (Jharkhand) and is headed by the Director-General of Mines Safety.
- The mission of the DGMS is to continually improve safety and health standards, practices, and performance in the mining industry and upstream petroleum industry by implementing:
 - proactive safety and health strategies;
 - continuous improvement of processes;
 - effective use of resources;
 - commitment and professional behaviour in its personnel.
- Under the Constitution of India, the safety, welfare, and health of workers employed in mines are the concern of the Central Government (Entry 55-Union List-Article 246).
- The objective is regulated by the Mines Act, 1952, and the Rules and Regulations framed thereunder.
- These are administered by the DGMS.

5. India Launches Responsible Nations Index

Context: India has launched the Responsible Nations Index (RNI) 2026 to introduce a new global benchmark for evaluating countries on ethical governance and responsibility, with India ranked 16th globally.

About India Launches Responsible Nations Index (RNI):

What it is?

- The Responsible Nations Index (RNI) is a global composite index designed to assess countries based on ethical governance, social well-being, environmental stewardship, and global responsibility, moving beyond traditional power- and GDP-centric metrics.

Launched by: Under the aegis of the World Intellectual Foundation (WIF).

Aim:

- To redefine national success by embedding ethical responsibility, inclusiveness, sustainability, and global cooperation into the assessment of nationhood.

Assessment criteria:

The RNI evaluates nations across **four broad pillars**:

- Ethical governance
- Social well-being and inclusiveness
- Environmental responsibility and sustainability
- Global responsibility and cooperative international conduct

Key features:

- Responsibility-centric framework, not power-centric.
- Integrates governance, moral values, and humanitarian outcomes.
- Encourages policy introspection and ethical benchmarking among nations.
- Designed as a dialogue-driven index, fostering global cooperation rather than competition.

- Accompanied by an annual Responsible Nations Index Report.

Rankings (RNI 2026):

Top 5 countries:

- Singapore – Rank 1
- Switzerland – Rank 2
- Denmark – Rank 3
- Cyprus – Rank 4
- Sweden – Rank 5
- India: Rank 16 (Overall Score: 0.5515) and Central African Republic – Overall Score: 0.35715, Rank: 154 (Last).
- India is the top-ranked Asian nation.
- India ranks 16th globally, ahead of South Korea (21), Thailand (24) and Kyrgyzstan (22).
- 9 of the top 10 countries are European, underscoring Europe's strength in institutional ethics.

6. Franz Edelman Award

Context: The Department of Food and Public Distribution (DFPD) is among the six finalists for the prestigious 2026 Franz Edelman Award for its Anna Chakra initiative.

Franz Edelman Award

- It is the world's most prestigious award in the field of Operations Research (OR) and advanced analytics.
- It is widely known as the "Nobel Prize of Operations Research and Analytics."
- Instituted by: INFORMS (Institute for Operations Research and the Management Sciences) a global professional body for analytics and OR.
- It is named after Franz Edelman, a pioneer in management science and operations research.
- The award recognizes the real-world, high-impact applications of operations research, advanced analytics, mathematical modeling and data-driven decision-making.

7. The Padma Awards

Context: The Padma Awards 2026 were announced on the eve of Republic Day, with the President approving 131 awards across Padma Vibhushan, Padma Bhushan and Padma Shri categories.

About The Padma Awards:

What it is?

- One of India's highest civilian honours, conferred to recognise distinguished and exceptional service involving an element of public service across diverse fields.

Established in: 1954 by the Government of India.

History:

- Initially, two civilian awards were instituted in 1954: **Bharat Ratna** and **Padma Vibhushan**.
- Padma Vibhushan originally had three classes, which were renamed in 1955 as:
 - Padma Vibhushan
 - Padma Bhushan
 - Padma Shri
- Awards are announced annually on **Republic Day**, with brief interruptions during 1978–79 and 1993–97.

Categories & purpose:

- Padma Vibhushan:** Exceptional and distinguished service
- Padma Bhushan:** Distinguished service of a high order
- Padma Shri:** Distinguished service in any field

Eligibility criteria:

- Open to all persons** irrespective of race, gender, occupation or position.
- Government servants (including PSU employees) are generally not eligible, except doctors and scientists.**
- Normally **not conferred posthumously**, but allowed in exceptional cases.
- A **minimum gap of 5 years** is required for a higher Padma category, unless relaxed in deserving cases.

- The award is for **“excellence plus”** - lifetime achievement with clear public service impact, not merely long service.

Key features of the awards:

- Conferred by the **President of India** at ceremonial functions held at **Rashtrapati Bhavan**.
- Awardees receive a Sanad (certificate) and a medallion; the award does not constitute a title and cannot be used as a prefix or suffix.
- Total annual awards capped at 120, excluding posthumous and foreign/NRI/OCI awardees.**
- Selection is based on recommendations of the Padma Awards Committee, constituted annually by the Prime Minister and headed by the Cabinet Secretary.
- Public nominations**, including **self-nominations**, are permitted, reinforcing transparency and inclusiveness.

8. Jeevan Raksha Padak Awards

Context: Recently, the President of India has conferred the Jeevan Raksha Padak Series of Awards-2025 to 30 persons.

About Jeevan Raksha Padak Awards

- It is awarded to a person for a meritorious act of human nature in saving the life of a person.
- The Jeevan Raksha Padak Award is given in three categories, namely,
- Sarvottam Jeevan Raksha Padak:** It is awarded for conspicuous courage in saving life under circumstances of very great danger to the life of the rescuer.
- Uttam Jeevan Raksha Padam:** It is awarded for courage and promptitude in saving life under circumstances of great danger to the life of the rescuer.
- Jeevan Raksha Padak:** It is awarded for courage and promptitude in saving life under

circumstances of grave bodily injury to the rescuer.

Jeevan Raksha Padak Awards Eligibility

- Persons of all walks of life are eligible for these awards. The award can also be conferred posthumously.**
- It is presented to the awardees by the respective Union Ministries/Organizations/State Government to which the awardee belongs.

Jeevan Raksha Padak Awards Features

- Its nominations are invited annually from States/UTs and Union Ministries.
- The recommendations of the award are considered by the Awards Committee within a period of two calendar years from the date of performance of the act.
- Final approval is given by the Prime Minister and the President of India.**
- Award:** The decoration of the award consists of a Medal, Certificate, along with a one-time monetary allowance: Sarvottam Jeevan Raksha Padak (₹2 lakh), Uttam Jeevan Raksha Padam (₹1.5 lakh) and Jeevan Raksha (₹1 lakh).
- No other facility/benefit in terms of any concession in Railways, Airfare etc. is provided by the Government.**



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