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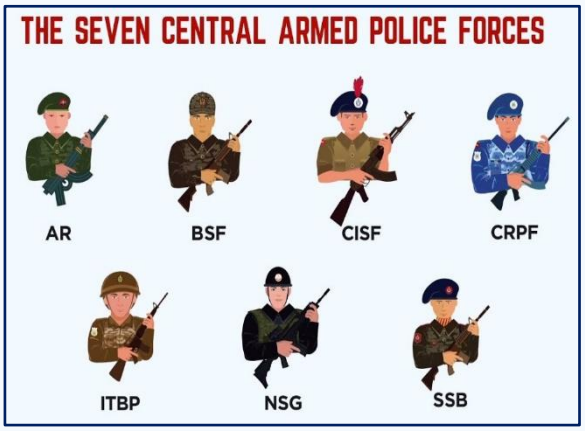
POLITY & GOVERNANCE

1.1. CENTRAL ARMED POLICE FORCES (CAPF)

Context:



- Recently, the Union Government notified the **Central Armed Police Forces (General Administration) Act, 2026**, which has sparked significant debate and protests by retired personnel and their families at Raj Ghat. These demonstrations, coinciding with CRPF Valour Day on April 9, highlight grievances regarding service conditions and the legal solidification of leadership roles for external cadres.
- The Act serves as a definitive legislative tool to streamline the administration of India's internal security forces while addressing long-standing operational synergy requirements between central forces and state police departments.

1. Overview and Administrative Control

The Central Armed Police Forces (CAPF) is the collective term for seven security forces under the **Ministry of Home Affairs (MHA)**.

- **Administrative Body:** The MHA is the sole defining administrative body for these forces.
- **Dual Control of Assam Rifles:** While all forces are under the MHA, the **Assam Rifles** remains unique as its operational control is vested with the Ministry of Defence (Indian Army).
- **Leadership Change:** The 2026 Act now provides a statutory basis for the recruitment and leadership structure that was previously governed by executive orders.

2. The Seven Forces and Their Primary Mandates

Force	Primary Mandate	Operational Area
BSF	Border Protection	Indo-Pakistan and Indo-Bangladesh Borders.
CRPF	Internal Security	Counter-Naxal operations and Election duties.
CISF	Critical Infrastructure	Airports, Metros, and sensitive Government buildings.
ITBP	High-Altitude Security	Indo-China Border (LAC).
SSB	Border Security	Indo-Nepal and Indo-Bhutan Borders.
NSG	Counter-Terrorism	Federal Contingency Force for anti-terror/hijack.
Assam Rifles	Border & Insurgency	Indo-Myanmar Border and North-East security.

3. Key Provisions of the CAPF (General Administration) Act, 2026

The 2026 Act introduces several critical mandates that define the career landscape for both cadre officers and deputed officers:

- **Leadership Reservation for IPS:** The Act legally cements the reservation of senior posts for Indian Police Service (IPS) officers across five CAPFs (BSF, CRPF, CISF, ITBP, and SSB).

- **50% of posts** at the Inspector General (IG) rank are reserved for IPS officers.
- **At least 67% of posts** at the Additional Director General (ADG) rank.
- **100% of posts** at the Special DG and Director General (DG) ranks are reserved for IPS officers.

- **Legislative Supremacy:** The Act states that any rules made under it regarding recruitment and service conditions will explicitly override any other existing laws, previous executive orders, or court judgments.
- **Operational Synergy:** The government rationale for this structure is that CAPFs must work in close coordination with state police and civil administrations, which are led by IPS and IAS officers; hence, IPS leadership ensures smoother coordination.

4. Major Concerns and Counter-Arguments

- **Career Progression:** Group A officers within the CAPF cadre often wait 15–18 years for promotions due to the limited number of senior-level "slots" available to them under the new Act.
- **Judicial Friction:** Critics argue the Act undermines a 2025 Supreme Court directive that recommended a progressive reduction of IPS deputation at the IG rank to boost internal force morale.
- **Demands:** Personnel are currently demanding the restoration of the Old Pension Scheme (OPS) and more time-bound promotions to ensure a dignified career path for those in combat roles.

1.2. CITIZENSHIP IN INDIA

Context:

- **Recently**, the Ministry of Home Affairs (MHA) notified the **Citizenship (Amendment) Rules, 2026**, which introduce a comprehensive digital framework for the registration and renunciation of citizenship and Overseas Citizen of India (OCI) status. These rules emphasize a "digital-first" approach by mandating online applications and introducing electronic OCI (e-OCI) documents to streamline immigration and oversight processes.

1. Constitutional and Statutory Framework

- **Constitutional Provisions**: Articles 5 to 11 under Part II of the Constitution deal with citizenship, though they only identified who became citizens at the commencement of the Constitution on January 26, 1950.
- **Article 11**: This article empowers the Parliament to make any provision with respect to the acquisition and termination of citizenship and all other matters relating to it.
- **Citizenship Act, 1955**: This is the primary legislation governing citizenship after 1950, providing for acquisition by birth, descent, registration, naturalization, and incorporation of territory.

2. **Key Features of the Citizenship (Amendment) Rules, 2026**
    - **Digital Transformation**: All applications for OCI registration must now be submitted electronically through a centralized portal, moving away from the previous requirement for duplicate physical documents.
    - **Introduction of e-OCI**: The government has formally introduced the **electronic OCI (e-OCI)**, allowing the maintenance of digital records that serve as valid proof of registration.
    - **Minor Children and Passports**: The rules establish a strict proviso that a minor child cannot hold the passport of any other country if they are also holding an Indian passport.
    - **Birth Registration**: For children born outside India, birth registration at an Indian consulate must be accompanied by a formal declaration that the child does not possess a foreign passport.
3. **Overseas Citizen of India (OCI) Status**
    - **Nature of OCI**: OCI is not "dual citizenship" (which the Indian Constitution prohibits under Article 9) but a form of permanent residency with specific benefits.
    - **Biometric Integration**: Under the 2026 Rules, OCI applicants must provide consent for their biometric data to be used for the **Fast Track Immigration (FTI) Programme** to facilitate seamless travel.
    - **Renunciation Procedures**: The process for renouncing OCI status has been moved online, and physical cards must be surrendered to the nearest Indian Mission or FRRO upon cancellation or renunciation.
4. **Termination of Citizenship**
    - **Renunciation**: A voluntary act where a person gives up Indian citizenship; however, if this occurs during a war, the registration may be withheld.
    - **Termination**: If an Indian citizen voluntarily acquires the citizenship of another country, their Indian citizenship automatically terminates.
    - **Deprivation**: A compulsory termination by the Central Government based on grounds like fraud, disloyalty to the Constitution, or residence outside India for seven continuous years.

1.3. RIGHTS OF PERSONS WITH DISABILITIES (RPWD) ACT, 2016

Context:

- **Recently**, the Supreme Court of India expanded the definition of "acid attack victims" under the **Rights of Persons with Disabilities (RPwD) Act, 2016**, to include survivors who were **forcibly administered acid**. Previously, the Act's Schedule narrowly recognized only those disfigured by the "throwing" of acid, thereby excluding victims suffering from severe internal injuries due to ingestion.
- Invoking its extraordinary powers under **Article 142**, a Bench led by Chief Justice of India Surya Kant directed that this inclusion be deemed operative **retrospectively** from the Act's inception in 2016 to ensure such survivors can immediately claim disability benefits and identity cards.

1. **Expanded Definition of Disability**
    - The RPwD Act, 2016, replaced the Persons with Disabilities (Equal Opportunities, Protection of Rights and Full Participation) Act, 1995.
    - It increased the number of recognized disabilities from **7 to 21**.
    - **New categories included:** Acid attack victims, dwarfism, muscular dystrophy, and blood disorders like Thalassemia, Hemophilia, and Sickle Cell disease.
    - The Central Government maintains the power to notify additional categories of specified disabilities.
2. **Benchmarking and Reservations**
    - **Benchmark Disability:** Defined as a person with at least **40%** of a specified disability.
    - **Employment:** Reservation in government vacancies increased from 3% to **4%** for persons with benchmark disabilities.
    - **Education:** A reservation of at least **5%** is mandated in higher educational institutions.
    - **Free Education:** Every child with a benchmark disability between **6 and 18 years** has the right to free education.
3. **Recent Supreme Court Clarification (May 2026)**
    - **Internal vs. External Injury:** The Court ruled that "disfigurement" must not be limited to external body parts; internal scars and injuries from acid ingestion are now covered.
    - **Article 142 Usage:** The Court used this Article to grant interim relief and provide a "deemed amendment" to the Act's Schedule while the formal legislative process is underway.
    - **Retrospective Effect:** The benefits for ingestion survivors apply from the very inception of the 2016 Act.
4. **Institutional Framework**
    - **UDID Project:** The government uses the **Unique Disability ID (UDID)** card to create a national database and ensure seamless delivery of benefits.
    - **Advisory Boards:** The Act mandates the creation of **Central and State Advisory Boards** on Disability to serve as apex policy-making bodies.
    - **Grievance Redressal:** Chief Commissioners and State Commissioners act as regulatory bodies and grievance redressal agencies.

1.4. PUBLIC INTEREST LITIGATION (PIL)

Context:

- Recently, Justice B.V. Nagarathna of the Supreme Court observed that **Public Interest Litigation (PIL)**, originally designed to bring social justice to the common man, is increasingly being misused. The judge noted that it has often metamorphosed into **"private interest litigation," "publicity interest litigation,"** and even **"paisa (money) interest litigation"**. These remarks were made during the hearing of review petitions in the **Sabarimala case**, where the court questioned the *locus standi* of certain petitioners and the potential for "meddlers" to exploit the judicial process.

Core Concept: What is PIL?

- Public Interest Litigation is a legal mechanism where a person or a group can file a petition in court for the protection of "Public Interest". It is an essential tool for the Indian judiciary to ensure social justice post-Emergency.
- The seeds of the concept of public interest litigation were initially sown in India by Justice Krishna Iyer, in 1976 in Mumbai Kamagar Sabha vs. Abdul Thai.

1. **Departure from 'Locus Standi'**
   - **Traditional Rule:** Traditionally, only the person whose rights are violated can move the court (*Locus Standi*).
   - **PIL Exception:** Under PIL, any public-spirited citizen or organization can approach the court for the enforcement of rights on behalf of a person or class of persons who, by reason of poverty or disability, cannot approach the court themselves.
   - **Suo Motu Cognizance:** The court can also take up cases on its own (suo motu) based on news reports or letters.
2. **Constitutional Basis**
   - **Judicial Mechanism:** PIL is **not defined in any statute** but is a judge-made law initiated by the Supreme Court (Article 32) and High Courts (Article 226).
3. **Evolution and Key Figures**
   - The concept was pioneered in the late 1970s and early 1980s by **Justice P.N. Bhagwati** and **Justice V.R. Krishna Iyer**.
   - **First Case:** *Hussainara Khatoon v. Home Secretary, State of Bihar* (1979) is often regarded as the first PIL, focusing on the rights of undertrial prisoners.
4. **Key Exceptions and Constraints**
   - **No Individual Matters:** PILs are meant for public issues, not personal disputes.
   - **Good Faith Requirement:** The case must be filed for genuine public causes, not for personal publicity or political gain.
   - **Not a Private Tool:** Misuse can lead to dismissal of the case
5. **Applicability**
   - Can be filed for environmental pollution, bonded labor, neglect of children, atrocities against women, food adulteration, and public health.
6. **Types of issues not covered by public interest litigation**

   There are a few types of issues for which a PIL cannot be filed in the court, as they don't involve public interest. They are personal matters related only to the parties to the suit. They are as follows:
   - Tenancy matters between a landlord and a tenant.
   - Matters related to admissions in educational institutions between the student and the institution.
   - Issues related to providing maintenance to the wife and children between the husband and the wife;
   - Plea filed for an early hearing of their case as it involves personal gain only.

- Matters related to pension and gratuity between the aggrieved person and the concerned authority.

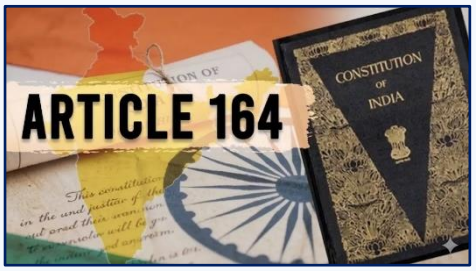
7. Issues and Challenges

While PIL was intended to be a "shield" for the vulnerable, it is now often criticized for becoming a "sword" used by individuals for personal or political gains.

Issue	Description
Frivolous Litigation	Petitions filed without adequate research or for purely personal motives.
Judicial Overreach	Critics argue that PILs sometimes lead the judiciary to perform executive or legislative functions.
Backlog of Cases	The influx of "paisa interest" or "publicity interest" cases adds to the already high pendency in the Indian legal system.

1.5. ARTICLE 164

Context:



- Recently, political tensions in West Bengal reached a peak as Chief Minister publicly refused to resign following demands from opposition parties amidst ongoing controversies and administrative challenges. This development, has sparked a constitutional debate regarding the tenure of a Chief Minister and the Governor's role under **Article 164**, specifically concerning the provision that ministers hold office during the "pleasure of the Governor" and the necessity of maintaining collective responsibility to the Legislative Assembly.

1. Appointment of Ministers (Article 164(1))

- **The Chief Minister:** The Governor appoints the Chief Minister (CM). By convention, the Governor invites the leader of the majority party in the State Legislative Assembly.
- **Other Ministers:** The Governor appoints other ministers based solely on the **advice of the Chief Minister**.
- **Pleasure of the Governor:** Ministers hold office during the **"pleasure of the Governor."** However, this "pleasure" is not arbitrary; a Governor cannot dismiss a minister as long as the Council of Ministers (CoM) enjoys the majority in the Assembly.
- **Special Provision for Tribal Welfare:** In the states of **Chhattisgarh, Jharkhand, Madhya Pradesh, and Odisha**, there must be a Minister in charge of tribal welfare. (Note: Bihar was removed from this list by the 94th Amendment Act, 2006).

2. Strength of the Council of Ministers (Article 164(1A))

- **Maximum Limit:** The total number of ministers, including the CM, in a State CoM shall not exceed **15%** of the total strength of that State's Legislative Assembly.
- **Minimum Limit:** The number of ministers, including the CM, shall not be less than **12**.
- **Origin:** These limits were inserted by the **91st Constitutional Amendment Act, 2003**, to prevent the practice of "jumbo cabinets" used for political appeasement.

3. **Disqualification and Tenure (Article 164(1B))**
    - **Anti-Defection:** A member of the State Legislature who is disqualified under the **Tenth Schedule** (Anti-Defection Law) is also disqualified from being appointed as a minister.
    - **Non-Legislator as Minister (Article 164(4)):** A person who is not a member of the State Legislature can be appointed as a minister. However, they must become a member (either through election or nomination) within **six consecutive months**. Failure to do so leads to the automatic cessation of their ministership.
4. **Accountability and Oaths**
    - **Collective Responsibility (Article 164(2)):** The Council of Ministers is **collectively responsible** to the Legislative Assembly of the State. This means the cabinet "swims or sinks together." If a no-confidence motion is passed, the entire CoM must resign.
    - **Oath (Article 164(3)):** Before entering office, the Governor administers the **oaths of office and secrecy** to the ministers according to the forms set out in the Third Schedule.
    - **Salaries (Article 164(5)):** The salaries and allowances of ministers are determined by the **State Legislature**

1.6. TENURE AND REMOVAL OF THE CHIEF MINISTER (CM)

Context:

- In the aftermath of state legislative assembly elections, significant constitutional questions often emerge concerning the resignation of the incumbent Chief Minister, the discretionary authority of the Governor in government formation or removal, and the constitutional validity of electoral outcomes.
- These issues are principally governed by Articles 164 and 172 of the Constitution of India, which collectively define the tenure of the Council of Ministers and the duration of State Legislatures within the framework of parliamentary democracy.

1. **Constitutional Provisions: Article 164**
    - **Appointment:** The CM is appointed by the Governor, and other ministers are appointed by the Governor on the advice of the CM.
    - **The "Pleasure" Doctrine:** Article 164(1) states that "the Ministers shall hold office during the **pleasure of the Governor**."
    - **Constituent Assembly Debate:** While the literal reading suggests the Governor has discretionary power to remove a CM, the Constituent Assembly (notably Dr. B.R. Ambedkar) clarified that "pleasure" is not absolute.
    - **The Proviso:** A CM and the Council of Ministers (CoM) remain in power only so long as they enjoy the **confidence of the Legislative Assembly (Lower House)**.
2. **When does a CM cease to hold office?**

    A Chief Minister must vacate office under the following circumstances:

- **Loss of Majority (Floor Test):** If the Governor has reason to believe the CM has lost the majority, a **Floor Test** is conducted. If the CM fails to prove support in the House, they must resign.
- **Dissolution of the Assembly:** Under **Article 172**, the normal tenure of an Assembly is **5 years**. Upon the expiration of this period, the Assembly stands dissolved, and the CM automatically ceases to hold office.
- **Dismissal by Governor:** Only if the CM refuses to resign after losing a majority on the floor of the House.
- **President's Rule:** Under **Article 356**, if the constitutional machinery fails, the State Government (including the CM) can be dismissed.

3. **Judicial Interpretation**
   - **A.G. Perarivalan v. State (2022):** The Supreme Court observed that the Governor is the "formal head" and ordinarily bound by the **"aid and advice"** of the Council of Ministers.
   - **S.R. Bommai Case (1994):** (Contextual addition) The Court ruled that the majority of a government must be tested on the **floor of the House** and not in the Governor's chambers.
4. **Challenging Election Results**

   If a CM or candidate's election is in question, the following legal routes apply:
   - **Election Petition:** Under **Section 100 of the Representation of the People Act (RPA), 1951**, an election can be challenged in the **High Court**.
   - **Timeline:** Such a petition must be filed within **45 days** from the declaration of results.
   - **Grounds for Challenge:** Corrupt practices, non-compliance with the Constitution/RPA, or improper rejection of nominations.
   - **Writ Petition:** If the integrity of the electoral process itself is at stake (e.g., large-scale voter deletion), a writ petition can be filed as it involves a violation of fundamental rights.

Quick Facts for Prelims

Provision	Detail
Article 163	Council of Ministers to aid and advise the Governor.
Article 164	Appointment and tenure of Ministers (Pleasure of Governor).
Article 172	Duration of State Legislatures (5 years unless sooner dissolved).
Floor Test	The constitutional mechanism to prove majority in the House.
High Court	Has original jurisdiction to hear election petitions (RPA 1951).

1.7. APPOINTMENT OF CEC AND ECS

Context:

- **Recently**, the Supreme Court of India questioned whether a "proper debate" was held in Parliament regarding the **Chief Election Commissioner and other Election Commissioners (Appointment, Conditions of Service and Term of Office) Act, 2023**.

- The Court's inquiry focused on whether the "ethos" of its 2023 *Anoop Baranwal* judgment—which aimed to insulate the appointment process from exclusive executive control—was adequately reflected in the legislative debates. This comes in the wake of petitions challenging the exclusion of the **Chief Justice of India (CJI)** from the selection panel, replaced by a Union Cabinet Minister nominated by the Prime Minister.

1. **Background: The Legislative Vacuum**
   - **Article 324(2):** It states that the President shall appoint the CEC and ECs, subject to any law made by Parliament.
   - **Historical Practice:** For over 70 years, no such law was enacted. Appointments were made by the President on the sole advice of the **Prime Minister/Council of Ministers**.
2. **The Landmark Anoop Baranwal Case (2023)**

   A five-judge Constitution Bench ruled that to ensure the independence of the ECI, a selection committee must be formed.
   - **The Judicial Committee:** Prime Minister, Leader of Opposition (LoO) in Lok Sabha, and the **Chief Justice of India (CJI)**.
   - **Mandate:** This arrangement was meant to be temporary, "until Parliament makes a law."
3. **Key Features of the 2023 Act**

   The Parliament enacted the **Chief Election Commissioner and other Election Commissioners (Appointment, Conditions of Service and Term of Office) Act, 2023**, effectively replacing the Supreme Court's temporary arrangement:
   - **The Selection Committee:**
   - **Prime Minister** (Chairperson).
   - **Leader of the Opposition** in Lok Sabha (Member).
   - A **Union Cabinet Minister** nominated by the PM (Member).
   - **Appointment Process for Other ECs:** The Act treats the appointment of **Other Election Commissioners** exactly like that of the CEC. They are appointed by the President based on the recommendation of the same three-member Selection Committee.
   - **Search Committee:** Headed by the **Cabinet Secretary**, it prepares a panel of five names for the Selection Committee.
   - **Eligibility:** Candidates must be persons of integrity and have served in a rank equivalent to the Secretary to the Government of India.
   - **Salary and Service Conditions:** The Act equates the salary and status of the CEC and ECs to that of the **Cabinet Secretary** (previously equal to a Supreme Court Judge).
4. **Constitutional Safeguards**
   - **Security of Tenure:** The CEC can only be removed in the same manner as a **Supreme Court Judge** (Impeachment).
   - **Other Election Commissioners:** Cannot be removed except on the recommendation of the CEC.
   - **Term:** 6 years or until the age of 65, whichever is earlier.

1.8. NATIONAL CRIME RECORDS BUREAU (NCRB)

Context

Recently, the National Crime Records Bureau (NCRB) released its annual **"Crime in India 2024"** report on May 6, 2026, which revealed a significant **6% decline** in overall cognizable crimes across the country compared to the previous year. This report, highlights that while traditional crimes like murder and kidnapping saw a marginal dip, **cybercrimes** witnessed a sharp surge of nearly **18%**, reflecting an evolving internal security challenge in the digital age.

1. **About National Crime Records Bureau (NCRB)**
    - **Establishment:** The NCRB was set up in **1986** based on the recommendations of the **Tandon Committee**, the National Police Commission (1977-81), and a Ministry of Home Affairs (MHA) Task Force (1985).
    - **Ministry:** It functions as an attached office under the **Ministry of Home Affairs (MHA)** and is headquartered in New Delhi.
    - **Objectives:** It serves as a central repository for crime and criminal data to assist investigators and policymakers. It was formed by merging the Inter-State Criminals Data Branch, the Directorate of Coordination and Police Computer (DCPC), and the Central Finger Print Bureau (CFPB) of the CBI.
    - **Repository Role:** It maintains the **National Fingerprint Database** of both Indian and foreign offenders and implements the **Crime and Criminal Tracking Network & Systems (CCTNS)**.
2. **Key Findings: Crime in India 2024 Report**
    - **Overall Crime Rate:** Total cognizable crimes stood at 58.85 lakh in 2024, down from 62.41 lakh in 2023. The crime rate per lakh population dropped to **418.9**.
    - **Cybercrime Surge:** A total of **1,01,928 cases** were registered, marking a 17.9% increase. Approximately **72.6%** of these cases were related to **financial fraud**.
    - **Crimes Against Women:** There was a marginal decline of 1.5% (4.41 lakh cases). However, **"Cruelty by Husband or Relatives"** remains the leading cause of reported violence against women.
    - **Economic Offences:** These rose by **4.6%**, largely driven by forgery, cheating, and fraud (FCF).
    - **State Performance: Telangana** reported a sharp rise in total crimes, while **Nagaland** continued to record the lowest crime rate in the country. **Kerala** maintained the highest charge-sheeting rate at 94.5%.
3. **Major Digital Initiatives**
    - **CCTNS (Crime and Criminal Tracking Network & Systems):** A Mission Mode Project under the National e-Governance Plan that interconnects over 17,000 police stations. It enables real-time data entry of FIRs and investigation reports.
    - **ICJS (Integrated Criminal Justice System):** It integrates the five pillars of the justice system—Police (CCTNS), e-Courts, e-Prisons, Forensics, and Prosecution—to ensure seamless data transfer and faster trial processing.

- **National Digital Police Portal:** Provides a single-window interface for citizens to report crimes (especially cybercrimes against women/children) and for police to search the national criminal database.

4. Major Publications of NCRB

1. **Crime in India:** The primary annual report on crime statistics.
2. **Accidental Deaths & Suicides in India (ADSI):** Detailed statistics on unnatural deaths.
3. **Prison Statistics India:** Annual report on jail populations, infrastructure, and prisoner demographics.
4. **Fingerprints in India:** Data regarding the usage and efficiency of fingerprint technology in criminal identification.

1.9. PM SHRI

Context:

- Recently, the Union Ministry of Education reminded West Bengal, Kerala, and Tamil Nadu to implement the PM SHRI scheme, as 34 other States and UTs have already adopted the initiative and the five-year programme has entered its third year.

1. Inter-State Cooperation in Education: The PM SHRI Implementation Push

I. Current Status of Implementation

- **West Bengal:** The state is yet to sign the **Memorandum of Understanding (MoU)** required for the scheme, despite receiving 11 letters from the Centre since 2022.
- **Kerala:** As of November 12, 2025, the state government has kept the MoU in abeyance while a committee examines specific implementation concerns.
- **Tamil Nadu:** Although the state provided an undertaking to introduce the scheme for the 2024-25 academic session, the process remains incomplete despite 12 official requests from the Union Government.

II. Implications of the Delay

- **Hindered NEP Goals:** The delay affects the intended strengthening of the education system through the National Education Policy (NEP) 2020 framework.
- **Time Constraints:** Launched in September 2022 as a **five-year initiative**, the Ministry has warned that only a limited duration is left to complete the selection and development of these schools.

2. About PM SHRI Scheme

The **PM SHRI (Pradhan Mantri Schools for Rising India)** is a Centrally Sponsored Scheme aimed at creating "exemplary schools" that showcase the implementation of the National Education Policy 2020.

I. Key Features

- **Objective:** To transform more than **14,500 schools** across the country into high-quality educational institutions.

- **Green Schools:** These institutions are developed as "Green Schools," incorporating environment-friendly aspects like solar panels, LED lights, natural farming, and waste management.
- **Facilities:** They have best-in-class modern facilities, including Smart Classrooms, Computer Labs, Integrated Science Labs, Vocational Labs/Skill Labs, and Atal Tinkering Labs.
- **Mentorship:** PM SHRI schools are intended to provide leadership to other schools in their respective regions by providing mentorship and sharing best practices.
- **Schools Eligible Under PM SHRI Scheme:**
  - Schools run by Central Governments, State Governments, Union Territories, and local bodies are eligible.
  - All non-project Kendriya Vidyalaya Sangathan schools and Navodaya Vidyalaya Samiti schools operating from permanent buildings are also eligible.

II. Governance and Funding

- **Nature:** It is a **Centrally Sponsored Scheme**, meaning the cost is shared between the Central and State/UT governments.
- **Funding:**
  - The funding pattern is 60:40 between Centre and State Governments and UTs with legislature (except J&K).
  - The sharing pattern is 90:10 for North Eastern and Himalayan States and UT of J&K and 100% central funding for the Union Territories without legislature.
- **Duration:** Initially planned as a five-year initiative starting from **2022-23 to 2026-27**.
- **Nodal Ministry:** Ministry of Education.

National Education Policy (NEP) 2020

The NEP 2020 envisions transforming India into a global knowledge hub and represents the third major overhaul of the education system since Independence, after the policies of 1968 and 1986.

Key Features:

- **Restructuring Schooling (5+3+3+4):** The policy replaces the old 10+2 structure with a new pedagogical and curricular structure consisting of the Foundational (ages 3-8), Preparatory (8-11), Middle (11-14), and Secondary (14-18) stages.
- **Emphasis on Foundational Literacy and Numeracy:** A top priority is ensuring that every child achieves basic reading and math skills by Grade 3, recognizing these as the "prerequisites for all future learning."
- **Multilingualism and Mother Tongue:** The NEP advocates for the medium of instruction to be in the home language, mother tongue, or local/regional language at least until Grade 5, and preferably until Grade 8.
- **Holistic and Multidisciplinary Higher Education:** It introduces a flexible four-year undergraduate program with multiple entry and exit points (certificate after 1 year, diploma after 2, etc.) and moves away from rigid silos between "Arts," "Sciences," and "Commerce."

