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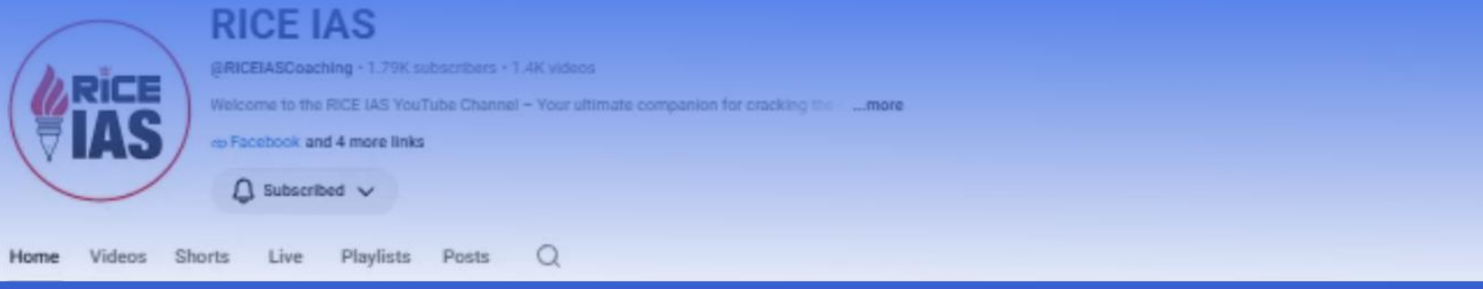



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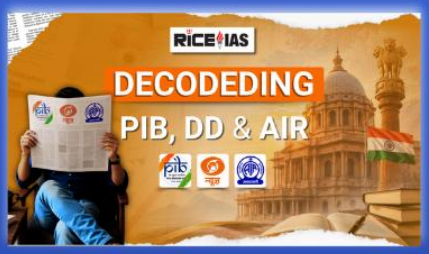

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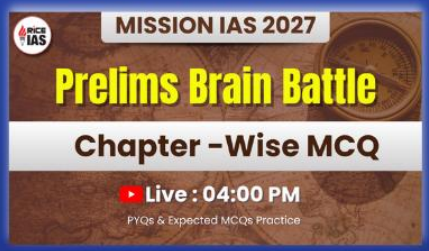

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POLITY & GOVERNANCE

1.1. VISA IS NOT A RIGHT TO ENTER INDIA



Context

- Recently, the Delhi High Court held that a valid visa does not guarantee a foreign national the right to enter India; entry remains subject to immigration laws and competent authorities.

Delhi HC on Foreigners' Right to Enter India

- The Delhi High Court held that a valid visa does not create an absolute or legally enforceable right to enter India.
- The court held that visa issuance and entry are separate matters, with entry subject to immigration law and competent authorities' powers.
- The judgment relied on the Immigration and Foreigners Act, 2025 and earlier Supreme Court rulings recognising broad State powers over foreigners' entry and presence.
- Refusal of entry is a sovereign function involving national security, foreign policy and administrative discretion.

Legal Framework

- **Union List:** Entries 17 (citizenship, aliens), 19 (admission, emigration, expulsion, passports and visas) and 10 (foreign affairs) are under Parliament's law-making power.
- **Immigration and Foreigners Act, 2025:** It governs the legal framework for foreigners in India and has replaced the Foreigners Act, 1946, which is now repealed.
- **Section 3 (2025 Act):** A foreigner must hold a valid passport or travel document and a valid visa to enter India.
- **Section 7 (2025 Act):** The Central Government can make provisions to prohibit, regulate or restrict the entry of foreigners, their departure, and their presence in India.
- **Immigration Officer's power:** The officer at the port of entry can require information and examine the passport, travel document and visa before admitting a foreigner.

Constitutional Scope: Fundamental Rights of Foreign Nationals

- **Article 14 (equality before law):** It applies to "any person", including foreigners, but reasonable classification and differences in circumstances are allowed.
- **Article 21 (life and personal liberty):** It is available to citizens and non-citizens alike. The court held that it does not cover a right to enter India.
- **Article 19(1)(e) (right to reside and settle in India):** It is available only to citizens, not to foreigners.

Supreme Court Precedents

- **Hans Muller of Nuremberg v. Superintendent, Presidency Jail (1955):** The Supreme Court held that statutory immigration laws give the Central Government absolute discretion to restrict or expel foreign nationals.

- **Louis De Raedt v. Union of India (1991):** The Supreme Court reaffirmed that a foreigner's fundamental rights are confined primarily to Article 21, with no absolute right to reside or claim entry into India.

1.2. APPOINTMENT OF DGPS AND THE PRAKASH SINGH JUDGMENT

Context



- The Supreme Court of India examined Jharkhand's 2025 law governing the appointment of the Director General of Police (DGP), following a challenge by the Union government over its alleged inconsistency with the Supreme Court's **Prakash Singh v. Union of India (2006)** judgment.

About the Prakash Singh Judgment, 2006

- The Supreme Court issued directions to reform the police system and insulate it from unwarranted political interference.
- **Objective:** To promote police autonomy, operational stability, accountability and professionalism.
- **Key Directions on DGP Appointment**
  - **Selection Process:** The State government should select the DGP from a panel of suitable officers prepared by the Union Public Service Commission (UPSC).
  - **Eligibility:** The panel should comprise the three senior-most suitable officers, assessed on the basis of seniority, service record and range of experience.
  - **Residual Service:** Eligible officers should have **at least six months of service** remaining before normal retirement.
  - **Minimum Tenure:** The DGP should have a minimum tenure of **two years**, irrespective of the date of superannuation.

Jharkhand's Counter: Double Standards

- Jharkhand said the Centre showed **"special affection"** for it, while States like **Bihar** have **"worse"** appointment laws.
- Sibal pointed to **West Bengal**, where the DGP was appointed by the **Election Commission of India in March 2026**, even though the officer was due to retire the following month.
- **Seventh Schedule**: Police and Public Order fall under List II (State List) of the Seventh Schedule of the Indian Constitution.

Constitutional and Governance Significance

- **Police Reforms:** Strengthens efforts to reduce political interference in policing.
- **Rule of Law:** Reinforces the binding nature of Supreme Court directions under Article 141 of the Constitution.
- **Cooperative Federalism:** Highlights tensions between Union oversight and State-level police administration.
- **Institutional Accountability:** Encourages transparent, merit-based appointments and uniform compliance with judicial directions.

1.3. UNDERSTANDING THE STATES' CONCERNS OVER THE MINING AMENDMENT



Context

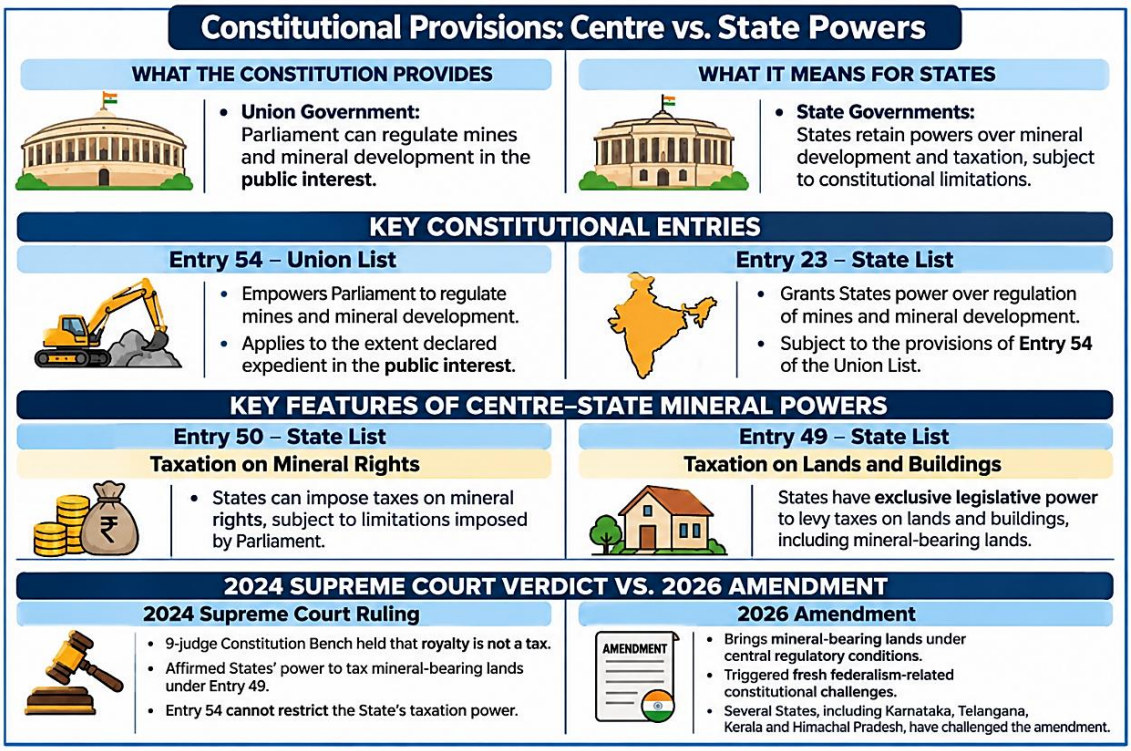
- Recently, Parliament passed the Mines and Minerals (Development and Regulation) Amendment Act, 2026, which expands the Centre's regulatory powers over mining and curbs the fiscal powers of States.

Key Changes Under the 2026 Amendment

- **Expanded Central Purview:** Extends the Union Government's regulatory authority beyond mines and mineral development to include **mineral-bearing lands**.
- **Taxation Restrictions:** Prohibits States from imposing fresh levies on mineral rights and mineral-bearing lands except under conditions prescribed by the Centre.
- **Cancellation of Uncollected Dues:** Mineral taxes imposed by States but not fully collected before the Act came into force are cancelled.
- **Centre's Rationale:** Aims to harmonize varied State-level levies, curb escalation in domestic mineral extraction costs, and reduce reliance on mineral imports.

Why are States Concerned?

- Mineral-rich States derive substantial revenue from:
  - Mineral royalties
  - Taxes and levies
  - Mining-related economic activity
- Any reduction in State-level taxation powers could therefore affect State finances and fiscal autonomy.



State Fiscal Exposure

- **High-Dependency States:** Mineral receipts constitute **85%** of non-tax revenue in Jharkhand and **80%** in Odisha.
- **Moderate/Low Dependency:** Karnataka (**48%**), Madhya Pradesh (**41%**), Rajasthan (**39%**), Telangana (**11%**), and Chhattisgarh (**6%**).

1.4. AADHAAR-BASED IDENTIFICATION MADE MANDATORY FOR DELHI ELECTRICITY SUBSIDY



Context

- The Delhi government has made **Aadhaar details mandatory for domestic consumers seeking electricity subsidies** under its power subsidy scheme.

Objectives of Aadhaar-Based Identification

1. **Beneficiary Identification:** Establishes the identity of consumers receiving electricity subsidies.
2. **Simplified Benefit Delivery:** Reduces dependence on multiple identity documents.
3. **Transparency and Efficiency:** Seeks to improve the administration and delivery of subsidies.
4. **Public Awareness:** Directs implementing agencies to publicise the new requirement among beneficiaries.

Significance of the Move

- **Targeted Welfare Delivery:** Helps identify eligible beneficiaries and improve the administration of public subsidies.
- **Administrative Efficiency:** Can simplify verification and reduce duplication in beneficiary records.
- **Fiscal Accountability:** Supports monitoring of expenditure financed through public funds.
- **Digital Governance:** Reflects the use of digital identity systems in the delivery of government welfare benefits.

Concerns and Challenges

- **Exclusion Risks:** Authentication or enrolment-related difficulties may create barriers for eligible beneficiaries.
- **Implementation Clarity:** The notification does not specify a deadline for existing beneficiaries or a separate procedure for consumers already receiving the subsidy.
- **Privacy and Data Security:** Collection and processing of Aadhaar details require appropriate safeguards for personal data.
- **Accessibility:** Alternative arrangements are important for consumers facing digital, technological or documentation barriers.

About Aadhaar

- Aadhaar is a 12-digit unique identification number issued by the Unique Identification Authority of India (UIDAI) to residents of India who satisfy the prescribed verification process.
- **Nodal Ministry**: Ministry of Electronics and Information Technology (MeitY).
- **Legal Basis**: Aadhaar (Targeted Delivery of Financial and Other Subsidies, Benefits and Services) Act, 2016.
- **Nature:** Aadhaar is proof of identity and **not proof of citizenship or domicile**.
- **Biometric Information**: Includes fingerprints, iris scans and a photograph, along with demographic information such as name, date of birth and address.
- **Voluntary and Mandatory Use**: Aadhaar is generally voluntary, but its use may be made mandatory for specified subsidies, benefits or services under applicable law, subject to constitutional and judicial safeguards.

Constitutional and Legal Significance

- In K.S. Puttaswamy (Retd.) v. Union of India (2018), the Supreme Court upheld the Aadhaar Act in part while placing limits on its use.
- The Court recognised privacy as a fundamental right and restricted mandatory Aadhaar requirements in certain contexts.

1.5. CLICK TO CANCEL RULE

Context



- Recently, the New York City announced the enforcement of the **'Click to Cancel' rule**, which requires businesses to make subscription cancellation as easy as the process of signing up.

What Is the 'Click to Cancel' Rule?

- The **'Click to Cancel' rule** aims to simplify subscription cancellation by ensuring that consumers can cancel a service as easily as they subscribed to it.
- It seeks to prevent businesses from using complicated cancellation procedures to retain customers who no longer wish to continue their subscriptions.
- The rule requires cancellation to be available through the **same medium** used for signing up.

Why Is the Rule Needed?

- **Dark Patterns:** Businesses may use deceptive interface designs, such as hidden cancellation buttons, multiple menus and confusing steps, to discourage consumers from cancelling subscriptions.
- **Unwanted Renewals:** Free trials may automatically convert into paid subscriptions without consumers being adequately informed.

- **Unequal Cancellation Processes:** Customers may be required to make phone calls, send emails or letters, or visit business premises to cancel services they subscribed to online.
- **Consumer Vulnerability:** Senior citizens, minors, vulnerable adults and consumers with limited digital or literacy skills may face additional difficulties.
- **Financial Loss:** Consumers may continue paying for unwanted services because cancellation is unnecessarily complicated.

Does India Have a 'Click to Cancel' Policy?

- India has certain regulatory measures to protect consumers from deceptive subscription practices, but the report highlights gaps in cancellation-related protections.
- **RBI's Digital Payments – E-mandate Framework**
  - The Reserve Bank of India (RBI) introduced an **e-mandate framework** to improve transparency in recurring digital payments.
  - Issuers must send a **pre-transaction notification at least 24 hours before a recurring debit**.
  - The notification must include:
    - Merchant's name.
    - Transaction amount.
    - Date and time of the debit.
    - E-mandate reference number.
    - Reason for the debit.
  - A post-transaction notification must also be sent to the customer.
- **Limitation:** These provisions improve transparency in recurring payments but do not, by themselves, ensure that cancelling a subscription is as easy as signing up.
- **Datum Intelligence Study (June 2026):** Major e-commerce platforms (Nykaa, Myntra, Flipkart, Amazon) and quick-commerce platforms (Big Basket, Zepto, Swiggy Instamart, Blinkit) did not offer pre-renewal reminders for free-trial billing. Cancellation took more than four steps on most of them.

