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MAY 2026

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Current Affairs
MAY, 2026

Compiled and Published by

La Excellence Publications

Hyderabad.

1st Edition Published – JUNE, 2026

Copies: 800

Printed in Hyderabad, Telangana, India.

Laser Typeset at **La Excellence Publications**

Survey No.58-60, Guttala Begumpet Village, Serilingampalli Mandal,
Ranga Reddy District. Telangana. PIN – 500 081.

La Excellence
— IAS Academy —

Published by

La Excellence Publications

(A Division of La Excellence IAS Academy)
Survey No.58-60, Guttala Begumpet Village,
Serilingampalli Mandal, Ranga Reddy District.
Telangana. PIN – 500 081.
Ph: 91212 39997
Email: laexcellence.hyd@gmail.com, Website: https://laex.in

Price: Not for Sale

PREFACE

Current Affairs MAY, 2026

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MAY 2026

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1. Polity and Governance

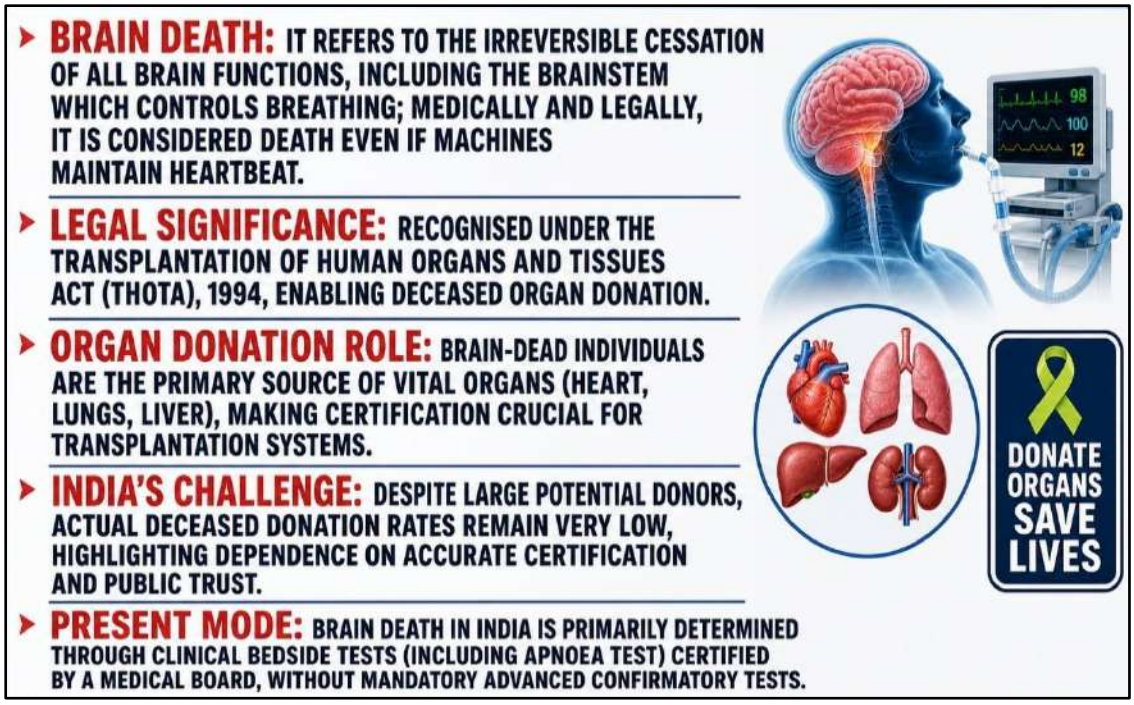
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1.1. Supreme Court to Examine Plea against Apnoea Test in Brain Death

Context:

Brain death certification has become a sensitive medico-legal issue because it directly affects end-of-life decisions and deceased organ donation. Recent allegations of premature or incorrect declaration of brain death have raised concerns about patient rights, medical objectivity and public trust. The Supreme Court is examining whether India's present reliance on clinical tests, especially the apnoea test, requires stronger safeguards and confirmatory procedures.

Background:



Explanation:

1. **Core Issue:**
   - The central concern is whether brain death is being certified with adequate scientific certainty and legal safeguards.
   - Petitioners have alleged that some patients may be wrongly declared brain dead, especially where organ transplantation is involved.
   - This raises serious ethical questions regarding consent, transparency, dignity of the patient and the rights of the family.
   - The issue is not against organ donation, but against any possibility of inaccurate or premature certification.
2. **Present Certification System in India:**
   - Brain death is recognised under the Transplantation of Human Organs and Tissues Act, 1994.
   - Certification is generally done by a medical board, including specialists such as a neurologist or neurosurgeon.

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- Brain death must be confirmed through repeated clinical examinations, usually with a prescribed time gap.
- Doctors must rule out reversible conditions such as drug intoxication, hypothermia, metabolic disturbance or temporary coma-like states.
- However, advanced confirmatory tests such as EEG or cerebral angiography are not mandatory in all cases.

3. **Apnoea Test and Its Controversy:**
   - The apnoea test checks whether the patient can breathe spontaneously when carbon dioxide levels rise.
   - Absence of breathing despite rising carbon dioxide is treated as evidence of brainstem failure.
   - Critics argue that the test may be operator-dependent and may not be sufficient if used without other safeguards.
   - There are also concerns that reduction or withdrawal of ventilatory support during the test may affect oxygen levels in vulnerable patients.
4. **Need for Objective Confirmatory Tests:**
   - EEG records the electrical activity of the brain and can help detect absence of brain signals.
   - Cerebral angiography examines whether blood flow to the brain has stopped.
   - Such tests provide more objective, visual and documentable evidence.
   - However, making them mandatory may create difficulties in smaller hospitals due to cost, infrastructure gaps and shortage of trained personnel.
5. **Supreme Court's Role and Broader Implications:**
   - The Supreme Court has found enough seriousness in the concerns to seek expert medical opinion.
   - AIIMS has been asked to constitute an expert committee and examine the reliability of the apnoea test.
   - The committee may recommend stronger documentation, videography, standardised procedures and additional confirmatory tests.
   - Any reform must balance two goals: preventing wrongful certification and protecting deceased organ donation from loss of public confidence.

Conclusion:

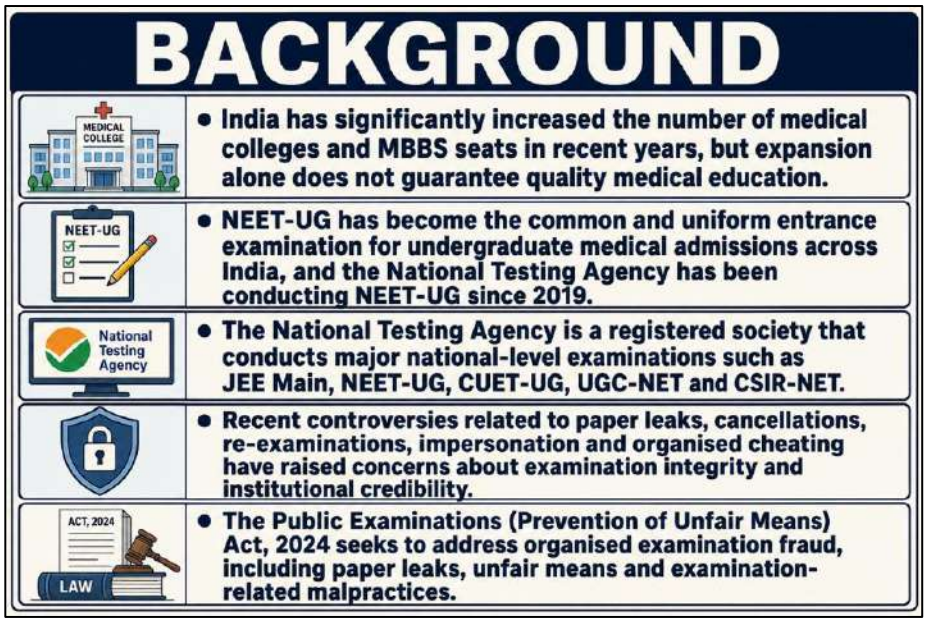
The debate over brain death certification reflects the delicate balance between medical certainty, ethical responsibility and organ donation needs. India requires a transparent, standardised and scientifically robust framework that protects both patient rights and transplantation systems. The Supreme Court's review may become an important step towards strengthening public trust in end-of-life medical decision-making.

1.2. Medical Education in India

Context:

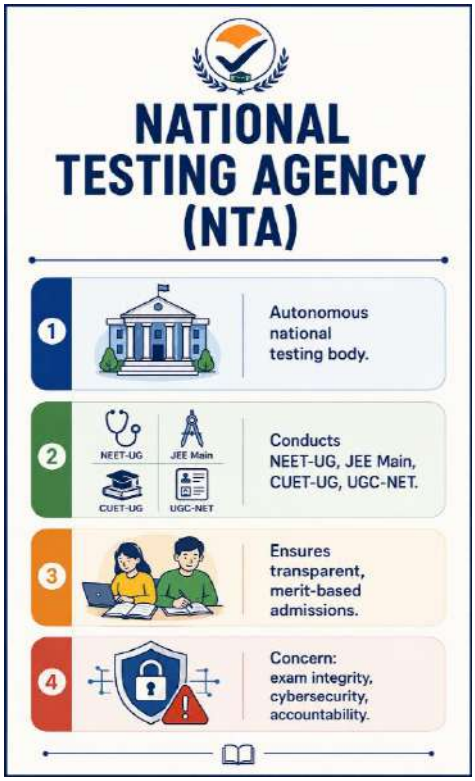
India's medical education system has expanded rapidly through more medical colleges and increased MBBS seats. This expansion is necessary to meet rising healthcare demand, but numbers alone cannot ensure competent doctors. The key challenge is to balance access, quality, examination integrity and future-ready medical training.