1.10. NATIONAL TESTING AGENCY (NTA)

Context:

- The National Testing Agency (NTA) has come under intense scrutiny following the cancellation and scheduled re-test of the National Eligibility-cum-Entrance Test (NEET) due to allegations of paper leaks, impersonation, and systemic "lax operational capacity". Experts are currently calling for deep structural reforms, including a shift toward digital testing and a decentralized admission process to plug security vulnerabilities.

1. Structural Reforms in Examination Bodies: The NTA Controversy

I. Identified Systemic Vulnerabilities

- **Physical Logistics:** The manual printing, distribution, and physical storage of question papers for over 24 lakh candidates create multiple points of vulnerability where leaks can occur.
- **Cybersecurity & Communication:** Current systems are criticized for having "porous cybersecurity" and poor crisis communication during operational failures.
- **The "Paper-and-Pen" Mode:** The traditional offline mode is increasingly seen as outdated and easier to compromise compared to encrypted, computer-based platforms.

II. Proposed Reform Measures

- **Transition to Digital/Hybrid Models:** Implementing computer-based platforms where distribution is fully encrypted.
- **Decentralization:** Moving away from a single, massive nationwide exam toward a system that allows multiple attempts per year and decentralized admissions.
- **Legal Deterrence:** Utilization of the **Public Examinations (Prevention of Unfair Means) Act, 2024**, which criminalizes paper leaks, organized cheating, and impersonation.

Public Examinations (Prevention of Unfair Means) Act, 2024

- Under Section 2(k), a Public Examination is defined as any examination conducted by a "public examination authority".
- **Punishment for offences:** All offences under this Act, shall be cognizable, non-bailable and non-compoundable.
  - **Cognizable offence:** Police can investigate and arrest without prior magistrate approval.
  - **Non-compoundable offence:** Case cannot be withdrawn even after compromise; trial is mandatory.
  - **Non-bailable offence:** Bail is not a right; it depends on the magistrate's decision.
- **Inquiry and investigation:** An officer not below the rank of Deputy Superintendent of Police or Assistant Commissioner of Police shall investigate any offence under this Act

2. About the National Testing Agency (NTA)

- **Establishment:** The NTA was approved by the Union Cabinet in 2017 as an autonomous and self-sustained premier testing organization.
- **Registration:** It is registered as a **Society** under the **Societies Registration Act, 1860**.

- **Mandate:** Its primary goal is to conduct efficient, transparent, and international-standard tests to assess the competency of candidates for admission to premier higher education institutions. It took over exam responsibilities (like NEET and JEE) from the CBSE in 2019.

3. Governance Structure

The NTA is governed by a multi-layered body to ensure professional management:

- **Chairman:** An eminent educationist appointed by the Ministry of Education.
- **Governing Body:** Comprises a CEO (Director General) and representatives from various premier institutions, including:
  - Directors of select **IITs** and **IIMs**.
  - Representatives from the **UGC** (University Grants Commission).
  - Representatives from the **AICTE** (All India Council for Technical Education).
  - Members from the **Ministry of Health and Family Welfare** (specifically for medical exams).
- **Director General (DG):** Appointed by the Government for a fixed tenure; acts as the Chief Executive Officer responsible for day-to-day administration.

1.11. ORDINANCE-MAKING POWER OF THE PRESIDENT & SUPREME COURT JUDGE STRENGTH

Context:

- Recently, the President Droupadi Murmu promulgated the **Supreme Court (Number of Judges) Amendment Ordinance, 2026** under **Article 123** of the Indian Constitution.

1. Key Highlights of the Development:

- **Strength Increased:** The ordinance increases the maximum sanctioned strength of Supreme Court judges (excluding the Chief Justice of India) from **33 to 37**.
- **Total Capacity:** Including the Chief Justice of India (CJI), the total sanctioned strength will rise from **34 to 38**.
- **Statutory Amendment:** The ordinance amends Section 2 of the **Supreme Court (Number of Judges) Act, 1956.**
- **Judicial Pendency:** To tackle a major crisis of judicial pendency, as the Supreme Court's backlog has crossed **93,000 cases**, threatening to touch six figures.
- **1950 (Original Constitution):** Article 124(1) originally envisaged 1 CJI + "not more than 7 judges" (7+1=8).

2. Ordinance-Making Power of the President (Article 123)

The ordinance-making power is the most important legislative power of the President, designed specifically to deal with unforeseen or urgent situations.

I. Four Core Constitutional Limitations:

1. **Recess of Parliament:** The President can *only* promulgate an ordinance when **both Houses of Parliament are not in session**, or when **either of the two Houses is not in session**. An ordinance issued while both Houses are in session is **completely void.**

2. **Immediate Action:** The President must be satisfied that circumstances exist which render it **necessary** to take immediate action.
3. **Co-extensive with Parliament:** The ordinance-making power is co-extensive with the legislative power of Parliament. This means:
    - An ordinance can only be issued on subjects where Parliament can make laws (Union and Concurrent lists).
    - It is subject to the same constitutional limitations as an Act of Parliament (e.g., **cannot violate Fundamental Rights**).
    - **Important Note:** An ordinance **cannot** be used to amend the Constitution.
4. **Retrospective & Amending Nature:** An ordinance can be retrospective (act from a past date) and can alter or amend any act of Parliament or even another ordinance.

II. Parliamentary Approval & Lifespan of an Ordinance

Every ordinance promulgated must be laid before both Houses of Parliament when they reconvene.

- **Mandatory Tabling:** Once the Parliament is back in session, the ordinance must be officially presented (laid) before both Houses.
- **Six-Week Deadline:** The legislature must pass a resolution approving the ordinance within six weeks of reassembling.
- **Bicameral Nuance:** If Lok Sabha and Rajya Sabha are called to reassemble on different dates, the six-week timeline is calculated from the later of the two dates.
- **Disapproval & Withdrawal:** An ordinance ceases to operate immediately if both Houses pass resolutions rejecting it. The President can also withdraw an ordinance at any time, on the **advice of the Council of Ministers.**

III. Calculating the Maximum Life of an Ordinance:

- **Maximum Gap Between Sessions:** Under Article 85, the maximum gap between two sessions of Parliament cannot exceed **6 months**.
- **Post-Reassembly Window:** The ordinance gets an additional **6 weeks** once Parliament reconvenes.
- **Maximum Validity:**

  6 months + 6 weeks = Approx. 7.5 months

3. Landmark Judicial Pronouncement

A. RC Cooper Case (1970): The Supreme Court ruled that the President's "satisfaction" regarding the necessity of immediate action is **not justifiable to be completely above judicial review**. It can be challenged in court if it is proved that the power was exercised with *malafide* intent or to bypass Parliamentary debate.

B. DC Wadhwa Case (1987): The Court observed that the Executive cannot usurp the law-making functions of the Legislature. It held that the **"re-promulgation of ordinances"** repeatedly without attempting to place them before the legislature constitutes a fraud on the Constitution and is subversion of the democratic legislative process.

C. Krishna Kumar Singh Case (2017): The Supreme Court solidified that:

- The authority to issue ordinances is not an absolute alternative to the law-making powers of the Parliament.
- The requirement to place the ordinance before the Legislature is **mandatory**. Failure to place it before Parliament is a constitutional abuse.

5. Core Differences: President vs. Governor

Comparative Feature	**President of India**	**Governor of a State**
Constitutional Article	**Article 123**	**Article 213**
Legislative Recess Requirement	Can issue an ordinance when **either House** (Lok Sabha or Rajya Sabha) or **both Houses** of Parliament are not in session.	Can issue an ordinance when the **Legislative Assembly** is not in session (unicameral), or when **both Houses** (Assembly and Council) are not in session (bicameral).
Legislative Competence	Co-extensive with the law-making power of Parliament. Can only issue ordinances on subjects in the **Union List** and **Concurrent List**.	Co-extensive with the law-making power of the State Legislature. Can issue ordinances on subjects in the **State List** and **Concurrent List**.
Presidential Instructions	Can act independently based on the aid and advice of the Union Cabinet. **No prior permission** is ever required.	**Cannot** issue certain ordinances without **prior instructions from the President** under three specific conditions. • Prior Presidential sanction required. • Governor may reserve the Bill for the President. • Valid only after Presidential assent.
Constitutional Amendments	Cannot amend the Constitution.	Cannot amend the Constitution.
Lapse / Approval Body	Must be laid before and approved by **both Houses of Parliament**.	Must be laid before and approved by the **State Legislative Assembly** (and Council, if bicameral).
Repugnancy Rule	An ordinance overriding a state law on a Concurrent subject will prevail.	An ordinance on a Concurrent subject that conflicts with a Central Parliamentary Law is **void**, unless it was issued on the prior instructions of the President.

6. Quick Prelims Pointers

- **Who decides the strength of the SC? Parliament** possesses the exclusive authority to increase the number of judges in the Supreme Court by law (Article 124(1)). This is why an executive ordinance must amend a Parliamentary Act (*Supreme Court Act, 1956*).
- **State Counterpart:** The Governor of a state possesses a parallel ordinance-making power under **Article 213**, which shares identical operational mechanics but is restricted to state legislative competencies.

1.12. PARLIAMENTARY PANEL TO REVIEW NATIONAL TESTING AGENCY REFORMS

Context:

- Against the backdrop of intensifying controversies surrounding public entrance examinations, the **Parliamentary Standing Committee on Education, Women, Children, Youth and Sports** has issued a notice to review the implementation of structural reforms within the **National Testing Agency (NTA)**

1. Understanding Parliamentary Committees

- Parliamentary committees are panels of Members of Parliament (MPs) appointed or elected to scrutinize legislation, review government budgets, and investigate specific policy issues. Because modern legislative business is complex and time is limited, these committees allow MPs to examine details away from the busy floor of the House.
- **Constitutional Basis:** These committees draw their legitimacy and authority from **Article 105** (dealing with privileges of Members of Parliament) and **Article 118** (granting Parliament the power to make rules for regulating its procedure and conduct of business).

2. Classification of Parliamentary Committees

Parliamentary Committees are broadly classified into two categories:

- **Standing Committees: Permanent** and regular committees constituted periodically (usually every year) in pursuance of an Act of Parliament or Rules of Procedure and Conduct of Business. They work on a continuous basis.
- **Ad-hoc Committees: Temporary** committees appointed for a specific task. They cease to exist once they complete their assigned mandate and submit a report (e.g., Joint Parliamentary Committees or Select Committees on specific Bills).

3. Department-Related Standing Committees (DRSCs)

The committee reviewing the NTA reforms belongs to the robust framework of **Department-Related Standing Committees (DRSCs)**.

- **Origin:** First introduced in 1993 on the recommendation of the Rules Committee of the Houses. Initially, 17 committees were formed, which were expanded to **24 DRSCs in 2004**.
- **Composition Matrix:** Each DRSC consists of **31 members**:
  - **21 members** are nominated from the **Lok Sabha** by the Speaker.
  - **10 members** are nominated from the **Rajya Sabha** by the Chairman.
- **Tenure:** The term of office of the members of these committees **does not exceed one year**.

- **The Minister Exclusion Rule: A Minister is not eligible to be nominated/elected as a member of these committees.** If a member, after nomination to the committee, is appointed as a Minister, they cease to be a member from the date of such appointment. This ensures the separation of powers and impartial oversight over the executive.
- **Division of Jurisdiction:** Out of the 24 DRSCs, **8 function under the Rajya Sabha** (including the Committee on Education, Women, Children, Youth and Sports), and **16 function under the Lok Sabha**.

Primary Functions of DRSCs

1. To consider the **Demands for Grants** of the concerned ministries before they are formally voted upon in the Lok Sabha.
2. To examine Bills pertaining to the concerned ministries as referred to them by the Chairman or the Speaker.
3. To consider **Annual Reports** of the ministries and long-term policy documents presented to Parliament.

4. About National Testing Agency (NTA)

- **Status:** Established in 2017 as an independent, autonomous, and self-sustained premier testing organization under the Ministry of Education.
- **Legal Structure:** It is registered as a **Society under the Societies Registration Act, 1860**, rather than being a statutory body established by a specific Act of Parliament.
- **Mandate:** To conduct highly efficient, transparent, and international-standard entrance tests (such as NEET-UG, JEE-Main, UGC-NET) to assess candidate competence for admissions and recruitments.

1.13. LEGAL BATTLE OVER UAPA BAIL CURBS

Context:

- Recently, the Delhi Police, represented by the Additional Solicitor General (ASG), requested the Supreme Court to refer the contentious issue of **statutory bail restrictions** under the Unlawful Activities (Prevention) Act, 1967 (UAPA) to a larger Bench for review.
- The dispute centers on **whether prolonged pre-trial detention and delayed trials** can override the stringent bail provisions of UAPA, raising critical questions about balancing national security with the Right to Life and Personal Liberty under Article 21.

1. Core Legal Disputes & Judicial Observations

- **The Conflicting Judgments:**
- A Bench of Justices B.V. Nagarathna and Ujjal Bhuyan granted bail to a narco-terror accused, reiterating that "bail is the rule and jail is the exception," even under UAPA, when there is excessive delay in trial and prolonged incarceration.
- In contrast, a coordinate Bench in the Umar Khalid case denied bail to the 2020 Delhi riots accused.

- **Prosecution's Core Argument:** Additional Solicitor General S.V. Raju argued that under the strict provisions of the Unlawful Activities (Prevention) Act, 1967 (UAPA), bail cannot be granted easily to an accused person. The use of the word "shall" in the law reflects the legislature's intention to maintain a strict approach toward bail.
- **Important Judgment in the K.A. Najeeb Case (2021):** In Union of India v. K.A. Najeeb, the Supreme Court held that if there is excessive delay in the trial process and the accused's fundamental right to a speedy trial under Article 21 is violated, courts can grant bail even under the stringent provisions of UAPA.

2. About the Unlawful Activities (Prevention) Act, 1967 (UAPA)

- The Unlawful Activities (Prevention) Act (UAPA) is India's primary anti-terror law, first enacted in 1967. It is designed to prevent unlawful activities and combat terrorist acts that threaten the sovereignty, integrity, and security of India
- **Punishment:** Carries severe penal provisions; the highest punishments under this Act include the death penalty and life imprisonment.
- **Territorial Jurisdiction:** It applies to both **Indian citizens and foreign nationals**. It is extraterritorial in nature—meaning individuals can be charged under this Act even if the crime is committed on foreign soil outside India.
- **The 2019 Amendment:** Empowered the Central Government to designate not just organizations, but **individual persons as 'Terrorists'** if they commit, prepare for, or promote terrorism.
- **Stringent Bail Conditions**: Bail is extremely difficult to obtain. **Under Section 43D(5),** a court can deny bail if it is of the opinion that there is a prima facie case that the allegations are true.
- **Property Seizure:** The Director General of the National Investigation Agency (NIA) is empowered to grant approval for the seizure or attachment of properties during a UAPA investigation

3. Constitutional Balancing Tool: Article 21 vs. Statutory Laws

- **Speedy Trial as a Fundamental Right:** The Supreme Court has consistently held that the right to a speedy trial is an integral part of the **Right to Life and Personal Liberty** wrapped under **Article 21**.
- While statutory laws (like UAPA passed by the Parliament) can place restrictions on bail, they **cannot completely abrogate or override constitutional fundamental rights**. If an individual is jailed for a prolonged period without trial, statutory restrictions like Section 43D(5) yield to the enforcement of Article 21 by constitutional courts.

About Article 21

- Article 21 of the Indian Constitution guarantees the fundamental right to protection of life and personal liberty, stating: "**No person shall be deprived of his life or personal liberty** except according to a procedure established by law."
- It is available to all citizens and non-citizens alike.
- Through landmark Supreme Court judgments, Article 21 has been interpreted to encompass a vast array of rights that contribute to a dignified human life. Some of the recognized rights include:

- **Right to Privacy**: Established as an intrinsic part of life and liberty (K.S. Puttaswamy v. Union of India).
- **Right to Livelihood:** Recognized as a component of the right to life (Olga Tellis v. Bombay Municipal Corporation).
- **Right to a Clean Environment:** Protection against pollution and environmental degradation.
- **Right to Health and Medical Care**: Ensures timely medical treatment and safeguards bodily integrity.
- **Right to Speedy Trial**: Protection against prolonged incarceration without trial (Union of India v. K.A. Najeeb).
- **Right to Education**: Elevated to a separate, specific fundamental right under Article 21A for children aged 6 to 14.

1.14. SEDITION LAW IN INDIA (SECTION 124A IPC)

Context:

- Recently, the Supreme Court of India has clarified that trials, appeals, or proceedings involving the offense of sedition under **Section 124A of the Indian Penal Code (IPC)** can proceed in courts across the country **if the accused has no objection**.

Understanding Sedition

1. **Historical Perspective (Colonial Roots)**
   - **Origin:** Sedition law was originally drafted in 1837 by **Thomas Babington Macaulay** but was omitted when the IPC was enacted in 1860. It was later introduced into the IPC via **Section 124A in 1870** by an amendment introduced by Sir James Stephen.
   - **Colonial Utility:** It was heavily used by the British administration to suppress the Indian National Movement.
   - **Key Historical Trials:**
     - **Jogendra Chandra Bose (1891):** The first prominent case.
     - **Bal Gangadhar Tilak (1897 & 1908):** Tried for his writings in the journal *Kesari*.
     - **Mahatma Gandhi (1922):** Tried for his articles in the publication *Young India*. Gandhi famously called Section 124A the "prince among the political sections of the IPC designed to suppress the liberty of the citizen."
2. **Legal & Statutory Perspective**
   - **Definition under Section 124A IPC:** It defines sedition as any action—by words (spoken or written), signs, or visible representation—that brings or attempts to bring **hatred or contempt, or excites disaffection towards the Government** established by law in India.
   - **Nature of the Offence:**
     - It is a **non-bailable** offense.
     - It is a **cognizable** offense (police can arrest without a warrant).

- Punishment ranges from imprisonment for three years to a **life term**, to which a fine may be added.
- **Special Note:** The colonial-era sedition law under Section 124A of the Indian Penal Code (IPC) has been replaced by **Section 152 of the Bharatiya Nyaya Sanhita (BNS).** While the term **"sedition" is removed**, the new provision broadens the scope to criminalize acts threatening India's sovereignty, unity, and integrity.

3. Constitutional Perspective (Fundamental Rights vs. State Security)

- **Article 19(1)(a):** Guarantees freedom of speech and expression.
- **Article 19(2):** Places **reasonable restrictions** on free speech. The grounds include the sovereignty and integrity of India, the security of the State, friendly relations with foreign States, public order, decency, or morality.

4. Landmark Judicial Pronouncements

Case Law	Key Ruling / Principle
Kedar Nath Singh v. State of Bihar (1962)	A Constitution Bench **upheld the validity of Section 124A** but significantly narrowed its scope. The court ruled that a person can be charged with sedition *only* if their speech involves **incitement to violence** or intention/tendency to create public disorder. Strong criticism of the government without inciting violence is not sedition.
Balwant Singh v. State of Punjab (1995)	The Supreme Court held that merely shouting slogans (e.g., "Khalistan Zindabad") a few times, without any accompanying threat to public response or incitement to violence, does not amount to sedition.

1.15. SAMPLE REGISTRATION SURVEY (SRS) 2024

Context:

- The recently released **Sample Registration System (SRS) Bulletin 2024** indicates a clear trend of demographic transition in India, showing a notable decline in the country's birth rate, death rate, and Infant Mortality Rate (IMR) over the decade from 2014 to 2024.

1. Key Data Trends (2014 vs. 2024)

Indicator	2014	2024	Absolute Difference / Trend
Birth Rate *(per 1,000 population)*	21	18.3	**Down by 2.7 points**
Death Rate *(per 1,000 population)*	6.7	6.4	**Down by 0.3 points** (Marginal decline)
Infant Mortality Rate (IMR) *(per 1,000 live births)*	39	24	**Down by 15 points** (Significant gain)

2. Core Concepts & Key Findings

I. **Demographic Transition:** India is actively progressing through the stages of demographic transition, characterized by shifting from high birth and death rates to lower birth and death rates as economic development and healthcare improve.

II. **Rural vs. Urban Disparities:**
   - **Birth Rate:** Rural birth rate fell from 22.7 to 20.2, while the urban birth rate fell from 17.4 to 14.7.
   - **Death Rate:** Rural death rate fell from 7.3 to 6.8. Interestingly, the urban death rate saw a marginal increase from 5.5 (in 2014) to 5.6 (in 2024).
   - **IMR Deficit:** The urban areas registered a sharp decline in IMR from 26 to 17 (a 9-point drop). Rural areas dropped 16 points from 43 to 27, but rural figures still lag significantly behind national single-digit targets, dragging down the national average.

III. **Natural Growth Rate (NGR):**
   - **Definition:** The rate at which a population increases or decreases solely due to births and deaths, **excluding the effects of migration**. It is expressed as a percentage.
   - **State Performances: Kerala** has the lowest Natural Growth Rate (NGR) among larger states at **3.9**.
   - **Tamil Nadu** follows closely with an NGR of **4.8**.
   - Among Union Territories, **Andaman and Nicobar Islands** lead with an NGR of **4.1**.

IV. **Infant Mortality Rate (IMR) Performers:**
   - **Kerala** has the lowest IMR in the country, achieving a single-digit IMR of **8**.
   - **Tamil Nadu** holds the second position among larger states with an IMR of **11**.
   - **Goa** (smaller state) has an IMR of **11**, and **Andaman and Nicobar Islands** (UT) show an IMR of **9**.

3. Important Keywords to Remember

- **Sample Registration System (SRS):** A large-scale demographic survey in India that provides annual estimates of infant mortality rate, birth rate, death rate, and other fertility/mortality indicators at the national and sub-national levels. It is conducted by the **Office of the Registrar General & Census Commissioner, Ministry of Home Affairs**.
- **Crude Birth Rate (CBR):** The annual number of live births per 1,000 population.
- **Crude Death Rate (CDR):** The annual number of deaths per 1,000 population.
- **Infant Mortality Rate (IMR):** The number of deaths of children under one year of age per 1,000 live births. It is a crucial indicator of the socio-economic development and health ecosystem of a region.
- **Natural Growth Rate (NGR):** Natural Growth Rate = Crude Birth Rate - Crude Death Rate (adjusted to a percentage, without accounting for net migration).
- **Total Fertility Rate (TFR)**: It is the average number of children a woman would have in her lifetime.

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UPSC PRELIMS PRACTICE QUESTIONS

Q. Consider the following statements regarding the Central Armed Police Forces (General Administration) Act, 2026:

Statement-I: The Act mandates that 100% of the posts at the level of Special Director General (SDG) and Director General (DG) in the CAPFs shall be occupied by officers from the Indian Police Service (IPS).

Statement-II: The Act was introduced to fulfill a 2025 Supreme Court directive which called for the permanent reservation of top leadership posts for deputed IPS officers to ensure operational synergy with state police.

Which one of the following is correct in respect of the above statements?

(a) Both Statement-I and Statement-II are correct and Statement-II is the correct explanation for Statement-I.

(b) Both Statement-I and Statement-II are correct and Statement-II is not the correct explanation for Statement-I.

(c) Statement-I is correct but Statement-II is incorrect.

(d) Statement-I is incorrect but Statement-II is correct.

Ans. (c)

Explanation:

- **STATEMENT I IS CORRECT:** The CAPF (General Administration) Act, 2026, explicitly reserves 100% of the top leadership positions (Special DG and DG) for IPS officers.
- **STATEMENT II IS INCORRECT:** While the government justifies the Act using the "operational synergy" argument, the Act actually contradicts the 2025 Supreme Court directive, which had asked the Centre to *reduce* the reliance on IPS deputation at senior levels rather than cement it legally.

Q. With reference to the Citizenship (Amendment) Rules, 2026, consider the following statements:

1. The registration of the birth of a minor child born outside India now requires a declaration that the child does not hold a passport from any other country.
2. The rules allow for the issuance of an electronic OCI (e-OCI) as a substitute for or supplement to physical cards.
3. Consent for the use of biometric data for the Fast Track Immigration (FTI) Programme is now a mandatory part of the OCI application process.

How many of the statements given above are correct?

(a) Only one

(b) Only two

(c) All three

(d) None

Ans. (c)

Explanation:

- **STATEMENT 1 IS CORRECT**: The 2026 Rules include a specific proviso that minor children holding Indian passports cannot hold a passport from any other country.
- **STATEMENT 2 IS CORRECT**: The amendment officially introduces e-OCI and mandates a digital shift in how the government maintains citizenship records.
- **STATEMENT 3 IS CORRECT**: Applicants must sign a consent form for biometrics to be integrated into the FTI Programme for automatic registration and easier immigration clearance.

Q. With reference to the Rights of Persons with Disabilities (RPwD) Act, 2016, and recent judicial developments, consider the following statements:

1. The Act recognizes acid attack victims as a category of disability, originally focusing on those disfigured by the throwing of acid.
2. The Supreme Court recently used Article 142 to include victims of forced acid ingestion within the Act's benefits, effective only from the date of the judgment.

3. The Act mandates a 5% reservation for persons with benchmark disabilities in government jobs and 4% in higher educational institutions.

Which of the statements given above is/are correct?

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

Ans. (a)

Explanation:

- **STATEMENT 1 IS CORRECT:** The RPwD Act, 2016, included "acid attack victims" as one of its 21 disability categories, but the statutory language initially focused on external disfigurement from "throwing" acid.
- **STATEMENT 2 IS INCORRECT:** While the Supreme Court did use Article 142 to include victims of forced ingestion, it ruled that this inclusion is **operative retrospectively** from the inception of the Act in 2016, not just from the date of the judgment.
- **STATEMENT 3 IS INCORRECT:** The reservation percentages are reversed; the Act mandates **4%** reservation in government jobs and **5%** in higher educational institutions.

Q. With reference to Public Interest Litigation (PIL) in India, consider the following statements:

1. PIL allows any public-spirited individual to approach the court on behalf of others.
2. PIL can only be filed in the Supreme Court under Article 32.
3. Courts can take suo motu cognizance of matters under PIL.

Which of the statements given above is/are correct?

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

Ans. (b)

Explanation:

Statement 1 is correct: Public Interest Litigation (PIL) is a departure from the traditional rule of *locus standi*. It allows any public-spirited citizen or organization to approach the court for the enforcement of rights on behalf of persons who, due to poverty or disability, cannot approach the court themselves.

Statement 2 is incorrect: While PILs can be filed in the **Supreme Court** under **Article 32**, they can also be filed in **High Courts** under **Article 226**. The statement "only be filed in the Supreme Court" is therefore factually wrong.

Statement 3 is correct: The judiciary possesses the power to take **suo motu cognizance** (action on its own motion) of matters based on news reports, letters, or telegrams, treating them as PILs.

Scan to attempt more questions

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2.1. OPEC AND OPEC+

Context:

- Recently, the United Arab Emirates (UAE) officially announced its departure from both the **Organization of the Petroleum Exporting Countries (OPEC)** and the broader **OPEC+** alliance, effective May 1, 2026. This sovereign decision stems from the UAE's strategic vision to accelerate domestic energy production and exercise independent control over its output capacity, which has grown significantly in recent years.
- This move follows a period of internal friction over production quotas and occurs amidst heightened geopolitical volatility in West Asia, which has already disrupted traditional maritime oil routes like the Strait of Hormuz.