1.6. FUNCTIONING OF THE ELECTION COMMISSION OF INDIA (ECI)

Context

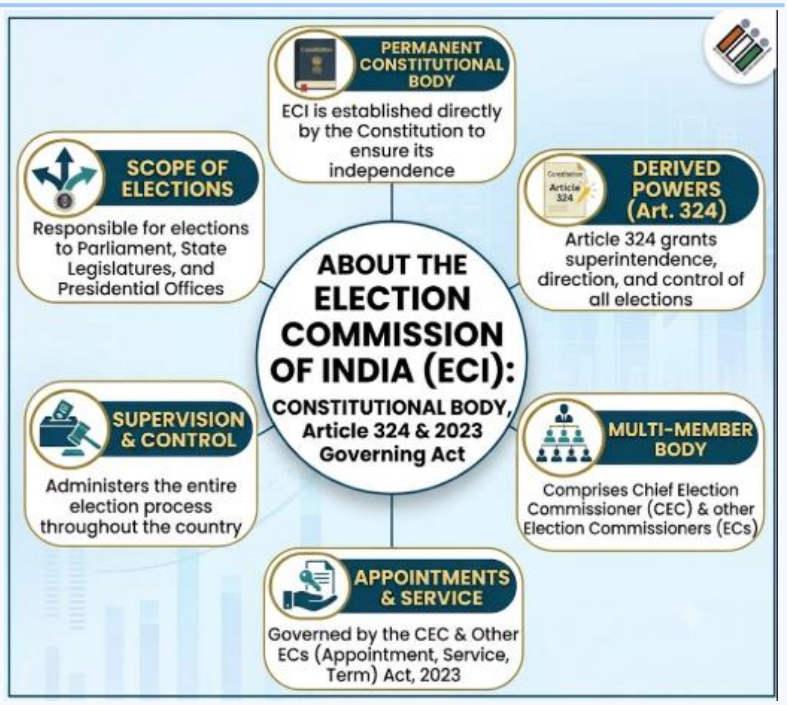


- Recently, the Election Commission of India (ECI), through Chief Election Commissioner (CEC) Gyanesh Kumar and Election Commissioners Sukhbir Singh Sandhu and Vivek Joshi, filed a joint affidavit of nearly 250 pages in the Supreme Court.

Key Highlights of the Affidavit

- **Removal of the CEC:** The affidavit states that the CEC can be removed only on grounds and through a procedure identical to that applicable to a Supreme Court judge.

- **Security of Tenure:** The CEC can be removed only on the same grounds and in the same manner as a Supreme Court judge, so any attempt to restrain the CEC's functioning is contrary to law.
- **Rule of Majority:** In case of a difference of opinion, decisions follow the majority rule under Section 18 of the 2023 Act.
- **Decision-making Process:** Decisions are routed first to one EC, then to the other, and finally to the CEC. They are signed by all three and then notified and implemented by the ECI Secretariat.



- **Electronic Approvals:** When members cannot be present in person, approval may be obtained through electronic means and recorded later in the official file.

Removal Procedures & Security of Tenure

Position	Safeguard / Ground for Removal	Removal Process
Chief Election Commissioner (CEC)	• **High level of security of tenure.** • Guaranteed under Article 324(5). • Can be removed **only** on the grounds of *proved misbehaviour or incapacity*.	Same manner and grounds as a **Judge of the Supreme Court** (Requires an order of the President passed after an address by each House of Parliament supported by a special majority).
Election Commissioners (ECs)	• No direct constitutional security of tenure.	Can be removed from office **only on the recommendation of the CEC** (Article 324(5) proviso).

Decision-Making and the "Rule of Majority"

- **Statutory Provision:** Under **Section 18** of the *Chief Election Commissioner and Other Election Commissioners (Appointment, Conditions of Service and Term of Office) Act, 2023*, the Election Commission follows a multi-member, collective decision-making framework.
- **Rule of Majority:** If a difference of opinion arises among the Chief Election Commissioner (CEC) and the other Election Commissioners on any matter, the issue is decided **according to the opinion of the majority**.
- The CEC does not possess veto or overriding powers over the other Election Commissioners.

1.7. PRADHAN MANTRI VIKSIT GRAM SWARAJ YOJANA (PM-VGSY)



Context

- Recently, the Union Cabinet recently approved the **Pradhan Mantri Viksit Gram Swaraj Yojana (PM-VGSY)**, a **Centrally Sponsored Scheme** aimed at transforming rural local governance.

Key Features and Financial Outlay

- **Scheme Type:** A **Centrally Sponsored Scheme (CSS)** operating with shared funding between the Union and States.
- **Implementation Period:** Runs from **2026-27 to 2030-31**, aligning perfectly with the **16th Finance Commission** cycle.
- **Geographical Coverage:** Encompasses all States and Union Territories, specifically including traditional rural local bodies **in non-Part IX areas** where standard Panchayats do not exist.
- **Target Demographics:** Aims to train around **32 lakh elected representatives** and Panchayat functionaries, though **no stipend** is provided to these beneficiaries.

Implementation and Approval Mechanism

- **Annual Action Plans:** State Governments and UT Administrations must formulate and submit tailored plans outlining local priorities.
- **Nodal Approval Body:** A designated **Central Empowered Committee** holds the sole authority to appraise and approve these Action Plans.
- **Administrative Structure:** The scheme strictly prohibits the creation of **permanent posts** but permits the engagement of **contractual technical personnel** at State, District, and Block levels.

Digital Interventions and Portals

- **eGramSwaraj:** A comprehensive work-based application integrated with **PFMS** (payments), **GeM** (procurement), **BHASHINI** (multilingual AI), and **IMD** (weather data).
- **PANCHAM:** A WhatsApp-based, AI-enabled chatbot operating in **17 Indian languages** designed for direct, two-way communication regarding scheme updates.
- **AuditOnline:** An application for the digital auditing of Panchayati Raj accounts, targeting the completion of **2.55 lakh online audit plans** annually.

1.8. SPECIAL EXECUTIVE MAGISTRATES (SEMS)



Context

- Recently, an SEM court in Delhi accepted the sureties and granted bail to Cockroach Janta Party (CJP) activists, who were in custody under preventive proceedings.

About Special Executive Magistrates (SEMs)

- **Appointment:** State governments appoint SEMs for specific areas, purposes or periods.

- **Legal Provision:** Under **Section 15 of the Bharatiya Nagarik Suraksha Sanhita (BNSS), 2023**, SEMs are conferred powers exercised by Executive Magistrates, subject to the authority granted by the State government.
- **Nature of Appointment:** Unlike regular Executive Magistrates, who perform continuing administrative and preventive functions, SEMs are appointed for specified periods, areas or functions.
- **Primary Objective:** To take preventive action in situations involving potential breaches of peace or threats to public order.

Key Functions of SEMs

- **Preventive Action:** Intervene when disturbance is likely, rather than after an offence has occurred.
- **Maintenance of Public Order:** Prevent breaches of peace through preventive and administrative functions.
- **Peace Bonds (Section 126, BNSS):** Require a person likely to disturb public tranquillity to show cause why they should not execute a bond to keep the peace.
    - Under Section 126 of the BNSS, an Executive Magistrate can require a person to execute a peace bond for up to one year to prevent a breach of peace.
- **Urgent Orders:** Issue orders in cases of nuisance or apprehended danger, such as danger to life or safety, a riot or an affray.
- **Inquiry and Security (Section 135, BNSS):** Inquire into the information received and, where needed, order security while the inquiry is pending, recording reasons in writing.
- **Action on Breach of Bond:** Order arrest or detention for the remaining period of the bond if it is breached.

Judicial Magistrates vs Special Executive Magistrates



Judicial Magistrates

- Judicial Magistrates are empowered to exercise **judicial powers** and handle criminal cases.



Special Executive Magistrates

- Special Executive Magistrates (SEMs) are appointed to perform **administrative** and **preventive** functions.

KEY DIFFERENCES

Basis	Judicial Magistrates	Special Executive Magistrates
Legal Provision	Section 9 of the BNSS, 2023	Section 15 of the BNSS, 2023
Appointment	Presiding officers are appointed by the High Court	Appointed by the State government
Nature of Role	Exercise judicial powers	Perform administrative and preventive functions
Key Functions	Handle criminal cases, remand proceedings, bail applications and trials	Prevent breaches of peace and maintain public order
Criminal Trials	Can conduct criminal trials and impose sentences permitted by law	Cannot conduct criminal trials or convict persons through SEM proceedings
Remand and Release	Exercise judicial powers relating to bail and remand	Powers depend on the authority conferred by the State government and the applicable law.

Can the Actions of SEMs Be Reviewed by Courts?

- **Judicial Review:** Actions and orders of SEMs are subject to judicial review to ensure legality and protect citizens' rights.
- **Challenge to Orders:** An SEM's order may be challenged before the appropriate court or authority, depending on the nature of the order and the remedy available.
- **Accountability:** Judicial review and administrative oversight help ensure that preventive powers are exercised lawfully and are not used arbitrarily.

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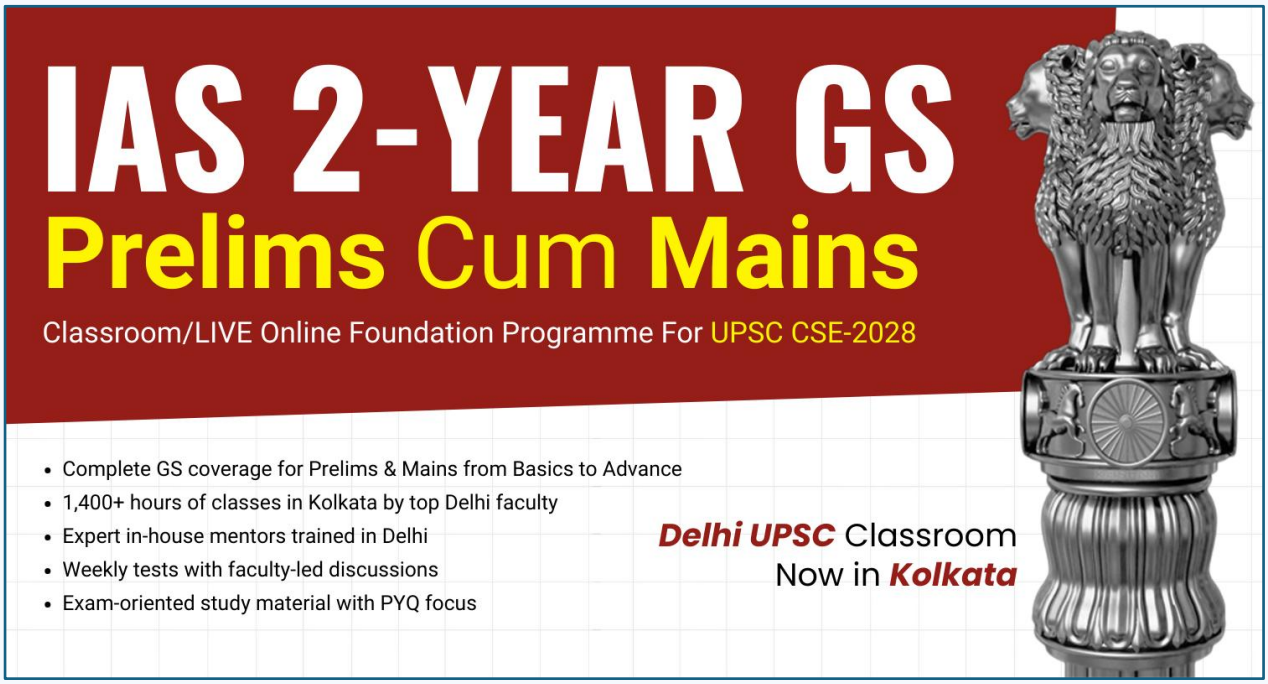


Q. Consider the following statements:

1. Article 14 of the Constitution is available to foreigners as well as citizens.
2. The right to reside and settle in any part of India under Article 19(1)(e) is available only to citizens.
3. Admission into India and expulsion from India are subjects in the Union List.
4. A High Court can issue writs under Article 226 only for the enforcement of Fundamental Rights.

Which of the statements given above are correct?

(a) 1 and 2 only
(b) 1, 2 and 3 only
(c) 2, 3 and 4 only
(d) 1, 2, 3 and 4

Answer: (b)

Explanation:

- **Statement 1 is correct:** Article 14 uses the term "any person".
- **Statement 2 is correct**: Article 19 rights are for citizens only, as held in *Louis De Raedt* (1991).
- **Statement 3 is correct**: Entry 19 of the Union List covers admission into India and expulsion from India.
- **Statement 4 is incorrect:** Article 226 allows writs for Fundamental Rights and for any other purpose.

Q. With reference to the Prakash Singh judgment (2006) and the appointment of Directors General of Police (DGPs) in India, consider the following statements:

1. The Supreme Court directed State governments to select the DGP from a panel of suitable officers prepared by the Union Public Service Commission (UPSC).
2. The selected DGP should have a minimum tenure of two years, irrespective of the date of superannuation.
3. Police and Public Order fall under the Concurrent List of the Seventh Schedule of the Constitution of India.
4. The directions issued by the Supreme Court in the Prakash Singh judgment are binding on State governments under Article 141 of the Constitution.

Which of the statements given above are correct?

(a) 1 and 2 only
(b) 1, 2 and 4 only
(c) 2 and 3 only
(d) 1, 2, 3 and 4

Answer: (b) 1, 2 and 4 only

Explanation:

- **Statement 1 is Correct**: The judgment directed States to select the DGP from a panel of suitable officers prepared by the UPSC.
- **Statement 2 is Correct**: The DGP should have a minimum tenure of two years, subject to the applicable directions.
- **Statement 3 is Incorrect**: Police and Public Order fall under the State List (List II) of the Seventh Schedule.
- **Statement 4 is Correct**: Article 141 provides that the law declared by the Supreme Court is binding on all courts within India.

Q. With reference to the legislative and fiscal powers over mines and minerals under the Constitution of India, consider the following statements:

1. State legislative power under Entry 23 of the State List is subject to parliamentary legislation under Entry 54 of the Union List.
2. Entry 50 of the State List empowers State legislatures to levy taxes on mineral rights, subject to limitations imposed by Parliament.
3. Taxes on lands and buildings under Entry 49 of the State List are expressly subject to laws made by Parliament under the Union List.

Which of the statements given above are correct?

(a) 1 and 2 only

(b) 2 and 3 only

(c) 1 and 3 only

(d) 1, 2, and 3

Answer: (a) 1 and 2 only

Explanation:

- **Statement 1 is correct:** Entry 23 of List II (State List) provides for the regulation of mines and mineral development, but it is explicitly subject to Entry 54 of List I (Union List).
- **Statement 2 is correct:** Entry 50 of List II grants States the power to tax mineral rights, subject to any limitations enacted by Parliament by law relating to mineral development.
- **Statement 3 is incorrect:** Entry 49 of List II (Taxes on lands and buildings) is an exclusive State power and is not constitutionally subordinated to parliamentary laws under Entry 54 of the Union List.

Q. Which statement about Aadhaar is correct?

(a) It is proof of domicile.

(b) It is proof of citizenship.

(c) It is proof of identity, not citizenship or domicile.

(d) It is issued by the Election Commission of India.

Correct Answer: (c) It is proof of identity, not citizenship or domicile.

Explanation: Aadhaar is a 12-digit unique identification number issued by the Unique Identification Authority of India (UIDAI). It serves as proof of identity but does not confer citizenship or establish domicile.