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Core Issues:

1. Expansion versus Quality:
   - India needs more doctors due to its large population, rising disease burden and uneven healthcare access across regions.
   - New medical colleges and increased seats can improve doctor availability, especially in underserved areas.
   - However, rapid expansion without adequate faculty, laboratories, hospital infrastructure and clinical exposure may dilute training quality.
   - The focus must shift from merely increasing seats to producing competent, ethical and skilled doctors.
2. Faculty and Training Deficit:
   - Many institutions face shortages of qualified teachers and specialists.
   - Weak faculty strength affects classroom teaching, clinical mentoring, research supervision and patient-care training.
   - Medical education must move beyond rote learning and strengthen clinical reasoning, communication skills, empathy, ethics and community health orientation.
3. Curriculum and Future Skills:
   - Healthcare is being transformed by artificial intelligence, telemedicine, digital diagnostics, genomics, electronic health records and robotic-assisted procedures.
   - Medical curriculum must prepare students for these emerging technologies while retaining patient-centred care.
   - Competency-Based Medical Education is a useful step, but its implementation must be closely monitored.



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4. Research and Postgraduate Concerns:
   - India's medical research culture remains weak in many institutions and often lacks innovation or public health relevance.
   - Vacant postgraduate seats, especially in non-clinical branches, indicate poor planning and uneven student preference.
   - Specialist training must be aligned with national healthcare priorities.
5. Examination Integrity and Student Stress:
   - NEET-UG created a common national route for medical admissions and reduced multiple entrance exams.
   - However, paper leaks, impersonation, organised cheating and exam cancellations have weakened public trust.
   - High-stakes exams have also increased coaching dependence, rote learning and mental pressure among aspirants.
   - The Public Examinations Act, 2024 and stronger digital security mechanisms are important for restoring credibility.

Mains Practice Question:

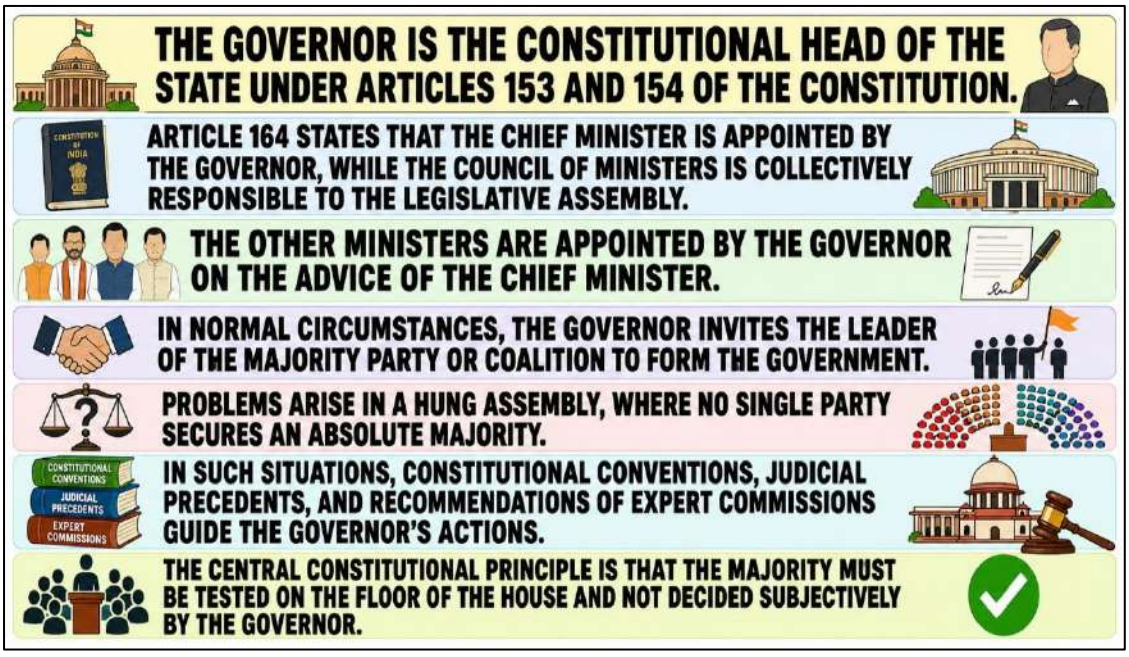
Q. The challenges in India's medical education system go beyond access and include faculty shortages, weak research culture, rote-based assessment and inadequate clinical reasoning. Analyse. **15M (250 Words)**

1.3. Discretionary Powers of Governors: Constitutional and Political Debate

Context:

The role of the Governor in Indian states, particularly in Tamil Nadu, has come under scrutiny following the recent elections. The Governor's delay in inviting the Tamilaga Vettri Kazhagam (TVK) leader, C. Joseph Vijay, to form the government raises questions about constitutional conventions and democratic principles.

Background:



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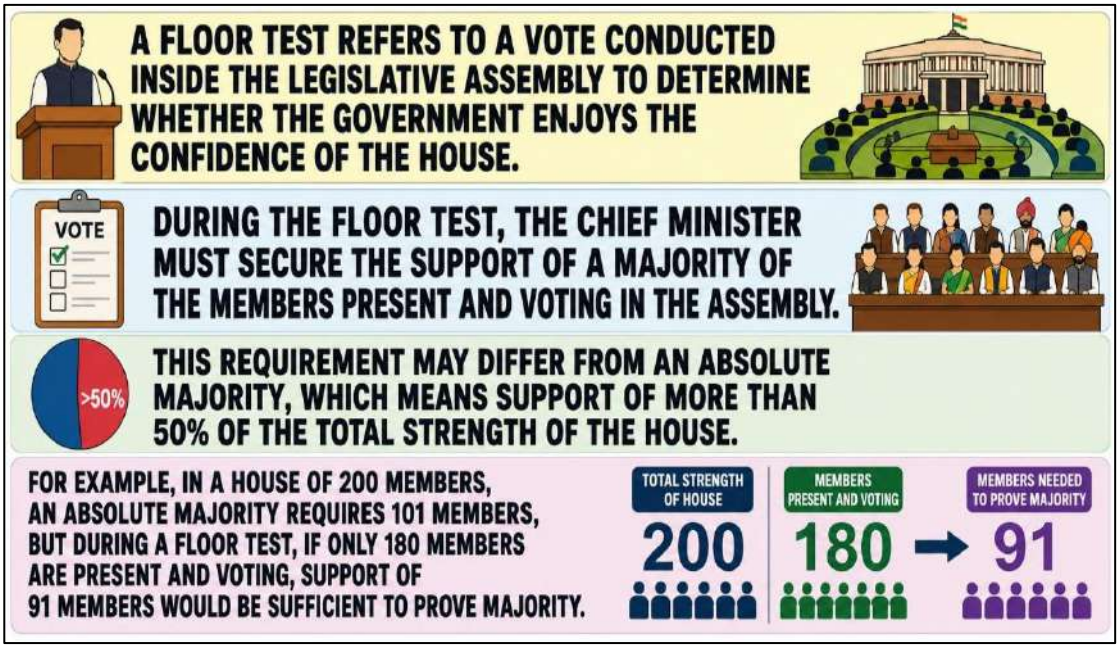
Explanation:

Constitutional Position of the Governor:

- The Governor functions largely on the **aid and advice of the Council of Ministers** under Article 163, except in limited discretionary situations.
- The Constitution does not clearly define the exact order in which parties should be invited in a hung Assembly.
- Therefore, conventions evolved over time, such as:
  - Pre-poll alliance with majority gets first preference.
  - Single largest party may be invited if it can demonstrate support.
  - Post-poll alliances may also stake claim if they possess majority support.

Governor's Discretion in Government Formation:

- Discretion does not mean unrestricted personal choice.
- The Governor's primary duty is to ensure a **stable government enjoying Assembly confidence**.
- The Governor cannot act as an agent of the Union government or political parties.
- Delay in inviting a majority coalition or selectively inviting a party may raise concerns regarding: Constitutional morality, Federalism & Democratic legitimacy.
- The Supreme Court repeatedly emphasized that political uncertainty should be resolved through a **floor test at the earliest opportunity**.



Important Supreme Court Judgements:

S.R. Bommai v. Union of India (1994):

- The Supreme Court held that majority support must be tested on the floor of the House.
- It strengthened federalism and reduced arbitrary dismissal of governments under Article 356.

Rameshwar Prasad Case (2006):

- The Court criticized misuse of gubernatorial reports and emphasized constitutional neutrality.

Nabam Rebia v. Deputy Speaker (2016):

- The Court observed that the Governor is not an all-powerful authority.
- It clarified that discretionary powers are limited and must operate within constitutional boundaries.