1. Organization of the Petroleum Exporting Countries (OPEC)

- **Establishment:** OPEC was founded in **September 1960** during the Baghdad Conference.
- **Founding Members:** The five founding nations were **Iran, Iraq, Kuwait, Saudi Arabia, and Venezuela**.
- **Headquarters:** While initially based in Geneva, the headquarters moved to **Vienna, Austria**, in 1965.
- **Primary Objective:** To coordinate and unify the petroleum policies of its Member Countries and ensure the stabilization of oil markets to secure an efficient, economic, and regular supply of petroleum to consumers.
- **Membership Status:** Membership is open to any country that is a substantial net exporter of crude petroleum and which has fundamentally similar interests to those of Member Countries.

2. The Advent of OPEC+

- **Formation:** Created in **2016** (via the Declaration of Cooperation) to include non-OPEC oil-producing nations.
- **Purpose:** The alliance was formed to counter the rise of US shale oil production and to exert greater control over global oil prices by managing a larger share of world supply.
- **Key Non-OPEC Members:** Includes **Russia, Kazakhstan, Azerbaijan, Bahrain, Brunei, Malaysia, Mexico, Oman, South Sudan, and Sudan**.
- **Significance:** Together, OPEC+ members control nearly **50% of global oil production** and over **80% of the world's proven oil reserves**, making their collective decisions the primary driver of global energy inflation.

3. Membership Dynamics and Recent Exits

The membership of the cartel is dynamic, reflecting the shifting economic priorities of oil-producing states:

- **Angola (Exited 2024):** Left due to disagreements over production targets.
- **Qatar (Exited 2019):** Left to focus on Liquefied Natural Gas (LNG) production.
- **UAE (Exited 2026):** The most recent departure, citing the need for production autonomy.

- **Current Status (Post-UAE Exit):** The group now faces a challenge in maintaining price floors as one of its most capable producers (UAE) are no longer bound by collective output cuts.

4. **Mechanism of Influence**
    - **Production Quotas:** The group meets regularly (Ministerial Meetings) to set production ceilings. By reducing supply, they aim to push prices up; by increasing it, they prevent market overheating.
    - **JMMC (Joint Ministerial Monitoring Committee):** A key body within OPEC+ that reviews market conditions and ensures member compliance with agreed-upon production adjustments.

2.2. WORLD GOLD COUNCIL (WGC)

Context:

- Recently, the World Gold Council (WGC) released data for the January to March quarter (Q1 2026), revealing that while total gold demand in India rose 10% year-on-year to 150.6 tonnes, there is a significant divergence in consumer behavior. High prices have led to a 19% dip in jewelry volume, yet investment demand has emerged as a powerhouse, with gold ETF demand skyrocketing by 197% and bar and coin demand rising by 34%.
- This shift underscores gold's growing reputation as a strategic "safe-haven" asset and an effective portfolio diversifier amid heightened global uncertainties and record-high prices.

1. **Overview and Genesis**
    - **Nature:** The WGC is the **market development organization** for the gold industry. It acts as a non-profit association representing the world's leading gold mining companies.
    - **Establishment:** It was founded in **1987** and is headquartered in **London**, United Kingdom.
    - **Offices:** It maintains a global presence with offices in India (Mumbai), China, Singapore, the UAE, and the USA.
2. **Core Mandate and Functions**
    - **Market Stimulation:** Its primary goal is to stimulate and sustain the demand for gold through research, marketing, and lobbying.
    - **Standard Setting:** The WGC works with regulators and industry stakeholders to create standards for a responsible and sustainable gold supply chain.
    - **Research & Data:** It is the authoritative source for global gold data, publishing the quarterly *Gold Demand Trends* report, which is widely used by central banks and institutional investors.
    - **Financial Innovation:** The council was instrumental in the creation of the first **Gold Exchange-Traded Fund (ETF)**, which revolutionized how investors access the gold market.
3. **Membership and Leadership**
    - **Members:** Its members comprise the world's leading and most forward-thinking gold mining companies (e.g., Barrick Gold, Newmont).

- **Leadership:** As of early 2026, the organization is led by CEO **David Tait**, who has focused on "financializing" gold and integrating it more deeply into global capital markets.

4. WGC and India

India is one of the world's largest consumers of gold, and the WGC plays a pivotal role in the Indian ecosystem:

- **Policy Advocacy:** The WGC has worked closely with the Government of India on initiatives like the **Sovereign Gold Bond (SGB) Scheme** and the **Gold Monetization Scheme**.
- **India International Bullion Exchange (IIBX):** The council provided technical expertise during the setup of India's first bullion exchange at GIFT City, aiming to make India a "price setter" rather than just a "price taker."
- **Recycling Focus:** A 2026 WGC report highlighted that India has become the **4th largest gold recycler** globally, reflecting a growing push toward an organized circular economy in the bullion sector.

2.3. MARITIME SECURITY AND THE INDIAN OCEAN RIM ASSOCIATION (IORA)

Context:

As India chairs the **Indian Ocean Rim Association (IORA)**, the organization is focusing on maritime safety and security amidst rising geopolitical tensions in West Asia (including the Red Sea and Hormuz Strait).

1. Key Highlights

- **Security Concerns:** Recent disruptions, including blockades and missile attacks, threaten energy and food security for littoral nations.
- **Economic Impact:** Disrupted sea lanes lead to increased fuel prices, airline disruptions (affecting tourism), and fertilizer shortages (impacting agriculture).
- **Strategic Dialogue:** The "Indian Ocean Dialogue" (Track 1.5) was recently co-hosted by India and the IORA Secretariat to address socio-economic impacts of regional conflicts.
- **Membership Dynamics:** Pakistan is notably absent from the grouping; its membership was previously blocked due to a failure to grant India "Most Favoured Nation" (MFN) status, violating IORA's charter of sovereign equality.

2. Indian Ocean Rim Association (IORA)

- **Established:** March 1997 (Originally known as the Indian Ocean Rim Initiative).
- **Visionary Leader:** Inspired by a concept proposed by **Nelson Mandela**.
- **Headquarters:** Ebene, **Mauritius**.
- **Composition:** Currently consists of **23 Member States** and 12 Dialogue Partners.
- **Governance:** IORA Council of Ministers: Highest decision making body comprised of the Minister of Foreign Affairs (or equivalent) of all Member States which meets annually.
- **The Charter:** Emphasizes sovereign equality, territorial integrity, and peaceful coexistence. It explicitly excludes controversial bilateral issues from its formal deliberations.

- **Priority Areas:**
  1. Maritime Safety & Security
  2. Trade & Investment Facilitation
  3. Fisheries Management
  4. Disaster Risk Management
  5. Academic, Science & Technology
  6. Tourism & Cultural Exchanges
  7. Blue Economy
  8. Women's Economic Empowerment

2.4. STRATEGIC OVERHAUL OF INDIA'S PHARMA TRADE IN SOUTH ASIA

Context:

- Recently, the Government of India has initiated a comprehensive review to identify and resolve market access barriers faced by Indian pharmaceutical exports in all **SAARC nations** and **Iran**.

1. **Key Interventions and Nodal Agencies**
   - **Executing Body:** The exercise is spearheaded by the **Foreign Trade (South Asia) Division** under the **Department of Commerce**, in coordination with **Pharmexcil** (Pharmaceuticals Export Promotion Council of India).
   - **Targeted Nations:** Sri Lanka, Nepal, Bangladesh, Afghanistan, Maldives, Pakistan, Bhutan, and Iran.
   - **Objective:** To formulate product-specific strategies and consolidate solutions for a high-level dialogue involving Indian Missions, the Ministry of External Affairs, and Export Promotion Councils.
2. **Key Issues to be Addressed:**

   The intervention specifically targets two major categories of international trade restrictions:
   - **SPS Measures (Sanitary and Phytosanitary):** Regulations applied to protect human, animal, or plant life/health from risks arising from additives, contaminants, or disease-carrying organisms.
   - **TBT (Technical Barriers to Trade):** Mandatory technical regulations, standards, and conformity assessment procedures that create unnecessary obstacles to international trade.
3. **Geopolitical Impact Assessment**
   - **West Asia Crisis Linkage:** The government is actively assessing how the ongoing geopolitical conflict and crisis in West Asia have disrupted pharmaceutical supply chains and trade volumes with these specific neighbouring countries.

4. **Key Economic Data (FY 2024-25)**
   - **Regional Export Volume:** India's pharmaceutical exports to the eight targeted nations stood at **$1.2 billion**.
   - **Global Export Volume:** This accounts for a small fraction of India's total global pharmaceutical exports, which reached **$30.47 billion** in the same fiscal year.
5. **About SAARC**

I. General Overview

- **Full Form:** South Asian Association for Regional Cooperation.
- **Establishment:** It was founded on **8 December 1985** with the signing of the SAARC Charter in **Dhaka** (Bangladesh).
- **Headquarters / Secretariat: Kathmandu**, Nepal (established in 1987).

II. Member Countries (8)

- Afghanistan, Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan, and Sri Lanka.
- **Afghanistan** is the newest member. It joined the organization during the 14th SAARC Summit in **2007**.

III. Key Objectives

- To promote the welfare of the people of South Asia and improve their quality of life.
- To accelerate economic growth, social progress, and cultural development in the region.

2.5. MULTILATERAL EXERCISE PRAGATI 2026 BEGINS IN MEGHALAYA

Context:

- Recently, the 13-nation military exercise PRAGATI 2026 began **at Meghalaya (Umroi Military Station)**, highlighting India's growing role in regional security and defence cooperation in the Indian Ocean Region (IOR).

1. **Key Highlights of Exercise PRAGATI 2026**
   - **Nomenclature:** PRAGATI stands for **P**artnership of **R**egional **A**rmies for **G**rowth and **T**ransformation in the **I**ndian **O**cean **R**egion.
   - **Format & Scale:** It is a 13-nation *multilateral* land force exercise hosted by the Indian Army.
   - **Geographical Focus:** It focuses on counter-terrorism operations executed specifically across **semi-mountainous and jungle terrain**.
   - **Defense Indigenization:** Beyond tactical drills, the exercise serves as a strategic platform under the *Atmanirbhar Bharat* initiative. Domestic Indian defense and tech companies use this venue to showcase indigenous equipment, weaponry, and innovations to friendly foreign nations.

2. Participating Nations Mapping

Apart from host **India**, 12 friendly nations spanning South Asia, Southeast Asia, and the island territories of the Indian Ocean are participating. Recognizing this specific group of countries is highly relevant for Prelims International Relations (IR) options:

- **South Asia:** Bhutan, Nepal, the Maldives, Sri Lanka.
- **Southeast Asia (ASEAN bloc):** Cambodia, Indonesia, Laos, Malaysia, Myanmar, the Philippines, Vietnam.
- **Western Indian Ocean Island:** Seychelles.

3. Other Important Joint Military Exercises Held in India (2026)

Exercise Name	Participating Nations	Type of Exercise	Key Focus Area / Terrain
MILAN 2026	India + Multi-nation Navies (Over 50 countries invited)	Multilateral (Navy)	Large-scale maritime maneuvers, anti-submarine warfare, and interoperability in the Indo-Pacific. Held at Visakhapatnam.
Yudh Abhyas	India & United States	Bilateral (Army)	High-altitude warfare, counter-insurgency operations, and joint humanitarian assistance.
Garuda Shakti	India & Indonesia	Bilateral (Special Forces)	Jungle warfare, tactical counter-terrorism operations, and military intelligence sharing.
Mitra Shakti	India & Sri Lanka	Bilateral (Army)	Semi-urban and counter-insurgency joint operational drills.
Surya Kiran	India & Nepal	Bilateral (Army)	High-altitude mountain warfare, disaster relief maneuvers, and terrain survival techniques.
Harimau Shakti	India & Malaysia	Bilateral (Army)	Jungle warfare tactics, sub-conventional operations, and drone/tech integration.

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UPSC PRELIMS PRACTICE QUESTIONS

Q. With reference to the Organization of the Petroleum Exporting Countries (OPEC) and OPEC+, consider the following statements:

Statement-I: The UAE's exit from OPEC in 2026 makes it the first Middle Eastern nation to leave the organization since its inception in 1960.

Statement-II: OPEC+ was established in 2016 primarily to include major non-member producers like Russia and Mexico to stabilize global oil prices against the volatility caused by US shale oil.

Which one of the following is correct in respect of the above statements?

(a) Both Statement-I and Statement-II are correct and Statement-II is the correct explanation for Statement-I.
(b) Both Statement-I and Statement-II are correct and Statement-II is not the correct explanation for Statement-I.
(c) Statement-I is correct but Statement-II is incorrect.
(d) Statement-I is incorrect but Statement-II is correct.

Ans. (d)

Explanation:

- **STATEMENT I IS INCORRECT:** While the UAE is a major Middle Eastern producer to leave, it is not the first. **Qatar**, another Middle Eastern nation, exited OPEC in January 2019.
- **STATEMENT II IS CORRECT:** OPEC+ was indeed a strategic response to the changing energy landscape of 2016, specifically the "Shale Revolution" in the United States, which threatened the market dominance of the original OPEC members.

Q. With reference to the World Gold Council (WGC), consider the following statements:

Statement-I: The World Gold Council is an intergovernmental organization under the aegis of the World Trade Organization (WTO) that regulates global gold prices.

Statement-II: According to the WGC's 2026 reports, central banks have broadened their gold demand base as a hedge against de-dollarization and geopolitical risks.

Which one of the following is correct in respect of the above statements?

(a) Both Statement-I and Statement-II are correct and Statement-II is the correct explanation for Statement-I.
(b) Both Statement-I and Statement-II are correct and Statement-II is not the correct explanation for Statement-I.
(c) Statement-I is correct but Statement-II is incorrect.
(d) Statement-I is incorrect but Statement-II is correct.

Ans. (d)

Explanation:

- **STATEMENT I IS INCORRECT:** The World Gold Council is an **international trade association** (industry body) of gold producers, not an intergovernmental organization or a part of the WTO. It does not "regulate" prices but influences demand and market standards.
- **STATEMENT II IS CORRECT:** Recent WGC data confirms that central banks (including new buyers like Indonesia and Malaysia) are increasingly utilizing gold to diversify away from the US Dollar due to geopolitical volatility.

Q. With reference to the Indian Ocean Rim Association (IORA), consider the following statements:

1. It was established based on a proposal by Nelson Mandela in 1997.
2. Its headquarters are located in Jakarta, Indonesia.
3. Pakistan is one of the founding members of the association.

Which of the statements given above is/are correct?

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

Ans. (a)

Explanation:

Statement 1 is correct: The concept of IORA was indeed inspired by **Nelson Mandela** during his visit to India in 1995, where he proposed the idea of a maritime grouping. It was formally established in **March 1997**.

Statement 2 is incorrect: The Coordinating Secretariat (Headquarters) of the IORA is located in **Ebene, Mauritius**, not Jakarta. Indonesia hosted the first-ever IORA Summit in 2017, but it is not the permanent headquarters.

Statement 3 is incorrect: Pakistan is not a member of the IORA. As highlighted in the article, Pakistan's application for membership was historically blocked, primarily because it did not fulfill the criteria of "sovereign equality" by refusing to grant **Most Favoured Nation (MFN)** status to India.

Q. Consider the following statements about India's pharmaceutical trade initiatives:

I. It aims to resolve non-tariff barriers such as Sanitary and Phytosanitary (SPS) measures faced by Indian pharmaceutical exporters.
II. The scope of this market access exercise is exclusively restricted to the member nations of the South Asian Association for Regional Cooperation (SAARC).

Which of the statements given above is/are correct?

(a) I only
(b) II only
(c) Both I and II
(d) Neither I nor II

Ans. (a)

Explanation:

Statement I is correct: The initiative specifically targets the resolution of Sanitary and Phytosanitary (SPS) measures and Technical Barriers to Trade (TBT), which act as significant non-tariff market access barriers for pharmaceutical exports.

Statement II is incorrect: The exercise to identify and resolve these market access issues is not exclusively limited to SAARC nations; it also actively includes Iran.

Scan to attempt more questions

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ECONOMY

3.1. PM E-DRIVE SCHEME

Context:

- Recently, the Central Government is considering the launch of a fresh electric bus scheme for States following the successful tendering and allocation of all 14,028 e-buses under the **PM E-DRIVE** programme.

1. Overview of PM E-DRIVE Scheme

The **PM Electric Drive Revolution in Innovative Vehicle Enhancement (PM E-DRIVE)** is a flagship Central Sector Scheme designed to accelerate the transition to electric mobility in India.

- **Nodal Ministry:** Ministry of Heavy Industries (MHI).
- **Total Outlay:** ₹10,900 crore.
- **Duration:** Initially launched for two years (October 2024 to March 2026), but recently extended for specific segments (e.g., e-2Ws until July 2026 and e-3Ws until March 2028).
- **Subsumed Schemes:** It subsumes the **Electric Mobility Promotion Scheme (EMPS) 2024**.

2. Key Components and Financial Allocation

The scheme focuses on both demand-side incentives and supply-side infrastructure development.

Component	Allocation (Approx.)	Target/Details
Demand Incentives	₹3,679 crore	Supports e-2Ws, e-3Ws, e-ambulances, and e-trucks.
Electric Buses	₹4,391 crore	Procurement of 14,028 e-buses for 9 major cities (population >4 million).
Charging Infrastructure	₹2,000 crore	Installation of ~72,300 public fast chargers.
Testing Agencies	₹780 crore	Upgrading MHI testing agencies for emerging EV technologies.

3. Salient Features

- **E-Voucher Mechanism:** To simplify the subsidy process, the government introduced Aadhaar-authenticated **e-Vouchers**. At the time of purchase, a digital voucher is generated for the buyer, which is signed and uploaded to the portal to claim the incentive.
- **Focus on Public Transport:** A major portion of the fund is dedicated to e-buses and e-ambulances (₹500 crore) to decarbonize public health and transport services.
- **Advanced Batteries:** Only vehicles fitted with **advanced batteries** (as per notified technical standards) are eligible for incentives to ensure safety and efficiency.
- **Scrapping Linkage for Trucks:** Incentives for e-trucks are specifically linked to the possession of a **scrapping certificate** from a MoRTH-approved Registered Vehicle Scrapping Facility (RVSF).

4. Comparison: PM E-DRIVE vs. FAME-II

Aspect	PM E-DRIVE	FAME-II
Scope	Greater emphasis on public transport (buses, ambulances) and trucks	Focused more broadly on electric mobility, including smaller vehicles
Hybrid Vehicles	Supports only pure Electric Vehicles (EVs)	Supported Hybrid Electric Vehicles (HEVs) along with EVs
Efficiency	Targets higher volumes with lower per-unit subsidy	Higher per-unit subsidy with relatively lower volume focus

3.2. ELECTRONIC GOLD RECEIPTS (EGRS)

Context

Recently, the **National Stock Exchange (NSE)** launched the **Electronic Gold Receipts (EGRs)** segment. This move fulfills a 2018-19 Union Budget announcement to establish a regulated gold exchange in India, aiming to transition the gold market from fragmented to a centralized, transparent ecosystem.

1. Understanding Electronic Gold Receipts (EGRs)

Electronic Gold Receipts are **dematerialized securities** that represent ownership of physical gold. Unlike "digital gold" sold by private apps, EGRs are regulated financial instruments traded on stock exchanges, much like shares.

I. The Three-Tranche Mechanism

The operational framework of the Gold Exchange is divided into three distinct phases:

- **First Tranche (Conversion):** Physical gold is deposited in a SEBI-accredited vault. The **Vault Manager** then creates an EGR in the depositor's demat account.
- **Second Tranche (Trading):** These EGRs are traded on the stock exchange (NSE/BSE) on a continuous basis, allowing for real-time **price discovery**.
- **Third Tranche (Redemption):** An investor can surrender the EGR and convert it back into physical gold delivered from the vault.

II. Regulatory Framework

- **Legal Status:** The Government of India has notified EGRs as **'securities'** under the **Securities Contracts (Regulation) Act, 1956 (SCRA)**.
- **Regulator:** The **Securities and Exchange Board of India (SEBI)** is the primary regulator for the entire EGR ecosystem, including Vault Managers.
- **Standardization:** To ensure quality, the gold must comply with either the **LBMA (London Bullion Market Association) Good Delivery Standard** or the **India Good Delivery Standard**.

2. Key Facts: EGRs vs. Other Gold Instruments

Feature	Electronic Gold Receipts (EGRs)	Sovereign Gold Bonds (SGBs)	Gold ETFs
Issuer/Regulator	SEBI	RBI (on behalf of Govt)	SEBI
Underlying Asset	Physical Gold in Vaults	Not backed by physical gold	Physical Gold / Gold instruments
Redeemability	Can be converted to physical gold	Cash only at maturity	Cash or Gold (for large units)
Interest	No fixed interest	2.5% fixed interest per annum	No fixed interest
Usage	Can be used as collateral for loans	Can be used as collateral	Generally not used for loans
Maturity	Perpetual	8 years	Perpetual

3.3. STRATEGIC PETROLEUM RESERVES: SECURING INDIA'S ENERGY FRONTIER

Context:

- Amidst escalating geopolitical tensions in **West Asia**, the Government of India recently reviewed the country's energy preparedness. The government has reassured that India maintains a robust cushion with **60 days of crude oil reserves**, **60 days of natural gas**, and **45 days of LPG rolling stock**, supported by a strong **Foreign Exchange (Forex) reserve** of approximately **$703 billion** (as of early 2026).

1. India's Strategic Petroleum Reserve (SPR) Programme

The SPR programme was conceptualized to safeguard the nation against external supply shocks, inspired by the 1991 Gulf War crisis.

I. Institutional Framework

- **Managing Entity:** The reserves are managed by **Indian Strategic Petroleum Reserves Limited (ISPRL)**.
- **Nature of Entity:** ISPRL is a Special Purpose Vehicle (SPV) and a wholly-owned subsidiary of the **Oil Industry Development Board (OIDB)** under the **Ministry of Petroleum & Natural Gas**.
- **Storage Technology:** Crude oil is stored in massive **underground unlined rock caverns**, which are safer and more cost-effective than above-ground tanks.

2. Phase-wise Development

Phase	Location	State
Phase I	Visakhapatnam	Andhra Pradesh
	Mangaluru	Karnataka
	Padur	Karnataka

Phase II	Chandikhol	Odisha
	Padur (Expansion)	Karnataka

3. **Important Points**

- **IEA Standards:** The International Energy Agency (IEA) recommends member countries hold emergency oil stocks equivalent to at least **90 days** of net imports. India, an associate member, is moving towards this benchmark.

About IEA

- It is an autonomous intergovernmental organization established in 1974, headquartered in Paris, France, to ensure reliable, affordable, and clean energy.
- It operates within the framework of the Organization for Economic Co-operation and Development (OECD).
- **Key Publications:** World Energy Outlook, World Energy Investment, Net Zero by 2050.
- **Membership:** Full membership was historically open only to OECD nations. IEA currently has 32 full members.
- **Association Countries:** 13 countries, including India, China, Brazil, and South Africa. These countries participate in discussions but lack decision-making rights.

4. **Oil Reserve Storage: USA vs India**

- The United States stores its Strategic Petroleum Reserve (SPR) in **underground salt caverns** created **inside naturally** occurring salt domes.
- These caverns are located mainly along the **Gulf Coast** in states like Texas and Louisiana.
- The U.S. has the world's largest SPR capacity.
- **In India:** Uses **engineered hard rock caverns** beneath the ground.

3.4. HIGHEST-EVER RENEWABLE ENERGY EXPANSION IN INDIA

Context:

In a significant milestone for India's energy transition, the **Union Ministry of New and Renewable Energy (MNRE)** recently confirmed that India added a record **44 gigawatts (GW)** of solar capacity in the calendar year 2025. This surge has catapulted India's total installed solar capacity to **150 GW**, reinforcing its position as the world's **third-largest** solar power producer. The growth is primarily attributed to robust policy interventions and decentralized solar missions.

1. **Major Growth Drivers**

The Ministry highlighted three primary schemes that acted as catalysts for this record-breaking year:

- **PM Surya Ghar: Muft Bijli Yojana:**
  - **Objective:** To provide free electricity (up to 300 units) to **1 crore households** by installing rooftop solar.

- **Subsidy:** Offers up to 40% subsidy for systems up to 3 kW.

- **Production Linked Incentive (PLI) Scheme:**
- **Focus:** "National Programme on High-Efficiency Solar PV Modules."
- **Goal:** To reduce import dependence (especially from China) by incentivizing domestic manufacturing of solar cells and modules.

- **PM-KUSUM:**
- **Focus:** De-dieselizing the agricultural sector by providing solar pumps and solarizing existing grid-connected pumps.

2. Alignment with National & International Targets

- **Panchamrit Targets (COP26):** India aims to reach **500 GW of non-fossil fuel** energy capacity by 2030.
- **NDC Achievement:** India has already achieved its commitment to have **50% of its installed electricity capacity** from non-fossil sources in 2025, five years ahead of the 2030 deadline.
- **Energy Mix:** Solar now contributes approximately **53%** of India's total Renewable Energy (RE) segment.

3. Global Renewable Energy Installed Capacity

Country	Capacity (GW)
China	2258.02
USA	467.92
India	**250.52**
Brazil	228.20
Germany	199.92
Japan	134.53
Canada	110.51
World	**5149.28**

4. Renewable Energy Installed Capacity – Sector-wise (GW)

Data Reference: Late 2025 (PIB/MNRE)

Detailed Capacity Table

Sector	Installed Capacity (GW)
Solar Power (a)	132.85
Wind Power (b)	53.99
Bio Energy (c)	11.61
Small Hydro (d)	5.16
Hybrid / RTC / FDRE (e)	---
Sub-Total (Renewables excl. Large Hydro) (f = a+b+c+d+e)	**203.61**
Large Hydro (g)	50.35
Total RE (f + g)	**253.96**
Nuclear Power (h)	8.78
Total Non-Fossil Fuel (f + g + h)	**262.74**

5. All India Electricity Installed Capacity

Data as of: November 30, 2025

Sector	Capacity (in GW)	Percentage (%)
Thermal (a)	246.90 GW	48.45%
Nuclear (b)	8.78 GW	1.72%
Renewable Energy (including large Hydro) (c)	253.96 GW	49.83%
Sub-Total (Non-Fossil Fuel) (b + c)	**262.74 GW**	**51.55%**
Total (a + b + c)	**509.64 GW**	**100%**

3.5. WORKER POPULATION RATIO (WPR)

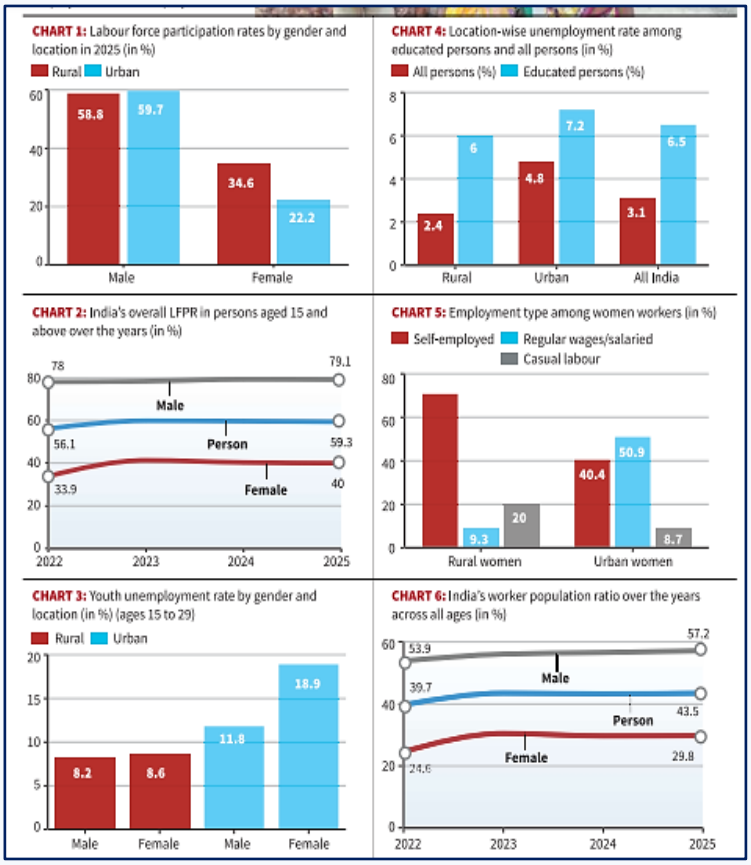
Context:

Recently, the Periodic Labour Force Survey (PLFS) 2025, released by MoSPI, provided monthly rural and urban labour market data for January–December 2025. The report shows rising employment and labour force participation, while highlighting continuing challenges in female and youth unemployment.