Scan to attempt more questions

***

2.1. 'ENEMY STATE' CLAUSES IN THE UN CHARTER

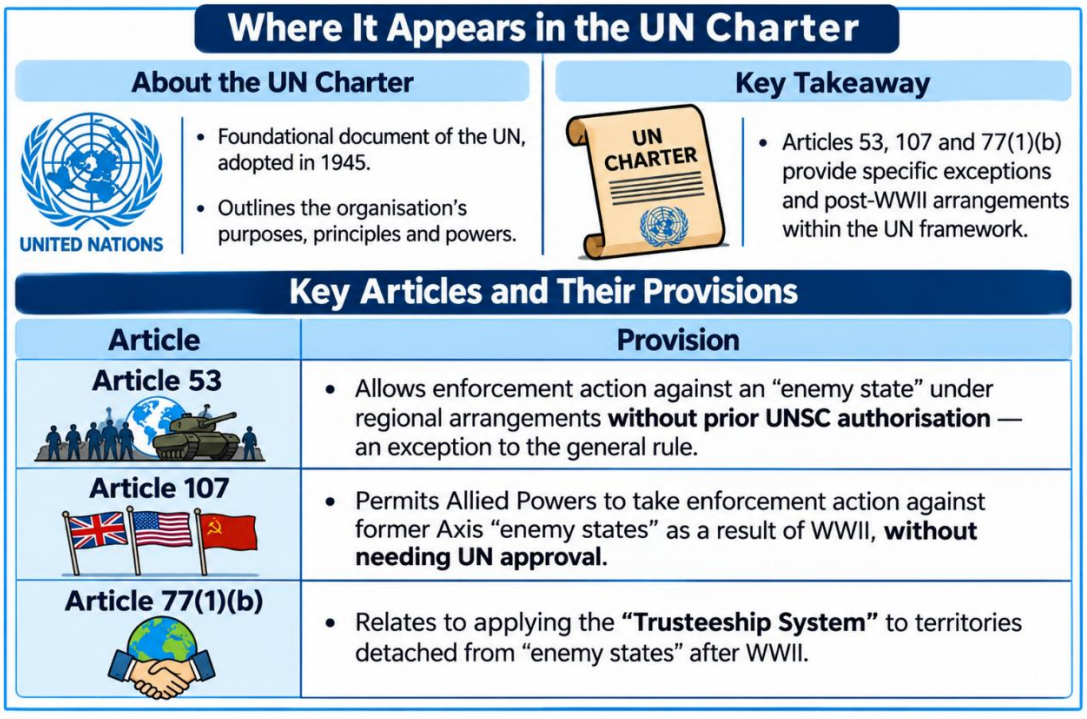
Context



- Recently, Japan's Prime Minister Sanae Takaichi, in her address to the UN General Assembly (UNGA), called for the removal of the obsolete **"enemy state" clauses** from the UN Charter and advocated reforms to make the UN Security Council (UNSC) more representative of present-day global realities.

What is an 'Enemy State'?

- The **UN Charter**, drafted towards the end of **World War II**, came into force on **24 October 1945**.
- It contains references to **"enemy states"** — a term applying to any state that was an **enemy of an Allied signatory during World War II** (primarily the **Axis Powers**: Germany, Italy, Japan).
- The clause was intended by the **Allied Powers** (Britain, USSR, USA) as a mechanism to counter the **re-emergence of militarism or fascism** in the defeated Axis states, without needing UN Security Council (UNSC) authorisation.



About UN Trusteeship System

- Established under the Charter for **"trust territories"** — regions whose people had not yet attained full self-government.
- There were **11 such territories**, located in **Africa and the Pacific Islands**.

Issues Surrounding the Clauses

- **Obsolete Provisions:** The UNGA recognised the "enemy state" clauses as **obsolete in 1995**, and the **2005 World Summit** called for their removal. However, they continue to remain part of the UN Charter.
- **Charter Amendment Hurdles:** Under **Article 108**, amendments require a **two-thirds majority of the UNGA** and ratification by two-thirds of UN member states, including all five permanent members of the UNSC**.**
- **Link with UNSC Reform:** Removing these clauses would require reopening the UN Charter, potentially triggering broader debates on UNSC restructuring, permanent membership and representation, including the aspirations of countries such as **Japan and Germany**.

2.2. THE NEW DIMENSION OF INDIA JAPAN DEFENCE TIES

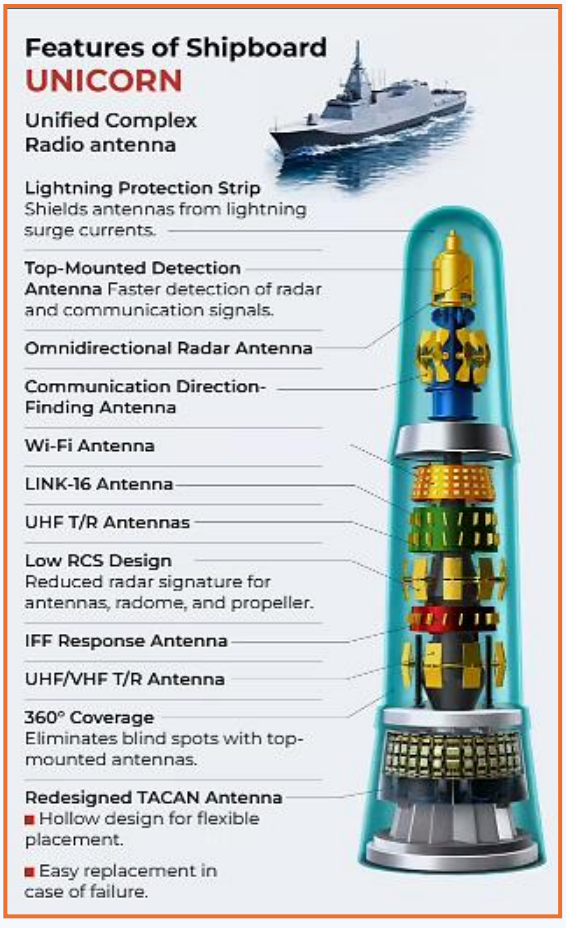


Context

- Recently, Japan has urged India to fast-track approval for the transfer of **UNICORN technology**, following the July 2026 India–Japan agreement, signalling deeper defence technology cooperation and co-development.

What is UNICORN Technology?

- **UNICORN** stands for **Unified Complex Radio Antenna**.
- It is an advanced **naval antenna system** developed by Japan.
- It integrates multiple communication and antenna functions into a **single integrated mast**.
- By integrating antennas into the mast, it can help reduce the ship's **radar signature and electromagnetic interference**.
- The system is intended for installation on **warships**.
- It is therefore associated with improved **stealth, communication and electronic warfare capabilities**.
- Presently utilized on the **Mogami-class stealth frigates** of the Japan Maritime Self-Defence Force (JMSDF). In India, it is planned to be co-developed involving public sector undertakings like **Bharat Electronics Limited (BEL)**.



Why is the Project Important?

- **Defence Technology Transfer**: Promotes technology transfer, co-development and defence production between India and Japan.
- **Make in India**: Strengthens domestic defence manufacturing and industrial capabilities.
- **Naval Modernisation**: Supports development of advanced and integrated Indian naval platforms.
- **Maritime Security**: Enhances maritime security, domain awareness and naval cooperation in the Indo-Pacific.

2.3. EXERCISE TARANG SHAKTI

Context



- The **French Air and Space Force** is participating in the multinational air combat exercise **'Tarang Shakti'**, hosted by the **Indian Air Force (IAF)**, as part of its ongoing **Mission Pégase**, aimed at enhancing military cooperation and interoperability between India and France.

About Exercise Tarang Shakti

- This is the **2nd edition** of Tarang Shakti, held at **Jodhpur Air Force Station**.
- It is India's **largest multinational air combat exercise**, hosted by the IAF.
- **Seven foreign nations** are participating**:** USA, France, Germany, Australia, Bangladesh, Sri Lanka, and UAE**.**
- Notably features the **first-ever participation of the US F-35 stealth fighter jet** in an exercise on Indian soil.
- **India's air assets** on display: Rafale, Mirage-2000, Jaguar, Tejas, MiG-29, and Su-30 MKI.

What is Mission Pégase?

- **Long-Range Power Projection:** Mission Pégase 26 is France's **7th long-range strategic deployment**.
- **Global Footprint:** Covering about **40,000 km** across the **Arctic, Indo-Pacific, Indian Ocean and Middle East**, it demonstrates France's ability to rapidly deploy air assets worldwide**.**

Significance

- Strengthens **India-France strategic partnership**, particularly in the **Indo-Pacific** context.
- Enhances **interoperability** among IAF and partner air forces through joint operations involving diverse aircraft platforms (including 5th-generation F-35).
- Reflects India's growing role as a hub for multinational defence exercises, alongside existing bilateral drills (Malabar, Varuna, Garuda, Shakti, etc.).
- Aligns with India's vision of an open, free, and rules-based Indo-Pacific, upholding freedom of navigation and international law.

2.4. FIRST BIMSTEC HOME MINISTERS' MEETING AND DELHI DECLARATION

Context



- India hosted the **first-ever meeting of Home Ministers of BIMSTEC member countries**, which adopted the **Delhi Declaration** to strengthen regional cooperation against terrorism and violent extremism.

About BIMSTEC

- **Full Name:** Bay of Bengal Initiative for Multi-Sectoral Technical and Economic Cooperation.
- **Established:** 1997 through the Bangkok Declaration.
- **Secretariat:** Dhaka, Bangladesh.
- **Member Countries:** Seven members; Bangladesh, Bhutan, India, Myanmar, Nepal, Sri Lanka and Thailand.
- **Key Areas of Cooperation:** Trade, investment, connectivity, security, energy, technology and people-to-people exchanges.

Key Highlights of the Delhi Declaration

1. **Counter-Terrorism Cooperation:** Condemns terrorism and violent extremism in all forms, including cross-border terrorism, and calls for sustained regional efforts to combat these threats.
2. **Prevention of Radicalisation:** Emphasises measures to counter radicalisation and violent extremism conducive to terrorism.
3. **Countering Terror Financing:** Calls for adherence to internationally agreed anti-money laundering and counter-terror financing standards, consistent with domestic and international law.
4. **Misuse of Emerging Technologies:** Highlights the need to prevent terrorist exploitation of encrypted communications, social media, drones, cryptocurrencies and the dark web.
5. **Implementation of UN Sanctions:** Calls for effective implementation of relevant UN Security Council sanctions measures, including those of the **1267 Sanctions Committee**.
6. **Justice for Victims:** Expresses solidarity with victims of terrorist attacks and their families and calls for those responsible to be brought to justice in accordance with applicable laws.

Five Key Areas of Cooperation Highlighted by India

1. **Drug Control:** Strengthening cooperation against illicit drug trafficking and narco-trade.
2. **Counter-Terrorism and Legal Cooperation:** Improving coordination to investigate and combat terrorism and transnational crime.
3. **Repatriation of Fugitive Criminals:** Enhancing cooperation in the extradition and repatriation of criminals operating across national borders, in accordance with applicable legal frameworks.
4. **Cybersecurity and Cybercrime Investigations:** Strengthening cooperation to address cybercrime, cyber slavery and the misuse of digital technologies.
5. **Institutional Cooperation and Capacity Building:** Improving coordination among law enforcement agencies, intelligence services and border management authorities.

2.5. UN SECURITY COUNCIL (UNSC) REFORMS



Context

- Recently, India called for **comprehensive reforms of the UN Security Council (UNSC)**, highlighting its lack of representativeness and its failure to respond effectively to global conflicts.

Key Highlights

- **India's Stand:** Historical authority derived from the Second World War cannot compensate for the UNSC's present-day legitimacy deficit.
- **Representation Gap:** The Asia-Pacific Group, representing over 60% of the world's population, remains underrepresented in the Council.
- **Expansion of Membership:** India advocates expanding both permanent and non-permanent membership categories.
- **Criticism of Existing Structure:** Expanding only non-permanent membership would leave the fundamental imbalance unchanged.
- **India's Candidature:** India is seeking a non-permanent UNSC seat for the **2028–29 term**.

About the United Nations Security Council (UNSC)

- **Established:** 1945 under the UN Charter.
- **Headquarters:** New York City, USA.
- **Composition:** 15 members - 5 permanent and 10 non-permanent members.
- **Permanent Members (P5):** China, France, Russia, the United Kingdom and the United States.
- **Non-Permanent Members:** 10 members elected by the UN General Assembly for **two-year terms**.
- **Presidency:** Rotates monthly among the 15 members in English alphabetical order.
- **Charter Mandate: Under Article 24 and Article 25** of the UN Charter, member states confer primary responsibility for maintaining international peace and security on the Security Council and agree to abide by its decisions.
- **Key Powers:** Imposing sanctions, authorising peacekeeping operations and approving the use of force under the UN Charter.
- **Veto Power:** Each permanent member can veto substantive resolutions.
- **Voting:** At least 9 affirmative votes are required to adopt a substantive resolution, with no veto from any permanent member.
- **India and UNSC:** India is not a permanent member but has served as a non-permanent member eight times, most recently in 2021–2022.
- **Permanent Seat Bid**: India is part of the G4 nations (along with Brazil, Germany, and Japan) pushing for structural reforms and a permanent seat on the UNSC.

***

Q. Question: With reference to the United Nations (UN) Charter, consider the following statements:

1. Articles 53 and 107 permit enforcement actions against an "enemy state" without prior authorization from the UN Security Council.
2. The term "enemy state" applies to any state that was an enemy of any signatory of the UN Charter during the Second World War.
3. An amendment to remove these clauses from the UN Charter requires approval by a two-thirds majority in the UN General Assembly and ratification by all five permanent members of the UN Security Council.

Which of the statements given above is/are correct?

(a) 1 and 2 only (b) 2 and 3 only
(c) 1 and 3 only (d) 1, 2 and 3

Correct Answer: **(d) 1, 2 and 3**

Explanation:

- **Statement 1 is correct:** Under Paragraph 1 of Article 53 and Article 107 of the UN Charter, enforcement measures against an "enemy state" serve as an exception to the general rule requiring prior UN Security Council authorization for the use of military force.
- **Statement 2 is correct:** Paragraph 2 of Article 53 explicitly defines an "enemy state" as any state that was an enemy of any signatory of the UN Charter during the Second World War (such as Germany, Japan, or Italy).
- **Statement 3 is correct:** Under Article 108 of the UN Charter, any amendment to the Charter must be adopted by a two-thirds vote of the members of the UN General Assembly and ratified by two-thirds of the UN member states, including all five permanent members (P5) of the Security Council.

Q. Consider the following statements regarding the UNICORN project between India and Japan:

1. UNICORN stands for **Unified Complex Radio Antenna**.
2. It is an integrated naval antenna system intended for use on warships.
3. The project involves **co-development and co-production** between India and Japan.
4. Bharat Electronics Limited is associated with the Indian side of the project.

Which of the statements given above are correct?

(a) 1 and 2 only (b) 1, 2 and 3 only
(c) 2, 3 and 4 only (d) 1, 2, 3 and 4

Answer: (d) 1, 2, 3 and 4

Explanation:

- **Statement 1 is correct:** UNICORN stands for **Unified Complex Radio Antenna**.
- **Statement 2 is correct:** It is an integrated antenna system for **naval platforms**.
- **Statement 3 is correct:** India and Japan are cooperating in its **co-development and co-production**.
- **Statement 4 is correct: Bharat Electronics Limited (BEL)** is involved on the Indian side.

Q. Consider the following statements regarding Exercise Tarang Shakti and Mission Pégase:

1. Exercise Tarang Shakti is a bilateral air exercise conducted between India and France.
2. Mission Pégase 26 involved the deployment of Dassault Rafale F4 fighters, Airbus A330 MRTT Phénix tankers, and Airbus A400M Atlas aircraft.

3. France's Indian Ocean territories include Réunion and Mayotte.

Which of the statements given above is/are correct?

(a) 1 and 2 only (b) 2 and 3 only
(c) 1 and 3 only (d) 1, 2 and 3

Answer: (b)

Explanation:

- **Statement I is incorrect:** Tarang Shakti is a **multinational** air exercise hosted by the Indian Air Force, not a bilateral one. The bilateral air exercise between India and France is called **Exercise Garuda**. Tarang Shakti provides a multilateral platform *in addition to* bilateral exercises like Garuda (Air Force), Varuna (Navy), and Shakti (Army).
- **Statement II is correct:** As part of Mission Pégase 26, France deployed 4 Dassault Rafale F4 fighters, 3 Airbus A330 MRTT Phénix tankers, and 2 Airbus A400M Atlas aircraft to participate in the exercise.
- **Statement III is correct:** France holds territories in the Indian Ocean region, including **Réunion and Mayotte**, which underpin its strategic interest and presence in the Indo-Pacific region.

Q. Consider the following statements regarding the United Nations Security Council (UNSC):

1. The UNSC consists of 15 members, including five permanent and ten non-permanent members.
2. Non-permanent members are elected by the UN General Assembly for a term of three years.
3. All five permanent members possess veto power over substantive resolutions.
4. India is a member of the G4 nations, which advocate UNSC reforms and permanent membership for themselves.

Which of the statements given above are correct?