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Raghukul Tilak Case (1979):

- The Court stated that gubernatorial discretion should not be arbitrary, fanciful, or politically motivated.

Committee Recommendations:

Sarkaria Commission (1988):

- Recommended that the Governor should invite:
  1. Pre-poll alliance with majority
  2. Single largest party with support
  3. Post-electoral coalition with majority
- Suggested that Governors should be politically neutral individuals.

Punchhi Commission (2010):

- Recommended codifying guidelines for government formation.
- Stressed that discretionary powers under Article 164 are very limited.
- Emphasized respect for constitutional morality and cooperative federalism.

Conclusion:

The Governor occupies a crucial constitutional office intended to preserve democratic stability and constitutional balance. However, discretionary powers must operate within judicially evolved principles, constitutional conventions, and federal norms. The ultimate test of legitimacy in a parliamentary democracy remains the confidence of the elected House, not the subjective satisfaction of the Governor.

Mains Practice Question:

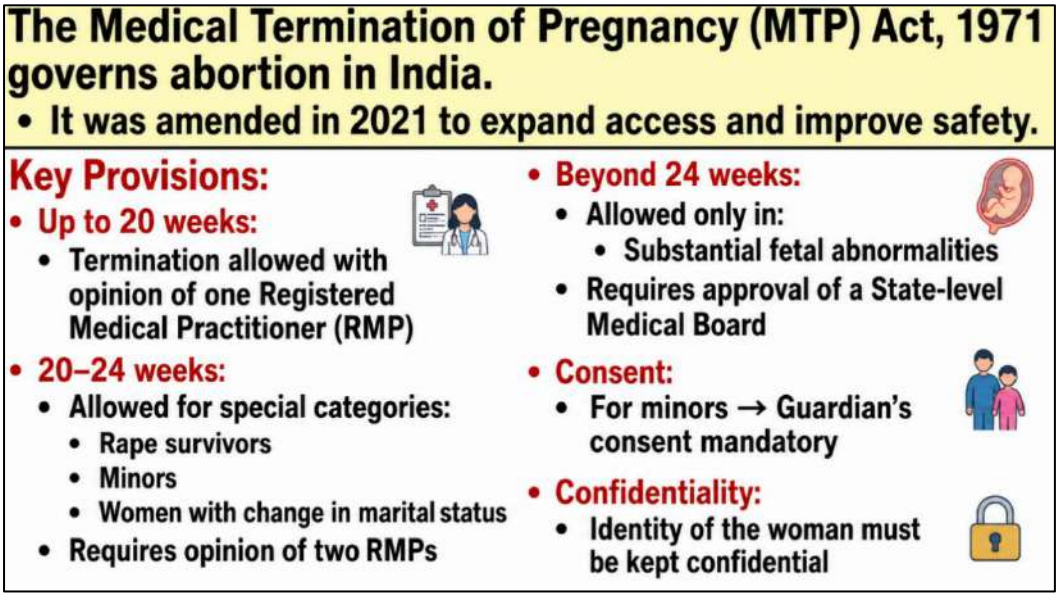
Q. The discretionary powers of Governors in government formation must be exercised within constitutional morality, democratic legitimacy and federal principles. Discuss.

1.4. Termination of Pregnancy

Context:

The Supreme Court has urged the Union Government to reconsider the 24-week limit for abortion in cases of minor rape survivors, emphasizing that rigid timelines may harm the survivor's long-term well-being. The Court stressed a rights-based and compassionate approach.

Background:



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Explanation:

- The Supreme Court highlighted that in cases of minor rape survivors, strict adherence to the 24-week limit may be unjust and harmful.
- Key Judicial Observations:
  - The decision should not be imposed by:
    - State authorities
    - Doctors alone
  - It must involve:
    - Parents/guardians
    - Consideration of the survivor's future life and dignity
- The Court emphasized that:
  - Law should not be guided by "momentary sentiments"
  - It must consider the lifelong trauma faced by the child
- Practical Issues Identified:
  - Many cases are reported late due to stigma, fear, and lack of awareness
  - This delays access and pushes cases beyond 24 weeks
- Concerns with Current System:
  - Court approvals cause:
    - Procedural delays
    - Additional mental and physical trauma
  - Medical boards may not act swiftly or uniformly

Suggestion by the Court:

- Amend the law to:
- Allow flexibility beyond 24 weeks in such cases
- Ensure time-bound decision-making (within a week)
- The Court also stressed:
- Forcing a minor to continue pregnancy may:
- Violate Article 21 (Right to Life and Dignity)
- Cause permanent psychological scars

Conclusion:

The issue reflects a critical gap between legal provisions and ground realities. The MTP framework must evolve towards a survivor-centric, flexible, and time-sensitive approach, ensuring that dignity and well-being take precedence over rigid procedural limits.

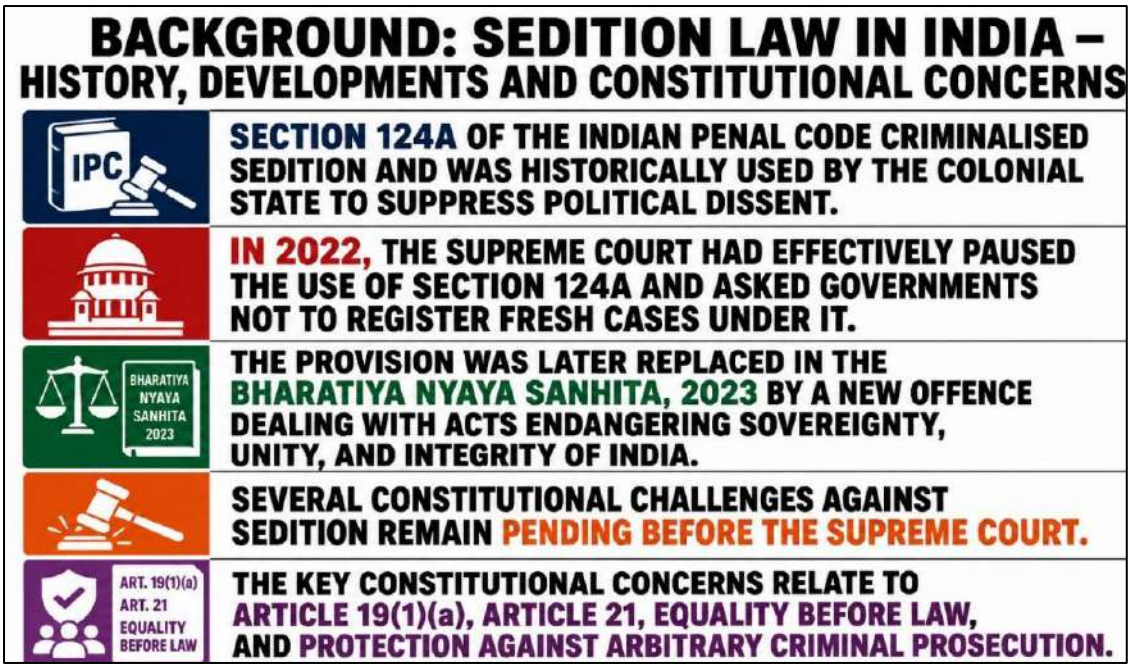
Mains Practice Question:

Q. Digital platforms have transformed political participation from institution-based mobilisation to emotion-based mobilisation. Discuss its implications for democracy, accountability and collective action. **10M (150 Words)**

1.5. Revival of Sedition Proceedings and Constitutional Concerns

Context:

The revival of proceedings under Section 124A has raised concerns about the continued use of the colonial-era sedition law. The issue is significant because sedition directly affects free speech, personal liberty, bail, and the constitutional validity of criminal restrictions on dissent.



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Explanation:

1. Free Speech and Chilling Effect:
   - Sedition-type laws can create a chilling effect because citizens may avoid criticism of the government due to fear of prosecution.
   - Democratic dissent, political speech, journalism, protests, and academic debate may be discouraged when criminal law is used broadly.
2. Colonial Legacy:
   - Sedition was designed under colonial rule to control anti-government expression.
   - Its continued use raises the question of whether a democratic constitutional republic should retain such a restrictive offence.
3. Consent and Fair Trial Concerns:
   - Allowing proceedings to continue on the basis of accused persons' consent may be problematic.
   - Poor and undertrial prisoners may consent under pressure simply to seek faster closure, bail, or relief from prolonged uncertainty.
4. Bail and Liberty:
   - If proceedings remain frozen for long periods, accused persons may face continued hardship.
   - The principle of **"bail is the rule, jail is the exception"** becomes important in such cases.
5. Constitutional Validity:
   - The central issue is whether sedition is constitutionally sustainable in a democracy.
   - The Court must balance national security concerns with freedom of expression and personal liberty.