1. India's Labour Market Dynamics: PLFS 2025 Insights

I. Key Indicators: LFPR and WPR

- **Labour Force Participation Rate (LFPR):** The overall LFPR for all ages stands at **44.9%**.
  - **Gender Gap:** Male participation is significantly higher at **59.7%** in urban areas, whereas urban female participation remains low at **22.2%**.
- **Worker Population Ratio (WPR):** This ratio has seen a steady climb from **39.7% in 2022 to 43.5% in 2025**.
  - **Rural Female WPR:** A notable increase has been recorded in rural areas, where the female WPR rose from **26.9% to 33.8%** over the same period.



II. The Unemployment Challenge

- **General Rate:** The overall unemployment rate has fallen from **3.6% in 2022 to 3.1% in 2025**.

- **Youth Unemployment (Ages 15-29):** Stands at **9.9%**, which is more than three times the national average.
  - The situation is most acute for **urban young women**, with an unemployment rate of **18.9%**.
- **Educated Unemployment:** Persons with secondary schooling and above face a **6.5%** unemployment rate.
  - In urban areas, this figure reaches **7.2%**, suggesting that job creation has not yet matched the growth of the educated workforce.

III. Nature of Employment

- **Self-Employment:** Highly prevalent in rural areas, especially among women (**70.7%**), often reflecting subsistence activities.
- **Regular Wage/Salaried Work:** Urban areas offer better distribution, with **50.9%** of working women in regular wage employment compared to only **9.3%** in rural areas.

2. Defining Key Terms

- **Labour Force Participation Rate (LFPR):** Defined as the percentage of persons in the labour force (those working or seeking work) out of the total population.
- **Worker Population Ratio (WPR):** Defined as the percentage of employed persons out of the total population.
- **Unemployment Rate (UR):** The percentage of persons unemployed among the persons in the labour force (it does **not** include those who are not looking for work).

3. About the Periodic Labour Force Survey (PLFS)

- **Nodal Agency:** National Statistical Office (NSO) under the **Ministry of Statistics and Programme Implementation (MoSPI)**.
- **Objectives:**

1. To estimate key employment and unemployment indicators (WPR, LFPR, UR) in the short time interval of three months for the **urban areas** only in the 'Current Weekly Status' (CWS).
2. To estimate employment and unemployment indicators in both **rural and urban areas** annually in both 'Usual Status' and CWS.

3.6. COAL GASIFICATION

Context:

- Recently, the Union Cabinet has approved a substantial **₹37,500-crore financial package** to incentivize and accelerate **surface coal gasification** projects across India. This initiative aims to utilize India's vast coal and lignite reserves more sustainably while reducing the massive import bill for critical products like urea, methanol, and natural gas. The government has set an ambitious target to gasify **100 million tonnes (MT) of coal by 2030**.

1. **Financial and Policy Incentives**
   - **CAPEX Subsidy:** The government will provide financial incentives of up to **one-fifth (20%)** of the cost of plant and machinery.
   - **Project Caps:**
   - For a single project, the maximum financial incentive is capped at ₹5,000 crore.
   - For a single product-centred project, the incentive limit is generally capped at ₹5,000 crore.
   - However, projects related to:
   - Synthetic Natural Gas (SNG) and Urea production can receive incentives up to ₹9,000 crore.
   - A single entity/company can avail a maximum cumulative incentive of ₹12,000 crore across all project categories.
   - **Investment Certainty:** To provide long-term stability, coal linkage tenures have been extended up to **30 years** for gasification units.
   - **Target Capacity:** The current package targets the gasification of approximately **75 million tonnes** of coal and lignite, contributing to the broader 100 MT target for 2030.
2. **Understanding Coal Gasification Technology**
   - **Coal Gasification** is a thermo-chemical process that converts coal into a gaseous mixture called **Syngas (a mixture primarily composed of carbon monoxide and hydrogen)** instead of burning it directly.
   - **The Process:**
   - The process occurs by reacting coal with a controlled amount of oxygen, steam, and heat under high temperature and pressure.
   - Unlike direct burning, coal is partially oxidized, not completely combusted.
   - **Syngas Formation**: Produces CO and H_2-rich gas.
   - **Gas Cleaning:** Removal of impurities like sulfur, ash, and particulates.
3. **Advantages over Direct Combustion**
   - Higher efficiency than conventional coal combustion
   - Lower emissions of pollutants
   - Can produce cleaner fuels and chemicals
   - Helps reduce crude oil and natural gas imports
4. **Uses in Modern Industries**
   - **Power Generation:** Syngas produced from coal gasification is used in Integrated Gasification Combined Cycle (IGCC) plants for efficient electricity generation.
   - **Fertilizer Industry:** Hydrogen obtained from syngas is used in the production of ammonia and urea fertilizers.
   - **Chemical Industry:** Used to manufacture chemicals such as methanol, ammonia, hydrogen, acetic acid, and synthetic natural gas (SNG).
   - **Steel Industry:** Syngas and hydrogen can act as reducing agents in steel production, helping reduce coke consumption.
   - **Hydrogen Production:** Coal gasification is an important source of industrial hydrogen for refineries and clean energy applications.

- **Synthetic Fuel Production:** Used to produce synthetic diesel, petrol, and aviation fuels through Fischer–Tropsch technology.
- **Refinery Operations:** Syngas is used in petroleum refining and upgrading low-quality fuels.
- **Methanol Economy:** Supports green and alternative fuel initiatives through methanol production for transport and marine fuel.
- **City Gas & Industrial Fuel:** Synthetic natural gas generated from coal gasification can be used for domestic cooking and industrial heating.
- **Waste-to-Energy Applications:** Integrated gasification technologies can process low-grade coal and industrial waste for energy recovery.

5. Why Coal Gasification is Important?

- Coal contributes over 55% of India's energy mix. Coal gasification converts coal into syngas for producing fuels and chemicals domestically, reducing import dependence and exposure to global price volatility.
- The technology supports economic independence by utilizing India's nearly 400 billion tonnes of coal reserves (**fifth largest**) to produce critical industrial feedstocks.
- Gasification is a "High Efficiency Low Emissions" (HELE) technology that acts as a bridge **toward India's Net Zero 2070 goal.**

3.7. INFLATIONARY PRESSURES AND MACROECONOMIC STABILITY

Context:

- Recent economic data indicates a significant divergence between retail and wholesale inflation in India. While retail inflation (CPI) reached a 13-month high of 3.48% in April, wholesale inflation (WPI) surged to 8.3%.
- This trend is primarily driven by global geopolitical conflicts leading to soaring fuel and energy costs, alongside rising food prices. The situation presents a complex challenge for both fiscal policy (government) and monetary policy (RBI) to maintain the inflation tolerance band of 2%–6%.

1. Understanding Inflation Indices: CPI vs. WPI

Inflation in India is primarily measured using two different indices that track price changes at different stages of the supply chain.

A. Consumer Price Index (CPI)

- **Definition:** Measures the average change over time in the prices paid by ultimate consumers for a basket of consumer goods and services.
- **Base Year:** 2024 (Current).
- **Released by:** National Statistical Office (NSO), Ministry of Statistics and Programme Implementation.
- **Key Components:** Food and beverages (36.75%), fuel and light, housing, clothing, and miscellaneous services (education, health, etc.).

- **Significance:** It is the primary tool used by the Reserve Bank of India (RBI) for monetary policy targeting.

B. Wholesale Price Index (WPI)

- **Definition:** Measures the changes in the prices of goods sold and traded in bulk by wholesale entities to other businesses.
- **Base Year:** 2011-12.
- **Released by:** Office of Economic Adviser, Ministry of Commerce and Industry.
- **Key Components:** Manufactured products (highest weightage), Primary Articles (food, non-food), and Fuel & Power.
- **Note:** WPI does not include services.

2. Key Differences at a Glance

Feature	Wholesale Price Index (WPI)	Consumer Price Index (CPI)
Primary Focus	Goods at the wholesale level (B2B)	Goods and services at retail level (B2C)
Prices paid by	Manufacturers and wholesalers	Final consumers
Services Included	No	Yes
Policy Use	Tracks supply-side pressures	Used for Inflation Targeting by RBI
Weights	Manufactured goods have highest weight	Food and beverages have highest weight

3. Factors behind Inflation and response to curve inflation

I. Cost-Push Factors

- **Energy Prices:** A surge in petroleum and natural gas prices (67.2%) due to international conflict acts as a major supply-side shock.
- **Imported Inflation:** As the Rupee depreciates against the Dollar, the cost of importing essential commodities (like crude oil and gold) increases, further fueling domestic inflation.

II. Fiscal and Monetary Response

- **Fiscal Measures:** The government has increased import duties on gold and silver to discourage "safe-haven" investments and support the Rupee. There are also appeals for reduced discretionary spending.
- **Monetary Measures:** The RBI is mandated to keep CPI within the 4% (+/- 2%) range. With inflation "bursting at the seams," the central bank may be forced to tighten monetary policy (e.g., increasing the Repo Rate) to reduce liquidity and curb demand.

4. Socio-Economic Impact

- **Impact on Consumption:** Rising costs of essential items like commercial LPG cylinders directly affect migrant labor and low-income households, potentially dampening overall consumption demand in the economy.
- **Sectoral Hits:** The hospitality and accommodation sectors are witnessing sharper price increases due to the cascading effect of fuel costs.

5. **Essentials Concepts to Remember**
    - **Headline Inflation:** The total inflation within an economy, including commodities such as food and energy prices (which are volatile).
    - **Core Inflation:** Headline inflation minus the volatile food and fuel components.
    - **Disinflation:** Disinflation is a temporary slowing in the rate of price inflation, where prices continue to rise but at a slower pace.
    - **Stagflation:** Stagflation is an economic condition defined by the simultaneous occurrence of slow economic growth, high unemployment, and rising prices (high inflation).

3.8. NCDEX TO LAUNCH INDIA'S FIRST WEATHER DERIVATIVES

Context

- Recently, the **National Commodity and Derivatives Exchange (NCDEX)** announced the launch of RAINMUMBAI on May 29, 2026, India's **first exchange-traded weather derivatives** contract. It aims to help farmers and businesses reduce financial risks caused by unpredictable monsoon and changing weather patterns.

1. **Key Features of the 'RAINMUMBAI'**
    - **Target Audience:** Specifically designed for farmers, agribusinesses, insurance entities, and corporate sectors whose revenue models are highly **sensitive to rainfall variations**.
    - **Regulatory Approval:** Fully cleared and regulated by the **Securities and Exchange Board of India (SEBI)**.
    - **Knowledge & Data Partners:** Developed in academic collaboration with **IIT Bombay**.
    - Utilizes baseline, authentic rainfall data provided by the **India Meteorological Department (IMD)**.
    - **Data Sources:** The underlying settlement value of the derivative will rely directly on surface rainfall data and **Automatic Weather Stations (AWS)** observations stationed specifically at **Santracruz and Colaba** in Mumbai.
2. **What is a Weather Derivative?**
    - **Definition:** A financial instrument whose payoff depends on concrete, measurable weather indexes (such as total rainfall, temperature, or wind speed) over a specified period.
    - **Key Distinction from Insurance:** Traditional insurance requires the policyholder to **prove a demonstrable physical loss** to get a payout (e.g., ruined crops).
    - Weather derivatives pay out based purely on the **index threshold being crossed** (e.g., if rainfall falls below a predetermined millimeter mark), regardless of actual physical damage. This dramatically reduces the time and paperwork needed for settlements.
    - **How Weather Derivative Work?**
    - The payout depends on a weather index (rainfall, temperature, snowfall, etc.), not on physical damage.

- If actual weather deviates from a pre-decided benchmark, compensation is provided.

- **Example:**
- A farmer expects normal monsoon rainfall:
- If rainfall falls below the agreed level, the derivative contract pays compensation.
- This reduces income loss due to poor monsoon.

3. Important Institutional Bodies

A. National Commodity and Derivatives Exchange (NCDEX)

- It is a nation-level, technology-driven **online commodity exchange** in India.
- Though it trades various commodities, it has a prominent focus on **agricultural commodities** (like chana, castor seed, coriander, etc.), making it crucial for agricultural pricing architecture.
- It is regulated by **SEBI** (following the merger of the Forward Markets Commission with SEBI in 2015).

B. Securities and Exchange Board of India (SEBI)

- A **statutory body** established under the provisions of the *SEBI Act, 1992*.
- It protects the interests of investors in securities and regulates the securities and commodities derivatives market in India.

C. India Meteorological Department (IMD)

- Established in 1875, it is the principal government agency responsible for meteorological observations, weather forecasting, and seismology.
- It functions under the **Ministry of Earth Sciences (MoES)**.

3.9. CURRENCY DEPRECIATION AND RBI INTERVENTION

Context:

- Following sustained market losses, the Indian Rupee (INR) has depreciated significantly, closing near ₹97 to the US Dollar ($). This has triggered a macroeconomic debate on whether the Reserve Bank of India (RBI) should intervene to defend the currency or let market forces determine its equilibrium level.

Core Economic Concepts & Mechanisms

1. Currency Depreciation vs. Devaluation

- **Depreciation:** A fall in the value of a currency in a **floating/market-driven exchange rate system**, caused by market forces of demand and supply.
- **Devaluation:** An official, deliberate downward adjustment of the value of a country's currency by its **central bank/government** under a **fixed exchange rate system**.

2. Twin Drivers of Current Rupee Depreciation

- **External Spikes:** Rising global oil prices and external inflationary pressures.

- **Speculative Capital Outflows:** Foreign Institutional Investors (FIIs/FPIs) pulling capital out due to **expectations of rising interest rates by foreign central banks** or lower expected returns on Indian stocks.

3. The Current Account Deficit (CAD) Connection

- **Definition:** CAD occurs when a country imports more goods, services, and transfers than it exports.
- **The Balancing Act:** A CAD requires a matching inflow of foreign capital (FDI/FPI) to maintain exchange rate stability. If capital inflows are insufficient to cover the deficit, demand for foreign exchange (USD) exceeds its supply, causing the local currency (INR) to **depreciate**.

Macroeconomic Impacts of Depreciation

A. Positive Impacts

- **Boosts Exports:** A weaker rupee makes domestic goods cheaper and more competitive in the international market.
- **Curtails Imports:** Imports become more expensive, naturally discouraging non-essential import demand.
- **Adjustment:** Theoretically, higher exports and lower imports work together to naturally compress and correct the Current Account Deficit.

B. Negative Impacts

- **Imported Inflation:** India is heavily dependent on imports for essential goods like crude oil. A falling rupee increases the domestic cost of these essentials, fueling domestic inflation.
- **Front-Loading of Purchases:** If consumers expect the rupee to fall further (and prices to rise tomorrow), they front-load purchases (e.g., rushing to buy fuel), which spikes short-term import demand and **worsens the deficit.**
- **Delayed Export Response:** A weak rupee **does not automatically boost exports** if global buyers expect the currency to fall even further, **causing them to delay purchases** to get cheaper rates later.

The Debate: To Intervene or Not?

I. Arguments FOR Allowing Free Depreciation (Non-Intervention)

- Advocates (including perspectives like Gita Gopinath) suggest letting the market find its own level.
- Intervention artificially props up the rupee, which only delays inevitable market adjustments and obstructs the free flow of market forces.

II. Arguments AGAINST Free Depreciation (Pro-Intervention)

- Unchecked depreciation driven by speculative capital (rather than economic fundamentals) causes extreme volatility.
- It inflicts severe inflationary pain on a populace already vulnerable to high global energy prices.
- **Global Precedent:** Even developed economies intervene during extreme volatility (e.g., Japan's signaling of 'decisive action' to maintain the Yen against the Dollar).

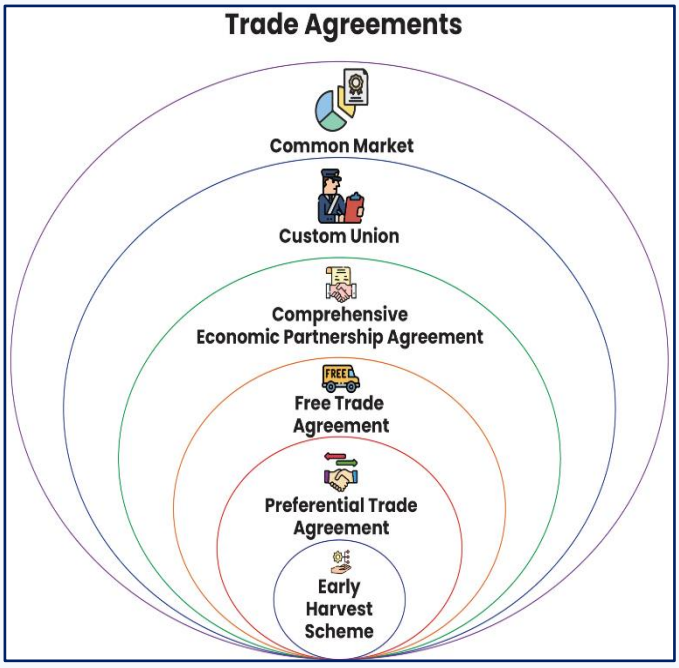
RBI's Intervention Tools

- **Spot Market Intervention:** The first line of defense. When the rupee depreciates sharply, the RBI **sells US Dollars (USD)** from its Foreign Exchange Reserves and **buys Indian Rupees (INR)**. This reduces the supply of INR and fills the shortage of USD, arresting the fall.
- **Policy Rate (Repo) Hikes:** Increasing interest rates improves the yield differential between India and developed markets (like the US Fed). This naturally incentivizes global capital to stay in India rather than flying out.
- **Regulatory Measures:** The RBI eases guidelines on External Commercial Borrowings (ECBs) and nonresident deposits (like FCNR) to stimulate steady dollar inflows.

3.10. TYPES OF TRADE AGREEMENTS

Context:

- **Recently**, India and New Zealand officially signed a landmark **Free Trade Agreement (FTA)** in New Delhi, which aims to provide Indian exporters with **100% duty-free access** to the New Zealand market.
- This development follows a series of high-speed negotiations and joins a string of recent economic pacts, including the **India-UK Comprehensive Economic and Trade Agreement (CETA)** and the **India-Oman CEPA**, reflecting India's aggressive "position of strength" in global trade as noted by the Prime Minister.



1. **Preferential Trade Agreement (PTA)**
   - **Nature:** The most basic form of trade agreement.
   - **Mechanism:** Two or more partners agree to reduce (not necessarily eliminate) customs duties on a **limited number of products** (Positive List).
   - **Key Detail:** Only those goods listed in the agreement receive preferential treatment.
2. **Free Trade Agreement (FTA)**
   - **Nature:** A more comprehensive arrangement than a PTA.
   - **Mechanism:** Member countries eliminate or significantly reduce tariffs on a **majority of goods** traded between them.
   - **Key Detail:** Unlike a Customs Union, member countries in an FTA maintain their own individual tariff rates for non-member countries.
   - **Recent Example:** The **India-New Zealand FTA (2026)** and the **India-EFTA TEPA**.
3. **Comprehensive Economic Cooperation Agreement (CECA)**
   - **Nature:** Covers a broader scope beyond just trade in goods.
   - **Mechanism:** Includes trade in services, investment, and often economic cooperation.
   - **Focus:** It primarily focuses on tariff negotiations and liberalizing trade in services.

- **Example:** India-Singapore CECA.

4. **Comprehensive Economic Partnership Agreement (CEPA)**
   - **Nature:** The most advanced form of bilateral/regional pact that India signs.
   - **Mechanism:** It is more exhaustive than CECA. It covers trade in goods, services, investment, **Intellectual Property Rights (IPR)**, competition, and even government procurement.
   - **Example:** India-UAE CEPA and the recently signed **India-Oman CEPA**.
5. **Customs Union**
   - **Nature:** A higher stage of integration.
   - **Mechanism:** Member countries eliminate internal barriers to trade AND adopt a **Common External Tariff (CET)** for non-members.
   - **Example:** Southern African Customs Union (SACU).
6. **Common Market**
   - **Nature:** Deep integration of factors of production.
   - **Mechanism:** A Customs Union that also allows the **free movement of labor and capital** among member nations.
   - **Example:** The European Union (EU) in its earlier stages.
7. **Economic Union**
   - **Nature:** Near-total integration.
   - **Mechanism:** A Common Market with **harmonized economic policies**, common fiscal and monetary policies, and often a common currency.
   - **Example:** The European Union.

The "New-Age" Pacts (Signed/Concluded 2022–2026)

These agreements are comprehensive, covering not just goods, but also services, digital trade, and investment commitments.

Agreement	Partner Country/Bloc	Status (as of April 2026)
India-EU FTA	European Union (27 nations)	**Concluded Jan 2026**; Internal ratification ongoing.
India-UK FTA	United Kingdom	**Signed**; Operational by May 1, 2026.
India-EFTA TEPA	Switzerland, Norway, Iceland, Liechtenstein	**In Force** (Effective Oct 1, 2025).
India-Oman CEPA	Oman	**Signed Dec 2025**; Implementation underway.
India-New Zealand FTA	New Zealand	**Announced Dec 2025**; Focused on services & dairy safeguards.
India-Australia ECTA	Australia	**In Force** (Since Dec 2022; Currently upgrading to CEPA).
India-UAE CEPA	United Arab Emirates	**In Force** (Since May 2022).
India-Mauritius CECPA	Mauritius	**In Force** (Since April 2021).

Major Established Agreements (Early Phase)

These primarily focus on the "Act East" policy and regional integration.

- **ASEAN-India Trade in Goods Agreement (AITIGA):** Currently undergoing review (2025-26) to address trade imbalances.
- **India-South Korea CEPA (2010):** Focuses on electronics and automotive sectors.
- **India-Japan CEPA (2011):** Covers a wide range of goods and provides "National Treatment" for investments.
- **South Asian Free Trade Area (SAFTA):** Signed in 2004, covering SAARC nations (though trade with Pakistan is currently suspended).

Preferential Trade Agreements (PTAs)

Limited scope agreements focusing on specific "Positive Lists."

- **India-MERCOSUR PTA:** With Brazil, Argentina, Uruguay, and Paraguay.
- **India-Chile PTA:** Expanded in 2017 to cover over 1,000 tariff lines.
- **India-Afghanistan PTA:** Signed in 2003.

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UPSC PRELIMS PRACTICE QUESTIONS

Q. With reference to the 'PM E-DRIVE' scheme, consider the following statements:

1. It is a Central Sector Scheme implemented by the Ministry of Road Transport and Highways.
2. The scheme provides demand incentives for electric two-wheelers, three-wheelers, and hybrid cars.
3. The incentives for electric trucks under this scheme are mandatory to be linked with a vehicle scrapping certificate.
4. It introduces a physical paper-based voucher system to provide upfront discounts to buyers.

Which of the statements given above is/are correct?

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

Ans. (b)

Explanation:

- **STATEMENT 1 IS INCORRECT:** The scheme is implemented by the **Ministry of Heavy Industries**, not the Ministry of Road Transport and Highways.
- **STATEMENT 2 IS INCORRECT:** While it supports e-2Ws and e-3Ws, it **does not** provide incentives for hybrid cars; it focuses on pure electric vehicles and includes new segments like e-ambulances and e-trucks.
- **STATEMENT 3 IS CORRECT:** To promote the circular economy, demand incentives for e-trucks are only available to those who provide a scrapping certificate from an approved RVSF.
- **STATEMENT 4 IS INCORRECT:** The scheme uses an **e-Voucher** (digital), which is Aadhaar-authenticated and generated via a portal, not a physical paper-based system.

Q. With reference to Electronic Gold Receipts (EGRs) recently launched in India, consider the following statements:

1. They are classified as 'securities' under the Securities Contracts (Regulation) Act, 1956.
2. The entire ecosystem, including vault managers, is regulated by the Reserve Bank of India (RBI).
3. EGRs allow for the conversion of physical gold into a dematerialized form that can be traded on stock exchanges.

Which of the statements given above are correct?

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

Ans. (c)

Explanation:

Statement 1 is correct: The Government of India has officially notified **Electronic Gold Receipts (EGRs)** as 'securities' under the **Securities Contracts (Regulation) Act, 1956 (SCRA)**. This legal classification allows them to be traded, cleared, and settled on recognized stock exchanges just like shares.

Statement 2 is incorrect: The entire ecosystem of the Gold Exchange, including the **Vault Managers** who store the physical gold, is regulated by the **Securities and Exchange Board of India (SEBI)**. While the RBI regulates the gold monetization scheme and SGBs, SEBI has the mandate for the EGR segment to ensure market integrity and investor protection.

Statement 3 is correct: The core purpose of EGRs is to allow physical gold to be deposited in a vault and converted into an electronic (dematerialized) receipt. This receipt can then be traded on the stock exchange, providing a transparent and efficient platform for price discovery.

Q. With reference to the International Energy Agency (IEA), consider the following statements:

1. It was established in 1974 and is headquartered in Paris.
2. It operates within the framework of the OECD.
3. India is a full member of the IEA with voting rights.

Which of the statements given above is/are correct?

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

Ans. (a)

Explanation:

Statement 1 is correct: The International Energy Agency (IEA) was established in **1974** in the aftermath of the global oil crisis and is headquartered in **Paris, France**.

Statement 2 is correct: The IEA functions within the institutional framework of the **Organisation for Economic Co-operation and Development (OECD)**.

Statement 3 is incorrect: India is **not a full member** of the IEA. India is an **Association Country**, which allows participation in discussions and cooperation, but without formal decision-making or voting rights.

Q. Consider the following statements regarding India's renewable energy sector:

1. Solar power accounts for the largest share in India's renewable energy installed capacity.
2. India became the world's second-largest producer of solar power in 2025.

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

Ans. (a)

Explanation:

- Statement 1 is correct: Solar power has the highest installed renewable energy capacity in India.
- Statement 2 is incorrect: India is the **world's third-largest** solar power producer, not second-largest.

Scan to attempt more questions

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ENVIRONMENT & GEOGRAPHY

4.1. LIGHT POLLUTION

Context:

- **Recently**, the global scientific community has raised alarms over the rapid degradation of the world's clearest skies due to urban sprawl and industrial development. Even remote locations like the Atacama Desert in Chile—the future site of the **$1.5 billion Extremely Large Telescope (ELT)**—are facing unprecedented light trespass.
- This issue is particularly relevant as India recently inaugurated its first **Dark Sky Reserve in Hanle, Ladakh**, marking a shift toward recognizing "darkness" as a natural resource that requires urgent legislative protection.

1. Defining Light Pollution (ALAN)

Light pollution, or **Artificial Light at Night (ALAN)**, is the alteration of outdoor light levels through man-made sources. It is not merely an aesthetic issue but a significant environmental pollutant.

- **Components of Light Pollution:**
  - **Skyglow:** The brightening of the night sky over inhabited areas (the most common form).
  - **Glare:** Excessive brightness that decreases visibility and causes visual discomfort.
  - **Light Trespass:** Light falling where it is not intended or needed.
  - **Clutter:** Bright, confusing, and excessive groupings of light sources.

2. The Scientific Metric: The Bortle Scale

To quantify the impact of light pollution, astronomers use the **Bortle Scale**, which ranks the darkness of a location from 1 to 9.

- **Class 1:** Pristine dark-sky site (ideal for professional observatories).
- **Class 9:** Inner-city sky (only the brightest celestial objects are visible).