(a) 1 and 2 only (b) 1, 3 and 4 only
(c) 2, 3 and 4 only (d) 1, 2, 3 and 4

Correct Answer: (b) 1, 3 and 4 only

Explanation:

- **Statement 1 is correct:** The UNSC has 15 members—five permanent and ten non-permanent.
- **Statement 2 is incorrect:** Non-permanent members are elected for **two-year terms**, not three years.
- **Statement 3 is correct:** The five permanent members—China, France, Russia, the UK and the USA—possess veto power over substantive resolutions.
- **Statement 4 is correct:** The G4 comprises India, Brazil, Germany and Japan, which advocate UNSC reforms and permanent membership.

Scan to attempt more questions

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ECONOMY

3.1. STRENGTHENING THE GRID FOR GREEN POWER

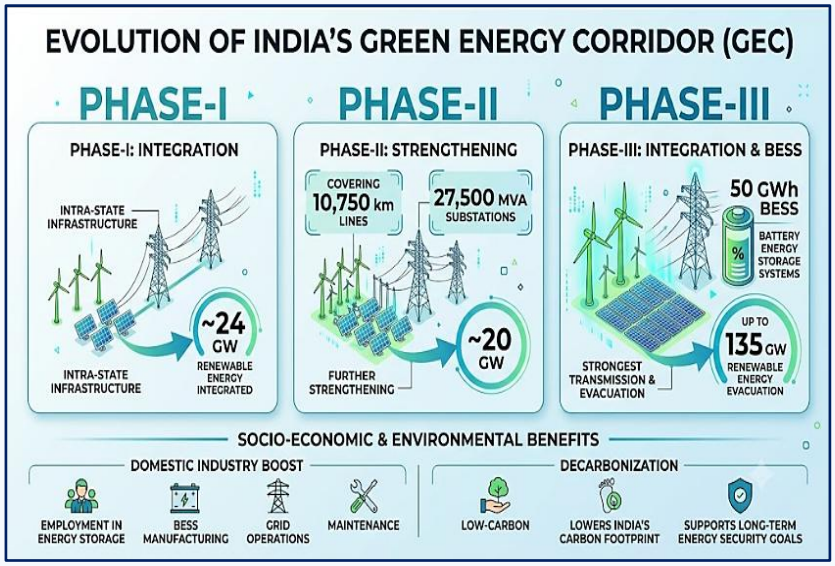


Context

- Recently, the Union Cabinet approved **Green Energy Corridor Phase-III (GEC-III)** to strengthen **intra-state transmission** and enable efficient **evacuation and integration of renewable energy**, supported by **Battery Energy Storage Systems (BESS)**.

About the Green Energy Corridor

- The **Green Energy Corridor (GEC)** is a transmission initiative to facilitate the evacuation and grid integration of large-scale renewable energy, especially from solar and wind-rich regions.
- Planning began following a 2012 Power Grid Corporation study, with implementation starting in 2015.



Core Objectives & Targets

- **RE Evacuation Capacity:** Strengthens the Intra-State Transmission System (InSTS) to enable the evacuation of up to **135 Gigawatt (GW)** of renewable energy across States and UTs.
- **Energy Storage Integration:** Deploys **50 Gigawatt-hours (GWh)** of Battery Energy Storage Systems (BESS).
- **Target Timeline:** Scheduled for completion by **FY 2032–33**.
- **Long-Term Goal:** Supports India's broader objective of achieving **900 GW** of installed non-fossil fuel capacity by **2035**.

Key Technical & Operational Features

I. **Grid Flexibility & Peak Management:** The 50 GWh BESS capacity will be installed at RE generation sites or critical grid nodes. It targets issues including:
   - Power intermittency and frequency fluctuations.
   - Network congestion.
   - Peak-hour curtailment (limiting active RE output).
   - Demand during non-solar hours.

II. Implementation Models:

- **Greenfield Projects:** Executed via **Tariff Based Competitive Bidding (TBCB)** through Transmission Service Providers under the **Build-Own-Operate-Maintain (BOOM)** model.
- **Brownfield Upgrades:** Handled under a **Cost Plus Basis (CPB)**.
- **Nodal Agencies:** State Transmission Utilities (STUs) act as primary implementation agencies.

3.2. SULPHUR PRICE SURGE: CAUSES AND IMPACT ON INDIA

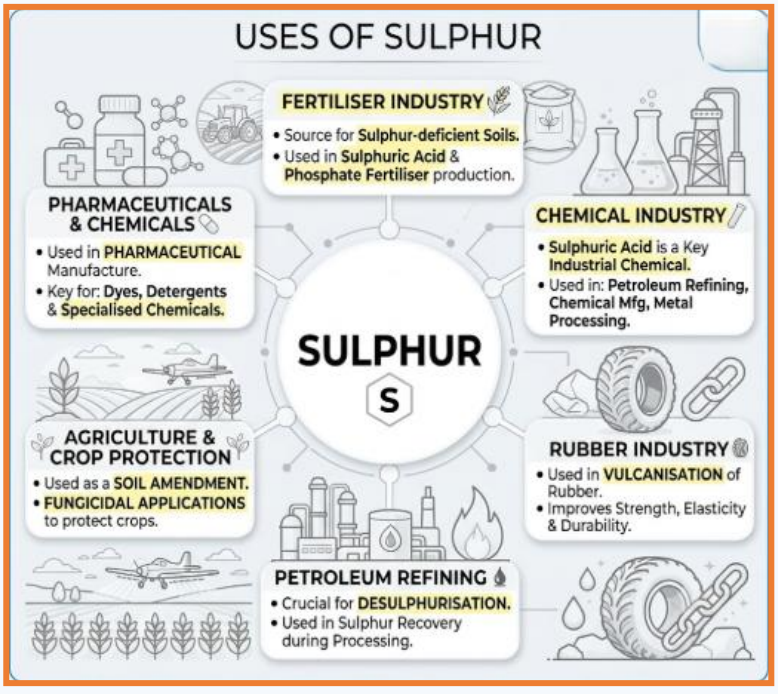
Context



- Recently, the international price of sulphur has risen nearly four-fold in one year, adding to India's import burden.

Why Prices Rose?

- **Supply Disruptions in Russia**: Ukrainian drone strikes targeting Russian oil and gas processing infrastructure disrupted production and contributed to restrictions on Russia's exports of industrial sulphur.
- **Geopolitical Disruptions in West Asia**: The West Asian conflict affected regional production, transportation and maritime trade, with the region accounting for more than 45% of global seaborne sulphur trade.
- **China's Export Restrictions**: In 2026, China restricted sulphuric acid exports to prioritise domestic requirements, further tightening regional availability and contributing to upward pressure on sulphur-related markets.



India's Sulphur Trade

- **Import Dependence:** India is a **net importer of sulphur**, as domestic production is insufficient to meet the requirements of key industries.
- **Major Import Sources:** Imports are primarily sourced from **West Asian producers**, particularly **the UAE, Saudi Arabia and Qatar**, owing to their large-scale petroleum and natural-gas processing capacity.
- **Key Domestic Uses:** Imported sulphur is mainly utilised in the production of **sulphuric acid, fertilisers, chemicals and other industrial products**.

Production and Source of Sulphur

I. Sources

- **By-product:** About 92% of global sulphur comes from petroleum refining and natural gas processing.
- **Mined:** Only about 8% is mined directly from natural deposits or sulphur-rich minerals such as pyrites.

II. Top Producers (2025)

- **Ranking:** China (19 MMT), USA (8.1), Russia (7.5), Saudi Arabia (7.2) and UAE (6.3).
- **India:** Among the top 10 producers with 3.7 MMT (8th), but relies on imports to meet demand.

3.3. WORLD ECONOMIC OUTLOOK (WEO) REPORT

Context



- Recently, the International Monetary Fund (IMF) revised India's economic growth forecast upward to 7% for 2026.

About the World Economic Outlook

- **Publisher**: International Monetary Fund (IMF).
- **Frequency**: Published twice a year, generally in April and October, with updates in January and July.
- **Coverage:** Provides estimates and projections for global economic growth, inflation, real GDP growth, consumer prices, current account balances and unemployment across IMF member countries.
- **Data Sources**: Draws on IMF staff assessments and consultations with member countries; related data are published in the WEO database.

Key Highlights of WEO 2026

- **Economic Growth** India remains among the fastest-growing major economies, with growth in 2026 projected at 7.0%.
- **Inflation**: IMF expects India's consumer price index (CPI) inflation to average 5% in FY27 before easing to 4.4% in FY28.
- **Current Account Deficit**: India's current account deficit is expected to widen to 1.5% of GDP in 2026.
- **Global Growth**: The IMF has raised its global growth forecast for 2026 by 10 basis points to 3.1%, while retaining its projection for 2027 at 3.4%.
- **Advance economics**: Advanced economies are projected to grow by 2.1% in 2026, compared with 2% in 2025.
- **Emerging and Developing Asia**: Growth is forecast at 5.1% in 2026.
- **Middle East and Central Asia:** The region's economy is projected to contract by 0.3% in 2026.

3.4. INDIAN COFFEE SUSTAINABILITY CERTIFICATION FRAMEWORK

Context

- **Recently,** the Coffee Board of India developed the **Indian Coffee Sustainability Standard and Certification Scheme (INDICOFS)** to establish a structured sustainability certification system, with a focus on India's **traditional shade-grown coffee cultivation**.

About INDICOFS

- **INDICOFS** is a sustainability standard designed specifically for Indian coffee production. It covers **Environmental, Social and Governance (ESG)** aspects, including:
  - Economic sustainability
  - Resource utilisation
  - Crop production practices
  - Environmental conservation
  - Human well-being

Three-Level Certification Framework

Level	Nature	Key Feature
Level 1	Self-Assessment	Growers assess their own sustainability practices
Level 2	Third-Party Verification	Independent agencies verify compliance
Level 3	Benchmarking	Practices are assessed against internationally recognised sustainability frameworks

About Coffee Board of India

- **Statutory Status**: Established under the **Coffee Act VII of 1942**.
- **Administrative Ministry**: Functions as an autonomous body under the **Ministry of Commerce and Industry**, Government of India.
- **Headquarters**: **Bengaluru**, Karnataka.

***

Q. With reference to the Green Energy Corridor Phase-III (GEC-III), consider the following statements:

1. It aims to facilitate the evacuation of up to 135 GW of renewable energy.
2. It provides for deployment of 50 GWh of Battery Energy Storage Systems.
3. State Transmission Utilities will be the overall implementing agencies under the scheme.
4. All transmission projects under GEC-III will be implemented through Tariff Based Competitive Bidding.

Which of the statements given above is/are correct?

(a) 1, 2 and 3 only
(b) 1 and 2 only
(c) 2, 3 and 4 only
(d) 1, 2, 3 and 4

Answer: (a) 1, 2 and 3 only

- **Statement 1 is Correct:** GEC-III aims to facilitate evacuation of up to **135 GW of renewable energy**.
- **Statement 2 is Correct:** The scheme provides for **50 GWh of Battery Energy Storage Systems (BESS)**.
- **Statement 3 is Correct: State Transmission Utilities (STUs)** will be the overall implementing agencies.
- **Statement 4 is Incorrect: Greenfield projects** will follow **Tariff Based Competitive Bidding (TBCB)**, whereas **brownfield upgradation and network strengthening** will be executed on a **Cost Plus Basis (CPB)**.

Q. With reference to sulphur, consider the following statements:

I. About 92% of global sulphur production comes from petroleum refining and natural gas processing.
II. India is among the top five sulphur-producing countries in the world.
III. Sulphuric acid is used in High-Pressure Acid Leach (HPAL) plants to extract nickel from laterite ores.

Which of the statements given above is/are correct?

(a) I and II only
(b) II and III only
(c) I and III only
(d) I, II and III

Answer: (c)

Statement I is Correct: Sulphur is mainly a by-product of petroleum refining and natural gas processing; only about 8% is mined directly.

Statement II is Incorrect: India produced 3.7 MMT in 2025, ranking 8th; China, the USA, Russia, Saudi Arabia and the UAE are the top five.

Statement III is Correct: Sulphuric acid leaches nickel from laterite ores in HPAL plants, and the nickel is used in products like EV batteries.

Q. With reference to the International Monetary Fund's (IMF) World Economic Outlook (WEO), consider the following statements:

1. The WEO is generally published in April and October, with updates released in January and July.
2. The WEO provides projections on economic growth, inflation, current account balances and unemployment across IMF member countries.
3. According to the provided WEO 2026 highlights, India's economic growth is projected at 7% in 2026.
4. Advanced economies are projected to grow faster than emerging and developing Asia in 2026.

Which of the statements given above are correct?

(a) 1 and 2 only
(b) 1, 2 and 3 only

(c) 2, 3 and 4 only

(d) 1, 2, 3 and 4

Answer: (b) 1, 2 and 3 only

Statement 1 is correct. The full WEO is published twice a year, in April and October. Shorter updates come in January and July, as with the January 2026 and July 2026 updates seen earlier.

Statement 2 is correct. The WEO database covers national accounts (growth), inflation, unemployment rates, balance of payments (including current account balances) and fiscal indicators for countries and country groups.

Statement 3 is correct, but only with the corrected figure. The October 2026 WEO projects India's growth at 7.0% in 2026. Your original highlights said 7.4%, so as the question is worded ("according to the provided highlights"), it would be wrong under your notes. Either fix the notes to 7.0%, or reword the statement as "India's growth is projected at 7% in 2026 in the October 2026 WEO."

Statement 4 is incorrect. Emerging and developing Asia is projected to grow 5.1% in 2026, well above advanced economies. Reported figures for advanced economies are far lower, such as the US at 2.3% and the euro area at about 1.1%. This is a typical reversal trap in UPSC questions.

Scan to attempt more questions

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ENVIRONMENT & GEOGRAPHY

4.1. NIYAMGIRI HILLS BAUXITE MINING CONTROVERSY AND TRIBAL RIGHTS

Context



- The National Alliance of People's Movements (NAPM) and environmental activists have cautioned against renewed proposals to revive bauxite mining across the Niyamgiri hills in Odisha's Kalahandi and Rayagada districts.

About The Niyamgiri Landscape

- **Geographical Location:** Niyamgiri is an ecologically sensitive hill range situated across the **Kalahandi and Rayagada** districts of south-western Odisha.
- **Indigenous Inhabitants:** Home to the **Dongria Kondh**, designated as a **Particularly Vulnerable Tribal Group (PVTG)**.
- **Cultural Significance:** The Dongria Kondh revere the hilltop of the Niyamgiri range as the sacred abode of **Niyam Raja** (their supreme deity and protector of the ecosystem).
- **Mineral Profile:** The flat-topped hills (lateritic plateaus) host extensive, high-grade **bauxite** deposits (the primary ore of aluminium).

Bauxite Production: India & World

- **Bauxite:** Principal ore of aluminium.
- **Processing:** Bayer process gives alumina (Al_2O_3); electrolysis then gives aluminium.
- **Guinea (2025):** 150 million metric tons; 34.1% global share.
- **Australia (2025):** ~97 to 103 million metric tons.
- **China (2025):** ~87 million metric tons.
- **Distribution in India:** Odisha 52% (largest producer); Andhra Pradesh 18%; Gujarat 7%.

Constitutional and Legal Framework for Gram Sabha's Role in Mining

Legal Framework / Authority	Mandate & Significance
Orissa Mining Corporation vs. MoEF (2013)	The Supreme Court ruled that the decision to permit mining rests with the **Gram Sabhas**, recognizing customary, cultural, and religious rights under the Forest Rights Act (FRA).
Forest Rights Act (FRA), 2006	Recognizes individual forest rights (IFR) and **Community Forest Resource (CFR)** rights; mandates free, prior informed consent of the Gram Sabha for forest diversion.
PESA Act, 1996	Panchayats (Extension to Scheduled Areas) Act mandates mandatory consultation and consent of **Gram Sabhas** before granting mining leases in Fifth Schedule areas.
Fifth Schedule of the Constitution	Provides administrative autonomy and constitutional safeguards to tribal areas, shielding them from alienation of land.