Conclusion:

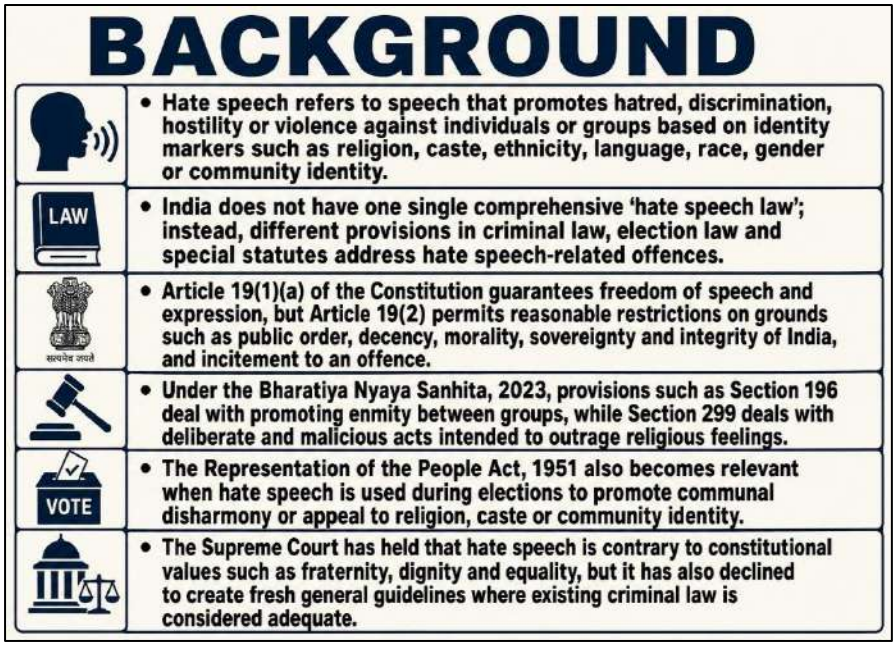
The sedition debate reflects the tension between state security and democratic freedom. A clear constitutional ruling is necessary to prevent uncertainty, protect civil liberties, and ensure that criminal law is not used to suppress legitimate dissent.

1.6. Hate Speech in India: Law, Constitution and Democratic Balance

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Context:

Hate speech has become a major constitutional and governance concern because it lies at the intersection of free speech, public order, equality, dignity and fraternity. Recent judicial debates have highlighted the difficulty of deciding when political speech, protest slogans or coded rhetoric cross the line from protected expression into criminally punishable hate speech. The larger challenge is to prevent communal hostility and targeted discrimination without weakening democratic dissent.



Causes:

- **Identity-Based Mobilisation:** Hate speech often emerges when religion, caste, ethnicity, language or regional identity is used for political mobilisation.
- **Polarised Political Competition:** Competitive politics may encourage provocative speeches, symbolic language and communal messaging to consolidate vote banks.
- **Digital Amplification:** Social media platforms can rapidly spread inflammatory content, memes, edited videos and coded messages beyond their original audience.
- **Weak Enforcement:** Delayed FIRs, selective police action and inconsistent prosecution can reduce deterrence and encourage repeat violations.
- **Ambiguity in Language:** Hate speech may not always be direct; it can operate through insinuation, symbolism, stereotypes, dog-whistle messaging and historically loaded phrases.
- **Low Constitutional Literacy:** Lack of awareness about fraternity, dignity, equality and responsible speech weakens democratic restraint in public discourse.

Impacts:

- **Threat to Social Harmony:** Hate speech can deepen communal suspicion, normalise prejudice and weaken trust between communities.
- **Risk of Violence:** Inflammatory language can create conditions for mob mobilisation, targeted attacks and public disorder.

- **Erosion of Equality and Dignity:** Hate speech harms not only public order but also the dignity and equal citizenship of vulnerable groups.
- **Chilling Effect on Minorities:** Repeated hostile rhetoric can make targeted communities feel excluded from democratic participation.
- **Damage to Democratic Discourse:** When public debate becomes abusive or polarised, reasoned disagreement and constitutional morality are weakened.
- **Pressure on Institutions:** Courts, police and election authorities face difficult questions regarding intent, context, evidence, selective enforcement and political neutrality.

Challenges:

- **Definitional Difficulty:** India lacks a single legal definition of hate speech.
- **Balancing Free Speech and Regulation:** Regulating hate speech without curbing free expression is challenging.
- **Direct vs Indirect Targeting:** Coded language can cause harm even without explicit targeting.
- **Dog-Whistle Politics:** Seemingly neutral statements may carry hidden communal messages.
- **Proof of Intent:** Establishing intent to promote hatred is often difficult.
- **Selective Enforcement:** Enforcement may vary across cases and individuals.
- **Digital Evidence Issues:** Anonymous accounts, bots and edited content complicate attribution.

Government Measures:

- **Constitutional Framework:** Article 19(1)(a) guarantees free speech, while Article 19(2) permits reasonable restrictions.
- **Bharatiya Nyaya Sanhita (BNS), 2023:** Contains provisions against promoting enmity and disturbing social harmony.
- **Election Law:** The Representation of the People Act, 1951 penalises communal and hate-based electoral appeals.
- **SC/ST Protection Act, 1989:** Punishes targeted insults and offences against SC/ST communities.
- **Judicial Intervention:** In Shaheen Abdulla v. Union of India, the Supreme Court directed suo motu action against hate speech.
- **Recent Judicial View:** The Supreme Court has emphasised better enforcement of existing laws rather than creating new ones.

Way Forward:

- **Clearer Legal Standards:** Develop clearer tests to identify punishable hate speech.
- **Context-Sensitive Assessment:** Consider context, audience, timing and potential harm.
- **Consistent Enforcement:** Ensure neutral and uniform application of laws.
- **Stronger Digital Regulation:** Improve monitoring, transparency and platform accountability.
- **Protect Legitimate Dissent:** Safeguard criticism, journalism and peaceful protest.
- **Institutional Capacity Building:** Train police and prosecutors in constitutional and legal standards.
- **Civic Education:** Promote constitutional values, fraternity and responsible public discourse.

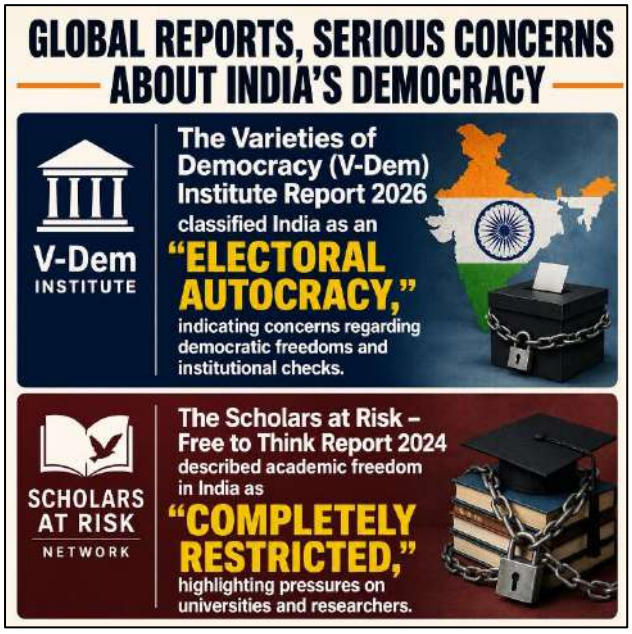
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1.7. Academic Freedom as a Pillar of Democratic Governance

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Context:

Concerns have increasingly emerged regarding the shrinking space for academic freedom, intellectual dissent, and institutional autonomy in India. Various global democracy and academic freedom assessments indicate declining standards in free expression, university independence, and protection of critical inquiry, raising broader concerns about the health of democratic institutions.



Background:

- Academic freedom refers to the freedom of students, teachers, and researchers to teach, study, publish, and express ideas without fear of political or institutional retaliation.
- Universities play a vital role in sustaining democracy by encouraging critical thinking, scientific inquiry, debate, and evidence-based policymaking.
- Global concerns include declining university autonomy, restrictions on dissent, ideological pressures in education, and growing self-censorship among scholars.
- Constitutional protections under Articles 14, 19, and 21 guarantee equality, freedom of expression, and personal liberty, forming the basis of academic and intellectual freedom.

Explanation:

Major Concerns:

- Increasing political and regulatory intervention in universities is reducing institutional autonomy and limiting independent academic functioning.
- Fear of disciplinary action, legal proceedings, or administrative pressure has contributed to growing self-censorship among students, faculty, and researchers.
- Ideological influence over curriculum design, research priorities, and campus discourse may weaken diversity of thought and critical scholarship.
- Weak institutional grievance mechanisms and inadequate protection for whistle-blowers can reduce trust within academic spaces.
- Restrictions on dissent and debate may discourage innovation, scientific inquiry, and evidence-based public discussion.
- Academic suppression can weaken democratic culture by limiting informed criticism, public accountability, and civic participation.
- International perception regarding democratic freedoms and research openness may affect India's global academic reputation and collaboration opportunities.

Way Forward:

- Universities should be granted greater institutional autonomy while ensuring accountability and transparency in governance.

- Strong legal and administrative safeguards must protect freedom of expression, research independence, and peaceful academic debate.
- Internal complaint and disciplinary mechanisms should function impartially and transparently to maintain institutional trust.
- Higher education policies should encourage pluralism, critical inquiry, and diversity of viewpoints rather than ideological conformity.
- Greater investment in research ecosystems, academic exchanges, and independent scholarship can strengthen India's knowledge economy and democratic resilience.

Conclusion:

Academic freedom is not merely an educational issue but a foundational requirement for a healthy democracy. Protecting open inquiry, institutional independence, and intellectual diversity is essential for strengthening democratic accountability, innovation, and informed public discourse in India.

Mains Prelims Question:

Q. Academic freedom is not merely an educational concern but a foundational requirement for democratic governance. Discuss in the context of institutional autonomy, dissent and evidence-based policymaking.