3. The Atacama Desert and the ELT Project

The Atacama Desert is uniquely suited for astronomy due to its "Photon Valley"—a corridor of high-altitude observatories.

- **The ELT (Extremely Large Telescope):** Managed by the **European Southern Observatory (ESO)**, it features a **39-meter main mirror**.
- **Comparative Advantage:** Once completed in 2030, it will be **20 times more powerful** than current leading telescopes and **15 times sharper** than the Hubble Space Telescope.
- **Geographic Factors:** High altitude (>3,000m), low humidity, and historically minimal light interference.

4. Impact on Biodiversity and Human Health

- **Ecological Disruption:** Many species, including sea turtles and migratory birds, rely on natural light cues. Artificial light disorients them, leading to increased mortality.

- **Melatonin Suppression:** In humans, blue-rich LED light suppresses melatonin, the hormone responsible for the **Circadian Rhythm**, potentially leading to sleep disorders and metabolic issues.
- **The Rebound Effect:** Ironically, the adoption of energy-efficient **LEDs** has led to cheaper lighting, causing people to install *more* lights, which has increased global light pollution by roughly **2% per year**.

5. **Important Indian Sites and Initiatives**
   - **Hanle Dark Sky Reserve (HDSR):** Located in Ladakh, it is India's first dark sky reserve. It is protected by strict regulations on light usage to facilitate research at the **Indian Astronomical Observatory (IAO)**.
   - **Pench Tiger Reserve:** Located in Maharashtra, it recently became India's first **Dark Sky Park**, emphasizing the link between darkness and wildlife conservation.

4.2. KANHA TIGER RESERVE

Context:

- Recently, the Kanha Tiger Reserve (KTR) has been in the news following the tragic death of a tigress and her four cubs in the **Sarhi range**, which has prompted state wildlife officials to investigate a suspected outbreak of the **Canine Distemper Virus (CDV)**.
- This incident is particularly significant as it adds to the rising tiger mortality in Madhya Pradesh in 2026 and has raised concerns regarding the presence of stray dogs within the reserve's core areas, which act as primary carriers for the virus.

Key Features of Kanha Tiger Reserve

1. **Location and Geography**
   - The reserve is situated in the **Maikal range** of the **Satpura hills** in the Mandla and Balaghat districts of **Madhya Pradesh**.
   - It covers a core area of approximately **940 square kilometers**, making it the largest national park in Central India.
   - The landscape is characterized by a horseshoe shape and is divided into two major protected areas: **Hallon** and **Banjar**.
   - The reserve serves as a critical link in the **Kanha-Pench Corridor**, which facilitates the movement of tigers between various protected areas in the central Indian landscape.
2. **Flora and Vegetation**
   - The vegetation is a diverse mix of **Sal (Shorea robusta)** and other mixed deciduous forests.
   - Large open grasslands, known as **maidans** (meadows), are scattered throughout the park and are essential for the survival of large herbivore populations.
   - The highland areas feature tropical moist and dry deciduous forests, often interspersed with **bamboo** on the slopes.

3. Fauna and Conservation Success

- **The Hard-ground Barasingha (Swamp Deer):** Kanha is internationally famous for saving the endemic *Cervus duvauceli branderi* from the brink of extinction. It is the only place in the world where this specific subspecies exists in the wild.
- **Mascot:** In 2017, Kanha became the first tiger reserve in India to introduce an official mascot, named **"Bhoorsingh the Barasingha"**.
- **Major Species:** Apart from the Bengal Tiger, the reserve hosts the Indian Leopard, Sloth Bear, Wild Dog (Dhole), Gaur (Indian Bison), and Sambar.
- **Conservation Initiatives:** The park is credited with the first successful reintroduction of orphaned tiger cubs into the wild and the translocation of Gaur to Bandhavgarh Tiger Reserve.

Canine Distemper Virus (CDV)

- **Viral Nature:** It is a highly contagious disease caused by a **paramyxovirus**, which is closely related to the human measles virus.
- **Multi-System Attack:** The virus simultaneously targets the **respiratory, gastrointestinal, and central nervous systems**, making it exceptionally deadly.
- **Transmission:** It spreads primarily through **aerosol droplets** (coughing or sneezing) and direct contact with infected fluids like saliva or urine.
- **The "Hard Pad" Symptom:** A classic clinical sign is the **thickening and hardening** of an animal's nose and footpads, often referred to as "Hard Pad Disease."
- **Wildlife Threat:** While common in dogs, it is a major conservation threat to **Apex predators** like Tigers and Lions, as it can cause them to lose their natural fear of humans and succumb to seizures.

4.3. INDIA'S FIRST GREEN METHANOL PLANT

Context:

- **Recently**, India is set to operationalize its first green methanol plant at the **Deendayal Port Authority (DPA) in Kandla, Gujarat**. This project is particularly significant as it aims to utilize **Prosopis juliflora**, a highly invasive weed that has threatened the biodiversity of the Banni grasslands in Kutch, as the primary feedstock.
- This initiative aligns with the International Maritime Organization (IMO) rules requiring the global shipping industry to transition toward green fuels like methanol to replace conventional bunker oil.

Project Overview

- **Location:** Deendayal Port Authority (DPA), Kandla, Gujarat.
- **Production Capacity:** The pilot plant is designed to produce **five tonnes of methanol per day**.
- **Developers:** The facility is being constructed by **Thermax Energy** (Pune-based) using gasification technology from **Ankur Scientific** (Vadodara-based).

- **Feedstock:** The plant primarily uses **Prosopis juliflora** (Kutch weed) and can also process other agricultural residues like bagasse and cotton stalks.

Prosopis juliflora: The Invasive Feedstock

- **Origin and Introduction:** *Prosopis juliflora* is a Mexican-origin shrub that was introduced to India by the British in the 1920s to green Delhi and later by the Gujarat Forest Department in 1961 to halt the encroachment of the salt desert in the Rann of Kutch.
- **Invasive Nature:** It is ranked among the "top 100 invasive species in the world" and has crowded out native grasses over thousands of kilometers, significantly threatening the biodiversity of the Banni grasslands.
- **Common Names:** In India, it is locally known as *Gando Baval* in Gujarat, *Vilayati Keekar* in North India, and *Seemai Karuvelam* in Tamil Nadu.
- **Feedstock Potential:** It is considered an ideal feedstock for green methanol because it is a dense hardwood with a high energy profile and low acid content.

Green Methanol Production Process

- **Comparison with Conventional Methanol:** While conventional methanol is produced from fossil fuels like natural gas or coal, green methanol is derived from renewable feedstocks such as biomass or agricultural residues.
- **The Two-Step Gasification Process:**
  - **Gasification:** The biomass is heated in the absence of oxygen (a process sitting between combustion and pyrolysis) to break it down into **syngas** (a mixture of hydrogen, carbon monoxide, and carbon dioxide).
  - **Conversion:** The syngas is then chemically converted into liquid methanol, which can be used as a direct replacement for traditional "bunker oil" in ships.
- **Environmental Benefits:** According to the Methanol Institute, using green methanol can reduce a vessel's CO_2 emissions by up to 95%, Nitrogen Oxides by up to 80%, and virtually eliminate Sulphur Oxides and particulate matter.

Strategic Significance

- **Maritime Green Ports:** This initiative aligns with the Government of India's policy to convert western coast ports into "green ports" to meet global shipping decarbonization standards.
- **Economic Impact:** The utilization of agricultural residues and invasive species as fuel could potentially displace a significant portion of India's oil imports.
- **Biodiversity Restoration:** By creating a commercial demand for *Prosopis juliflora*, the project provides a functional method to clear invasive species and allow native ecosystems to recover.

The Concept of Methanol Economy

The **NITI Aayog** is driving the "Methanol Economy" program to reduce India's oil import bill and carbon footprint.

- **Blending:** Blending 15% methanol in gasoline (M-15) can reduce crude oil imports by 15%.
- **Shipping & Rail:** Methanol is a high-density energy carrier, making it ideal for marine fuel and locomotives.
- **Waste-to-Wealth:** It allows for the conversion of high-ash coal, municipal solid waste, and agricultural residue into valuable fuel.

4.4. KERALA'S SACRED GROVE RESTORATION PROJECT

Context:

- Recently, the **Kerala State Biodiversity Board (KSBB)** has launched a pilot project to restore declining sacred groves across five districts (Ernakulam, Palakkad, Kozhikode, Kannur, and Kasaragod) to counter developmental pressures and invasive species.

I. Key Features of the Restoration Project

- **Implementing Agencies:** KSBB in collaboration with local **Biodiversity Management Committees (BMCs)**.
- **'Kavu Nurseries':** Establishment of specialized nurseries to propagate specific plant species native to these groves.
- **Core Activities:**
  - Biodiversity assessment and identification of endangered/invasive species.
  - **Bio-fencing** using native plants instead of artificial barriers.
  - Rejuvenation of associated water bodies (ponds) and removal of plastic waste.
- **Scope:** Identification of over 100 native/threatened species and planting of nearly 3,000 saplings.

> **Biodiversity Management Committees (BMCs)** are local bodies mandated by India's **Biological Diversity Act, 2002,** to promote conservation, sustainable use, and documentation of local biological resources. Operating under local self-governments (rural Panchayats or urban Municipalities), they prepare People's Biodiversity Registers (PBRs) to document local flora, fauna, and traditional knowledge.

II. What are Sacred Groves?

- **Definition:** These are patches of primeval forest that are communally protected, usually dedicated to a local deity or ancestral spirits.
- **Ecological Significance:**
  - **In-situ Conservation:** They serve as repositories for rare, endemic, and medicinal plants.
  - **Ecosystem Services:** They act as micro-watersheds, helping in soil conservation and groundwater recharge.
  - **Biogeographical Islands:** They often represent the only remaining "climax vegetation" of a region amidst a modified landscape.
- **Legal Status:** Many sacred groves in India are now protected under the **Wildlife (Protection) Amendment Act, 2002**, categorized as **'Community Reserves'**.

> - **A Community Reserve** is a legal category of protected area in India, introduced by the 2002 amendment to the Wildlife (Protection) Act, 1972 (Section 36C).
> - It serves as a buffer or corridor between established national parks, sanctuaries, and forests, allowing local communities to voluntarily conserve biodiversity on private or communal land while maintaining ownership.

- **Management:** Managed by a Community Reserve Management Committee (CRMC) constituted by the State Government, allowing for sustainable resource use.
- **Restrictions:** Once declared, land use cannot be changed without a resolution from the Management Committee and approval by the State Government.
- **Prevalence:** There are over 219 community reserves in India.

III. Regional Names of Sacred Groves

State	Local Name
Kerala	**Kavu** / Sarpakavu
Meghalaya	Law Kyntang
Rajasthan	Orans / Kenri
Maharashtra	Deorais
Karnataka	Devarakadu
Tamil Nadu	Kovil Kadu
Himachal Pradesh	Deo Bhumi
Madhya Pradesh	Jahera / Sargi

4.5. ABROLHOS MARINE NATIONAL PARK

Context:

Recently, the coral cover of Brazil's Abrolhos reefs—the most biodiverse coral ecosystem in the South Atlantic—has fallen by around 15% over 18 years due to climate change and human activity.

1. About the Abrolhos Marine National Park

The **Abrolhos Marine National Park** (*Parque Nacional Marinho dos Abrolhos*) is a pristine archipelago and marine sanctuary located in the South Atlantic, roughly 70 kilometers off the coast of Bahia, Brazil. Established in 1983, it was the first of its kind in the country and protects the largest and most biodiverse coral reef system in the South Atlantic.

I. Unique Geological & Coral Formations

The park is world-renowned for its **"Chapeirões"**—mushroom-shaped coral pinnacles that rise up to 25 meters from the sandy seafloor.

- **Endemic Species:** It is the primary home of the Brain Coral (*Mussismilia braziliensis*), a species found only in Brazilian waters.
- **Biodiversity:** The area supports over 1,300 species, including sea turtles, reef sharks, and the endemic Parrotfish.

II. Seasonal Highlight: Humpback Whales

From **July to November**, the park becomes a critical nursery for Humpback Whales migrating from Antarctica.

- **Whale Watching:** The warm, shallow waters are ideal for mating and calving. Visitors during this time can frequently see breaches and hear "songs" from the males.
- **Research Hub:** It is considered the most significant breeding ground for these mammals in the entire South Atlantic.

2. About Coral Reefs

Coral reefs are underwater ecosystems formed by colonies of coral polyps held together by calcium carbonate. Often called the "rainforests of the sea," they occupy less than 0.1% of the ocean floor but support over 25% of all marine species (National Marine Sanctuary Foundation, 2020).

I. Types of Coral Reefs

There are three primary types of coral reefs, distinguished by their formation and relationship to land:

- **Fringing Reefs:** The most common type, these grow seaward directly from the shore of islands or continents.
- **Barrier Reefs:** Similar to fringing reefs but separated from the shoreline by a deep lagoon (e.g., the Great Barrier Reef).
- **Atolls:** Rings of coral that surround a central lagoon, usually formed when a fringing reef grows around a volcanic island that eventually sinks (National Marine Sanctuary Foundation, 2020).

II. Impact of Climate Change on Coral Reefs

Climate change poses an existential threat to coral ecosystems through several mechanisms:

- **Coral Bleaching:** As ocean temperatures rise, corals experience thermal stress and expel the symbiotic algae (*zooxanthellae*) living in their tissues. These algae provide corals with food and their vibrant colors. Without them, the coral turns white (bleaches) and is at high risk of starvation and disease (The SEA People, 2024).
- **Ocean Acidification:** The ocean absorbs a significant portion of atmospheric CO2, which lowers the pH of seawater. This increased acidity reduces the availability of carbonate ions, making it difficult for corals to build and maintain their calcium carbonate skeletons (The SEA People, 2024).
- **Sea Level Rise:** Rapidly rising sea levels can lead to increased sedimentation. Silt and runoff can "smother" corals, blocking the sunlight needed for photosynthesis (The SEA People, 2024).
- **Extreme Weather:** Increased intensity of tropical storms can physically destroy reef structures, which take decades to regrow (The SEA People, 2024).

III. Conservation Efforts in India

India has four major coral reef regions: **Andaman and Nicobar Islands, Lakshadweep, Gulf of Mannar,** and **Gulf of Kachchh** (Madras School of Economics, 2018).

- **Legal Protection:** Corals are protected under **Schedule I** of the Wildlife Protection Act, 1972, granting them the highest level of legal protection in India.
- **Marine Protected Areas (MPAs):** India has established several MPAs, such as the Gulf of Mannar Marine National Park, to regulate human activities and prevent habitat destruction.

- **Restoration Projects:**
  - In the **Gulf of Mannar**, authorities and researchers have successfully transplanted seized poached corals onto artificial reef modules with a survival rate of over 60%.
  - **Mineral Accretion Technology (Biorock):** This technology has been piloted in the Gulf of Kachchh to accelerate coral growth using small electrical currents.
- **Coastal Regulation Zone (CRZ):** Specific rules (like CRZ4 for Andaman and Nicobar) prohibit the use of corals and beach sand for construction and restrict dredging near reef formations (Madras School of Economics, 2018).

IV. International Conservation Efforts

Global cooperation is essential given that climate change is a transboundary issue.

- **CORDAP (Coral Research & Development Accelerator Platform):** Launched by **G20** nations in 2020, CORDAP is the only international organization solely dedicated to funding global R&D for coral restoration and conservation at scale (CORDAP, 2020).
- **ICRI (International Coral Reef Initiative):** An informal partnership among nations and organizations which strives to preserve coral reefs and related ecosystems worldwide.
- **GCRMN (Global Coral Reef Monitoring Network):** This network provides scientific data on the status and trends of coral reef ecosystems to help guide policy decisions.
- **The Paris Agreement:** By aiming to limit global warming to well below 2 degree above pre-industrial levels, this treaty is considered the single most important factor for the long-term survival of reefs (IUCN).

4.6. THE DILEMMA OF CRITICAL MINERALS

Context:

- As the world transitions toward a low-carbon future, the demand for renewable energy technologies—such as wind turbines, solar panels, and electric batteries—has skyrocketed. However, these "green" solutions rely heavily on the extraction of finite, non-renewable resources like lithium, cobalt, and rare-earth elements. This has sparked a global debate on whether mining, an inherently extractive process, can ever truly be "sustainable".

1. Sustainable Mining: An Economic and Environmental Oxymoron?

I. The Inherent Conflict

Mining is fundamentally a non-sustainable activity in the commonsensical sense because it extracts finite resources that do not grow back. The environmental footprint is significant, often resulting in:

- **Pollution:** Contamination of air, water, and soil during extraction.
- **Landscape Alteration:** Permanent changes to the Earth's surface.
- **Biodiversity Loss:** Destruction of pristine ecosystems and rainforests that no amount of technology can fully restore.

II. The Concept of "Weak Sustainability"

To reconcile the need for minerals with environmental goals, organizations like the UN and the International Energy Agency (IEA) have introduced the idea of **weak sustainability**.

- **Core Argument:** Mining is considered sustainable if the value created from the extracted resources (e.g., human capital through education and infrastructure) outlasts the lifespan of the mine itself.
- **Inescapability:** Proponents argue that since green technologies require these minerals, mining is an inescapable necessity for a low-carbon future.

III. "Responsible Mining" Frameworks

Industries are increasingly adopting "responsible mining" practices to mitigate their immediate impact. Key pillars include:

- **Green Powering:** Using green hydrogen, solar, or wind power to run mining equipment and trucks.
- **Community Engagement:** Seeking explicit permission from local communities to operate.
- **Profit Sharing:** Ensuring that a portion of the mining revenue is shared directly with the local inhabitants.

IV. The Recycling Bottleneck

A major hurdle to achieving a circular mineral economy is the current recycling rate.

- **Current Rate:** For many critical minerals, the global recycling rate is currently at best only **5%**.
- **Future Goal:** To reduce reliance on fresh mining, minerals must be recycled almost indefinitely once they have been extracted and used in products.

2. Major Mineral Production by Country

Mineral	Top Producer	Other Major Producers
Iron Ore	Australia	Brazil, China, India
Gold	China	Australia, Russia, Canada
Aluminum	China	India, Russia, Canada
Silver	Mexico	China, Peru, Chile
Nickel	Indonesia	Philippines, Russia, New Caledonia
Coal	China	India, Indonesia, USA

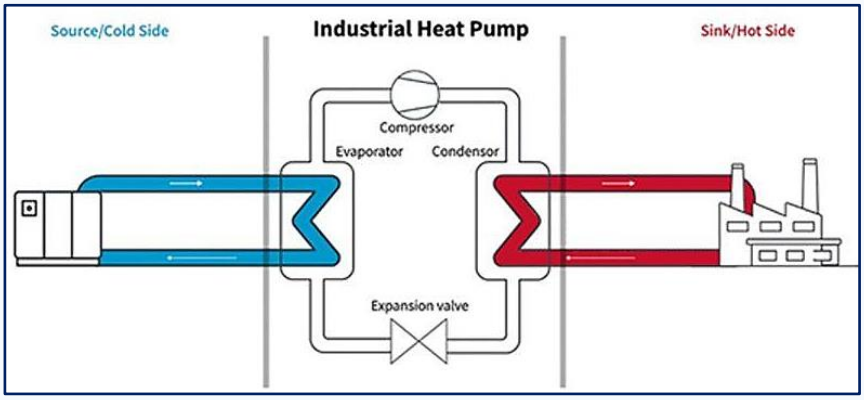
3. Mineral-Wise Leading States

Mineral	Leading State	Notable Regions/Mines
Iron Ore	**Odisha**	Mayurbhanj, Keonjhar (Joda-Barbil belt)
Coal	**Chhattisgarh / Odisha**	Korba (CG), Talcher (Odisha), Jharia (JH)
Bauxite (Aluminum)	**Odisha**	Kalahandi, Koraput (Panchpatmali)
Manganese	**Madhya Pradesh**	Balaghat (Bharveli mine)
Copper	**Madhya Pradesh**	Malanjkhand (Largest open-cast copper mine)

Chromite	**Odisha**	Sukinda Valley (Produces ~95% of India's supply)
Limestone	**Rajasthan**	Chittorgarh, Jodhpur
Gold	**Karnataka**	Kolar Gold Fields (KGF), Hutti Mines

4.7. INDUSTRIAL HEAT PUMPS (IHPS) AND INDUSTRIAL DECARBONISATION

Context:



- As India pushes toward its Net-Zero goals, the focus is shifting toward "hard-to-abate" sectors. While technologies like Green Hydrogen are still in the early stages of adoption, **Industrial Heat Pumps (IHPs)** have emerged as a ready-to-deploy solution for low-to-medium temperature process heat. Decarbonizing industrial heat is critical as it accounts for nearly half of India's final energy consumption in 2025 and is a major source of CO2, SO2, and NOx emissions.

1. **Core Technology: Industrial Heat Pumps**

   I. **Mechanism: How IHPs Work**

   - **Heat Transfer:** Unlike boilers that *generate* heat by burning fossil fuels, IHPs *move and upgrade* low-grade waste heat from one stream to another using electricity.
   - **Thermodynamic Cycle:** They utilize a refrigerant cycle involving four main components: an **Evaporator** (absorbs heat), a **Compressor** (increases pressure/temperature), a **Condenser** (releases heat to the process), and an **Expansion Valve**.
   - **Simultaneous Heating and Cooling:** IHPs can produce hot water or steam while simultaneously producing chilled water or dehumidified air as a byproduct, making them highly efficient for sectors like food processing.

   II. **Efficiency and Performance**

   - **Coefficient of Performance (COP):** This is the ratio of useful heat output to electricity input. IHPs typically have a COP of **3 to 5**, meaning they deliver 3–5 units of heat for every 1 unit of electricity consumed.
   - **Energy Savings:** Transitioning from conventional boilers to IHPs can reduce overall energy use by **40–60%** in suitable industrial applications.

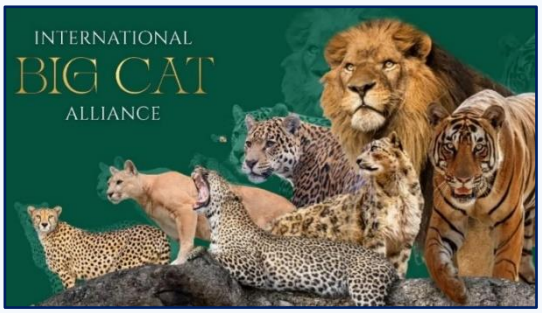
2. **Significance for India and MSMEs**

   - **Sectoral Impact:** IHPs are most effective in sectors requiring low-to-medium temperatures, such as **textiles, food processing, chemicals, and pharmaceuticals**.
   - **Focus on MSMEs:** Micro, Small, and Medium Enterprises (MSMEs) contribute significantly to industrial emissions (around 17%). IHPs offer a modular and scalable solution for brownfield MSME clusters where replacing large boiler systems is impractical.

- **Public Health:** By displacing on-site coal and biomass combustion, IHPs reduce air pollutants that contribute to respiratory and cardiovascular diseases, potentially mitigating the high rate of premature deaths linked to industrial air pollution.

4.8. INTERNATIONAL BIG CAT ALLIANCE (IBCA)

Context:



- **Recently**, the Union Minister for Environment, Forest and Climate Change launched the website and logo for the **inaugural International Big Cat Alliance (IBCA) Summit**, which India is set to host from **June 1 to 3, 2026**, in New Delhi. The summit, themed **'Save big cats, save humanity, save ecosystem'**, is expected to witness the participation of 95 countries and culminate in the adoption of the first-ever global declaration on big cat conservation, titled the **'Delhi Declaration'**.

1. Origin and Launch

- **Launched by:** Prime Minister Narendra Modi on **April 9, 2023**.
- **Occasion:** Commemoration of **50 years of Project Tiger** in Mysuru, Karnataka.
- **Status:** A treaty-based international intergovernmental organization.
- **Headquarters: New Delhi, India**.

2. The Seven Big Cats Covered

The alliance focuses on the protection and conservation of seven major big cat species. Out of these seven, **five are found in India** (Tiger, Lion, Leopard, Snow Leopard, and Cheetah).

Species	IUCN Status (General)	Key Fact
Tiger	Endangered	Largest of all wild cats; India holds ~75% of global population.
Lion	Vulnerable	Asiatic Lions are restricted solely to Gir National Park, Gujarat.
Leopard	Vulnerable	Most adaptable; found across diverse habitats in Africa and Asia.
Snow Leopard	Vulnerable	"Ghost of the Mountains"; found in the high-altitude Himalayas.
Cheetah	Vulnerable	Declared extinct in India in 1952; reintroduced in 2022 (Project Cheetah).
Jaguar	Near Threatened	Largest cat in the Americas; famous for the strongest bite force.
Puma	Least Concern	Also known as Cougar or Mountain Lion; found in the Americas.

3. **Membership and Governance**
    - **Eligibility:** Open to **96 range countries** (nations where these cats naturally occur) and non-range countries, intergovernmental organizations, and scientific bodies.
    - **Structure:** Consists of a **General Assembly**, a **Council** (7 to 15 members), and a **Secretariat**.
    - **Model:** It is modeled on the lines of the **International Solar Alliance (ISA)** and the **Coalition for Disaster Resilient Infrastructure (CDRI)**, positioning India as a global leader in environmental diplomacy.
4. **Funding and Objectives**
    - **Initial Funding:** The Government of India has committed **₹150 crore** for the first five years (2023–2028).
    - **Primary Goals:** To curb **illegal wildlife trade** and poaching through transboundary cooperation.
    - Knowledge sharing and capacity building among range countries.
    - Creating a **centralized repository** of successful conservation practices (like India's Project Tiger).
    - Integrating conservation with sustainable local livelihoods.

4.9. OIL SPILLS

Context:

- **Recently**, the draft Oil Spill Contingency Plan (OSCP) for Kerala highlighted that oil spills are no longer just accidental leaks but complex environmental disasters involving diverse pollutants like **nurdles** and **hazardous chemicals**.

What are Oil Spills?

An oil spill is the release of a liquid petroleum hydrocarbon into the environment, especially the marine ecosystem, due to human activity. It is a form of pollution that involves different types of oil, including crude oil, refined petroleum products (such as gasoline or diesel), or oily refuse.

Primary Causes

1. **Accidental Discharges:** Shipwrecks (e.g., *MSC Elsa 3*), tanker accidents, or pipeline ruptures.
2. **Operational Discharges:** Illegal tank cleaning by ships at sea or runoff from land-based industries.
3. **Blowing Out:** Uncontrolled release from offshore oil and gas wells during drilling.

Behavior of Oil in Water (The "Weathering" Process)

When oil spills into the ocean, it undergoes a series of physical and chemical changes known as **weathering**. This is a critical concept for UPSC Geography and Environment:

- **Spreading:** Oil initially spreads as a thin film called an **oil slick**.
- **Evaporation:** Light components of the oil evaporate into the atmosphere within hours.
- **Emulsification:** The mixing of water into the oil, often creating a thick, mayonnaise-like substance called "mousse," which is much harder to clean.
- **Biodegradation:** Microorganisms in the ocean naturally break down some oil components, though this is a very slow process.

- **Sedimentation:** Heavier components of oil sink to the seafloor, affecting benthic (bottom-dwelling) organisms.

Ecological and Socio-Economic Impacts

- **Hypoxia:** The oil slick blocks sunlight and prevents oxygen exchange between the air and water, leading to "dead zones."
- **Hypothermia in Wildlife:** Oil destroys the insulating ability of fur-bearing mammals (like sea otters) and the water-repellency of a bird's feathers, causing them to die of cold.
- **Toxicity:** Ingesting oil causes kidney and liver damage in fish and marine mammals.
- **Livelihood:** Contamination of fish stocks leads to a collapse in the local fishing economy and tourism.