4.2. THE TWELVE YEAR BLOOM OF NEELAKURINJI

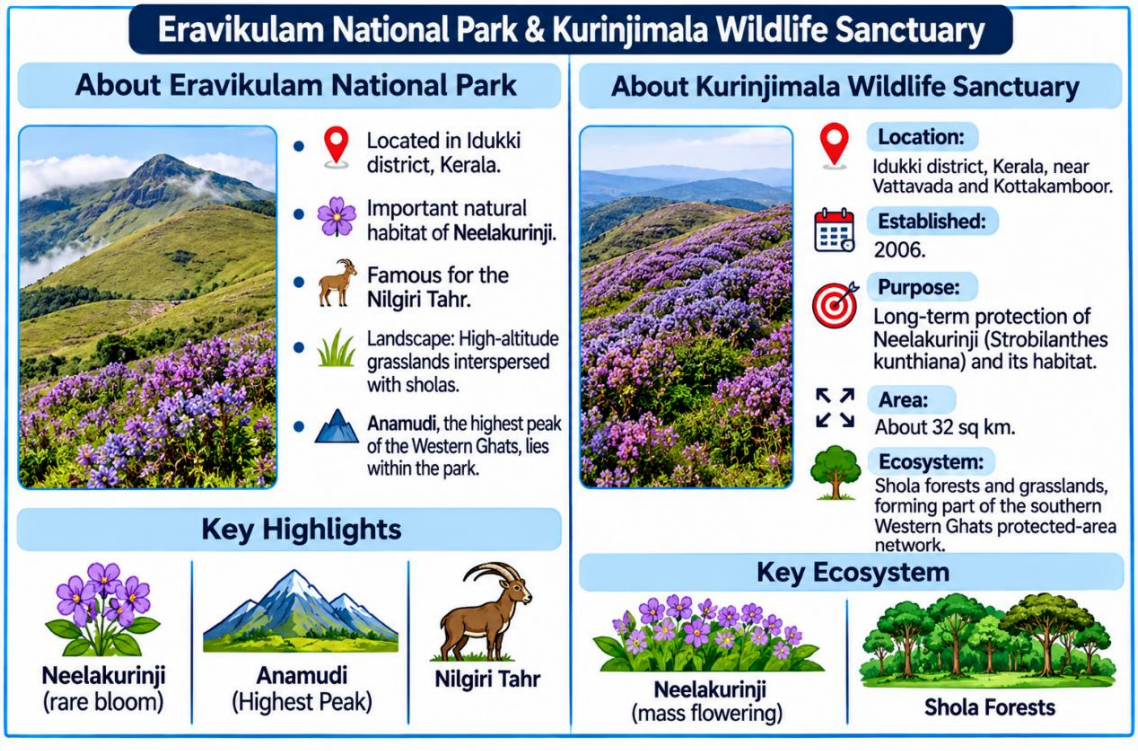
Context



- A walkathon will be held in **Munnar, Idukki district of Kerala, on 1 October 2026** to commemorate conservationist **G. Rajkumar**, who worked to create awareness about the conservation of **Neelakurinji**. The event brings attention to the unique high-altitude ecosystem of the Western Ghats.

About Neelakurinji

- **Scientific name:** *Strobilanthes kunthiana*
- **Family:** Acanthaceae; **Genus:** *Strobilanthes*
- **Flowering Cycle**: Exhibits a unique gregarious mass-flowering cycle occurring once every **12 years**.
- **Life Strategy**: Plants with such long-interval blooming cycles are termed **plietesials**. It is **semelparous** (monocarpic), meaning the shrub flowers and fruits only once in its lifetime and dies shortly after.
- **Habitat & Distribution**: Endemic to the high-altitude montane grasslands (Shola-grassland ecosystems, often called "**sky islands**") of the **Western Ghats** across Kerala, Tamil Nadu, and Karnataka.
- **Conservation Status**: Classified as **Vulnerable** under the IUCN Red List criteria.
- **Protected Areas**: Safeguarded locally in regions like the **Kurinjimala Sanctuary** (Idukki district, Kerala) and **Eravikulam National Park.**
- The last major flowering in the Munnar–Eravikulam region occurred in **2018**, with the next major cycle expected around **2030**.



4.3. TIGERS RETURN TO BUXA TIGER RESERVE



Context

- Three-year-old tigress **T138** was translocated from Valmiki Tiger Reserve, Bihar to Buxa Tiger Reserve, West Bengal, on 2 October 2026, launching the phased effort to restore a self-sustaining tiger population, supported by **NTCA** and **WII** through telemetry and camera-trap monitoring.

About Buxa Tiger Reserve

Feature	Detail
Location	Alipurduar subdivision of **West Bengal** (extending across Terai, Bhabar, and sub-Himalayan ecosystems).
Boundaries	Northern boundary runs along the international border with **Bhutan**; Eastern boundary touches **Assam** (demarcated by the Sankosh River).
Contiguous Landscapes	Contiguous with Bhutan's **Phibsoo Wildlife Sanctuary** to the north and Assam's **Manas Tiger Reserve** to the east, forming a vital international transboundary wildlife corridor.
Drainage	Drained by trans-boundary rivers originating in Bhutan, notably the **Raidak**, **Sankosh**, and **Jayanti** rivers.
Status Timeline	Declared a **Tiger Reserve** in 1983 (15th tiger reserve in India) and a **National Park** in 1992.



4.4. VULTURES RETURN TO THE WAYANAD LANDSCAPE



Context

- Recently, a two-day synchronous vulture survey in the Wayanad Wildlife Sanctuary (WWS), Kerala, recorded 65 vultures, comprising 54 White-rumped Vultures and 11 Red-headed Vultures.

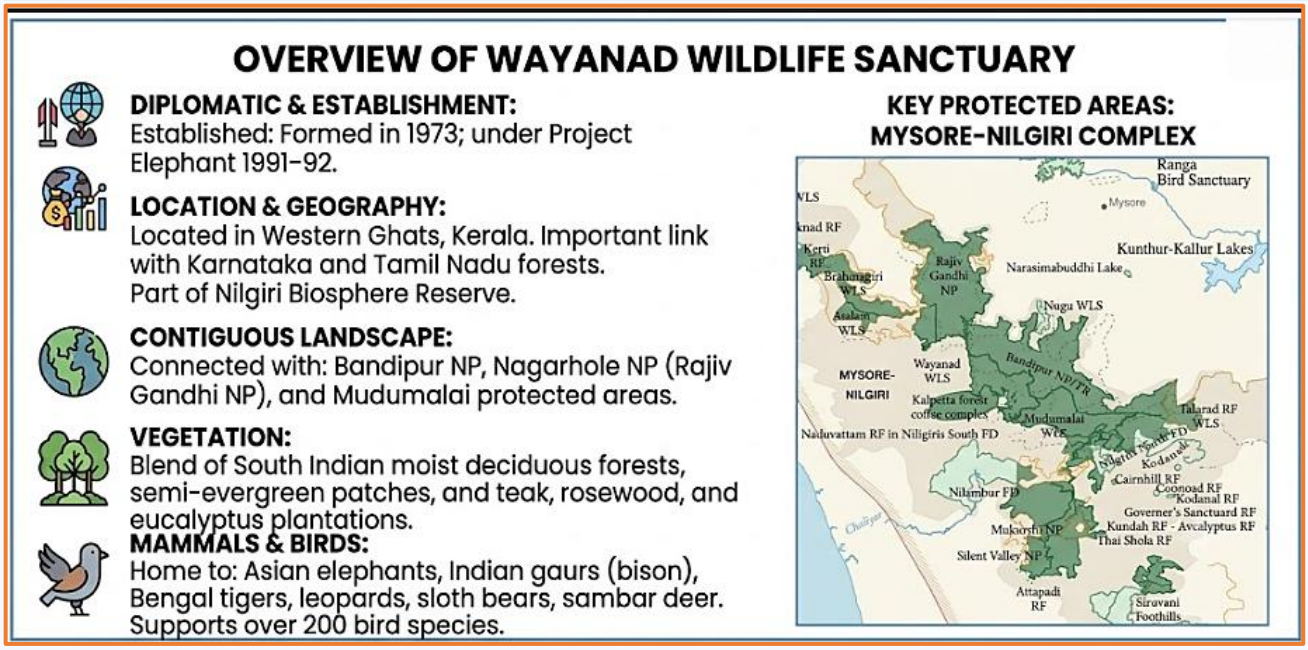
Vulture Species in India

- India is home to 9 species of vultures, belonging mainly to the Accipitridae family:

Species Name (Common & Scientific)	Resident / Migratory	IUCN Red List Status	Key Habitat / Features
White-rumped Vulture	Resident	**Critically Endangered (CR)**	Plains and open forests; builds nests on tall trees (Banyan, Peepal).
Indian Vulture / Long-billed Vulture	Resident	**Critically Endangered (CR)**	Prominent in hilly areas and peninsular cliffs; nests on rocky ledges.
Slender-billed Vulture	Resident	**Critically Endangered (CR)**	Found north of the Ganges, Sub-Himalayan belt, and Northeast India.
Red-headed Vulture / King Vulture	Resident	**Critically Endangered (CR)**	Distinctive bare red head and neck; solitary or paired feeder.
Egyptian Vulture	Resident & Migratory	**Endangered (EN)**	Small size, yellow face, white plumage; known for tool use (breaking eggs with stones).
Cinerous Vulture	Winter Migrant	**Near Threatened (NT)**	Massive wingspan; migrates from Eurasia to northern and western India.
Himalayan Griffon	Resident / High-altitude	**Near Threatened (NT)**	Trans-Himalayan and high-altitude regions; winters in northern plains.
Eurasian Griffon	Winter Migrant	**Least Concern (LC)**	Migrates from Europe/Central Asia to northern India during winter.
Bearded Vulture / Lammergeier	Resident (Himalayas)	**Near Threatened (NT)**	High Himalayas; unique diet consisting primarily of bone marrow.

Why Are Vultures Important?

- **Obligate scavengers** that rapidly consume animal carcasses.
- Remove carcasses, **recycle nutrients**, and maintain ecosystem sanitation.
- Their decline can increase carcass accumulation, feral scavenger populations, and **disease-transmission risks**.



4.5. VEERANGANA DURGAVATI TIGER RESERVE BECOMES INDIA'S THIRD CHEETAH HABITAT

Context



- Recently, Madhya Pradesh has established its third cheetah habitat at Veerangana **Durgavati Tiger Reserve** with the release of Vyom (male) and Neera (female), complementing **Kuno National Park** and **Gandhi Sagar Wildlife Sanctuary** and strengthening the spatial diversification of India's cheetah reintroduction programme.

About Veerangana Durgavati Tiger Reserve (VDTR)

- **Location:** Madhya Pradesh; spans Sagar, Damoh and Narsinghpur districts.
- **Established:** Notified as Madhya Pradesh's 7th Tiger Reserve in 2023.
- **Landscape:** Part of the Central Indian highlands, providing connectivity between important wildlife habitats.
- **River Systems:** The Narmada, Sonar and Kopra river systems influence the reserve's landscape.
- **Key Fauna:** Tiger, leopard, sloth bear, gaur, sambar, chital and wild dog.
- **Conservation Significance:** Strengthens tiger conservation, habitat connectivity and landscape-level wildlife management in Central India.

About Kuno National Park

- **Location**: Sheopur district, Madhya Pradesh, within the Kuno River landscape.
- **Established:** Declared a National Park in 2018; earlier notified as a wildlife sanctuary in 1981.
- **Habitat:** Predominantly dry deciduous forests, grasslands and riverine ecosystems.
- **Key Fauna:** Leopard, chital, sambar, nilgai, wild boar and Indian wolf.
- **Cheetah Significance**: India's primary cheetah reintroduction site under Project Cheetah, receiving cheetahs from Namibia and South Africa since 2022.

About Gandhi Sagar Wildlife Sanctuary

- **Location:** Mandsaur and Neemuch districts, Madhya Pradesh, along the Chambal River.
- **Established**: 1974; forms part of the Gandhi Sagar–Kuno landscape for wildlife conservation.
- **Habitat**: Predominantly dry deciduous forests, grasslands, ravines and riverine ecosystems.
- **Key Fauna:** Chinkara, leopard, sloth bear, striped hyena, crocodile and various migratory birds.
- **Cheetah Significance**: Selected as the second cheetah reintroduction site in Madhya Pradesh, complementing Kuno National Park and supporting the expansion of Project Cheetah.

Project Cheetah

- **Launched:** September 2022, to reintroduce cheetahs in India after their extinction in 1952.
- **Nodal Ministry**: Ministry of Environment, Forest and Climate Change (MoEFCC).
- **Objective**: Establish a viable, self-sustaining cheetah population through phased reintroduction.
- **Sources:** Cheetahs are being translocated primarily from Namibia and South Africa.
- **Key Habitats in Madhya Pradesh**: Kuno National Park, Gandhi Sagar Wildlife Sanctuary and Veerangana Durgavati Tiger Reserve.
- **Significance**: Aims to restore a lost apex predator, enhance ecosystem functioning and promote grassland and open-forest conservation.

4.6. ALBERTA REFERENDUM

Context

- Recently, Alberta's separatist movement has gained momentum amid debates over federal policies, **oil and gas development**, environmental regulations, and the province's relationship with the Canadian federal government.



About Alberta

- **Location:** A **landlocked** western province of Canada, bordered by British Columbia to the west and Saskatchewan to the east.
- **Capital:** Edmonton.
- **Major economic resource:** Home to 'oil sands' and holds the **world's fourth-largest** proven oil reserves, trailing behind Venezuela, Saudi Arabia, and Iran.
- **Economic Contribution**: Accounts for more than **80% of Canada's crude oil** production and contributes a disproportionate share to the national economy.

Causes of Separatist Sentiments

- **Federal vs. Provincial Policies:** Resistance against federal environmental/climate policies aimed at curbing oil extraction.

- **Economic Grievance:** A perception among local constituents that the province contributes significantly more to the federal government than it receives back.
- **Pandemic Restrictions & External Influences:** Discontent over COVID-19 pandemic restrictions and regulations, coupled with political rhetoric from neighboring border regions advocating provincial autonomy over local resources and tax collection.

4.7. PFAS: EMERGING CONTAMINANTS & THE CHALLENGE OF WATER POLLUTION IN INDIA

Context

- Recent, studies across India have detected **Per- and Polyfluoroalkyl Substances (PFAS)** in groundwater, surface water, sewage and coastal waters, raising concerns about environmental contamination and potential health risks.

About PFAS



- **Full Form:** Per- and Polyfluoroalkyl Substances.
- **Nature:** A large group of synthetic chemicals characterised by multiple carbon–fluorine bonds.
- **Common Uses:** Coatings, textiles and various industrial and consumer products.
- **Key Property:** Strong carbon–fluorine bonds make many PFAS highly resistant to environmental degradation.
- **Persistence:** Many PFAS persist in the environment for long periods and are commonly referred to as **"forever chemicals."**
- **Environmental Occurrence:** Found in water, soil, sewage and other environmental matrices.
- **Major Concern:** Their persistence, potential toxicity and widespread use make them a significant emerging environmental concern.

Sources and Pathways of PFAS Contamination

- **Industrial Discharges:** Release of PFAS-containing chemicals through industrial wastewater.
- **Municipal Sewage:** Domestic wastewater can carry PFAS from consumer products and other sources.
- **Landfills and Garbage Dumps:** Leaching from discarded products can contaminate groundwater.
- **Consumer Products:** PFAS-containing coatings, textiles and other materials can contribute to environmental releases.
- **Transformation of Precursors:** Certain precursor compounds can transform into more persistent PFAS in the environment or during treatment processes.

Environmental and Health Implications

1. **Environmental Persistence:** Many PFAS resist natural degradation, allowing contamination to persist over extended periods.