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1.8. PIL Jurisdiction: Time for Recalibration

Context:

The debate on whether Public Interest Litigation (PIL) jurisdiction should be reconsidered arises from concerns of misuse, judicial overreach, and agenda-driven petitions, even as PIL continues to remain a powerful instrument of social justice in India.

Background:

	Public Interest Litigation (PIL) refers to litigation filed to protect public interest or collective rights, especially of marginalized groups.
	• **It emerged in India in the late 1970s–80s as a judicial innovation led by Justices P.N. Bhagwati and V.R. Krishna Iyer.**
	• **Traditional Doctrine – Locus Standi:** • **Only an aggrieved person could approach the court.**
	• **Change under PIL:** • **Courts relaxed locus standi, allowing any public-spirited person to file petitions.**
	• **Constitutional Basis:** • **Article 32 (Supreme Court)** • **Article 226 (High Courts)**
	• **Key Features:** • **Focus on social justice and public welfare** • **Can address issues like environment, human rights, governance failures** • **Courts may even act on letters (epistolary jurisdiction)**
	• **Significance:** • **Expanded access to justice** • **Strengthened judicial activism and accountability** • **Enabled courts to protect rights of those unable to approach judiciary**

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Explanation:

- PIL has evolved from a **tool of empowerment** to a **contested judicial mechanism.**

Core Concern: Who Should File PILs?

- Expansion from "affected persons" to **any citizen** has:
- Increased accessibility
- But also enabled **frivolous or motivated petitions**

Judicial Overreach vs Necessity:

- Courts often intervene due to **executive inaction**
- However, PILs sometimes lead courts into:

Policy-making domains:

- Areas beyond judicial competence

Rise of "Ambush PILs": Poorly drafted or politically motivated petitions:

- Seek publicity or quick relief
- Burden the judiciary
- Courts now emphasize **strict scrutiny and costs** to deter misuse

Complex Nature of PIL Cases:

- Many PILs involve m**ulti-dimensional issues** & large-scale public impact.
- Courts rely on experts and amicus curiae.
- But excessive reliance risks d**ilution of procedural safeguards**

Weak Enforcement of Court Orders:

- In many PIL cases: Government agencies **delay or ignore compliance**
- This reduces: Effectiveness of judicial intervention

Need for Guidelines on Amicus Curiae:

- Amicus role sometimes expands beyond assistance
- May influence outcomes without accountability

Reform Debate:

- One view: Restrict PIL to **genuine rights violations**
- Other view: Retain flexibility to ensure **access to justice for vulnerable groups**

Conclusion:

PIL remains a cornerstone of Indian judicial activism, but its credibility depends on balancing access to justice with institutional discipline. Future reforms must ensure that PIL continues to serve as a tool for genuine public good, not a platform for misuse or overreach.

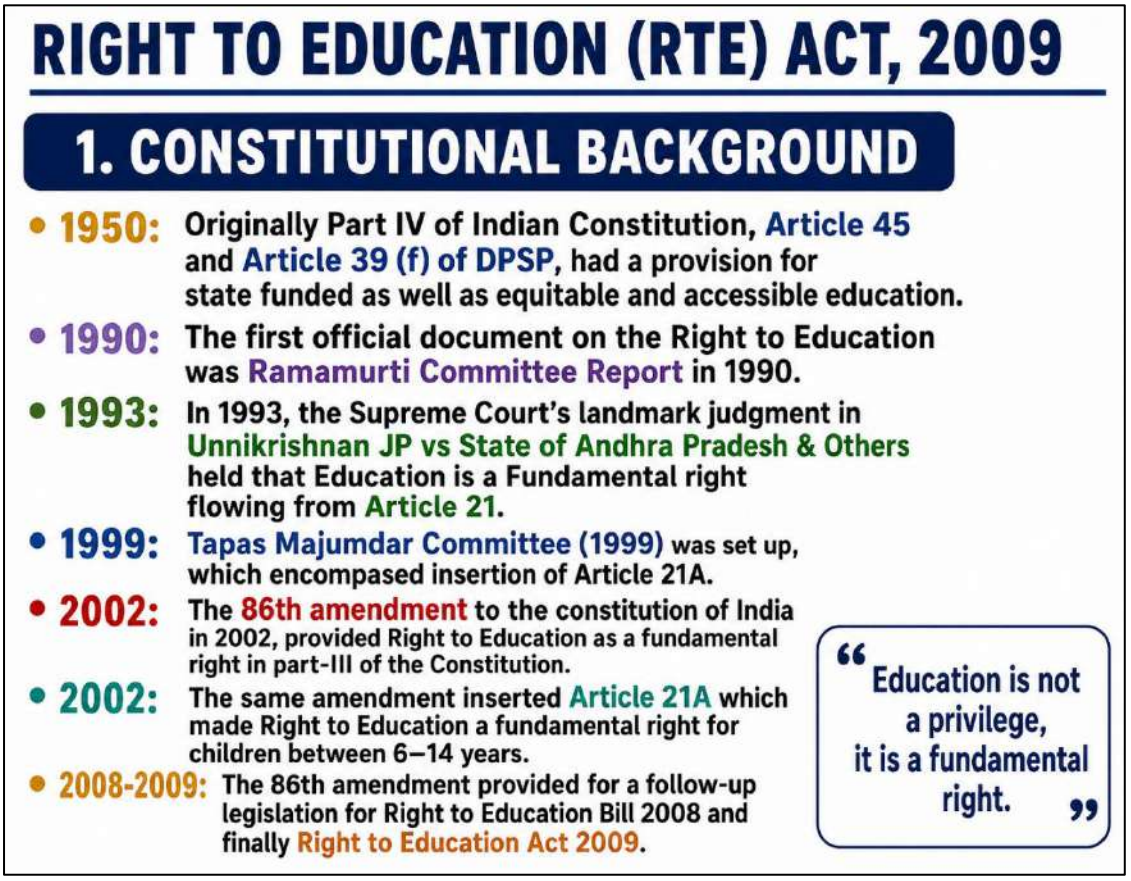
1.9. Right to Education (RTE) Act and Social Inclusion

Context:

In a recent judgment (2026), the Supreme Court reaffirmed the importance of **Section 12(1)(c)** of the Right to Education (RTE) Act, 2009, which mandates 25% reservation for disadvantaged children in private schools. The ruling emphasizes social inclusion as a constitutional goal of education policy.

Background:

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RTE Act: Core Provision for inclusive Education

- **Section 12(1)(c) of the RTE Act** mandates that private schools reserve 25% of their seats for children from economically weaker sections (EWS) and disadvantaged groups.
- This provision is designed to ensure that children from diverse backgrounds can learn together, thereby promoting social integration.
- By facilitating access to quality education for marginalized communities, the RTE Act aims to create a more inclusive educational environment that reflects the diversity of Indian society.

RTE Act: Shared Responsibility in Education

- Since the implementation of the RTE Act, over five million children have gained access to educational opportunities that were previously out of reach.
- Retention rates in these blended classrooms have averaged over 90%, indicating a positive impact on student engagement and success.
- Research, including studies like the Annual Status of Education Report (ASER), shows that mixed classrooms foster increased generosity, reduced discrimination, and enhanced pro-social behavior among students.
- These environments not only improve academic outcomes but also broaden aspirations and worldviews for children from disadvantaged backgrounds.

Challenges:

Despite the positive impact of the RTE Act, several challenges persist.

- Some private schools resist full inclusion, often imposing hidden costs for uniforms, books, and materials that can deter families from utilizing the provision.

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- Implementation of Section 12(1)(c) remains uneven across states, with gaps in transparency, grievance redress mechanisms, and last-mile outreach.
- These challenges highlight the need for clear, enforceable rules to ensure that the benefits of the RTE Act reach all intended beneficiaries.

Supreme Court View:

- The **Supreme Court's reaffirmation of Section 12(1)(c)** is significant as it reinforces the idea that the RTE Act is not a retreat from public education but a commitment to social integration.
- This judgment aligns with earlier cases, such **as the Society for Unaided Private Schools of Rajasthan v. Union of India (2012),** which emphasized the importance of balancing private and public educational responsibilities.
- The **Court's stance underscores the necessity of operationalizing the constitutional** promise of equality in education.

Way Forward:

- To realize the full potential of the RTE Act, several administrative reforms are needed. States must **ensure timely reimbursements to private schools for the reserved seats,** eliminate hidden costs imposed by these institutions, and strengthen grievance redress mechanisms.
- Improved monitoring and accountability measures, particularly through digital admission systems, can enhance transparency and ensure that inclusion norms are enforced effectively.

Conclusion:

The RTE Act represents a significant step towards achieving social integration and equality of opportunity in education. Its success depends on strengthening implementation, addressing financial and administrative gaps, and ensuring that inclusion translates into meaningful equality in classrooms.

Mains Practice Question:

Q. Section 12(1)(c) of the Right to Education Act is not merely an access provision but a tool for social inclusion and constitutional equality. Discuss. **10M (250 Words)**

1.10. Central Prabhari Officer (CPO)

The Central Prabhari Officer (CPO) Portal is a digital platform launched by NITI Aayog to eliminate persistent implementation deficits in government welfare schemes. By replacing delayed reporting with continuous data-driven supervision, the portal ensures that grassroots insights directly inform policy decisions.