National Oil Spill Disaster Contingency Plan (NOS-DCP)

- **Origin:** Originally promulgated in 1996 and periodically updated (the latest major revision being in 2024).
- **Mandate:** It provides a proactive institutional framework for responding to oil and **Hazardous and Noxious Substances (HNS)** spills in Indian waters.
- **Tiers of Response:**
  - **Tier 1 (Small):** Handled by the individual port, oil company, or facility (up to 700 tonnes).
  - **Tier 2 (Medium):** Handled at the regional/district level with state assistance (700 to 10,000 tonnes).
  - **Tier 3 (Large):** National-level emergency handled by the Indian Coast Guard (>10,000 tonnes).

Role of the Indian Coast Guard (ICG)

- The ICG is the **Central Coordinating Authority** for combating marine pollution in India's Exclusive Economic Zone (EEZ).
- It functions under the **Ministry of Defence**.
- The ICG maintains dedicated **Pollution Response Vessels (PRVs)** and stockpiles of equipment (like booms and skimmers) at major centers like Mumbai, Chennai, and Port Blair.

4.10. KUNO NATIONAL PARK

Context:

- In a significant setback for **Project Cheetah**, four one-month-old cheetah cubs were found dead in the **Sheopur district** of Madhya Pradesh. These cubs were particularly notable as they were the first to be born in the **open forest** rather than in specialized enclosures since the reintroduction programme began in 2022.
- Preliminary investigations by forest officials suggest the deaths resulted from **predation**, likely by a leopard, highlighting the challenges of inter-species competition in the wild.

1. **Project Cheetah: Challenges in Open Forest Success**
   - **Location:** Kuno National Park, Madhya Pradesh (Sheopur Territorial Division).

- **Status of Cubs:** The litter was born on April 11 and was part of the first successful birth in a non-enclosed, open-forest environment.
- **Cause of Death:** Suspected **predation by a leopard**; carcasses were found partially eaten near the den site.

2. Significance for Wildlife Management

- **Inter-species Competition:** The incident underscores the threat posed by co-predators like leopards, which share the same habitat as the reintroduced cheetahs.
- **Acclimatization Hurdles:** Success in Project Cheetah is measured by the ability of the species to survive and reproduce in the **unprotected open forest**; this loss represents a major hurdle in establishing a self-sustaining wild population.

3. About the Kuno National Park (KNP)

- **Location:** Situated in the **Vindhyan Hills** in the Sheopur and Morena districts of **Madhya Pradesh**.
- **Vegetation:** Primarily consists of dry deciduous forests and open grasslands (Savannah-type), which are ideal for high-speed predators like cheetahs.
- **River:** The **Kuno River**, a major tributary of the Chambal River, flows through the park.
- **History:** It was originally selected for the **Asiatic Lion Reintroduction Project** before becoming the primary site for the world's first intercontinental large wild carnivore translocation project (Project Cheetah).

4. About The Cheetah Species

I. Sub-species and Conservation Status

- **African Cheetah (*Acinonyx jubatus jubatus*):**
  - **IUCN Status:** Vulnerable.
  - **Habitat:** Mostly found in Africa (Namibia, South Africa). These are the cheetahs currently being reintroduced in India.
- **Asiatic Cheetah (*Acinonyx jubatus venaticus*):**
  - **IUCN Status:** Critically Endangered.
  - **Habitat:** Survives only in **Iran**.
  - **Extinction in India:** Officially declared extinct in India in **1952** due to overhunting and habitat loss.

II. Biological Traits

- **Speed:** The fastest land animal, capable of reaching speeds up to **110 km/h**.
- **Diurnal Nature:** Unlike most big cats (lions/tigers/leopards) that are nocturnal, cheetahs hunt primarily during the **day** to avoid competition with larger predators.
- **Social Structure:** Females are solitary (except when raising cubs), while males often live in small groups called **coalitions**.

4.11. THE RANN OF KUTCH: INDIA'S LIVING SALT DESERT

Context:

- Recently, the Little Rann of Kutch in Gujarat has been experiencing severe heatwave conditions, with temperatures frequently crossing 45 degree and at times nearing 48 degree. Nearly 50,000 salt workers are enduring these extreme conditions in shade-less salt pans without electricity while harvesting salt that fulfills around three-fourths of India's salt demand, exposing them to serious health risks.

1. **Physical Geography & Formation**
   - The Rann of Kutch is a vast salt marsh region in the northwestern Indian subcontinent, spread across Gujarat's Kutch district and parts of Pakistan's Sindh province. It is geographically divided into the **Great Rann and the Little Rann of Kutch.**
   - It is one of the largest seasonal **salt marshes in the world**, known for its unique ecosystem consisting of saline desert plains, grasslands, thorn scrub forests, and wetlands.
   - **Origin:** Geologically, it was once a shallow arm of the Arabian Sea. Ongoing tectonic uplift and the deposition of sediments by rivers (**like the Luni**) transformed it into a closed basin.
   - **Seasonal Dynamics:** During the monsoon, the area is inundated with shallow water (a mix of seawater and freshwater). As the water evaporates during the grueling summer, it leaves behind a thick crust of salt, forming the famous **"White Desert."**
2. **History and Culture**
   - The Rann of Kutch has a rich historical and cultural heritage, with evidence of **Neolithic and Indus Valley Civilization** settlements such as **Dholavira**, the largest Harappan site in India.
   - Historians believe the region was once a navigable archipelago supporting maritime trade. It later became part of the **Maurya Empire and Gupta Empire**.
   - During British rule, Mahatma Gandhi's salt protest highlighted the region's significance, while today the **Rann Utsav** celebrates its vibrant local art and culture.
   - The Rann of Kutch Biosphere Reserve is inhabited by indigenous communities such as the **Rabari, Koli, Bajanias, Kutchis, Gujjars, and Bharvads**.
   - Among them, the **Rabari tribe** is well known for its pastoral lifestyle, camel herding, colorful attire, and traditional embroidery, while all these communities possess deep ecological knowledge of the region's harsh environment.
3. **Ecological Dimensions & Wildlife**
   - The Rann of Kutch is the only large flooded grassland region in the Indomalayan realm, supporting diverse ecosystems such as mangroves and desert vegetation due to its unique location between the desert and the sea.
   - The Rann of Kutch hosts around 50 mammal species, including herbivores like the Indian **wild ass, chinkara, nilgai, and blackbuck**, along with predators such as the Indian wolf, striped hyena, desert wildcat, and caracal. Notably, the **Indian wild ass is endemic** to this region.

- **Banni Grasslands:** One of Asia's largest and finest tropical grasslands. It is home to the **Maldhari** tribes and the unique **Banni buffalo** breed, which is adapted to grazing at night to avoid the daytime heat.
- **The Concept of "Bets":** During monsoon, the Rann gets flooded for a period of about one month and is dotted with about 74 elevated plateaus or islands, locally called 'bets'. These bets are covered with grass and feed the population of around 2,100 animals.
- **Important rivers draining into the Rann:**
  - Luni
  - Banas
  - Saraswati
  - Rupen

4. **Conservation and protected areas**
   - In 2008, the **Rann of Kutch** was designated as a biosphere reserve to conserve its unique biodiversity and promote sustainable development.
   - The Kachchh Biosphere Reserve is mainly composed of two major ecosystems — the **Great Rann of Kachchh (GRK) and the Little Rann of Kachchh (LRK)** — covering an area of 12,454 km².
   - It includes the Kachchh Desert Sanctuary (in GRK) and the Wild Ass Sanctuary (in LRK).

     - **Indian Wild Ass Sanctuary (LRK):** The Little Rann is the only home to the **Indian Wild Ass (Khur)**, listed as **Near Threatened** on the IUCN Red List. They are known for their stamina and ability to survive in high temperatures and saline environments.
     - **Flamingo City:** Located in the Great Rann, this is the only known concentrated nesting ground of **Greater Flamingos** in India.
     - **Kutch Bustard Sanctuary:** Home to the **Great Indian Bustard** (Critically Endangered), focusing on the grasslands (*Banni*) adjacent to the salt flats.

5. **The Economic Dimension: Agariyas and Salt**
   - **Salt Production:** Gujarat accounts for roughly 75% of India's salt production, a significant portion of which comes from the Little Rann.
   - **The Agariyas:** This traditional salt-farming community lives in the LRK for eight months of the year. They endure the extreme 45°C+ heat to extract **Karkach salt** (crystals) from brine pumped from underground wells.
   - **Environmental Challenge:** The overlap between salt pans and the Wild Ass Sanctuary often leads to debates regarding conservation vs. livelihood.
6. **Strategic and Political Importance**
   - **International Border:** The Great Rann of Kutch forms part of the international border between **India and Pakistan**.
   - **Sir Creek Dispute:** A 96-km long tidal estuary in the uninhabited marshlands. The dispute lies in the interpretation of the boundary line (mid-channel vs. eastern bank), which impacts the **Exclusive Economic Zone (EEZ)** and maritime resources (petroleum and gas).

4.12. INDIA'S FIRST SATELLITE-TAGGED GANGES SOFTSHELL TURTLE RELEASED

Context

- Recently, coinciding with the observation of Endangered Species Day on May 15, 2026, wildlife biologists successfully released India's first satellite-tagged Ganges Softshell Turtle (Nilssonia gangetica) into the **Kaziranga National Park** and Tiger Reserve.
- The initiative—jointly conducted by the **Wildlife Institute of India (WII)**, the **Assam Forest Department, and funded by the National Geographic Society**—marks a shift from passive observation to active bio-telemetry. Tracking this freshwater apex predator along the northern banks of the Brahmaputra River will provide data on its migratory pathways, breeding zones, and micro-habitat usage.

1. About Active bio-telemetry

Active bio-telemetry is a wildlife tracking technique in which a transmitter attached to an animal continuously sends real-time location and movement data to satellites, radio receivers, or GPS systems.

It helps scientists monitor:

- Migration patterns
- Habitat use
- Behaviour and survival
- Threats from poaching or habitat loss

In conservation, active bio-telemetry is widely used for tracking endangered species such as turtles, tigers, elephants, and birds.

2. The Species Profile – Ganges Softshell Turtle

- **Taxonomy & Identification:** Locally known as the Indian Softshell Turtle (*Nilssonia gangetica*), it is a large freshwater reptile. It is distinguished from other riverine turtles by its **prominent arrowhead-shaped markings** on the top of its head, a compressed carapace that aids in fast swimming, and a distinctive tube-like snout used as an underwater snorkel.
- **Geographical Distribution:** Endemic to the northern and eastern regions of the Indian subcontinent. It is primarily found across the major mud-bottomed river networks of the **Indus, Ganga, Yamuna, Mahanadi, and Brahmaputra river basins**.
- **Ecological Role:** Operating as an apex riverine predator and scavenger, it fulfills a vital **ecosystem cleanup service** by feeding on carrion, dead organic matter, and fish, directly checking the bacterial degradation of river ecosystems.
- **Conservation & Legal Status:**
  - **IUCN Red List:** Endangered
  - **Wildlife (Protection) Act, 1972:** Schedule I (afforded the highest tier of legal protection alongside the Royal Bengal Tiger).
  - **CITES:** Appendix I

- **Major Threats:** Rampant illegal poaching networks targeting its meat for domestic black markets, habitat loss driven by unauthorized riverbed sand mining, and mortality caused by heavy monsoonal gill-net fishing.

3. About Kaziranga National Park & Tiger Reserve

- **Geographical Matrix:** Situated partly across the Golaghat and Nagaon districts of Assam, the park occupies the dynamic **floodplains of the Brahmaputra River Valley**. It is bounded by the Brahmaputra river channel along the north and the **Karbi Anglong Hills** to its immediate south.
- **Hydro-Geomorphic Features:** The landscape is a complex mosaic of wet alluvial tall elephant grasslands, tropical moist deciduous forests, and numerous shallow oxbow lakes locally termed ***Beels***. The **Diphlu River** flows directly through the core area of the sanctuary.
- **International Designations:** Designated as a **UNESCO World Heritage Site** in 1985.
  - Identified as an **Important Bird Area (IBA)** by BirdLife International.
  - Recognized as a core Tiger Reserve since 2006.
- **The Big Five Richness:** While famous globally for holding over two-thirds of the world's population of the **Great Indian One-Horned Rhinoceros**, its "Big Five" megafauna include the **Asian Elephant, Royal Bengal Tiger, Wild Water Buffalo, and Swamp Deer (*Barasingha*)**.
- **Turtle Conservation Hub:** As per the Wildlife Institute of India (WII), Assam serves as a top global priority zone for freshwater chelonian conservation. Out of the eight distinct species of softshell turtles found across India, **five species breed naturally within the Kaziranga ecosystem alone**.

4.13. DRI RECOVERS TWO INDIAN RED SAND BOA SNAKES

Context:

- Officials from the Hyderabad zonal unit of the **Directorate of Revenue Intelligence (DRI)** intercepted a suspect and seized two live Indian Red Sand Boa snakes during a decoy undercover operation in Warangal, Telangana. The individual was attempting to sell the reptiles in the grey/black market.
- This bust highlights the persistent threat of illegal wildlife trafficking in India and underscores the role of central economic intelligence agencies in combating non-fiscal environmental crimes.

About Red Sand Boa

- **Scientific Name:** *Eryx johnii*
- **Common Names:** Indian Sand Boa, John's Sand Boa, Brown Sand Boa. In local parlance, it is often referred to as 'Mandul' or 'Du-tondya' (the one with two mouths).
- **Physical Characteristics:** It is a **non-venomous, harmless** snake primarily reddish-brown in color with a thick-set body.
  - It is the **largest of the sand boas** in the world, capable of growing over 4 feet long.

- **"Double-Headed" Appearance:** It features a characteristically blunt, wedge-shaped tail that closely resembles its head. This serves as a defense mechanism to confuse predators.

- **Behavior and Habitat:** It is **nocturnal** (active at night) and **fossorial** (spends the majority of its time underground in loose sand or burrows).
- It is **ovoviviparous**, meaning embryos develop inside eggs that remain within the mother's body until they are ready to hatch, resulting in live births.

- **Geographical Distribution:** Endemic to Iran, Pakistan, and India.
- In India, it is found throughout dry and arid regions. Notably, it is generally **absent in the North-Eastern states**.

- **Ecological Significance:** Often called the **"farmer's friend"** because its primary diet consists of destructive rodents, bats, lizards, and occasionally other snakes, helping naturally regulate pest populations.

Conservation & Legal Status

- **IUCN Red List:** Near Threatened (NT)
- **CITES:** Appendix II (regulates its international commercial trade)
- **Wildlife (Protection) Act, 1972:** Scheduled under **Schedule I** (making its possession, trade, or hunting a punishable criminal offense).

About DRI

- The **Directorate of Revenue Intelligence (DRI)** is the apex anti-smuggling intelligence agency of India.
- It functions under the **Central Board of Indirect Taxes and Customs (CBIC), Department of Revenue, Ministry of Finance**.
- While its primary mandate is safeguarding economic frontiers (curbing trade frauds and duty evasions), it also acts as a frontline agency enforcing allied environmental laws like the Wildlife (Protection) Act to curb cross-border wildlife trafficking.

4.14. CENTER'S FINAL STAND: NO NEW HYDRO POWER PROJECTS IN UPPER GANGA REACHES

Context:

- **Recently,** the Union Government informed the Supreme Court that no new hydropower projects will be allowed in the upper Ganga basin in Uttarakhand due to ecological and seismic concerns.
- Only seven already commissioned or nearly completed projects will continue, citing the harmful cumulative impact of "bumper-to-bumper" dams in the fragile Himalayan region.

1. **Ecological and Legal Background**
    - **Origin:** The legal battle stems from the **June 2013 Kedarnath disaster**. The Supreme Court directed the Environment Ministry to evaluate if hydroelectric projects amplified the tragedy.

- **Expert Committees:**
  - **Expert Body-I (Ravi Chopra Committee - 2014):** Concluded that 23 out of 24 examined projects would severely impact the Alaknanda and Bhagirathi river basins.
  - **Vinod Tare Committee (IIT-Kanpur):** Flawed design/siting of multiple proposed projects.
  - **Expert Body-II (B.P. Das Committee - 2020):** Took a more permissive view (recommending 26 projects), but the Centre ultimately accepted only seven.
- **Geographical Fragility Factor:** The decision is driven by extreme vulnerability to **landslides, flash floods, Glacial Lake Outburst Floods (GLOFs)**.

2. Hydropower Projects and Associated Rivers

Hydropower Project	Associated River / Basin
Tehri Pumped-Storage Project (1,000 MW)	**Bhagirathi River**
Tapovan Vishnugad (520 MW)	**Dhauliganga River**
Vishnugad Pipalkoti (444 MW)	**Alaknanda River**
Singoli Bhatwari (99 MW)	**Mandakini River**
Phata Byung (76 MW)	**Mandakini River**
Madhyamaheshwar (15 MW)	**Madhyamaheshwar Ganga** (Tributary of Mandakini)
Kailganga-II (6 MW)	**Kaliganga River** (Tributary of Mandakini)

4.15. NURDLE POLLUTION

Context:

- Recently, the Kerala coast near Thiruvananthapuram continues to face severe pollution from nurdles (plastic pellets) even one year after the Liberian-flagged ship MSC Elsa 3 sank off the coast.

1. What are Nurdles?

- **Definition:** Nurdles are tiny, pre-production plastic pellets that serve as the raw material for manufacturing nearly all plastic products.
- **Classification:** They are classified as **primary microplastics** because they are intentionally manufactured to be small, unlike secondary microplastics which break down from larger plastic items (like bags or bottles).
- **Physical Characteristics:** They typically measure between **1 mm to 5 mm** in diameter.
  - They possess high **buoyancy**, allowing them to float easily, spread rapidly via ocean currents, and wash ashore over vast distances.

2. Chemical Composition: Polyethylene & PVC

- **Materials:** Nurdles are primarily made from polymers such as **Polyethylene (PE)** or **Polyvinyl Chloride (PVC)**.
- **Toxicity Profile:** In their pure, manufactured form, these polymers are **not inherently toxic** in themselves.

- **Bioaccumulation:** Because of their chemical properties, nurdles act like "sponges" in the ocean. They highly attract and concentrate **Persistent Organic Pollutants (POPs)**, heavy metals, and toxins from the surrounding seawater onto their surfaces.

3. Polyethylene vs Polyvinyl chloride

Feature	Polyethylene (PE)	Polyvinyl chloride (PVC)
Flexibility	Highly flexible, lightweight, and ductile.	Naturally rigid and brittle (requires *plasticizers* to make it flexible).
Density & Strength	Lower density; moderate tensile strength.	High density; exceptional structural strength and rigidity.
Thermal Properties	Lower melting point; melts easily.	Higher melting point; inherently **fire-retardant** due to chlorine content.
Recycling Challenges	Highly recyclable	Notoriously difficult to recycle
Applications	Squeeze bottles, plastic grocery bags, cling wraps, milk jugs, shampoo bottles, agricultural pipes, geomembranes, and pre-production **nurdles** etc.	Construction pipes (plumbing), window frames, electrical conduits, medical tubing, blood bags, cable insulation, imitation leather, and flooring.

4. Environmental and Health Footprint

The environmental impacts of these two plastics vary deeply due to their distinct chemical hazards during manufacturing and disposal.

I. Hazardous Byproducts

- **PE:** Relatively clean to manufacture compared to PVC. It burns to produce carbon dioxide and water if combustion is complete, though incomplete burning releases carbon monoxide and particulate matter.
- **PVC:** Dubbed the **"Poison Plastic."** Throughout its lifecycle (production, use, and disposal), PVC releases highly toxic, bioaccumulative **chlorinated organic chemicals**, including **dioxins** and **furans** (both are persistent organic pollutants or POPs).

II. The Plasticizer Dilemma

- **Pure PVC** is unusable for flexible products without chemical additives called **phthalates**. Phthalates are used to soften plastics, making them more flexible or more durable.
- **Phthalates** are not chemically bound to the PVC matrix and easily leach out into liquids, soils, or the human body.
- They are recognized **endocrine disruptors**, linked to reproductive anomalies, and are heavily restricted in children's toys and specific medical devices globally. PE does not require these plasticizers.

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UPSC PRELIMS PRACTICE QUESTIONS

Q. With reference to the impact of Light Pollution, consider the following statements:

1. The Bortle Scale is used to measure the transparency of the atmosphere for radio telescopes.
2. The "Rebound Effect" describes a situation where increased lighting efficiency leads to higher overall light consumption.
3. The Hanle Dark Sky Reserve in India is situated within the Changthang Wildlife Sanctuary.

Which of the statements given above is/are correct?

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

Ans. (b)

Explanation:

- **STATEMENT 1 IS INCORRECT:** The Bortle Scale measures the brightness (light pollution) of the night sky for **optical** observations, not radio telescope transparency.
- **STATEMENT 2 IS CORRECT:** The "Rebound Effect" occurs when the cost-savings from energy-efficient LEDs encourage the installation of more light fixtures, worsening light pollution.
- **STATEMENT 3 IS CORRECT:** The **Hanle Dark Sky Reserve** is indeed located in the high-altitude region of Ladakh within the **Changthang Wildlife Sanctuary**.

Q. With reference to the Kanha Tiger Reserve, consider the following statements:

1. It is the only natural habitat in the world for the Hard-ground Barasingha (*Cervus duvauceli branderi*).
2. The reserve is geographically situated within the Vindhya Mountain Range.
3. Kanha was the first tiger reserve in India to officially introduce a mascot to promote conservation.

How many of the statements given above are correct?

(a) Only one
(b) Only two
(c) All three
(d) None

Ans. (b)

Explanation:

- **STATEMENT 1 IS CORRECT:** Kanha Tiger Reserve is indeed the last world population and the only natural habitat for the specific subspecies of hard-ground Barasingha.
- **STATEMENT 2 IS INCORRECT:** The reserve is located in the **Maikal range of the Satpuras**, not the Vindhya Range.
- **STATEMENT 3 IS CORRECT:** It made history in India by being the first to introduce an official mascot, "Bhoorsingh the Barasingha," to create awareness.

Q. With reference to Green Methanol production in India, consider the following statements:

Statement-I: India's first green methanol plant is being established at Kandla to convert invasive weed species into marine fuel.

Statement-II: According to the Ministry of New and Renewable Energy (MNRE), green methanol must have a total carbon emission threshold of not more than 0.38 kg CO_2 equivalent per kg of methanol.

Which one of the following is correct in respect of the above statements?

(a) Both Statement-I and Statement-II are correct and Statement-II is the correct explanation for Statement-I.
(b) Both Statement-I and Statement-II are correct and Statement-II is not the correct explanation for Statement-I.
(c) Statement-I is correct but Statement-II is incorrect.
(d) Statement-I is incorrect but Statement-II is correct.

Ans. (c)

Explanation:

- **STATEMENT I CORRECT:** The first green methanol plant is indeed located at Deendayal Port (Kandla) and uses Prosopis juliflora (an invasive weed) as feedstock for shipping fuel.
- **STATEMENT II INCORRECT:** According to the MNRE notification (February 2026), the threshold for **Green Methanol** is **0.44 kg CO_2 eq/kg**. The 0.38 kg limit mentioned in the statement actually refers to the standard for **Green Ammonia**.

Q. Consider the following statements

1. Community reserves are established under the Forest Conservation Act of 1980.
2. The Forest Rights Act (FRA) of 2006 is governed by the Ministry of environment, forest and climate change (MoEFCC).

Which of the statements given above is/are correct?

(a) only
(b) 2 only
(c) Both 1 and 2
(d) Neither 1 nor 2

Ans. (d)

Explanation:

Statement 1 is incorrect: Community Reserves (as well as Conservation Reserves) were introduced through the **Wildlife (Protection) Amendment Act of 2002**, which amended the **Wildlife (Protection) Act of 1972**. They are not established under the Forest Conservation Act of 1980. These reserves act as buffer zones or connectors between established national parks and wildlife sanctuaries.

Statement 2 is incorrect: The **Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006** (commonly known as the **FRA**) is governed and administered by the **Ministry of Tribal Affairs (MoTA)**, not the MoEFCC. While the Act deals with forest land, the nodal agency was specifically chosen to ensure the protection of the rights of tribal and forest-dwelling communities.

Scan to attempt more questions

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SCIENCE & TECHNOLOGY

5.1. ORS — ORAL REHYDRATION SOLUTION

Context:

- As Delhi records temperatures exceeding 42°C and peak power demands crossing 7,000 MW, the Delhi Government, Municipal Corporation of Delhi (MCD), and the Lieutenant Governor (L-G) have initiated a multi-agency response to mitigate the impact of heatwaves on public health and infrastructure.

1. **Key Administrative Measures**
   - **Labor Welfare:** Mandatory rest breaks for outdoor workers during peak heat hours (**1:00 PM to 4:00 PM**). Employers are legally responsible for providing shade and water.
   - **Public Transport:** Provision of cold drinking water in all DTC buses and ORS counters at bus shelters.
   - **Education Sector:** MCD schools have scrapped **outdoor assemblies** to prevent heatstroke among children.
   - **Institutional Roles:**
   - **District Magistrates (DMs):** Designated as the lead executors for heatwave action plans.
   - **Focus Groups:** Special protection for "Vulnerable Groups" (Women, Children, Elderly, and Laborers).
2. **Public Health Focus: Oral Rehydration Solution (ORS)**

   The article mentions the distribution of ORS at bus stands.

   I. What is ORS?

   ORS is a specialized mixture of dry salts that is mixed with safe water. It is used to treat **dehydration** caused by extreme heat (perspiration) or diarrhea. It is listed on WHO's Essential Medicines List — one of the most important public health interventions of the 20th century

   II. Composition (WHO Formula):

   1. **Sodium Chloride (Salt):** Replaces electrolytes lost through sweat.
   2. **Glucose (Sugar):** Crucial because it helps the intestines absorb the salt and water more efficiently.
   3. **Potassium Chloride:** Replaces potassium lost during dehydration.
   4. **Trisodium Citrate:** Corrects the acidity in the blood (acidosis).

   III. Mechanism of Action:

   - ORS works on the **"Glucose-Sodium Co-transport"** mechanism. The bowel can absorb salt much better if sugar is present.
   - It does not "cure" the heat, but it prevents the body from shutting down due to the loss of fluids and essential minerals.

Heatwave Criteria (IMD)

- **Plains:** Heatwave is declared when the maximum temperature is 40°C.
- **Hilly Areas:** Heatwave is declared when the maximum temperature is 30°C.
- **Coastal Stations:** Maximum temperature reaches 37◦C or more.

5.2. PROJECT 17A (NILGIRI-CLASS)

Context

- **Recently**, the Indian Navy achieved a major milestone in maritime indigenization with the delivery of **Mahendragiri**, the sixth advanced stealth frigate under **Project 17A**, on April 30, 2026. This follow-on delivery, occurring just weeks after the induction of the fifth frigate, **Dunagiri**, highlights the accelerated pace of the Indian Navy's modernization program.
- The delivery by **Mazagon Dock Shipbuilders Limited (MDL)** underscores India's growing prowess in constructing sophisticated "blue-water" naval assets to counter emerging security challenges in the Indian Ocean Region.

1. **Overview and Design**
   - **Successor Project:** Project 17A is a follow-on to the **Project 17 Shivalik-class** frigates. It features improved stealth features, advanced weapons, and sensors.
   - **Lead Designer:** The ships are designed in-house by the **Warship Design Bureau (WDB)**, formerly known as the Directorate of Naval Design.
   - **Integrated Construction:** This project utilizes the "Integrated Construction" methodology, where blocks are pre-outfitted before being joined, significantly reducing the build period.
2. **Stealth and Technology**
   - **Radar Cross Section (RCS):** The ships are designed with a reduced RCS, achieved through efficient hull shaping and the application of radar-absorbent materials, making them harder to detect by enemy radars.
   - **Integrated Platform Management System (IPMS):** This state-of-the-art system centralizes the control and monitoring of the ship's machinery and auxiliaries.
3. **Weaponry and Propulsion**
   - **Propulsion:** The frigates use a **Combined Diesel or Gas (CODOG)** configuration. This includes two gas turbines for high-speed operations and two diesel engines for economical cruising.
   - **Potent Suite:** They are equipped with **BrahMos** supersonic cruise missiles, **MRSAM** (Medium Range Surface-to-Air Missiles), and advanced sonar systems for anti-submarine warfare.
4. **Indigenous Contribution**
   - **Local Content:** Approximately **75%** of the project's equipment and systems are sourced from indigenous vendors.
   - **MSME Involvement:** Over **200 MSMEs** across the country have contributed to the supply chain, generating thousands of direct and indirect jobs.