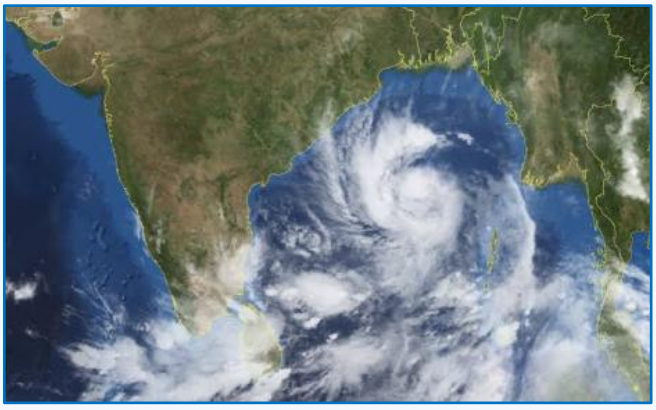
2. **Potential Human Health Risks:** Health risks depend on the specific compound, exposure dose, duration and route of exposure.
3. **Carcinogenicity:** According to the International Agency for Research on Cancer (IARC), in its 2025 monograph:
    - **PFOA (Perfluorooctanoic acid):** Classified as carcinogenic to humans (Group 1).
    - **PFOS (Perfluorooctanesulfonic acid):** Classified as possibly carcinogenic to humans (Group 2B).
4. **Aquatic Toxicity:** A 2026 study examining a mixture of 24 PFAS compounds reported delayed hatching, reduced growth, accumulation in zebrafish blood and reduced heart rates in offspring.
5. **Food-Chain Concerns:** Certain PFAS can accumulate in organisms and may enter food chains, depending on their chemical properties and environmental conditions.

India's Regulatory and Institutional Response

- **Bureau of Indian Standards (BIS):** The drinking-water standard IS 10500:2012 is under revision. A dedicated Working Group on Emerging Contaminants and Forever Chemicals is examining PFAS limits and associated contaminants.
- **Ministry of Environment, Forest and Climate Change:** The Ministry has stated that there is no specific regulation banning PFAS manufacturing.
- **CSIR–Indian Institute of Toxicology Research (CSIR-IITR):** Participating in a UNEP-funded National Implementation Plan to build baseline data on PFAS in environmental matrices and consumer products.
- **Analytical Capacity:** CSIR-IITR has developed capabilities to detect 50 multi-class PFAS molecules across different environmental and product matrices.

4.8. INFLUENCE OF EL NIÑO ON CYCLONE PATH AND INTENSITY

Context



- A recent report highlighted how **El Niño influenced the path and intensity of Cyclone Arnab**, which affected parts of the eastern coast of India.

About El Niño

- **El Niño** is the periodic warming of sea-surface temperatures in the central and eastern equatorial Pacific Ocean.
- It is the warm phase of the **El Niño–Southern Oscillation (ENSO)**, a climate pattern involving interactions between the ocean and atmosphere.
- It can influence global atmospheric circulation, rainfall patterns, monsoons and tropical cyclone activity.

How El Niño Can Influence Tropical Cyclones?

1. **Atmospheric circulation:** El Niño changes large-scale atmospheric circulation, potentially influencing the environmental conditions in which cyclones develop.
2. **Vertical wind shear:** It can alter vertical wind shear—the change in wind speed or direction with altitude—which may affect cyclone formation and intensification.
3. **Regional differences:** El Niño's effects vary across ocean basins. Its influence on cyclone activity in the North Indian Ocean is complex and is not uniform in every event.
4. **Cyclone track and intensity:** Cyclone movement and strength also depend on sea-surface temperatures, atmospheric pressure systems, steering winds and other local conditions.

Tropical Cyclones' Fuel

- **Niño 3.4 region:** Used to measure El Niño's intensity. Sea surface temperature here was 2-2.8°C above normal in July-September 2026.
- **Condition for formation:** Ocean temperature of 26°C or above at depths of 50-100 m.
- Warm oceans can cause rapid intensification at sea.
- **Other factors:** Boundary layers, wind shear, convection, upper ocean circulation, air-sea interaction.

How Are Cyclones Named?

- Naming in the Bay of Bengal and Arabian Sea began in September 2004, following a 2000 meeting of an intergovernmental panel (the WMO/ESCAP Panel on Tropical Cyclones).
- **Members:** Initially 8 countries (Bangladesh, India, Maldives, Myanmar, Oman, Pakistan, Sri Lanka, Thailand). In 2018, 5 more joined (Iran, Qatar, Saudi Arabia, UAE, Yemen), making 13.
- **Rules:** Names must be short, easy to pronounce and inoffensive. A name, once used, is never repeated.
- **Who names:** The Regional Specialised Meteorological Centre (RSMC), New Delhi, assigns the name once a system reaches 62 kmph.
- **Order:** Countries are listed alphabetically and their names used in sequence. When all 13 names in a column are used, the next column is taken.
- **Arnab** (pronounced "Ornab") was proposed by Bangladesh. The next name is **Murasu**, proposed by India (a Tamil word for drum).

***

Q. With reference to the Dongria Kondh tribe and the legal provisions governing Scheduled Areas in India, consider the following statements:

1. The Dongria Kondh community is classified as a Particularly Vulnerable Tribal Group (PVTG) indigenous to Odisha.
2. Under the Panchayats (Extension to Scheduled Areas) Act, 1996 (PESA), the recommendation of the Gram Sabha is mandatory prior to granting prospecting licences or mining leases for minerals in Scheduled Areas.
3. The Supreme Court in the 2013 Niyamgiri judgment held that the religious and cultural rights of tribal communities can be adjudicated and decided by the local Gram Sabha under the Forest Rights Act, 2006.

Which of the statements given above are correct?

(a) 1 and 2 only
(b) 2 and 3 only
(c) 1 and 3 only
(d) 1, 2, and 3

Answer: (d) 1, 2, and 3

Explanation:

- **Statement 1 is correct:** The Dongria Kondh are one of the 13 Particularly Vulnerable Tribal Groups (PVTGs) identified in Odisha (out of 75 PVTGs across India).
- **Statement 2 is correct:** Section 4(k) of the PESA Act, 1996 explicitly stipulates that the prior recommendation of the Gram Sabha or the Panchayats at the appropriate level is mandatory before granting mining leases for minor minerals and concessions in Scheduled Areas.
- **Statement 3 is correct:** In *Orissa Mining Corporation v. MoEF (2013)*, the Supreme Court held that the Gram Sabha possesses the statutory authority under the Forest Rights Act (FRA), 2006 to determine if mining impinges on the religious, customary, and cultural rights of tribal communities.

Q. Consider the following statements regarding Neelakurinji:

1. Neelakurinji is scientifically known as *Strobilanthes kunthiana*.
2. It is associated with the high-altitude shola-grassland ecosystems of the Western Ghats.
3. Its mass flowering generally occurs every 12 years.
4. Kurinjimala Wildlife Sanctuary is located in Idukki district of Kerala and was established for the conservation of Neelakurinji and its habitat.

Which of the statements given above are correct?

(a) 1 and 2 only
(b) 1, 2 and 3 only
(c) I2, 3 and 4 only
(d) 1, 2, 3 and 4

Answer: D. 1, 2, 3 and 4

- **Statement 1 is correct:** Neelakurinji is *Strobilanthes kunthiana*.
- **Statement 2 is correct:** It is associated with high-altitude shola-grassland habitats of the Western Ghats.
- **Statement 3 is correct:** It is famous for mass flowering approximately once every 12 years.
- **Statement 4 is correct:** Kurinjimala Wildlife Sanctuary in **Idukki, Kerala**, was established in 2006 for the long-term conservation of Neelakurinji and its habitat.

Q. Consider the following statements about the Indian Coast Guard (ICG):

I. It functions under the Ministry of Home Affairs.

II. It is a statutory body established under the Coast Guard Act, 1978.

III. It is the Central Coordinating Authority for marine oil spill response in Indian waters under the National Oil Spill Disaster Contingency Plan (NOS-DCP).

Which of the statements given above is/are correct?

(a) I and II only
(b) II and III only
(c) I and III only
(d) I, II and III

Answer: (b)

Explanation

Statement I is Incorrect: The ICG functions under the **Ministry of Defence**, not the Ministry of Home Affairs.

Statement II is Correct: The ICG began as an interim force in **1977** and became a statutory body under the **Coast Guard Act, 1978**.

Statement III is Correct: The ICG is the Central Coordinating Authority for marine oil spill response under the **NOS-DCP**, which is why it led the MT Seagull 9 operation.

Q. Consider the following statements regarding Buxa Tiger Reserve:

1. Buxa Tiger Reserve was established in 1983.
2. It is located in the Alipurduar district of West Bengal.
3. The recent tiger reintroduction programme involves translocation of a tigress from Valmiki Tiger Reserve in Bihar.
4. The National Tiger Conservation Authority and Wildlife Institute of India are associated with the programme.

Which of the statements given above are correct?

(a) 1 and 2 only
(b) 1, 2 and 3 only
(c) 2, 3 and 4 only
(d) 1, 2, 3 and 4

Answer: (d) 1, 2, 3 and 4

- **Statement 1 is correct:** Buxa was declared a Tiger Reserve in **1983**.
- **Statement 2 is correct:** Buxa Tiger Reserve is located in **Alipurduar district, West Bengal**.
- **Statement 3 is correct:** Tigress **T138** was translocated from **Valmiki Tiger Reserve, Bihar**, to Buxa.
- **Statement 4 is correct:** The programme involves scientific and technical support from the **NTCA and Wildlife Institute of India (WII)**.

Scan to attempt more questions

***

SCIENCE & TECHNOLOGY

5.1. INDIA'S FIRST LNG-POWERED TRAIN



Context

- India has introduced its **first LNG-powered train** from **Sabarmati Railway Station in Ahmedabad, Gujarat,** marking an important step toward using alternative fuels in railway transport.

About the Train technology

- **Dual-Fuel Technology:** Unlike pure LNG propulsion, the newly introduced train utilizes a **diesel-LNG dual-fuel system**.
- **Fuel Substitution & Efficiency:** LNG can replace roughly **40% of conventional diesel consumption**.
- **Driving Power Cars (DPCs):** Two 1,400 HP DPCs at the Sabarmati Integrated Coaching Depot were converted to support this dual-fuel capability.
- **Emission Reduction:** The technology substantially lowers emissions of carbon dioxide, nitrogen oxides, and particulate matter (PM).

About LNG

- **Full Form**: Liquefied Natural Gas
- **State:** Liquid
- **Process:** Cooled to about −162°C
- **Storage:** Cryogenic tanks
- **Volume:** More energy-dense; occupies less space
- **Major Use**: Heavy transport, shipping, railways
- **Key Advantage**: Suitable for long-distance, high-energy applications

5.2. INDIAN PAYLOADS ON SPACEX'S TRANSPORTER



Context

- Recently, multiple Indian payloads were launched on SpaceX's Falcon 9 from Vandenberg Space Force Base, California, as part of the Transporter-18 rideshare mission. Dhruva Space's LEAP-2 mission was among them, hosting multiple in-orbit demonstration (IOD) payloads.

About the Transporter-18 Mission

- **Type:** A rideshare mission, meaning multiple customers share the same rocket.
- **Vehicle:** Falcon 9, SpaceX's reusable two-stage rocket.

- **Launch site:** Space Launch Complex 4E, Vandenberg Space Force Base, California.
- **Scale:** About 130 payloads were carried.
- **Orbit:** A dedicated smallsat rideshare to Sun-synchronous orbit (SSO).

About LEAP (Launching Expeditions for Aspiring Payloads)

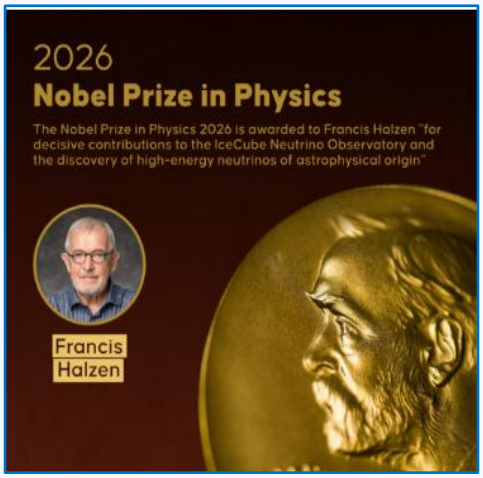
- **Full form:** Launching Expeditions for Aspiring Payloads.
- **Developer:** Dhruva Space, a private Indian space company.
- **Concept:** A hosted-payload model. Instead of building a whole satellite for one instrument, a customer fits it onto Dhruva's ready-made satellite bus, called P-30.
- **Services:** Dhruva also handles launch integration, ground station support and mission management.
- **Earlier missions:**
  - **LEAP-TD** (technology demonstrator) flew on ISRO's **PSLV-C58** in 2024.
  - **LEAP-1**, Dhruva's first commercial mission, flew on a Falcon 9 in **August 2025**.
- **LEAP-2:** Carries four payloads, including a star tracker from France's **Sodern**.

Other Indian Payloads on the Mission

- **TAPAS-1 (SatLeo Labs):** A thermal-imaging payload that flew aboard LEAP-2. It is described as India's first commercial CubeSat thermal payload.
- **MOI-1A (TakeMe2Space):** A satellite designed to process Earth observation data in orbit using AI. It carried EON Space Labs' MIRA multi-spectral imaging system.
- **Background:** TakeMe2Space's first satellite, MOI-1, was lost on ISRO's PSLV-C62 in January 2026.
- **Regulator:** All three Indian missions were authorised by IN-SPACe.

5.3. NOBEL PRIZE IN PHYSICS 2026: ICECUBE NEUTRINO OBSERVATORY

Context



- The **2026 Nobel Prize in Physics** is being awarded to **Francis Halzen** for his pioneering contributions to the **IceCube Neutrino Observatory** and the discovery of **high-energy neutrinos of astrophysical origin**.

About the IceCube Neutrino Observatory

- **IceCube** is a giant **neutrino detector located at the South Pole** in Antarctica.
- It is designed primarily to detect **high-energy astrophysical neutrinos** originating from distant and energetic cosmic events.
- The observatory occupies nearly **1 cubic kilometre of Antarctic ice**.
- It contains around **5,160 optical sensors** embedded deep in the ice.
- IceCube was **completed in 2010**.

Why Neutrinos are Important?

- **Neutrinos** are extremely elusive **subatomic particles** with very weak interactions with matter.
- They can travel enormous cosmic distances without being significantly deflected or absorbed.
- High-energy neutrinos can therefore provide information about **violent astrophysical environments** that cannot be studied adequately through conventional electromagnetic astronomy.

Why is Ice Used to Detect Neutrinos?

- **Antarctic ice** offers a vast and exceptionally **transparent medium** for detecting the faint flashes of light produced by neutrino interactions.
- When a **neutrino interacts with matter in the ice**, it can produce charged particles that emit **Cherenkov light**.
- **Light sensors embedded deep in the ice** detect these faint flashes.
- By analysing these signals, scientists can determine the **energy and direction** of the neutrino and trace its **cosmic origin**.

About Cherenkov Radiation

- **Cherenkov light** is the characteristic blue light produced when a **charged particle travels through a transparent medium faster than light can travel through that medium**.
- It does **not** mean that the particle travels faster than light in vacuum.
- IceCube uses this light to reconstruct the **direction and energy of neutrino interactions**.

5.4. CARBON CAPTURE, UTILISATION AND STORAGE (CCUS)

Context

- Recently, Iceland has expressed interest in collaborating with India in **geothermal energy, Carbon Capture, Utilisation and Storage (CCUS)** and **carbon-to-stone technologies**.



Iceland and Geothermal Energy

- Iceland has abundant **geothermal resources** due to its location on the **Mid-Atlantic Ridge**, where tectonic plates are diverging.
- Around **70% of Iceland's electricity** comes from **hydropower** and about **30% from geothermal energy**.
- Geothermal energy is also widely used for **space heating and hot water**.
- Iceland has significant expertise in **geothermal exploration, power generation and direct heat utilisation**.



India's Geothermal Potential

- India has an estimated **geothermal potential of about 10.6 GW**, according to government estimates.
- Major geothermal regions in India include:
  - **Himalayan region**
  - **Western India**
  - **Deccan region**
  - **Andaman & Nicobar Islands**
- Geothermal energy is a **renewable and relatively continuous source of energy**, unlike solar and wind, which are weather-dependent.