Core Objectives:

- **Address Implementation Deficits:** Overcomes weak feedback loops and fragmented coordination across Centre, State, and District levels.
- **Real-Time Governance:** Transforms administrative supervision from periodic paperwork to continuous tracking.
- **Accelerate Last-Mile Delivery:** Ensures welfare initiatives reach the most marginalized communities under the Aspirational Districts/Blocks Programmes (ADP/ABP).

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1.11. Bonded Labour Rescue from Brick Kilns and Labour Rights in India

Context:

Over 400 labourers, including nearly 100 children, were rescued from brick kilns in Nizamabad, Telangana, after allegations of bondage-like working conditions, wage denial, confinement and abuse. The incident highlights persistent challenges of bonded labour, migrant worker exploitation and child labour in informal sectors.

Explanation:

- **Article 23 of the Constitution** prohibits **trafficking in human beings, begar and forced labour**; any violation is punishable by law.
- **Article 24** prohibits employment of children below 14 years in factories, mines and other hazardous employment.
- **Article 21** guarantees right to life with dignity, which includes freedom from exploitation and inhuman working conditions.
- **Directive Principles** such as **Article 39(e), Article 39(f), Article 41, Article 42 and Article 43** guide the State to protect workers, children and livelihood dignity.
- The **Bonded Labour System (Abolition) Act, 1976** abolishes bonded labour, cancels bonded debt and criminalises enforcement of bonded labour.
- The **Child and Adolescent Labour (Prohibition and Regulation) Act, 1986** restricts child labour and regulates adolescent labour.
- The **Inter-State Migrant Workmen Act, 1979** protects migrant workers through registration, wage safeguards and displacement allowance.
- Offences may also involve **human trafficking**, wrongful confinement, assault and sexual offences under criminal law.
- Legal response includes **identification, rescue, release certificate, rehabilitation assistance, compensation and prosecution of employers or contractors.**

1.12. OBC Reservation in Panchayats and the Triple Test Requirement

Context:

Uttar Pradesh has approved a dedicated commission to examine OBC reservation in Panchayati Raj institutions. This step is linked to judicial directions that OBC reservation in local body elections must be based on empirical data and follow the constitutional "triple test."

Explanation:

- **OBC reservation in Panchayats** aims to provide representation to socially and educationally backward classes in grassroots democracy.
- Panchayats are constitutional local self-government institutions under **Part IX** of the Constitution.
- **Article 243D** provides for reservation of seats in Panchayats for **Scheduled Castes, Scheduled Tribes and women.**

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- Reservation for backward classes in Panchayats can be provided by State laws, but it must satisfy judicially evolved safeguards.
- The Supreme Court has laid down the **triple test** for OBC reservation in local bodies.
- The first requirement is setting up a **dedicated commission** to study backwardness in local bodies.
- The second requirement is conducting an **empirical inquiry** to collect objective data on backwardness.
- The third requirement is fixing the reservation proportion without breaching the overall constitutional reservation limits.
- OBC reservation cannot be based only on political claims or general population estimates.

1.13. UAPA and Bail Norms: 'Bail the Rule' vs Stringent Security Laws

Context:

The Supreme Court has again discussed the question of bail under the **Unlawful Activities (Prevention) Act, 1967**, especially where trials are delayed and the accused remains in jail for long periods. The issue highlights the balance between **national security** and **personal liberty under Article 21**.

Explanation:

- **UAPA, 1967** is India's main anti-terror law, used to deal with unlawful activities, terrorist acts, terror funding and membership/support of banned organisations.
- It allows the government to declare individuals or organisations as **terrorist** or **unlawful**.
- Bail under UAPA is stricter than ordinary criminal law because of **Section 43D (5)**.
- Under Section 43D (5), bail may be denied if the court finds that accusations are **prima facie true**.
- Normally, Indian criminal law follows the principle: **"bail is the rule, jail is the exception."**
- This principle flows from **Article 21**, which protects life and personal liberty.
- However, special laws like UAPA, NDPS Act and PMLA impose stricter bail conditions.
- Courts have held that prolonged incarceration and delayed trial can violate **Article 21**.
- Therefore, even under UAPA, bail may be granted if trial delay makes detention unreasonable.
- The key issue is balancing **state security, due process, speedy trial, presumption of innocence and liberty**.

1.14. Supreme Court on Religious Instruction and Minority Educational Institutions

Context:

While reviewing the scope of Article 30(1), which protects minority educational institutions, particularly concerning those that impart religious instruction, The Supreme Court has asked the Union Government to determine if such institutions should be treated as religious institutions under Article 26(a) rather than enjoying the greater autonomy granted by Article 30(1).

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Explanation:

- A petition argued that institutions mainly teaching religion should fall under Article 26(a) dealing with religious and charitable institutions, not under Article 30(1) or Article 19(1)(g).

Why It Matters?

- Article 30(1) gives minority educational institutions greater autonomy and protection from excessive State interference.
- Bringing such institutions under Article 26(a) could allow stronger government regulation, monitoring and supervision.
- **Article 30 vs. Article 26:** A petition argued that schools primarily teaching religion should fall under Article 26(a) (freedom to manage religious affairs) rather than Article 30(1), which protects minority-run educational institutions.
- **"Educational Institutions of Choice":** The plea challenged whether "educational institutions of their choice" in Article 30 refers to religious education, arguing it should be interpreted as limited to secular/professional education.
- **Regulation of Minority Institutions:** The SC has previously held that the state has the right to regulate minority educational institutions in the national interest to ensure educational standards.
- The court noted that these matters fall within the policy domain of the government and chose not to intervene in this case and disposed the petition.

1.15. Supreme Court's "One Case One Data" Initiative and "Su Sahay" AI Chatbot

Context:

The Supreme Court of India has launched the "One Case One Data" digital initiative to integrate judicial administration from subordinate courts to the Supreme Court into a unified database system. The Court also introduced "Su Sahay", an AI-powered chatbot integrated with the Supreme Court website to improve access to justice and court-related services.

Explanation:

- India's judiciary has been undergoing digital transformation under the e-Courts Mission Mode Project implemented by the Department of Justice.
- "One Case One Data" aims to create a unified digital judicial database by assigning standardised case information across different court levels, improving interoperability and judicial data management.
- The initiative seeks to reduce duplication, improve case tracking, strengthen transparency and enhance judicial efficiency.
- Integrated judicial databases can support pendency analysis, faster case movement and better policy planning in the justice delivery system.
- "Su Sahay" is an Artificial Intelligence (AI)-based chatbot designed to help litigants access case status, filing procedures and court services through the Supreme Court website.
- AI in judiciary is increasingly used globally for legal research, document management and citizen assistance, though concerns remain regarding privacy, algorithmic bias and data security.

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1.16. NCRB Report Shows Decline in Overall Crime but Sharp Rise in Cybercrime

Context:

The National Crime Records Bureau (NCRB) Crime in India Report 2024 shows that India's overall crime rate declined by around 6% compared to the previous year. However, cybercrime cases increased significantly by nearly 17%, highlighting growing digital security challenges and online financial fraud risks.

Explanation:

- The National Crime Records Bureau (NCRB) functions under the Ministry of Home Affairs and compiles nationwide crime statistics.
- NCRB publishes the annual "**Crime in India" report** based on data submitted by States and Union Territories.
- Crime rate refers to the number of registered crimes per lakh population, enabling inter-state comparison.
- Crimes in India are broadly classified under the Indian Penal Code (IPC) and Special and Local Laws (SLL).
- Cybercrime includes offences committed using computers, digital networks, mobile devices, or the internet.
- Common cybercrimes include online financial fraud, identity theft, phishing, ransomware, cyberstalking, and sexual exploitation.
- Rapid digitalisation, online banking, UPI transactions, and social media usage have expanded cyber vulnerabilities.
- India addresses cyber threats through institutions such as the Indian Cyber Crime Coordination Centre (I4C), CERT-In, and the National Cyber Crime Reporting Portal.
- NCRB data also tracks crimes against women, Scheduled Castes (SCs), Scheduled Tribes (STs), economic offences, suicides, and accidental deaths.
- The report indicated increases in cyber fraud and drug-overdose deaths, reflecting emerging socio-economic and public health concerns alongside traditional law-and-order issues.

1.17. Increase in Supreme Court Judge Strength

Context:

The Union Cabinet has approved increasing the sanctioned strength of the Supreme Court from 34 to 38 judges, including the Chief Justice of India. The decision aims to address the growing pendency of cases and improve the efficiency of judicial functioning.

Explanation:

- The Supreme Court of India is established under **Article 124** of the Constitution and functions as the highest constitutional court in the country.
- Under **Article 124(1)**, Parliament has the authority to determine the number of judges in the Supreme Court through legislation.



- The strength of Supreme Court judges is regulated by the **Supreme Court (Number of Judges) Act, 1956**, which has been amended multiple times to increase judicial capacity.
- Before this approval, the sanctioned strength was **34 judges** consisting of the Chief Justice of India and 33 other judges. The proposal seeks to increase it to **38 judges**.
- The Supreme Court Collegium recommends names for appointment, while the President appoints judges under the constitutional framework.