5. List of Project 17A Ships

A total of **seven** ships are being constructed under this project by two premier public sector shipyards:

Ship Name	Manufacturer	Current Status (Approx.)
INS Nilgiri	MDL, Mumbai	Delivered/Commissioned
INS Himgiri	GRSE, Kolkata	Under Trials
INS Udaygiri	MDL, Mumbai	Delivered/Commissioned
INS Dunagiri	GRSE, Kolkata	Delivered (March 2026)
INS Taragiri	MDL, Mumbai	Commissioned (April 2026)
INS Vindhyagiri	GRSE, Kolkata	Under Trials
INS Mahendragiri	MDL, Mumbai	Delivered (April 2026)

5.3. DUAL-USE SATELLITES AND INTERNATIONAL SPACE LAW

Context:

- Recently, discussions on the militarization of space have intensified due to the increasing reliance on commercial satellite constellations for military intelligence and drone targeting, which creates a "legal blindspot" in existing international treaties. Modern orbital conflicts are transitioning from physical destruction to invisible cyber-interference, such as signal loss and deliberate misdirection, as seen in recent global geopolitical tensions.

1. Dual-Use Technology in Space

- **Definition:** Dual-use satellites are those that provide services to both civilian and military sectors simultaneously.
- **Examples:** GPS networks used for civilian navigation also provide high-precision coordinates for missile strikes; broadband constellations like Starlink provide internet to remote areas while supporting military communication networks.
- **Strategic Ambiguity:** Because these assets serve schools or hospitals alongside military kill-chains, they complicate the "principle of distinction" required under international humanitarian law.

2. Cyber-Warfare Tactics in Orbit

- **Jamming:** The process of blocking or interfering with radio signals, preventing the satellite from communicating with ground stations.
- **Spoofing:** Sending false data to a satellite or its users, such as manipulating GPS signals to mislead maritime vessels or aircraft.
- **Ground Station Hacking:** Gaining unauthorized control of satellite systems via the terrestrial infrastructure that manages them.

3. **Legal Frameworks and Challenges**
    - **Outer Space Treaty (1967):** The foundational pillar of international space law which stipulates that space should be used for peaceful purposes.
    - **Principle of Distinction:** Requires warring parties to differentiate between civilian objects and military targets, a rule that is increasingly difficult to apply to dual-use constellations.
    - **The UN Charter Article 2(4):** Prohibits the "use of force"; however, there is significant debate on whether a non-physical cyber-attack that "bricks" a satellite constitutes a violation of this article.
    - **Attribution Gap:** In the digital domain, operations routed through proxy networks make it difficult to identify the perpetrator with evidentiary certainty, complicating traditional deterrence.
4. **India's Stance and Initiatives**
    - **CERT-In/SIA-India Guidelines:** India has institutionalized a "secure-by-design" doctrine for space systems to embed cybersecurity into every stage of a satellite's lifecycle.
    - **Capability Building:** India is expanding its presence in orbit to improve the ability to detect, trace, and respond to cyberattacks in real-time.

5.4. DIRECTED ENERGY WEAPONS (DEWS)

Context:

- **Recently**, Defence Minister Rajnath Singh, while addressing the North Tech Symposium in Prayagraj, underscored the urgent necessity for India to accelerate innovation in high-tech warfare domains. He specifically urged the industry and academia to prioritize the development of emerging technologies, including **Directed Energy Weapons (DEWs)**, hypersonic systems, and artificial intelligence, to ensure India maintains a strategic edge in a rapidly transforming global security landscape.

1. **What are Directed Energy Weapons (DEWs)?**

   Directed Energy Weapons are a class of technologies that use **concentrated electromagnetic energy** rather than kinetic projectiles (bullets or missiles) to incapacitate, damage, or destroy enemy equipment and personnel. They operate at the **speed of light**, offering near-instantaneous engagement of targets.
2. **Types of DEWs**
    - **High-Energy Lasers (HEL):** These weapons focus intense beams of light to physically burn through a target's hull or destroy sensitive optical sensors (a process known as a "hard-kill").
    - **High-Power Microwaves (HPM):** These emit short pulses of microwave energy that penetrate electronic systems to "fry" circuits and disrupt internal electronics without necessarily causing physical structural damage.
    - **Particle Beam Weapons:** These use accelerated subatomic particles (electrons or protons) to damage targets, though they remain largely experimental due to massive power requirements.

3. India's Key DEW Projects

Project Name	Type	Key Features
DURGA-II	High-Energy Laser	Standing for **Directionally Unrestricted Ray-Gun Array**, it is a 100-kW system intended for land, sea, and air platforms to neutralize drones and missiles.
KALI	High-Power Microwave	Standing for **Kilo Ampere Linear Injector**, it is a linear electron accelerator developed by DRDO and BARC to disrupt enemy satellite and missile electronics.
Project Tri-Netra	High-Energy Laser	Managed by the Laser Science and Technology Centre (LASTEC) for short-range aerial defense.

4. Advantages vs. Challenges

- **Cost-Effectiveness:** A single "shot" from a laser costs only a few dollars (primarily the cost of electricity), compared to millions for an interceptor missile.
- **Logistical Ease:** There is no need for physical ammunition storage; as long as there is power, the weapon has an "infinite magazine."
- **Speed and Precision:** They are unaffected by gravity or wind and can hit hypersonic targets instantly.
- **Challenges:** DEWs are heavily affected by **atmospheric conditions** (fog and rain scatter the beam) and require **massive power sources** and cooling systems.

5.5. TARA WEAPON SYSTEM

Context:

- **Recently**, the **Defence Research and Development Organisation (DRDO)** and the **Indian Air Force (IAF)** successfully conducted the maiden flight-trial of the **Tactical Advanced Range Augmentation (TARA)** weapon system off the coast of Odisha on May 7, 2026. This development, marks the arrival of India's first indigenous modular range extension kit designed to transform conventional unguided bombs into high-precision glide weapons.

1. Definition and Functional Utility

The **Tactical Advanced Range Augmentation (TARA)** is a glide weapon system designed to convert existing unguided warheads (gravity bombs) into **precision-guided munitions (PGMs)**. It essentially acts as a "modular kit" that can be attached to standard bombs to provide them with guidance and extended range.

2. Key Technical Features

- **Glide Technology:** The system utilizes a modular range extension kit consisting of deployable wings. These wings allow the bomb to "glide" through the air, significantly increasing its standoff distance.
- **Precision Guidance:** By integrating state-of-the-art guidance systems, TARA ensures that low-cost unguided warheads can neutralize ground-based targets with extreme accuracy.

- **Variants:** The system is developed in multiple configurations to suit different payloads, including **TARA 250**, **TARA 450**, and **TARA 500** (corresponding to 250kg, 450kg, and 500kg bomb classes).
- **Low Cost:** A primary objective of the TARA project is to provide a cost-effective solution for precision strikes compared to expensive dedicated missiles.

3. **Development and Indigenization**
   - **Agency:** The system has been designed and developed by the **Research Centre Imarat (RCI)**, Hyderabad, in collaboration with other DRDO laboratories.
   - **Industrial Collaboration:** The project involves **Development-cum-Production Partners (DcPP)** and several private Indian industries, ensuring a robust supply chain under the **Atmanirbhar Bharat** framework.
   - **Platform Integration:** While initial carriage trials were conducted using **Jaguar** fighter jets, the system is slated for integration with other frontline IAF aircraft like the **Su-30MKI** and **Mirage 2000**.
4. **Strategic Importance**
   - **Standoff Capability:** By increasing the range, TARA allows IAF pilots to release weapons from a distance where they remain safe from enemy Ground-Based Air Defence (GBAD) systems.
   - **Lethality and Efficiency:** It enhances the lethality of the existing stockpile of "dumb bombs" by ensuring they hit specific high-value targets rather than causing collateral damage.

5.6. HANTAVIRUS OUTBREAK

Context:

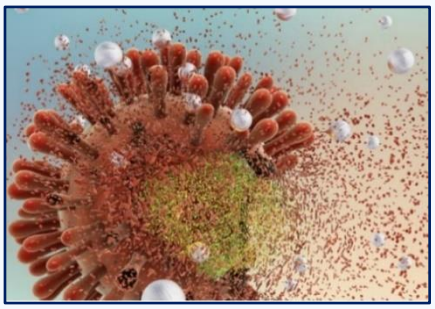
Recently, a Dutch-flagged cruise vessel, the MV Hondius, has been hit by a deadly outbreak of **Hantavirus (Andes strain)** during its voyage from Argentina. After stops in the South Atlantic, the vessel reached the **Canary Islands (Spain)** in May 2026, where a complex repatriation and evacuation operation began under World Health Organization (WHO) monitoring.

1. **About the Hantavirus**
   - Hantaviruses are a group of viruses **carried by rodents** that cause severe respiratory or kidney disease in humans worldwide.
   - **Transmission Source:** While usually spread by rodents, investigators believes the first case contracted it in South America. Crucially, the Andes strain is the only Hantavirus known for **human-to-human transmission**, likely occurring here in the close quarters of the ship.
   - **Symptoms:** Characterized by "Hantavirus Pulmonary Syndrome" (HPS)—fever, muscle aches, and rapid progression to severe respiratory distress (fluid in lungs).
   - **Fatality Rate:** High, typically around **38–40%**.
   - **Treatment:** No specific vaccine or treatment exists; patients require hospitalization and supportive care (often requiring ventilators).

2. **Geography of Canary Islands**
    - **Location:** An archipelago in the Atlantic Ocean, located off the northwest coast of **Africa** (Morocco/Western Sahara), but politically part of **Spain**.
    - **Origin:** Volcanic archipelago; home to **Mount Teide** (on Tenerife), which is the highest peak on Spanish soil.
    - **Strategic Status:** An **Outermost Region (OR)** of the European Union.
    - **Key Islands:** Tenerife (where the evacuation occurred at Santa Cruz), Gran Canaria, Lanzarote, and Fuerteventura.
    - **Climate:** Subtropical and semi-arid, influenced by the **Canary Current** (a cold ocean current) and trade winds.

5.7. BREAKTHROUGH IN HIV TREATMENT

Context:



- Recently, researchers explored the use of CAR-T cell therapy to combat Human Immunodeficiency Virus, with a recent study showing that genetically engineered immune cells suppressed the virus in two patients for one and two years without daily medication, raising hopes for a potential functional cure.

1. **The Mechanism: CAR-T Cell Therapy for HIV**
    - **The Process:** T-cells (immune soldiers) are extracted from a patient's blood and genetically engineered to become "living drugs".
    - **The Modification:** For HIV, these cells were given "dual features": they were programmed to better find/kill infected cells and engineered with a protective "armor" to prevent the HIV virus from infecting the T-cells themselves.
2. **Current Global HIV Landscape**
    - **Scale:** Approximately **40 million people** are living with HIV globally.
    - **Treatment Limitations:** While current antiretroviral drugs make HIV a manageable chronic disease, the virus hides in "reservoirs" in the body and rebounds immediately if treatment is stopped.
    - **The Goal:** Moving beyond daily drug adherence to long-lasting viral suppression through gene and cell therapy.
3. **About CAR-T Cell Therapy (Chimeric Antigen Receptor T-cell)**
    - Chimeric antigen receptor (CAR) T-cell therapy is a revolutionary, personalized form of immunotherapy that modifies a patient's own immune cells (T cells) to recognize and kill cancer cells. It is primarily used to treat certain advanced blood cancers, such as leukemias, lymphomas, and multiple myeloma, especially when other treatments have failed.
    - **Process:**
    - **Collection:** T cells are collected from the patient's blood.
    - **Genetic Modification:** T cells are engineered in the lab to produce Chimeric Antigen Receptors (CARs) that target cancer cells.
    - **Expansion:** Millions of modified CAR-T cells are grown in the laboratory.

- **Infusion:** The engineered CAR-T cells are infused back into the patient.
- **Targeting:** CAR-T cells identify and destroy cancer cells inside the body.

4. B- Cell vs T-Cell

Feature	B Cells	T Cells
Site of Maturation	Bone Marrow	Thymus
Type of Immunity	**Humoral Immunity** (targets pathogens in bodily fluids)	**Cell-Mediated Immunity** (targets infected or cancerous cells)
Antigen Recognition	Recognizes and binds to antigens **directly**	Requires antigens to be **"presented"** by other cells via MHC molecules
Primary Function	Produce and secrete **antibodies**	Coordinate the immune response (**Helper T**) or kill infected cells (**Cytotoxic T**)
Life Span	Generally shorter-lived (except for memory cells)	Often longer-lived; can circulate for many years

5.8. EBOLA RESURGENCE IN CENTRAL AFRICA

Context:

- The World Health Organization (WHO) has officially declared the ongoing Ebola outbreak in the Democratic Republic of Congo (DRC) and Uganda as a **Public Health Emergency of International Concern (PHEIC)**.
- The outbreak originated in the Ituri province (eastern DRC) and has geographically expanded, reaching as far as Kinshasa (the capital, 1,000 km away) and crossing international borders into Uganda.

1. Decoding the Ebola Virus Disease (EVD)

- **Pathogen:** It is a severe, often fatal viral disease caused by a group of viruses known as **orthoebolaviruses** (formerly ebolavirus). The current outbreak is specifically driven by the **Bundibugyo virus**, a rare variant.
- **Nature of Disease:** It is classified as a **hemorrhagic fever virus**. It disrupts the body's clotting system, leading to internal bleeding as blood leaks from small vessels.
- **Historical Context:** EVD was first identified in 1976 in dual outbreaks in southern Sudan and the DRC, primarily affecting remote villages in Central and West Africa.

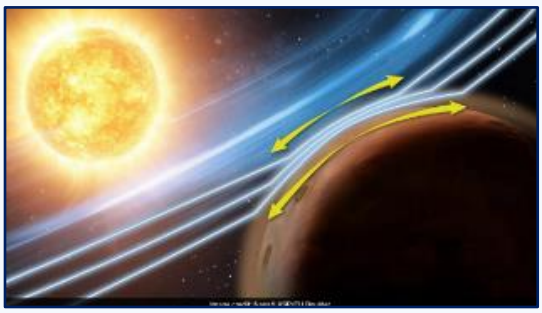
2. Transmission Dynamics: How Does it Spread?

- **Zoonotic Origin:** The virus is initially transmitted to humans from wild animals, including fruit bats, porcupines, and non-human primates.
- **Human-to-Human Spread:** It spreads through direct contact with infected bodily fluids (such as blood, vomit, secretions, or semen) and surfaces contaminated with these fluids.
- **Key Exclusions:** Ebola is **not transmitted by air**.
- **Infectious Period:** Infected individuals are not contagious during the incubation period (which typically lasts 5 to 15 days, but can range from 2 to 21 days). They only become infectious once symptoms appear and remain so as long as the virus is in their blood.

3. **Fatality and Treatment Landscape**
    - **Fatality Rate:** The disease is severe, with an average case fatality rate of around **50%** (historically varying between 25% and 90% depending on the outbreak and viral strain).
    - **Treatment Constraints:** There is currently **no known cure**, and critically, there are **no approved vaccines or therapeutics** available for the Bundibugyo variant.
    - **Medical Management:** Chances of survival depend on early supportive care, which primarily consists of maintaining fluid and electrolyte balance, alongside the administration of blood and plasma to control bleeding.
4. **What is a Public Health Emergency of International Concern (PHEIC)?**
    - **Institutional Framework:** It is the highest level of formal health alert declared by the WHO under the **International Health Regulations (IHR)**.
    - **Core Criteria:** A PHEIC is declared when a public health event is determined to be serious, sudden, unusual, or unexpected.
    - **Global Significance:** The declaration indicates a high risk of international spread, making it a global health risk that necessitates an immediate, coordinated international medical response.

5.9. ZWAN-WOLF EFFECT

Context:



- Recently, a study published in Nature Communications found evidence of a rare space phenomenon called the **"Zwan-Wolf effect" on Mars**. Using data **from MAVEN**, scientists discovered that this effect changes how solar wind interacts with planets that do not have a strong global magnetic field, like Mars.
- In December 2023, a powerful solar storm called a **Coronal Mass Ejection (CME)** hit Mars. This created strong magnetic disturbances in Mars's weak magnetic field, helping scientists detect the rare Zwan-Wolf effect, which is usually too weak to observe.

1. **What is the Zwan-Wolf Effect?**
    - The Zwan-Wolf effect has been observed on Mars. This effect occurs when particles in the ionosphere are pushed into specific regions by the solar wind.
    - **How does it Happen?**
    - **Compression at Boundaries:** As this magnetized solar wind approaches the magnetic field or the plasma boundary of a planet, it undergoes severe compression near the planet's magnetic boundaries.
    - **Pressure Gradient Setup:** This compression creates a steep pressure gradient along the magnetic field lines.
    - **The Diverter Mechanism:** This pressure gradient acts as a **"stream diverter,"** squeezing and pushing the charged particles along the magnetic field lines and forcing them away from the central stream.
    - **The Net Result:** Consequently, closer to the stream boundary, an area forms with a significantly **lower density of charged particles**. This is called the Zwan –**Wolf Effect.**

- On Earth, this mechanism deflects much of the solar wind and protects us from the Sun's constant bombardment.

2. About the MAVEN Mission

- **Agency:** Launched by NASA in 2013.
- **Objective:** To explore Mars's upper atmosphere, ionosphere, and its specific interactions with the Sun and solar wind.

Some Important Mars Mission

Space Mission	Country / Space Agency
Viking 1	United States / NASA
Mars Orbiter Mission (MOM) / *Mangalyaan*	India / ISRO
Perseverance (Mars 2020)	United States / NASA

3. Understanding Coronal Mass Ejections (CMEs)

- A Coronal Mass ejection (CME) is a massive **expulsion of magnetized plasma and solar wind** from the Sun's corona into space.
- When they strike a planet, they cause severe space weather events, triggering geomagnetic storms on Earth, and can acutely alter ionospheric densities on weaker-magnetized bodies like Mars.
- **Impacts on Earth and Technology**
  - **Geomagnetic Storms:** CMEs can disrupt power grids and damage electrical systems.
  - **Communication & Navigation:** They disturb the ionosphere, affecting radio communication and GPS signals.
  - **Space Assets:** Satellites and astronauts face harmful radiation exposure.
  - **Auroras:** Charged particles interacting with Earth's atmosphere create Northern and Southern Lights.

5.10. SURYASTRA: INDIA'S FIRST PRIVATE-SECTOR PRECISION ROCKET SYSTEM

Context:

- **Recently,** Pune-based private defence company Nibe Ltd. successfully conducted field firing trials of its indigenous **Suryastra rocket system** at Chandipur, Odisha.
- It marks the first time an Indian private defence firm has independently demonstrated a long-range indigenous rocket system with advanced tactical capabilities under the **Atmanirbhar Bharat** initiative.

1. Technical Capabilities of the Suryastra Rocket System

- **Classification:** It is India's first indigenous **universal multi-calibre rocket launcher system** designed for precision **surface-to-surface** tactical deep strikes.
- **Strike Ranges Tested:** The trials successfully validated dual long-range capabilities:
  - **Short/Medium Range Configuration:** Strike range of **150 km** with a Circular Error Probable (CEP) accuracy of just 1.5 meters.

- **Extended Range Configuration:** Strike range of **300 km** (utilizing *Predator Hawk* rockets) with a CEP accuracy of 2 meters.

- **Operational Significance:** It effectively bridges the critical operational gap between traditional area-bombardment field artillery (like the Pinaka MLRS, which has a shorter baseline range) and heavy surface-to-surface ballistic missiles.

2. **Policy and Industrial Alignment**

- **Procurement Track:** The project was developed and fast-tracked under an **Indian Army Emergency Procurement order** to augment stand-off firepower along contested borders.
- **Strategic Manufacturing Pivot:** Historically, long-range heavy rocket artillery production in India was **exclusively restricted to the public sector** (DRDO and DPSUs). This trial signifies a major regulatory and technological shift, proving that the domestic private sector can handle high-tech missile and rocket integration.

5.11. GAGANYAAN'S LIFE-SUPPORT SYSTEM

Context:

- As part of India's maiden human spaceflight program, **Gaganyaan**, ISRO is deploying an **Environmental Control and Life Support System (ECLSS)**. This system is designed to replicate Earth's atmospheric conditions inside the crew module while orbiting at an altitude of **400 km** in Low Earth Orbit (LEO).

Core Components of ECLSS

- The ECLSS manages four critical domains to keep astronauts alive and comfortable in microgravity: **Air, Water, Temperature, and Waste**.
- For short-term missions like Gaganyaan, all supplies are carried from Earth and waste is stored for post-mission disposal (unlike long-duration missions on the ISS, which actively recycle waste into resources).

1. **Air Revitalisation System (ARS)**

The ARS performs three primary functions: providing fresh oxygen (O2), removing carbon dioxide (CO2), and filtering trace contaminants/odors.

- **CO2 Removal Mechanism:** Uses **Lithium Hydroxide (LiOH) canisters** to chemically scrub CO2 from the cabin air.
  - **Lithium Hydroxide (LiOH)** is a highly **alkaline inorganic compound** primarily utilized in the production of high-performance EV battery cathodes, heavy-duty industrial lubricating greases, and specialized carbon dioxide scrubbers for aerospace and maritime environments.
- **Medical Risk Mitigated:** Prevents **Hypercapnia** (elevated CO2 levels in the blood), which causes headaches, dizziness, and impaired cognitive function.
- **Daily Human Metabolic Metrics (Standard Requirements):**
  - **Oxygen Consumption:** A healthy crew member needs **0.84 kg of O2 per day**.
  - **CO2 Exhalation:** A healthy adult exhales approximately **1 kg of CO2 per day**

- **Air Circulation Challenge:** In microgravity, natural convection does not occur. The ECLSS uses **small fans** to force air circulation, preventing lethal pockets of stagnant CO2 or hazardous oxygen pockets from accumulating around the crew.

2. **Pressure, Temperature, and Humidity Control**

To ensure crew safety and protect onboard electronics, the cabin environment is tightly regulated within strict baseline parameters:

Parameter	Controlled Target Baseline	Technical Mechanism / Challenge
Atmospheric Pressure	**101.3 kPa** (Mimics Earth's sea-level pressure)	Regulated via **electronic sensors** and **safety valves** that perfectly balance air and oxygen levels.
Temperature	**20°C to 26°C**	Heat is generated by astronaut metabolism (100–150 W per crew member) and onboard avionics. An **active cooling system** circulates air through **heat exchangers**, which expel excess heat into space.
Relative Humidity	**30% to 70%**	Managed by **condensing units** that collect water. • **Too low:** Dry skin, eye irritation, and high risk of **static electricity discharge** (damages electronics). • **Too high**: Microbial growth and **condensation**, risking short-circuits or corrosion.

3. **Water and Fluid Management in Microgravity**

- **The Fluid Behavior Challenge:** In microgravity, water does not "pour" or flow due to gravity; instead, it surface-tensions into **floating globules**. These globules pose a severe risk of causing short-circuits in electronics or choking hazards if accidentally inhaled by astronauts.
- **Gaganyaan's Solution:** Potable water is stored in **specially designed pouches featuring pressurized bladders**. These bladders mechanically force the water directly into the astronaut's mouth without allowing gas-liquid mixing.

4. **Waste Management**

- **Storage Philosophy:** For the short-duration Gaganyaan mission, liquid and solid wastes are mechanically collected and stored securely inside the module for disposal after landing, rather than being recycled in-situ.

About Gaganyan

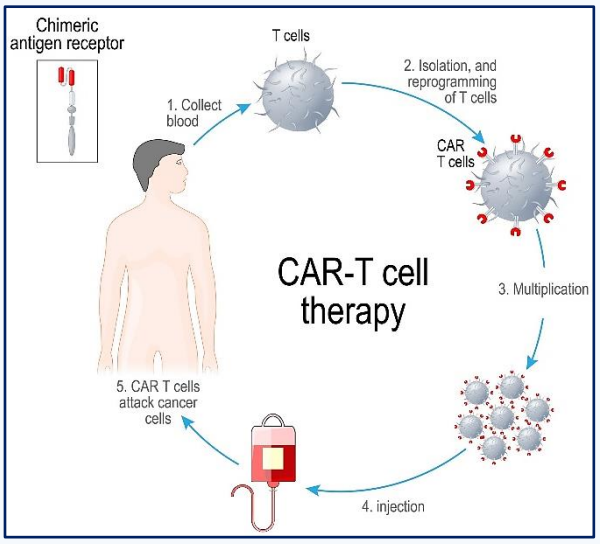
The Gaganyaan mission is India's premier human spaceflight program. It aims to launch a crew of three astronauts into a Low Earth Orbit (LEO) at an altitude of 400 km for a 3-to-7 day mission, and safely return them to Earth, landing in Indian sea waters.

Prior to the crewed launch, the program mandates several precursor uncrewed missions to test systems, including a module carrying the humanoid robot *Vyommitra*.

5.12. CAR-T CELL THERAPY

Context:

- Recently a study reported the development of a new generation of immune cells with HIT (HLA-independent T-cell) receptors designed to overcome the "faint signal" problem in solid tumours such as kidney, ovarian, and pancreatic cancers.
- Unlike traditional CAR-T therapy—which has been highly effective in blood cancers but less so in solid tumours due to antigen heterogeneity—these receptors enable engineered T-cells to detect and target cancer cells that express very low levels of tumour markers.



What is CAR-T Cell Therapy?

Chimeric Antigen Receptor (CAR) T-cell therapy is a revolutionary form of **immunotherapy** that falls under the category of **gene therapy**. Unlike chemotherapy, which uses chemicals to kill cancer, CAR-T therapy uses the patient's own immune system as a weapon.

1. **The Core Components**
    - **T-Cells:** These are a type of white blood cell (lymphocyte) responsible for identifying and killing foreign pathogens or abnormal cells.
    - **CAR (Chimeric Antigen Receptor):** This is an artificial receptor engineered in a lab. It does not occur naturally. The term "chimeric" refers to the fact that it is composed of parts from different sources (an antibody part to see the cancer and a T-cell part to activate the attack).
2. **The Process: From Patient to Cure**
    - **Apheresis:** T-cells are extracted from the patient's blood.
    - **Genetic Engineering:** In a laboratory, a viral vector is used to "recode" these T-cells. A new gene is inserted so the cells grow the **CAR** on their surface.
    - **Expansion:** These newly engineered cells are multiplied into millions.
    - **Infusion:** The "supercharged" T-cells are infused back into the patient.
    - **Targeting:** The CAR acts like a **GPS**, allowing the T-cells to lock onto a specific protein (usually **CD19**) on cancer cells and destroy them.

NexCAR19: India's Indigenous Pride

- **Developed by: ImmunoACT** (a company incubated at **IIT Bombay**) in collaboration with **Tata Memorial Centre**.
- **Approval:** It was approved by the **Central Drugs Standard Control Organization (CDSCO)** in October 2023.
- **Significance:** It is a "humanized" therapy, meaning it uses human-like protein sequences to reduce the risk of the body rejecting the treatment.
- **Cost Factor:** While global treatments cost approximately **₹3–4 crore**, NexCAR19 has brought the cost down to **₹30–40 lakh**, with targets to reach **₹10 lakh** in 2026.