About CCUS (Carbon Capture, Utilisation and Storage)

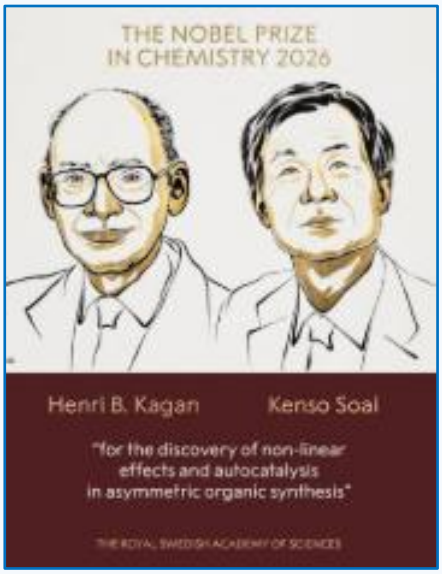
- **CCUS** is a technology that **captures CO_2 emissions** from industrial sources or directly from the atmosphere.
- The captured CO_2 is either **utilised** in products/processes or **transported and stored permanently** in geological formations.
- It can help **decarbonise hard-to-abate sectors** such as cement, steel, chemicals and refining.

About Carbon-to-Stone Technology

- **Carbon-to-Stone** is a carbon-removal technology that converts **captured CO_2 into stable carbonate minerals (rock)** through **mineralisation**.
- CO_2 reacts with **calcium- or magnesium-rich minerals**, forming solid carbonates that can store carbon for **thousands to millions of years**.
- **Example**: Heirloom Carbon Technologies uses captured CO_2 to accelerate its reaction with limestone-derived materials, permanently storing carbon as solid calcium carbonate.
- **Another example**: Carbfix injects dissolved CO_2 into basaltic rocks, where it mineralises into stable carbonates.
- **Significance**: Provides long-term carbon storage and can support net-zero and carbon-removal efforts.

5.5. 2026 NOBEL PRIZE IN CHEMISTRY

Context



- Henri B. Kagan (France) and Kenso Soai (Japan) received the 2026 Nobel Prize in Chemistry for discovering non-linear effects and autocatalysis in asymmetric organic synthesis, helping explain **homochirality**—why life predominantly uses one mirror-image form of certain molecules.

What is Chirality?

- **Chirality** refers to the property of an object or molecule that is **not identical to its mirror image**.
- The two mirror-image forms of a chiral molecule are called **enantiomers**.
- A simple example is the **left and right hand**—they are mirror images but cannot be perfectly superimposed.
- Many biologically important molecules, including **amino acids**, are chiral.
- Biological systems often preferentially use **one specific enantiomer**.
- This molecular "handedness" is known as **homochirality** when one form predominates in a biological system.

Why is Chirality Important?

- Chirality is important because biological systems are completely asymmetrical, meaning two mirror-image molecules will fit into body receptors differently—like a left hand trying to fit into a right-handed glove.
- This is particularly important in **pharmaceuticals**, where one molecular form may produce the desired therapeutic effect while another may have a different or undesirable effect.
- Therefore, controlling which enantiomer is produced is crucial for **drug development and manufacturing**.
- Chirality is also important in the production of **flavours, fragrances and advanced materials**.

Significance of the Discovery

- **Pharmaceuticals:** Enables greater control over the production of desired enantiomers.
- **Organic synthesis:** Provides methods to selectively produce **chiral molecules**.
- **Origin of life:** Offers insights into the emergence of **homochirality**.
- **Chemical catalysis:** Demonstrates how molecular asymmetry can be **amplified through catalytic processes**.
- **Materials and technology:** Chiral molecules are increasingly relevant in the development of **new materials and technological applications**.

5.6. NOBEL PRIZE 2026 AND THE BREAKTHROUGH IN OPTOGENETICS

Context



- The 2026 Nobel Prize in Physiology or Medicine was awarded to Peter Hegemann, Karl Deisseroth and Georg Nagel for pioneering optogenetics, which uses light to control specific neurons and study brain functions.

What is Optogenetics?

- Optogenetics combines genetic engineering and light to selectively activate or inhibit specific neurons, helping scientists study their roles in brain functions and behaviour.

Why is Optogenetics Important?

- **High Precision**: Targets specific neurons with millisecond-level control.
- **Circuit Analysis**: Reveals the roles of specific neural pathways.
- **Causal Links**: Connects neural activity with specific behaviours.
- **Brain Research**: Helps study memory, movement, emotions, attention and sleep.

Scientific Mechanism: From Algae to Neuroscience

- **Discovery:** Peter Hegemann and Georg Nagel studied light-sensitive proteins called channelrhodopsins in green algae.
- **Breakthrough (2005):** Karl Deisseroth introduced the algal gene into mammalian neurons, making them responsive to blue light.
- **Neural Control:** Fibre-optic light selectively switches neurons on or off, helping researchers study brain circuits and behaviour in live animals.

Significance & Applications

- **Understandings:** Establishes direct links between specific neural circuits and behaviour.
- **Disease Research**: Helps investigate Alzheimer's, Parkinson's, schizophrenia and depression.
- **Vision Restoration**: Shows potential for treating retinal disorders like retinitis pigmentosa.
- **Hearing Restoration**: Explores potential approaches to recovering hearing.

5.7. INS SURYA: INDIA'S FIRST INDIGENOUS FLEET SUPPORT SHIP

Context



- Recently, the Defence Minister launched **Fleet Support Ship-1 (FSS-1), named 'Surya'**, at **Hindustan Shipyard Limited (HSL), Visakhapatnam**.

What is a Fleet Support Ship (FSS)?

- A **Fleet Support Ship** is a naval logistics vessel designed to **replenish warships at sea**.
- It can provide **fuel, fresh water, ammunition and stores**, allowing naval vessels to remain deployed for longer without returning to port.
- Thus, FSS strengthens the Navy's **operational endurance, mobility and reach**, particularly during extended operations in the **Indian Ocean Region (IOR)**.

Key Features of FSS-1 'Surya'

- **First of five** Fleet Support Ships being built for the Indian Navy.
- **Designed and built indigenously by HSL**.
- Approximately **43,500 tonnes**.
- Equipped with:
  - First-line maintenance workshops
  - **Helicopter deck** for Multi-Role Helicopter operations
  - Self-defence systems
- The ships are intended to strengthen India's Blue Water Navy capability.

5.8. CRISPR TECHNOLOGY AND GENETICALLY MODIFIED CROPS IN INDIA

Context



- Nobel laureate **Richard J. Roberts**, recipient of the 1993 Nobel Prize in Physiology or Medicine, defended the use of biotechnology in agriculture at the **Emerging Science, Technology and Innovation Conclave (ESTIC) 2026** in New Delhi.

About CRISPR Technology

- **CRISPR-Cas9** is a gene-editing technology that enables scientists to modify specific DNA sequences in an organism.
- **How it works:**
  - A guide RNA directs the Cas9 enzyme to a specific location in DNA.

- Cas9 cuts the DNA at the targeted site.
- Scientists can then modify the genetic sequence or insert genetic material, depending on the method used.

- **Applications:** Crop improvement, disease resistance, nutritional enhancement and scientific research.
- **Significance:** CRISPR can support the development of improved crop varieties and strengthen agricultural research.
- **Intellectual Property:** Foundational CRISPR-Cas9 patents have been subject to legal disputes.

About Genetically Modified (GM) Crops

- GM crops are developed using genetic engineering techniques to introduce, modify or regulate specific genetic characteristics.
- They may be developed to improve resistance to pests, enhance nutritional content or introduce other desirable traits.
- Their adoption raises questions relating to biosafety, environmental effects, agricultural productivity, intellectual property and seed sovereignty.

GM Crops vs Gene Editing

- **Genetic Modification:** May involve introducing genetic material from another organism or modifying an organism's genetic characteristics through genetic engineering.
- **Gene Editing:** Uses tools such as CRISPR-Cas9 to make targeted changes to an organism's DNA. Some gene-editing techniques can produce changes **without introducing foreign DNA.**

Important Examples of GM Crops

1. **Bt Cotton**
   - India permits Bt cotton for commercial cultivation.
   - It is genetically modified to provide protection against certain insect pests.
   - It is an important example of the commercial cultivation of a GM crop in India.
2. **Bt Brinjal**
   - Bt brinjal was developed to provide resistance against the brinjal fruit and shoot borer.
   - In **2010**, the then Environment Minister imposed an indefinite moratorium on its introduction.
3. **GM Mustard**
   - GM mustard has been a subject of scientific, regulatory and legal debate in India.
   - In **July 2024**, the Supreme Court delivered a split verdict on its environmental release.
4. **Golden Rice**
   - Developed in **1999** by Ingo Potrykus and Peter Beyer.
   - Engineered to produce a precursor of vitamin A in the rice grain.
   - Intended to help address vitamin A deficiency.

Major Concerns Associated with GM Crops

- **Biosafety:** Potential risks to human health and the environment require scientific assessment.
- **Biodiversity:** Gene flow to related plants and possible effects on ecosystems need evaluation.

- **Seed Sovereignty:** Dependence on a limited number of companies may raise concerns about farmers' access to seeds.
- **Intellectual Property Rights:** Patents and licensing arrangements can affect access to biotechnology.
- **Agricultural Productivity:** Claims about higher yields must be supported by independent scientific evidence.
- **Socioeconomic Concerns:** The affordability of seeds, impacts on farmers and equitable access to technology remain important considerations.
- **Regulatory Challenges:** Effective biosafety assessment, monitoring and transparent decision-making are essential.

GM Crops and India's Regulatory Framework

- India has permitted **Bt cotton** for commercial cultivation but, according to the supplied article, has not permitted any GM food crop for commercial cultivation.
- The **2010 moratorium on Bt brinjal** remains a significant episode in India's GM crop debate.
- The Supreme Court's 2024 split verdict on GM mustard highlighted the need for a clear national policy.

Significance for India

- **Food Security:** Biotechnology may help improve agricultural productivity and crop resilience.
- **Nutritional Security:** Biofortified crops may contribute to addressing micronutrient deficiencies.
- **Scientific Self-Reliance:** Domestic research can reduce dependence on foreign technology providers.
- **Agricultural Innovation:** Gene editing can support the development of crop varieties with desirable characteristics.
- **Economic Benefits:** Improved crop varieties may benefit farmers if they deliver demonstrable advantages and remain accessible.
- **Environmental Sustainability:** Crop-improvement technologies may contribute to sustainable agriculture when supported by appropriate safety assessments.

5.9. ASHOKE SEN WINS 2026 OSKAR KLEIN MEDAL

Context



- Renowned Indian theoretical physicist **Professor Ashoke Sen** has been awarded the **2026 Oskar Klein Medal**, becoming the **first Indian physicist** to receive the honour.

About the Oskar Klein Medal

- **What it is:** A prestigious international award recognising outstanding contributions to theoretical physics.
- **Awarded by:** Stockholm University and the Nobel Committee for Physics of the Royal Swedish Academy of Sciences.

- **Established:** 1988.
- **Named after:** Swedish theoretical physicist **Oskar Klein**, known for his contributions to the Kaluza–Klein theory.
- **Significance:** Recognises foundational work in areas such as quantum mechanics, cosmology, gravity and the fundamental forces of nature.
- **Associated Lecture:** Recipients deliver the Oskar Klein Memorial Lecture in Stockholm.

Key Contributions of Ashoke Sen

- **S-Duality:** Demonstrated important relationships between strongly and weakly interacting string theories.
- **String Theory:** Contributed to unifying different string theories within the broader framework of M-theory.
- **Black Hole Entropy:** Developed the Entropy Function Formalism to study the microscopic origins of black hole entropy.
- **String Field Theory:** Advanced research on tachyon condensation and the dynamics of unstable string configurations.

Important Scientific Concepts

- **String Theory:** A theoretical framework that describes fundamental particles as tiny vibrating strings.
- **M-Theory:** A proposed framework that connects different versions of string theory.
- **S-Duality:** A relationship in which a strongly interacting theory can be described through a corresponding weakly interacting theory.
- **Black Hole Entropy:** A measure of the microscopic information associated with a black hole, related to its thermodynamic properties.

5.10. FIRST HUMAN CASE OF SHAMONDA VIRUS

Context



- Recently, the French health authorities have reported the world's first confirmed human infection of the Shamonda virus in an immunocompromised patient who subsequently died from neurological complications.

What is the Shamonda Virus?

- The Shamonda virus is a **negative-sense single-stranded RNA virus** belonging to the genus ***Orthobunyavirus*** (family *Peribunyaviridae*).
- It is primarily an **animal pathogen** that infects livestock, especially cattle, though sporadic cases occur in sheep, goats, and horses.
- **Symptoms** in livestock include acute diarrhoea, high fever, lethargy, reduced milk yield, and congenital defects or spontaneous abortions in pregnant animals.

Transmission and Vector Dynamics

- The virus is a **vector-borne pathogen** primarily transmitted via the bites of small biting insects, mainly midges (*Culicoides* species).
- **Animal-to-animal spread**: Primarily through infected midges, rather than direct contact.
- **Pregnancy-related transmission**: Vertical transmission has been reported, raising concerns about infection affecting unborn animals.
- Prior to this incident, the virus had circulated **exclusively among animals, with no historical transmission to humans.**

Treatment, vaccine and prevention

- **Vaccine:** WOAH reports that no commercially available vaccine against Shamonda virus is currently available.
- **Specific treatment:** No established virus-specific treatment is identified in the cited veterinary guidance.
- **Animal prevention:** Veterinary surveillance, reducing exposure to biting midges, using suitable physical barriers and following veterinary advice can help reduce transmission risk.
- **Diagnosis:** Laboratory testing is important because symptoms overlap with other livestock diseases.

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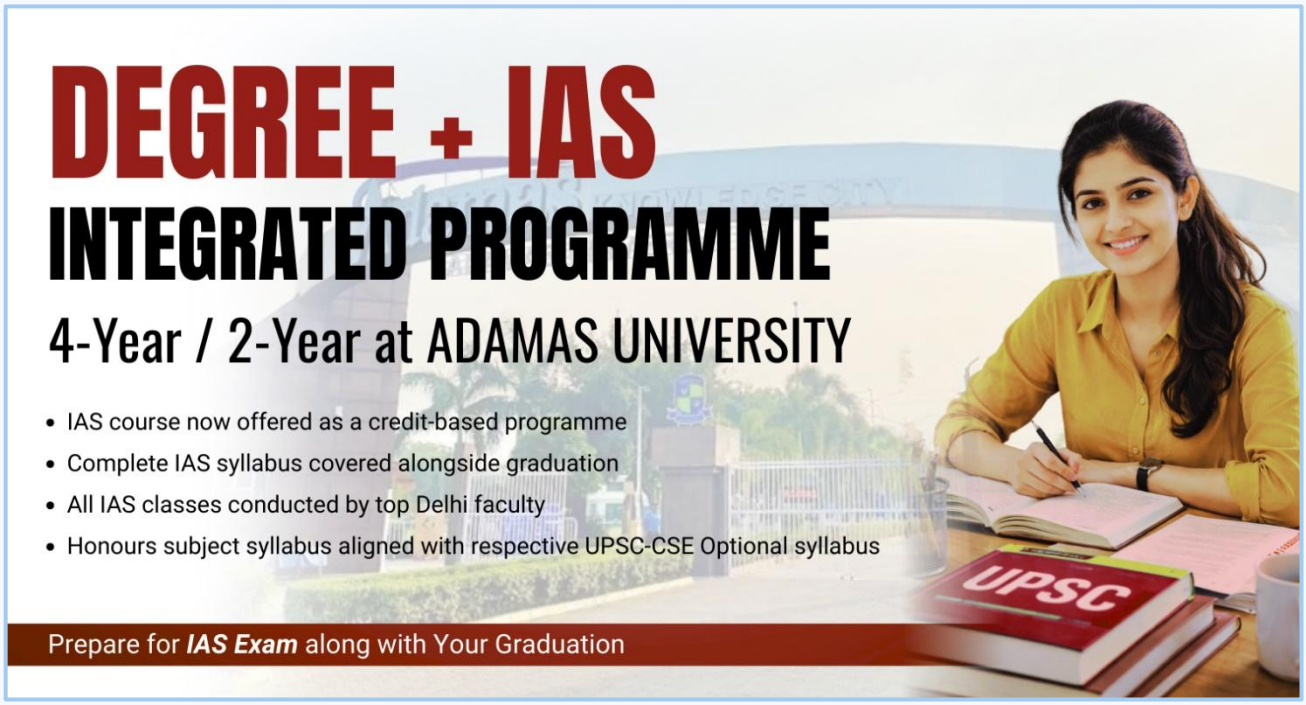

UPSC PRELIMS PRACTICE QUESTIONS

Q. Consider the following statements regarding Liquefied Natural Gas (LNG):

1. LNG is produced by cooling natural gas to approximately −162°C.
2. LNG is primarily composed of methane.
3. Unlike CNG, LNG is stored in a gaseous state under high pressure.
4. LNG is a zero-emission fuel because it does not produce carbon dioxide during combustion.