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1.18. Forest Rights Act Ruling and Tharu Tribe Issue

Context:

The Lucknow Bench of the Allahabad High Court set aside the rejection of forest rights claims of the Tharu tribe in Uttar Pradesh, holding that decisions inconsistent with the Forest Rights Act, 2006 are invalid. The ruling strengthens protection against arbitrary denial of forest rights.

Explanation:

- The case concerns the **Tharu tribe of Lakhimpur Kheri (Uttar Pradesh)**, where **100+ families filed Community Forest Rights (CFR) claims** under FRA.
- The District Level Committee (DLC) rejected these claims in 2021, relying on older legal provisions instead of FRA.
- **The Forest Rights Act, 2006 recognizes individual and community rights of forest-dwelling tribes over land and resources**, with claims processed through DLCs.
- **The Court held that FRA, being a later central law, overrides earlier inconsistent orders**, reaffirming that "later law prevails."
- It emphasized that forest rights are "recognized and vested", meaning they already exist legally and are not merely granted by the state.
- The judgment clarified that DLCs cannot arbitrarily reject claims and must strictly follow FRA procedures, failing which it amounts to a legal violation.
- It directed that no eviction or interference with occupation and livelihood can occur until the full verification and recognition process is completed.
- The Court reaffirmed that traditional rights such as grazing and forest resource use are protected, even in protected forest areas.
- The case highlights a broader issue where many claims were historically rejected or forests diverted, reflecting conflicts between conservation laws and community rights.
- Overall, the ruling strengthens FRA implementation by asserting that as a central law, it overrides conflicting state actions, while also exposing ongoing gaps in enforcement and protection of tribal rights.

1.19. Delhi High Court Upholds Personality Rights

Context:

The Delhi High Court restrained unauthorised commercial use of a celebrity's name, image, and likeness, recognising personality rights. The interim order highlights judicial protection against misuse on digital platforms.

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Explanation:

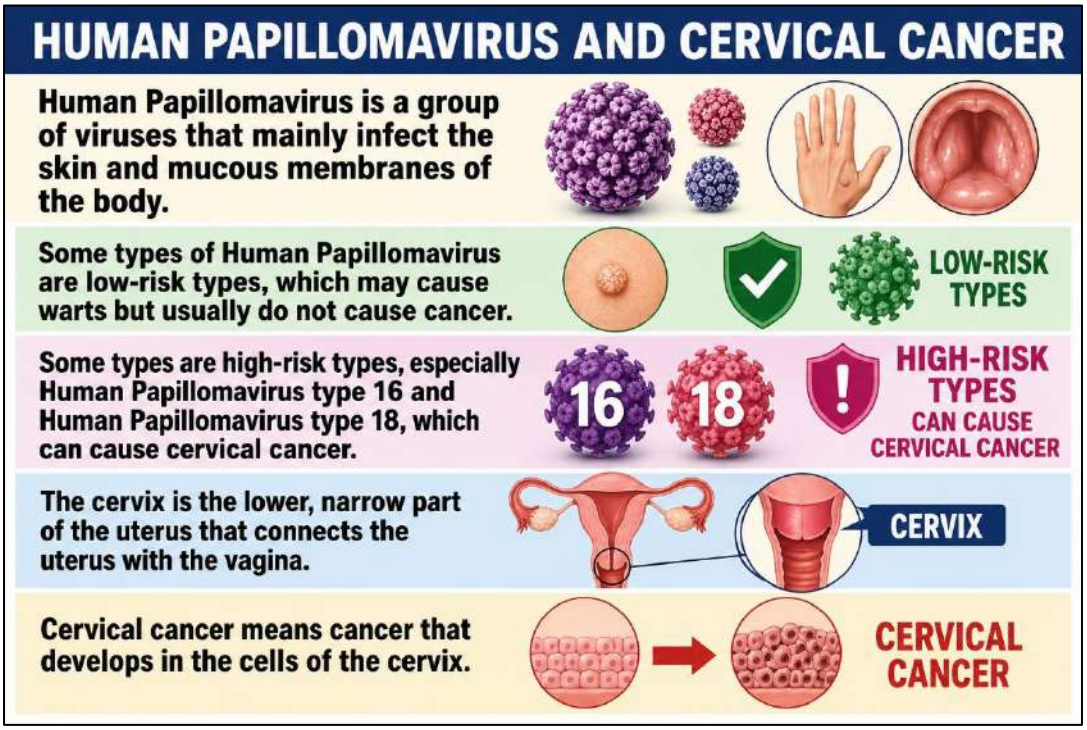
- Personality rights are legal protections that allow individuals, particularly celebrities, to control and profit from the commercial use of their identity, including their name, image, likeness, voice, and signature.
- They prevent unauthorized exploitation **(right of publicity)** and protect against unwanted public representation (**right to privacy**).
- Not explicitly codified in India but derived from **Article 21 (Right to Life and Personal Liberty)**.
- Closely linked to **Right to Privacy** (Justice K.S. Puttaswamy case, 2017).
- Also overlaps with **Intellectual Property Rights (IPR)** such as **copyright and trademark**.
- Courts grant **injunctions (interim orders)** to prevent unauthorised commercial exploitation.
- Increasing misuse on **digital platforms, AI-generated content, and advertisements**.
- Protects celebrities' **economic rights and reputation**.
- Recognised through judicial precedents like **ICC Development v. Arvee Enterprises (2003)**.

1.20. Eliminating HPV Cervical Cancer and Public Health Strategy

Context:

India has launched a nationwide **Human Papillomavirus vaccination (HPV) drive to prevent cervical cancer** among adolescent girls. This is significant because cervical cancer is one of the most common yet preventable cancers affecting women in India.

Background:



- Cervical cancer usually develops slowly through **precancerous changes**, which can be detected early through screening.
- In India, cervical cancer remains a major public health issue (2nd most common cancer in Indian Women after breast cancer) because many women are not screened regularly and diagnosis often happens at a later stage.

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Explanation:

Target Group and Coverage:

- The vaccination drive targets adolescent girls, especially girls in the **9–14 years age group**, before possible exposure to Human Papillomavirus.
- The vaccination is **voluntary and free of cost**.
- It will be provided through government health facilities such as **Ayushman Arogya Mandirs** and district hospitals.

Vaccine Used:

- India is using **Gardasil**, a quadrivalent vaccine.
- A **quadrivalent vaccine** means it protects against four types of Human Papillomavirus.
- Gardasil protects against Human Papillomavirus types **6, 11, 16 and 18**.
- Human Papillomavirus types **16 and 18** are most important because they cause the majority of cervical cancer cases.

Dose Schedule:

- India has adopted a **single-dose Human Papillomavirus vaccine regimen**, based on World Health Organization recommendations.
- A delayed second dose may be given later, usually after **3 to 5 years**, if required.

Safety and Effectiveness:

- The Human Papillomavirus vaccine is a **non-live vaccine**, meaning it cannot cause Human Papillomavirus infection.
- It works best when given before exposure to the virus.
- Studies show that Human Papillomavirus vaccines are highly effective in preventing cervical cancer caused by vaccine-covered Human Papillomavirus types.

Institutional Support:

- The vaccine has approval from the **Central Drugs Standard Control Organisation**, India's national regulatory authority for drugs and vaccines.
- The vaccine introduction was recommended by the **National Technical Advisory Group on Immunisation**, India's expert advisory body on vaccines.
- The programme is also supported through India's partnership with **Gavi, the Vaccine Alliance**, an international organisation that helps improve vaccine access.

Campaign Strategy:

- The drive will be conducted as a **special vaccination campaign**, rather than only through routine immunisation.
- Coverage will be tracked through **U-WIN**, a digital platform for vaccination registration and monitoring.

WHO Elimination Targets:

The **World Health Organization** has set three major cervical cancer elimination targets by 2030:

- **90%** of girls fully vaccinated against Human Papillomavirus by age 15.
- **70%** of women screened with a high-performance test by ages 35 and 45.
- **90%** of women with cervical disease receiving treatment and care.

Conclusion:

India's Human Papillomavirus vaccination drive is a major step from cancer treatment to cancer prevention. Its success will depend on public awareness, vaccine acceptance, last-mile delivery, and regular cervical cancer screening.

1.21. Electoral Roll Purges and Constitutional Concerns

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Context:

Recent reports highlight large-scale deletions of voters from electoral rolls in several states under the category of "logical discrepancy" during the Special Intensive Revision (SIR) conducted by the Election Commission of India (ECI). This has raised constitutional and procedural concerns regarding citizenship verification, voter rights, and institutional accountability.

Background:

- Article 326 of the Constitution provides for universal adult suffrage based on citizenship, age, and non-disqualification.
- Under Article 324 of the Constitution of India (overall control of elections) read with the Representation of the People Act, 1950, the Election Commission of India is responsible for preparation and revision of electoral rolls.
- Electoral roll revision can be **summary revision** (routine) or **intensive revision** (detailed verification).