Key Advantages and Risks

Feature	Description
"Living Drug"	Unlike pills that leave the body, these cells can persist for years, providing long-term surveillance against cancer recurrence.
Precision	It specifically targets cancer cells while sparing most healthy cells, unlike the "scorched earth" approach of chemotherapy.
Major Side Effect	**Cytokine Release Syndrome (CRS)** – a massive immune response that can cause high fever and organ failure if not managed.
Current Limit	Highly effective for **blood cancers** (Leukemia, Lymphoma) but struggles with **solid tumors** (like lung or breast cancer) due to their protective microenvironment.

***

Q. Oral Rehydration Solution (ORS), used in the management of dehydration, typically contains which of the following components?

(a) Sodium chloride, potassium chloride, glucose, and trisodium citrate
(b) Calcium carbonate, sodium chloride, glucose, and vitamin C
(c) Sodium bicarbonate, iron salts, glucose, and zinc
(d) Potassium nitrate, sodium chloride, sucrose, and calcium phosphate

Ans. (a)

Explanation:

ORS is a balanced mixture of electrolytes and glucose that enhances water absorption in the intestines, helping to treat dehydration caused by diarrhea.

Sodium Chloride: Essential for replacing the sodium lost through sweat and bodily fluids.

Potassium Chloride: Replaces potassium, which is vital for heart and muscle function during dehydration.

Glucose (Anhydrous): Acts as the "key" to the transport mechanism; it triggers the intestinal wall to pull in sodium and water.

Trisodium Citrate: Helps neutralize excess acid in the blood (metabolic acidosis) that often occurs with severe dehydration.

Q. Consider the following statements regarding Project 17A of the Indian Navy:

Statement I: Project 17A frigates are follow-on versions of the Shivalik-class frigates with enhanced stealth features and high levels of automation.

Statement II: These ships are powered by a Combined Diesel and Diesel (CODAD) propulsion system to ensure high fuel efficiency at all speeds.

Which one of the following is correct in respect of the above statements?

(a) Both Statement I and Statement II are correct and Statement II is the correct explanation for Statement I.
(b) Both Statement I and Statement II are correct and Statement II is not the correct explanation for Statement I.
(c) Statement I is correct but Statement II is incorrect.
(d) Statement I is incorrect but Statement II is correct.

Ans. (c)

Explanation:

- **STATEMENT I CORRECT:** Project 17A (Nilgiri-class) is indeed the successor to the Project 17 (Shivalik-class) and incorporates advanced stealth technology such as reduced Radar Cross Section (RCS).
- **STATEMENT II INCORRECT:** The ships do not use a CODAD system; instead, they use a **Combined Diesel or Gas (CODOG)** propulsion plant, which combines the high power of gas turbines with the efficiency of diesel engines.

Q. With reference to the 'Outer Space Treaty of 1967' and modern space security, consider the following statements:

1. The treaty explicitly prohibits the placement of all types of weapons, including conventional missiles, in Earth's orbit.
2. The 'Principle of Distinction' under international humanitarian law requires satellites to be used exclusively for either civilian or military purposes, prohibiting dual use.
3. The 'Attribution Gap' refers to the difficulty in legally identifying the perpetrator of a cyber-interference operation against a satellite.

How many of the above statements are correct?

(a) Only one
(b) Only two
(c) All three
(d) None

Ans. (a)

Explanation:

- **STATEMENT 1 IS INCORRECT:** While the treaty prohibits placing weapons of mass destruction (WMDs) in orbit and forbids military bases on celestial bodies (like the Moon), it does not explicitly ban all conventional weapons in Earth's orbit.
- **STATEMENT 2 IS INCORRECT:** The Principle of Distinction requires warring parties to differentiate between civilian and military *targets* during a conflict, but it does not prohibit the existence or manufacturing of dual-use technology.
- **STATEMENT 3 IS CORRECT:** The attribution gap is a significant technical and legal challenge where the invisible nature of cyber-disruption makes it hard to prove who launched an attack.

Q. With reference to Directed Energy Weapons (DEWs), consider the following statements:

1. High-Energy Lasers (HEL) primarily damage targets by disrupting their electronic circuits through electromagnetic interference.
2. The KALI (Kilo Ampere Linear Injector) is an indigenous Indian project developed jointly by DRDO and the Bhabha Atomic Research Centre (BARC).
3. Atmospheric conditions such as heavy fog and rain do not impact the efficacy of Laser-based DEWs due to their high frequency.

Which of the statements given above is/are correct?

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

Ans. (b)

Explanation:

- **STATEMENT 1 IS INCORRECT:** High-Energy Lasers (HEL) damage targets through **thermal effects** (burning/melting), whereas High-Power Microwaves (HPM) are the ones that disrupt electronic circuits.
- **STATEMENT 2 IS CORRECT:** KALI is a linear electron accelerator designed for generating high-power microwaves, developed as a collaboration between DRDO and BARC.
- **STATEMENT 3 IS INCORRECT:** Laser-based DEWs are highly sensitive to **atmospheric attenuation**; particles like water droplets (fog/rain) and dust scatter the light beam, significantly reducing its range and power.

Scan to attempt more questions

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6.1. REPATRIATION OF INDIAN ANTIQUITIES FROM THE U.S.

Context:

- U.S. authorities have returned **657 antiquities** to India, valued at nearly **$14 million**. These items were recovered following investigations into major international trafficking networks, specifically those led by **Subhash Kapoor** and **Nancy Wiener**.

Key Highlights of the Repatriated Artefacts

1. **Red Sandstone Buddha Figure**
   - **Significance:** Valued at approximately **$7.5 million**.
   - **Iconography:** Depicted in **Abhaya Mudra** (gesture of protection/fearlessness).
   - **Condition:** Features a broken halo and feet damaged below the knees, typical of looted artefacts.
   - **Origin:** Believed to be from **Northern India** (likely Mathura school, given the use of red sandstone).

Buddha Mudras

- **Bhumisparsha Mudra (Earth Witness):** Right hand reaches down to touch the ground, palm inward, symbolizing Buddha's enlightenment under the Bodhi tree and his triumph over Mara (temptation).
- **Dhyana Mudra (Meditation):** Hands rest in the lap, right hand over left with thumbs touching, representing concentration, inner peace, and balance.
- **Abhaya Mudra (Fearlessness):** Right hand raised to shoulder height, palm facing outward, symbolizing protection, peace, and the dispelling of fear.
- **Varada Mudra (Charity/Compassion):** Right hand extends downward, palm facing outward, symbolizing generosity and the granting of boons.
- **Vitarka Mudra (Teaching/Discussion):** Thumb and index finger touch to form a circle, with other fingers pointing up, representing the transmission of wisdom and the teaching of the Dharma.
- **Dharmachakra Mudra (Turning the Wheel):** Both hands are held at the chest, thumb and index finger of each hand forming a circle, representing the Buddha's first sermon.
- **Anjali Mudra (Greeting/Devotion):** Both palms pressed together at the chest, representing respect, devotion, and a greeting.

2. **Bronze Avalokiteshvara**
   - **Iconography:** Seated on an inscribed **double-lotus base** over a **lion-flanked throne**.
   - **Artisan/Location:** The inscription identifies the craftsman as **Dronaditya of Sirpur** (near modern-day Raipur, Chhattisgarh).
   - **Historical Link:** Part of a large hoard of bronzes discovered near the **Lakshmana Temple in 1939**.

Sirpur (ancient Sripura) in Chhattisgarh, India, is a major 6th-8th century archaeological site on the Mahanadi river, renowned for its dense concentration of Buddhist, Hindu, and Jain monuments. It was a major regional capital and intellectual center boasting 100+ monasteries, famously visited by Chinese traveler Xuanzang. Key sites include the 7th-century brick **Lakshmana Temple, Surang Tila, and multiple excavated Viharas (monasteries).**

3. Legal framework

I. Regulatory Framework in India

- **Antiquities and Art Treasures Act, 1972:** This is the primary legislation. It makes it illegal for any person other than the Government or its authorized agencies to export any antiquity.
- **Archaeological Survey of India (ASI):** The nodal agency responsible for the protection and repatriation of cultural heritage.

II. Global Framework

- **UNESCO Convention 1970:** Prohibits and prevents the illicit import, export, and transfer of ownership of cultural property.
- **Cultural Property Agreement (CPA):** India and the U.S. recently signed a Cultural Property Agreement (July 2024) to streamline the return of stolen artefacts and prevent further trafficking.

6.2. THE KOMAGATA MARU INCIDENT (1914)

Context:

- Recently, the Komagata Maru incident was mentioned by singer Diljit Dosanjh on *The Tonight Show Starring Jimmy Fallon*, highlighting the historical injustice and racial discrimination faced by Indian immigrants during the colonial era

I. Key Details of the Voyage

- **The Ship:** A Japanese steamship named *Komagata Maru*.
- **The Organizer:** Gurdit Singh, a Punjabi entrepreneur based in Singapore.
- **The Passengers:** 376 passengers in total, including 340 Sikhs, 24 Muslims, and 12 Hindus from Punjab.
- **Timeline:** The ship sailed from Hong Kong in the spring of 1914 and arrived at Vancouver's Burrard Inlet on May 23, 1914.

II. Legal and Administrative Standoff

- **Continuous Journey Regulation (1908):** Barred anyone who had not travelled by a single unbroken journey from their country of birth to Canada. No direct shipping routes existed from India, making it practically impossible for South Asians to qualify.
- **The Standoff:** Canadian Prime Minister Robert Borden refused to let the ship dock, keeping it anchored offshore for two months.

- **Local Support: The Shore Committee** was a group formed in 1914 by Vancouver-based South Asian activists (mainly Sikhs, Hindus, and Muslims) to support the 376 passengers of the Japanese steamer Komagata Maru, who were denied entry into Canada due to discriminatory immigration policies. Led by figures like Hussain Rahim, Sohan Lal Pathak, and Balwant Singh, the committee raised $20,000 for food, water, and legal aid for passengers facing harsh conditions.
- **Departure:** The ship was forced to depart under escort on July 23, 1914, after Canadian officials withheld food and water and attempted to board the ship by force.

III. Return to India: The Budge Budge Riot

- **Arrival at Calcutta:** The ship anchored near Calcutta (Budge Budge) in late September 1914.
- **The Confrontation:** British authorities attempted to force passengers onto trains bound for Punjab.
- **Casualties:** In the ensuing clash, 20 passengers were killed by police fire, and many others were imprisoned.
- **Gurdit Singh:** He evaded capture for several years before surrendering in 1920.

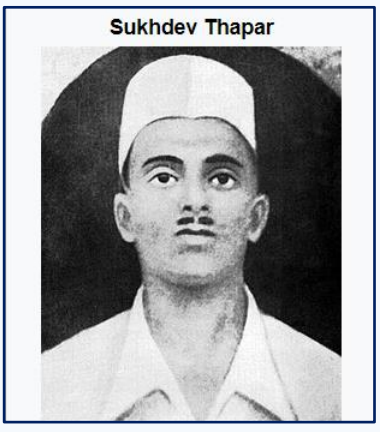
IV. Link with the Ghadar Movement

The Komagata Maru incident was deeply intertwined with the Ghadar Movement, acting as a catalyst for its revolutionary activities.

- **Ideological Infusion:** Ghadar activists boarded the ship at Yokohama to deliver lectures and distribute anti-colonial literature among the passengers.
- **Recruitment Surge:** The brutal treatment of the passengers served as a recruitment tool, causing a surge in support for the Ghadar Party.
- **Ghadar Revolution (1915):** Many Ghadar members returned to Punjab in 1915 to attempt an armed uprising, inspired by the grievances highlighted by the voyage.
- **Exposure of British Promises:** The incident demonstrated to Indian subjects that the British Empire's promise of equal status was a myth, fueling the demand for total independence.

6.3. SUKHDEV THAPAR (1907–1931): REVOLUTIONARY FREEDOM FIGHTER

Context:



- Recently, honorable Home Minister paid tribute to Sukhdev Thapar on his birth anniversary, stating that the immortal revolutionary symbolized indomitable courage, patriotism, and sacrifice, and dedicated his entire life to India's freedom struggle.

1. Early Life & Background

- Sukhdev Thapar was born on 15 May 1907 in the Naughara area of O**ld Ludhiana,** Punjab. He belonged to a **Punjabi Khatri community** and was brought up by his uncle Lala Achintram after the death of his father.
- Sukhdev was only twelve years old when his uncle was arrested by the British police for organising an agitation against the **Rowlatt Act**. The arrest of his uncle again in 1921 during

the Non-Cooperation Movement deepened his resentment and determined his path as a revolutionary.

2. **Key Revolutionary Contributions**

Sukhdev was not just a soldier but a high-level planner for the HSRA.

- **Naujawan Bharat Sabha:** He was a founding member of this organization (formed in 1926), which aimed to mobilize the youth against British rule and communalism.
- **The Saunders Assassination (1928):** Following the death of Lala Lajpat Rai due to a brutal lathi charge, the HSRA decided on a retaliatory strike. Sukhdev is credited with being the primary strategist who chose the team and oversaw the logistics for the assassination of John P. Saunders.
- **Central Assembly Hall Bombing (April 1929):** Sukhdev was also part of the conspiracy to bomb inside the **Central Assembly in New Delhi**. The HSRA had no interest in causing casualties; they merely wanted to draw public attention to the injustice meted out to Indians by the British.
- **Lahore Conspiracy Case:**.Three individuals — **Hans Raj Vohra, Jai Gopal, and Phanindra Nath Ghosh** — turned approvers for the British government, leading to a total of 21 arrests including Sukhdev Thapar and Shivaram Rajguru.

The 1915 First Lahore Conspiracy Case was a pivotal series of trials held between April and September 1915, targeting members of the Ghadar Party who attempted to incite a pan-Indian mutiny against British rule during World War I. Led by figures like Kartar Singh Sarabha and influenced by Rash Behari Bose, the planned uprising for February 21, 1915, was foiled, leading to 291 convictions, 42 executions, and many life sentences to the Andaman Cellular Jail

3. **The Hunger Strike and Trial**

- While in prison, Sukhdev was a leader in the historic **hunger strike** demanding that Indian prisoners be treated as "political prisoners" rather than common criminals. This strike lasted over 60 days and gained massive public sympathy, effectively using the British court system as a platform to spread revolutionary propaganda.

4. **Ideology and Legacy**

- Sukhdev read about various world revolutions, including the **Russian and French revolutions**. He was especially inspired by the Russian revolution and was quite influenced by **Lenin's revolutionary ideas**.
- His letter to **Mahatma Gandhi**, written just prior to his hanging and protesting against Gandhi's disapproval of revolutionary tactics, throws light on the key ideological divide between the **non-violent (Gandhian)** and **revolutionary** schools of thought in the Indian freedom movement
- **Execution:** Despite widespread national protests and appeals, Sukhdev was hanged in Lahore Central Jail on **March 23, 1931**, alongside Bhagat Singh and Rajguru. He was only **23 years old**.
- **Shaheed Diwas:** Their execution day is observed annually as *Shaheed Diwas* (Martyrs' Day) in India.

5. HRA VS HSRA

Feature	HRA	HSRA
Full Form	Hindustan Republican Association	Hindustan Socialist Republican Association
Established	1924	1928
Key Founders	Ram Prasad Bismil, Sachindra Nath Sanyal, Jogesh Chandra Chatterjee	Bhagat Singh, Chandrasekhar Azad, Sukhdev Thapar
Main Objective	Armed revolution to overthrow British rule and establish a federal republic	Socialist revolution along with ending British colonial rule
Ideology	Republican Nationalism	Socialist Republicanism
Major Event	Kakori Train Robbery	Lahore Conspiracy Case and Central Assembly Bombing

6.4. THE ANAIMANGALAM COPPER PLATES

Context:

- Recently, the Leiden University Library in the Netherlands formally **repatriated the 11th-century Chola-era Anaimangalam Copper Plates** (popularly known as the **Leiden Plates**) to the Government of India.
- These plates were removed from Nagapattinam without indigenous consent during Dutch colonial rule (VOC control) in the 18th century, eventually entering Leiden University's collection in 1862.

1. Epigraphical Features of the Leiden (Anaimangalam) Plates

- **Composition:** The artifact consists of **two distinct sets**:
  1. **The Larger Leiden Plates:** A massive set of **21 large copper sheets** bound together by a heavy bronze ring carrying the **royal Chola seal**.
  2. **The Smaller Leiden Plates:** A set of **3 smaller copper sheets** bound by a ring featuring the royal seal of a later king, **Kulottunga Chola I** (reigned 1070–1120 CE), recording subsequent land additions.
- **Bilingual Framework:**
  - **Sanskrit Section (5 Plates):** Written in the **Grantha script**. It traces the mythical, divine solar lineage (*Suryavamsha*) and historical genealogy of the Chola monarchs.
  - **Tamil Section (16 Plates):** Written in the local Tamil script, outlining the granular details of local administration, land boundaries, tax exemptions, and executive execution.
  - **The Royal Insignia (Chola Seal):** The binding ring contains the standard royal herald of imperial supremacy over rival dynasties:
  - A central **Tiger** (the dynastic emblem of the Cholas).
  - Two **Fish** (representing the subjugation of the Pandyas).
  - A **Bow** (representing the subjugation of the Cheras).
  - Complemented by fly-whisks (*chamaras*), a royal parasol, and a swastika.

2. Religious Pluralism & Socio-Economic History

The core value of the Leiden plates lies in what they reveal about the socio-political fabric of early medieval India:

- **Socio-Religious Harmony:** Though the Chola emperors were devout Shaivite Hindus (worshipers of Lord Shiva), the plates document state patronization of heterodox faiths.
- **The Grant Details:** The plates formalize a **Pallichchandam** (a specific tax-exempt land revenue grant dedicated explicitly to non-Hindu institutions like Jain basadis or Buddhist monasteries).
- **The Beneficiary:** The land revenue of the entire village of **Anaimangalam** was granted to sustain the **Chudamani Vihara** (also known as the *Chulamanivarma Vihara*), a magnificent Buddhist monastery constructed in the international port town of **Nagapattinam**.
- **Trans-Maritime Geopolitics:** The vihara was built by **King Sri Mara Vijayottungavarman** of the **Srivijaya Kingdom** (spanning Sumatra, Java, and the Indonesian archipelago). This proves the deep diplomatic, trade, and cultural networks bridging South India and Southeast Asia.

3. Core Personalities Implicated in the Inscription

- Raja Raja Chola I
- Rajendra Chola I
- Kulottunga Chola I

A. Raja Raja Chola I (r. 985–1014 CE)

- **Cultural Contribution:** Built the architectural marvel **Brihadisvara Temple** (Peruvudaiyar Kovil) at **Thanjavur**, dedicated to Lord Shiva. It is a pinnacle of Dravidian architecture and a UNESCO World Heritage site.
  - Initiated a massive land survey project to streamline agrarian revenue and local administration.

B. Rajendra Chola I (r. 1012–1044 CE)

- **Cultural & Military Legacy:** Known for his aggressive maritime expeditions, conquering Srivijaya (Southeast Asia) to safeguard Chola trade routes.
  - Marched northward to the Ganga river, earned the title **Gangaikonda Chola**, and established a new capital city: **Gangaikondacholapuram**.
  - Constructed the vast western artificial lake/reservoir called **Chola Gangam** to upgrade regional irrigation.

C. Kulottunga Chola I (1070–1122 CE)

- **Contribution:** Kulottunga was a prolific builder and patron of the arts, integrating new elements into Dravidian temple architecture.
- **Chidambaram Nataraja Temple:** Kulottunga I and his son famously expanded the sprawling complex of the Chidambaram Nataraja Temple, increasing its footprint multiple times and renovating its halls.
- Kulottunga I is immortalized in Tamil epigraphy and literature with the title **"Sungam Tavirtta Chola" (or Shungamataravita),** meaning "the Chola who abolished tolls/customs duties".

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UPSC PRELIMS PRACTICE QUESTIONS

Q. Consider the following statements regarding the repatriation of Indian antiquities:

1. The Archaeological Survey of India (ASI) is the nodal agency responsible for the protection and repatriation of cultural heritage in India.
2. The UNESCO Convention of 1970 facilitates and promotes unrestricted international trade of cultural property among member countries.

Which of the following is correct?

(a) Only 1 is correct
(b) Only 2 is correct
(c) Both 1 and 2 are correct
(d) Neither 1 nor 2 is correct

Ans. (a)

Explanation:

Statement 1 is correct:

The **Archaeological Survey of India (ASI)**, an attached office under the Ministry of Culture, is indeed the nodal agency for all matters related to the protection, preservation, and repatriation of cultural heritage.

- **Repatriation Role:** When Indian antiquities are identified in foreign museums or private collections (often having been smuggled out), the ASI works alongside the Ministry of External Affairs and law enforcement agencies like the CBI to establish ownership and facilitate their return to India.
- **Legal Framework:** It operates primarily under the **Antiquities and Art Treasures Act, 1972**, which regulates the export and internal trade of antiquities to prevent illicit trafficking.

Statement 2 is incorrect:

The statement is incorrect because the **UNESCO Convention of 1970** (Convention on the Means of Prohibiting and Preventing the Illicit Import, Export and Transfer of Ownership of Cultural Property) is designed to **prohibit and prevent** the illicit movement of cultural property, not to promote unrestricted trade.

- **Purpose:** It was established to ensure that member countries cooperate to protect their cultural heritage from theft and illegal export.
- **Key Mechanism:** It requires member states to take measures such as creating national inventories, establishing export certificates, and providing assistance in the recovery and return of stolen artifacts.

Q. The *Shore Committee* was constituted in 1914 in connection with which of the following incidents?

(a) Komagata Maru Incident
(b) Jallianwala Bagh Massacre
(c) Champaran Satyagraha
(d) Non-Cooperation Movement

Ans. (a)

Explanation:

The **Shore Committee (1914)** was formed by the British Government to investigate the **Komagata Maru Incident**, where an Indian ship carrying passengers was denied entry in Canada and later faced conflict at Budge Budge (near Kolkata).

Q. Consider the following statements regarding Sukhdev Thapar:

1. He was a founding member of the Naujawan Bharat Sabha, which aimed to mobilize youth against British rule and communalism.
2. He was executed along with Bhagat Singh and Chandrasekhar Azad in Lahore Central Jail in 1931.

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

Ans. (a)

Explanation:

- **Statement 1 is correct:** Sukhdev Thapar was a founding member of the Naujawan Bharat Sabha established in 1926.
- **Statement 2 is incorrect:** Sukhdev was executed along with Bhagat Singh and Shivaram Rajguru, not Chandrashekhar Azad.

Q. With reference to the Anaimangalam Copper Plates (Leiden Plates), consider the following statements:

1. The plates record a tax-exempt land grant to a Buddhist monastery at Nagapattinam.
2. The Sanskrit section of the plates was written in the Brahmi script.

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

Ans. (a)

Explanation:

Statement 1 is Correct: The Anaimangalam (Leiden) Plates record a **Pallichchandam** (tax-exempt land grant) given to the **Chudamani Vihara**, a Buddhist monastery located at **Nagapattinam**.

Statement 2 is Incorrect: The Sanskrit portion of the plates was written in the **Grantha script**, not the Brahmi script.

Scan to attempt more questions

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MISCELLANEOUS

7.1. DENOTIFIED, NOMADIC AND SEMI-NOMADIC TRIBES (DNTS)

Context:

- Recently, during a three-day "Chintan Shivir" (brainstorming session), the Ministry of Social Justice and Empowerment discussed the inclusion and enumeration of Denotified, Nomadic and Semi-Nomadic Tribes (DNTs) in the ongoing Census 2027 exercise.

Denotified Tribes (DNTs)

DNTs are communities that were "notified" as "born criminals" during the British regime under a series of laws, primarily the **Criminal Tribes Act of 1871**.

1. **Historical Background**
   - **Criminal Tribes Act, 1871:** The British designated several nomadic and semi-nomadic communities as "hereditary criminals."
   - **Reason:** British considered mobile communities "hard to monitor", linking mobility to "habitual criminality".
   - **Repeal (1952):** Post-independence, the Government of India repealed the Act based on the recommendations of the **Ayyangar Committee**. These tribes were "denotified."
   - **Habitual Offenders Act:** Unfortunately, many states replaced the 1871 Act with Habitual Offenders Acts, which often continued the social stigma against these groups.
2. **Key Committees and Commissions**
   - **Ayyangar Committee (1949): Recommended repeal of the 1871 Act.**
   - **Kaka Kalelkar Commission (also called first OBC Commission-1953):** The first commission to recognize the specific hardships of DNTs.
   - **Renke Commission (2008):** Estimated the DNT population to be roughly 10-12 crore and recommended a separate census and sub-quota for them.
   - **Idate Commission (2014):** Recommended the permanent setup of a dedicated Board for DNT welfare.
3. **Government Initiatives**
   - **DWBDNC:** The Development and Welfare Board for De-notified, Nomadic and Semi-Nomadic Communities was established in 2019 for a period of three years (later extended) under the Societies Registration Act, 1860.
   - **SEED Scheme (Scheme for Economic Empowerment of DNTs): Health Insurance:** Through Ayushman Bharat PM-JAY.
     - **Livelihood:** Productivity through clusters/SHGs.
     - **Housing:** Financial assistance via PMAY.
     - **Education:** Coaching for competitive exams (JEE, NEET, Civil Services).

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UPSC PRELIMS PRACTICE QUESTIONS

Q. Which of the following best explains the rationale behind the British targeting nomadic communities under the Criminal Tribes Act, 1871?

(a) Their involvement in anti-colonial movements

(b) Their refusal to adopt settled agriculture

(c) Their mobility made surveillance and control difficult

(d) Their dominance in trade and commerce

Ans. (c)

Explanation:

The Criminal Tribes Act, 1871 was rooted in colonial administrative convenience rather than evidence of criminality.

- **Core rationale:** Nomadic and semi-nomadic communities were **highly mobile**, making them difficult for the British to **track, tax, and police**.
- The colonial state equated **mobility with suspicion**, branding entire communities as "hereditary criminals."
- This helped the British establish **greater control over populations** by forcing surveillance, registration, and restrictions on movement.

Scan to attempt more questions

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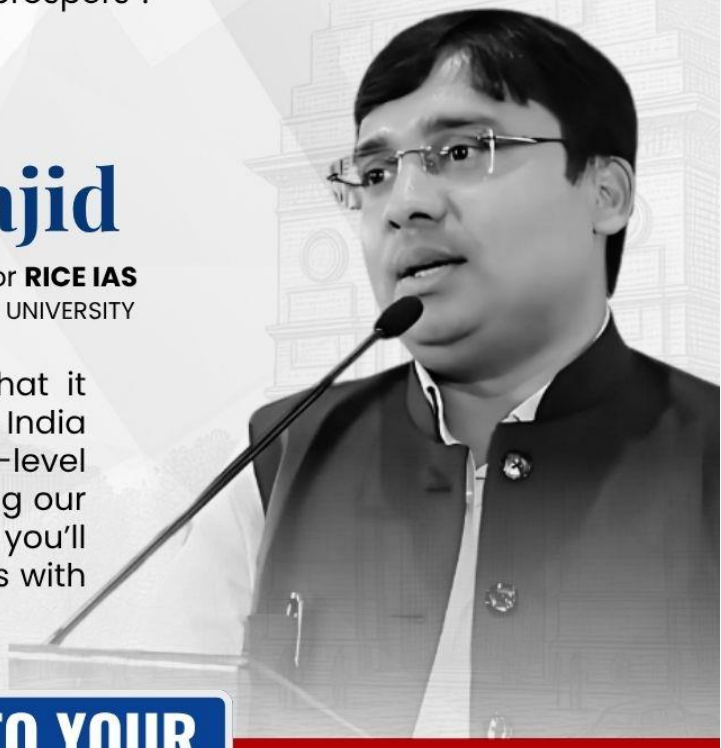

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