Which of the statements given above is/are correct?

(a) 1 and 2 only
(b) 1, 2 and 3 only
(c) 2 and 4 only
(d) 1, 2, 3 and 4

Answer: (a) 1 and 2 only

- **Statement 1 is Correct:** Natural gas is cooled to approximately **−162°C** to convert it into liquid form.
- **Statement 2 is Correct:** LNG consists predominantly of **methane (CH_4)**.
- **Statement 3 is Incorrect: CNG** is stored as compressed gas under high pressure, whereas **LNG is stored in liquid form at cryogenic temperatures**.
- **Statement 4 is Incorrect:** LNG is still a **fossil fuel** and its combustion releases **CO_2**. It is therefore not a zero-emission fuel.

Q. With reference to the recent Transporter-18 mission, consider the following statements:

I. It was a rideshare mission in which multiple customers shared a single Falcon 9 launch.
II. Dhruva Space's LEAP platform allows smaller payloads to be hosted on a single satellite for in-orbit demonstration.
III. IN-SPACe is the commercial arm of ISRO that markets ISRO's products and services.

Which of the statements given above is/are correct?

(a) I and II only
(b) II and III only
(c) I and III only
(d) I, II and III

Answer: (a)

Explanation

- **Statement I is correct:** Transporter-18 was a rideshare mission with about 130 payloads from multiple customers on one rocket.
- **Statement II is correct:** LEAP (Launching Expeditions for Aspiring Payloads) hosts several small payloads on one P-30 bus for IOD.
- **Statement III is incorrect:** The commercial arm of ISRO is **NewSpace India Limited (NSIL)**. IN-SPACe is the autonomous regulator and promoter of private space activity under the Department of Space.

Q. With reference to the IceCube Neutrino Observatory, consider the following statements:

1. It is located in the Arctic region.
2. It detects Cherenkov light produced by neutrino interactions in ice.
3. Its main focus is on high-energy astrophysical neutrinos.

Which of the statements given above are correct?

(a) 1 and 2 only
(b) 2 and 3 only
(c) 1 and 3 only
(d) 1, 2 and 3

Answer: B

- **Statement 1 is incorrect.** IceCube is at the **South Pole, in Antarctica**, not the Arctic.

- **Statement 2 is correct.** Its **5,160 optical sensors** detect **Cherenkov light**, the pale blue flash produced when charged particles from a neutrino collision travel through the ice faster than light does in that medium.
- **Statement 3 is correct.** Its principal scientific focus is **high-energy astrophysical (cosmic) neutrinos**, such as the ones first reported in 2013 and the one traced to a blazar in 2018.

Q. Consider the following statements regarding CCUS and Carbon-to-Stone Technology:

1. **CCUS** involves capturing CO_2 and either utilising it or storing it in suitable geological formations.
2. In **Carbon-to-Stone technology**, CO_2 is dissolved in water and injected into basaltic rocks.
3. The injected CO_2 reacts with minerals in basalt to form **stable carbonate minerals**.

Which of the statements given above is/are correct?

(a) 1 and 2 only
(b) 2 and 3 only
(c) 1 and 3 only
(d) 1, 2 and 3

Answer: (d) 1, 2 and 3

Explanation:

- **Statement 1 – Correct:** CCUS captures CO_2 and either **utilises it** in industrial processes or **stores it** in suitable geological formations.
- **Statement 2 – Correct:** In the **Carbon-to-Stone** approach, CO_2 is dissolved in water and injected into **basaltic rock formations**.
- **Statement 3 – Correct:** CO_2 reacts with minerals present in basalt and gets converted into **stable carbonate minerals**, enabling long-term storage as rock.

Scan to attempt more questions

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6.1. RAMAPPA TEMPLE



Context

- Activists have raised concerns over **a proposed open-cast coal mine near Venkatapur** in Mulugu district of Telangana, arguing that mining activity could adversely affect the **Rudreshwara Temple, popularly known as Ramappa Temple**, and the adjoining **Ramappa Lake**.

About Ramappa Temple

- The **Rudreshwara Temple**, popularly known as the **Ramappa Temple**, is located at **Palampet in Mulugu district, Telangana**.
- It was built during the **Kakatiya period** in the **13th century**.
- The temple is dedicated to **Lord Shiva**.
- It is popularly named after **Ramappa**, the chief sculptor associated with its construction.
- The temple is noted for its **intricate sculptures, ornamental carvings and distinctive architectural techniques**.
- The temple complex is located near the **Ramappa Lake**, a historic water-management structure associated with the Kakatiya period.

UNESCO World Heritage Status

- The **Rudreshwara (Ramappa) Temple** was inscribed on the **UNESCO World Heritage List in 2021**.
- It is significant because it represents the architectural and cultural achievements of the **Kakatiya dynasty**.

Kakatiya Architecture: Key Features

- **Star-shaped plan**: Temples often have a distinctive stellate (star-shaped) ground plan.
- **Material**: Extensive use of locally available granite and sandstone, with highly polished stone surfaces.
- **Intricate carvings**: Rich floral, geometric, mythological and figurative sculptures adorn walls and pillars.
- **Lathe-turned pillars**: Highly polished, finely carved circular pillars are a prominent feature.
- **Raised platforms**: Temples were often built on elevated platforms (jagati).
- **Distinctive gateways**: Elaborate entrances and toranas, especially seen at the Warangal Fort.
- **Open-pillared halls**: Spacious mandapas with numerous ornate pillars were used for religious gatherings.
- **Water architecture**: Kakatiyas developed tanks, reservoirs and stepped wells, reflecting their expertise in water management.
- **Notable examples**: Thousand Pillar Temple, Ramappa Temple, and Warangal Fort.

6.2. FREEDOM FIGHTER 'SOCIO VASU'



Context

- Veteran freedom fighter **P. Vasu**, popularly known as **'Socio Vasu'**, passed away at his residence in Cheruvannur, Kozhikode, at the age of 103.

Role in the Indian Freedom Struggle

- **Quit India Movement (1942):** Actively participated in the movement against British colonial rule.
- **Local Leadership:** Led a prominent protest march from **Kundaithodu to Cheruvannur** in Kozhikode, Kerala.
- **Imprisonment:** Arrested, beaten, and imprisoned by British police for his active role in the Quit India Movement.

Post-Independence Socialist Movement

- **Association with Jayaprakash Narayan:** Joined the Socialist Movement after Independence and received formal party membership directly from **Jayaprakash Narayan** in Kozhikode.
- **Origin of Name:** Earned the moniker **'Socio Vasu'** due to his lifelong commitment and association with the socialist ideology.
- **Rejection of Material Rewards:** In 1951, he turned down 10 acres of land and ₹2,000 offered by the Madras Presidency for freedom fighters, maintaining that he fought for independence rather than material gains.

The Socialist Stream in Indian Politics

Stage	Development
1934	**Congress Socialist Party (CSP)** formed within the Congress
1948	Socialists left the Congress and formed the **Socialist Party**
1952	**Praja Socialist Party (PSP)** formed by merger

***

UPSC PRELIMS PRACTICE QUESTIONS

Q. With reference to the Kakatiya Rudreshwara (Ramappa) Temple, consider the following statements:

1. It is built in close proximity to a historic irrigation lake developed by the Kakatiyas.
2. The superstructure of the temple was constructed using porous, lightweight bricks capable of floating on water.
3. The temple utilizes a specialized sandbox foundation technique to absorb seismic vibrations.
4. It was commissioned during the reign of Kakatiya ruler Prataparudra I.

Which of the statements given above are correct?

(a) 1, 2, and 3 only

(b) 2 and 4 only

(c) 1, 3, and 4 only

(d) 1, 2, 3, and 4

Answer: (a) 1, 2, and 3 only

Explanation:

- **Statements 1, 2, and 3 are correct:** The temple sits adjacent to the Kakatiya-era Ramappa Lake, incorporates floating lightweight bricks in its *vimana*, and relies on a sandbox foundation to buffer against seismic tremors.
- **Statement 4 is incorrect:** It was commissioned in 1213 CE during the reign of Kakatiya King **Ganapati Deva** by his general Recherla Rudra, not Prataparudra I.

Q. With reference to the freedom struggle in Kerala, consider the following statements regarding P. Vasu ('Socio Vasu'):

1. He actively participated in the Quit India Movement and led local protest marches in Kozhikode.
2. Post-Independence, he joined the socialist movement under the influence of Jayaprakash Narayan.

Which of the statements given above is/are correct?

(a) 1 only

(b) 2 only

(c) Both 1 and 2

(d) Neither 1 nor 2

Answer: (c) Both 1 and 2

Statement 1 is correct: He took part in the Quit India Movement and led a protest march from Kundaithodu to Cheruvannur (Kozhikode). The British police imprisoned him for this.

Statement 2 is correct: After Independence he joined the socialist movement and received party membership from Jayaprakash Narayan in Kozhikode. This association is why he came to be called 'Socio Vasu'.

Scan to attempt more questions

***

MISCELLANEOUS

7.1. CANADIAN POET ANNE CARSON WINS NOBEL PRIZE IN LITERATURE



Context

- Canadian poet, essayist, and translator **Anne Carson** was awarded the **2026 Nobel Prize in Literature** by the **Swedish Academy**.

About Anne Carson

- **Nationality:** Canadian
- **Fields**: Poetry, essays and translation
- **Literary Style**: Her works blend poetry, prose, essays and fiction, drawing inspiration from ancient Greek and Roman literature.
- Carson is the **19th woman** to receive the Nobel Prize in Literature since its inception in 1901.

Notable Works

- Eros the Bittersweet
- Autobiography of Red
- Men in the Off Hours
- Norma Jeane Baker of Troy
- Glass, Irony, and God
- Nox

About the Nobel Prize System

- **Established by:** Alfred Nobel, Swedish chemist, engineer and inventor of dynamite.
- **Institutional Origin:** The Nobel Prizes were established through Alfred Nobel's will, signed in 1895.
- **First Awards:** The Nobel Prizes were first awarded in 1901.
- **Prize Categories:** Physics, Chemistry, Physiology or Medicine, Literature and Peace.
- **Economic Sciences:** The Sveriges Riksbank Prize in Economic Sciences in Memory of Alfred Nobel was established in 1968 and first awarded in 1969. It is not one of the original five Nobel Prizes.
- **Nobel Prize in Literature:** Awarded by the Swedish Academy.
- **Other Awarding Institutions:**
  - Physics and Chemistry — Royal Swedish Academy of Sciences.
  - Physiology or Medicine — Nobel Assembly at Karolinska Institutet.
  - Peace — Norwegian Nobel Committee, appointed by the Norwegian Parliament (Storting).
  - Economic Sciences — Royal Swedish Academy of Sciences.

- **Award Ceremony:** The Nobel Prizes in Physics, Chemistry, Physiology or Medicine, Literature and Economic Sciences are presented in Stockholm, Sweden, while the **Nobel Peace Prize is presented in Oslo, Norway**.
- **Prize Components:** A Nobel Prize consists of a medal, a diploma and a monetary award.

***



UPSC PRELIMS PRACTICE QUESTIONS

Q. With reference to Anne Carson and the Nobel Prize in Literature, consider the following statements:

1. Anne Carson is a Canadian poet, essayist and translator whose works draw inspiration from ancient Greek and Roman literature.
2. The Swedish Academy is responsible for awarding the Nobel Prize in Literature.
3. Anne Carson is the 29th woman to receive the Nobel Prize in Literature since its inception in 1901.
4. Autobiography of Red and Glass, Irony, and God are among her notable works.

Which of the statements given above are correct?

(a) 1, 2 and 4 only

(b) 1 and 3 only

(c) 2, 3 and 4 only

(d) 1, 2, 3 and 4

Answer: (a) 1, 2 and 4 only

Explanation:

- **Statement 1 is Correct**: Anne Carson is a Canadian poet, essayist and translator known for blending classical themes with modern literary forms.
- **Statement 2 is Correct**: The Swedish Academy selects the laureate for the Nobel Prize in Literature.
- **Statement 3 is incorrect**: The passage identifies Carson as the 19th woman to receive the award.
- **Statement 4 is Correct**: Both Autobiography of Red and Glass, Irony, and God are among Carson's notable works.

Scan to attempt more questions

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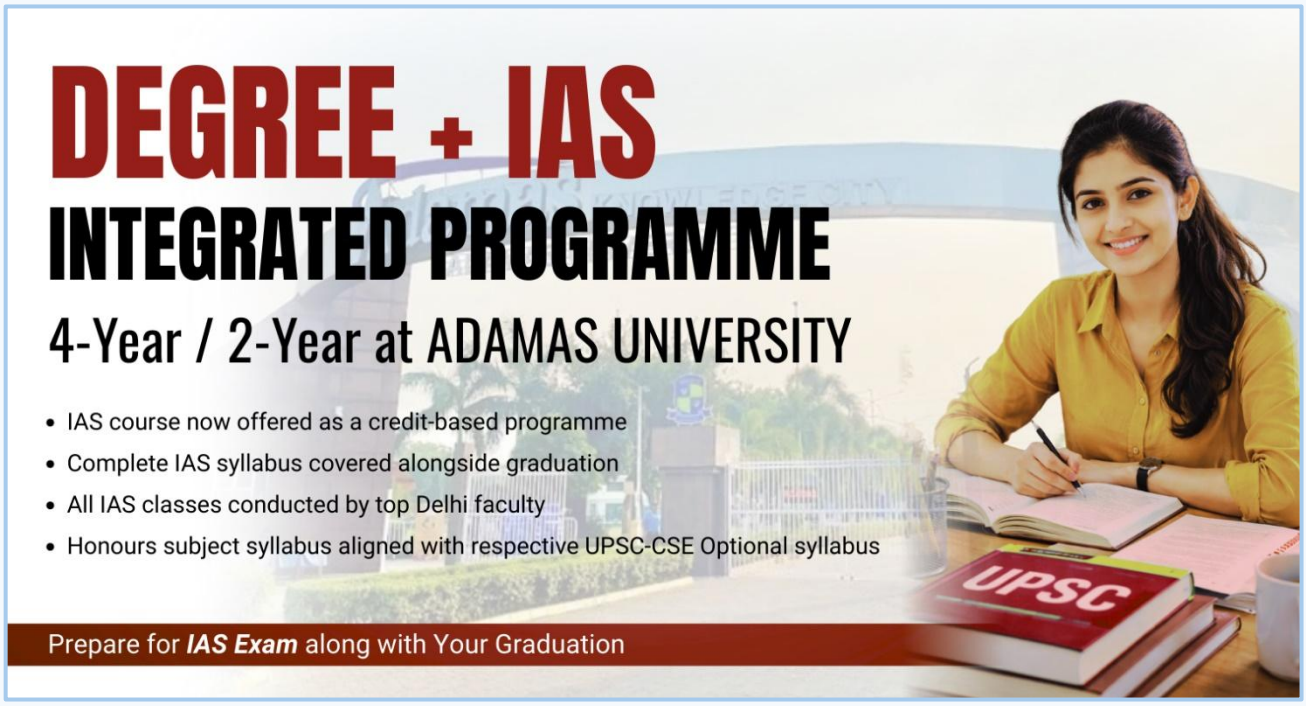

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