Explanation:

1. **Nature of the Issue:**
   - Large numbers of voters were removed under vague categories such as "logical discrepancy."
   - Many commonly used documents (Aadhaar, ration card, voter ID) were reportedly not accepted.
   - Rural and poor populations faced difficulty in producing required documents.
   - Example: Around 91 lakh voters removed in West Bengal & Around 64 lakh removed in Bihar.
   - This suggests possible exclusion of genuine voters, not just correction of rolls.
2. **Citizenship vs Voter Registration:**
   - Citizenship is the fundamental basis for voting rights under Article 326.
   - The ECI can verify entries in electoral rolls but does not have the authority to determine citizenship conclusively.
   - Citizenship determination is legally under the jurisdiction of the Union Ministry of Home Affairs (As it administers the Citizenship Act 1955).
   - Hence ECI actions creating a jurisdictional overlap issue.
3. **Legal and Procedural Concerns:**
   - The Special Intensive Revision appears to have been conducted hastily, sometimes close to elections.
   - Laws permit intensive revision, but such processes require time and careful verification.
   - The removal of voters without adequate opportunity to respond violates principles of natural justice.
4. **Administrative Challenges:**
   - Many citizens, especially in rural areas, lack access to proper documentation.
   - Some reports suggest that ECI did not accept routine documents such as Addhar
   - Demanding multiple documents increases exclusion risks.
   - Booth Level Officers (BLOs) may rely on local information, which can be inconsistent.

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5. Democratic Implications:
   - Exclusion from electoral rolls effectively denies the right to vote.
   - It undermines electoral integrity and public trust in democratic institutions.
   - Mass deletions can distort electoral outcomes and representation.

Conclusion:

The issue of electoral roll purges highlights the need to balance electoral integrity with inclusiveness. Ensuring due process, clear legal boundaries, and citizen-friendly verification mechanisms is essential to uphold democratic rights and constitutional values.

1.22. Regulation of Digital Speech and IT Rules Amendments in India

Context:

The Union Government has proposed amendments to the Information Technology (IT) Rules, 2021, expanding regulatory control over online content and digital platforms. These changes have triggered concerns about freedom of speech, executive overreach, and the balance between regulation and rights in India's digital public sphere.

Background:



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Core Issues Explained:

1. Expansion of Executive Power:
   - The proposed amendments significantly increase the role of the executive (government) in regulating online content.
   - Platforms may be required to comply with government advisories, directions, and procedures even if they are not backed by formal law.
   - This weakens the traditional role of Parliament and the judiciary in setting limits on free speech.
2. Impact on Safe Harbour Protection:
   - Under Section 79 of the IT Act, platforms enjoy "safe harbour" protection if they follow due diligence norms.
   - The new rules make this protection conditional on compliance with a wide range of government-issued instructions.
   - This creates legal pressure on platforms to follow informal directives, encouraging over-compliance and censorship.
3. Conflict with Judicial Precedents:
   - The Supreme Court in *Shreya Singhal v. Union of India (2015)* held that content can only be removed based on court orders or lawful government notifications.
   - The new amendments dilute this safeguard by allowing informal executive directions to influence content moderation.
   - This undermines established constitutional protections for free speech.
4. Expansion of Oversight Mechanisms:
   - The amendments extend government oversight to include ordinary users who post news and current affairs content.
   - The Inter-Departmental Committee (IDC), originally meant for grievance redressal, is now empowered to review and recommend blocking content.
   - This expands state control beyond traditional publishers to individuals.
5. Undefined and Broad Powers:
   - The role and functioning of the IDC remain vaguely defined, creating scope for arbitrary action.
   - There is no clear threshold for intervention or guarantee of hearing for affected users.
   - This raises concerns about violation of principles of natural justice.
6. Shift from Grievance Redressal to Pre-emptive Control:
   - The regulatory framework shifts from resolving complaints to proactively monitoring and controlling content.
   - This changes the nature of digital governance from reactive to intrusive.
   - It increases the risk of suppressing legitimate expression before any harm occurs.

Space for Notes

7. **Increased Data Retention and Surveillance Risks:**
    - Platforms may be required to retain user data, including browsing and communication records, for extended periods.
    - Longer data retention increases risks of misuse, data breaches, and surveillance.
    - It alters the relationship between citizens and digital platforms, encouraging self-censorship.
8. **Chilling Effect on Free Speech:**
    - Unclear liability and fear of penalties will push platforms to remove content proactively.
    - Users may avoid expressing opinions due to fear of monitoring or content removal.
    - This leads to a "chilling effect" where free expression is indirectly suppressed.
9. **Delegated Legislation and Constitutional Concerns:**
    - The amendments rely on delegated legislation, which must remain within limits set by Parliament.
    - Supreme Court judgments (e.g., *Indian Express Newspapers v. Union of India*) emphasize that such rules must not create new legal obligations beyond the parent law.
    - The current changes risk upsetting the balance between regulation and overreach.
10. **Weak Public Consultation Process:**
    - The consultation period for such significant amendments was short.
    - Major policy changes require wider debate, legislative scrutiny, and alignment with constitutional principles.
    - Lack of adequate consultation reduces transparency and accountability.

Conclusion:

The proposed amendments reflect a shift towards tighter state control over digital spaces. While regulation of harmful content is necessary, it must be balanced with constitutional safeguards, judicial oversight, and transparency to preserve democratic freedoms.

1.23. OCI Status, Eligibility and Rights of Overseas Indians

Context:

The OCI status of some foreign nationals is under scrutiny after allegations that they voted in Indian elections. OCI cardholders are allowed long-term stay and travel benefits in India, but they do **not** have political rights such as voting or contesting elections.

Explanation:

- **OCI** means **Overseas Citizen of India**; it is a special status given to eligible foreign citizens of Indian origin under the **Citizenship Act, 1955**.
- It is **not dual citizenship**, because the Indian Constitution does not permit simultaneous Indian and foreign citizenship.
- Eligible persons include foreign nationals who were Indian citizens earlier, were eligible to become Indian citizens on **26 January 1950**, or belonged to territories that later became part of India.
- A foreign-origin spouse of an Indian citizen or OCI cardholder may apply if the marriage is registered and has subsisted for at least **two years**.

Space for Notes

- Persons with parents, grandparents or great-grandparents who were citizens of **Pakistan or Bangladesh** are not eligible for OCI registration.
- OCI cardholders get **lifelong visa facility** and exemption from local police registration for any length of stay in India.
- OCI cardholders **cannot vote**, become MPs/MLAs/MLCs, hold constitutional posts, obtain an Indian passport, or acquire agricultural land, plantation property or farmhouses in India

1.24. Pride of Hills Initiative and Infrastructure Development in Himalayan States

Context:

The Union Government has allocated ₹4,900 crore to Arunachal Pradesh under the "Pride of Hills" initiative. The programme aims to strengthen infrastructure, connectivity, and socio-economic development in Himalayan and hill States, particularly in strategically important border regions.

Explanation:

- India's Himalayan and hill States face unique developmental challenges due to difficult terrain, sparse population, fragile ecology, and poor physical connectivity.
- Border States such as Arunachal Pradesh are strategically important because they share international boundaries with China, Bhutan, and Myanmar.
- Infrastructure gaps in roads, tunnels, bridges, digital connectivity, power supply, and healthcare affect economic growth as well as national security preparedness.
- The "Pride of Hills" initiative is a Central Government programme aimed at improving infrastructure and connectivity in Himalayan and hill regions through targeted financial assistance.
- The initiative focuses on all-weather road connectivity, border infrastructure, tourism promotion, rural development, telecommunications, and access to public services.
- The current "Pride of Hills" initiative is a subset or special component of the larger "Special Assistance to States for Capital Investment" (SASCI) scheme. The scheme is operated by the Ministry of Finance.
- Improved connectivity supports faster movement of defence forces, disaster management operations, trade, and local economic activities.
- Arunachal Pradesh is a key frontier State in India's Act East Policy and Indo-Pacific strategy because it connects India with Southeast Asia through the North-East region.
- Development in hill States must balance strategic infrastructure creation with environmental sustainability because the Himalayan ecosystem is ecologically fragile and prone to landslides, earthquakes, and climate-related disasters.

1.25. CBI Director Extension and Selection Committee

Context:

The Central Government has extended the tenure of CBI Director Praveen Sood by one year. The decision was taken on the recommendation of the statutory Selection Committee. The CBI functions under the Delhi Special Police Establishment (DSPE) Act, 1946.

Space for Notes

Explanation:

- The Director of the CBI is appointed by the Central Government on the recommendation of a three-member committee under the provisions of the Delhi Special Police Establishment (DSPE) Act, 1946, as amended by the Lokpal and Lokayuktas Act, 2013.
- The Selection Committee consists of the Prime Minister, Leader of Opposition in Lok Sabha, and Chief Justice of India or a Supreme Court judge nominated by the CJI.
- The committee recommends senior IPS officers based on integrity, experience, and competence.
- The Director has a minimum tenure of two years to ensure institutional independence.
- The Central Government can grant annual extensions up to a maximum total tenure of five years.

1.26. Plea Bargaining under India's Criminal Justice System

Context:

The Union Home Ministry is reviewing reforms related to plea bargaining amid concerns regarding its limited use in India's criminal justice system. Experts argue that despite being introduced to reduce pendency and speed up trials, plea bargaining has not achieved significant success under existing criminal laws and the new Bharatiya Nagarik Suraksha Sanhita (BNSS).

Explanation:

- Plea bargaining is a pre-trial negotiation in which an accused agrees to plead guilty in exchange for reduced punishment or lesser charges.
- It was introduced in India through the Criminal Law (Amendment) Act, 2005 by inserting provisions in the Code of Criminal Procedure (CrPC).
- It generally applies to offences punishable with imprisonment up to seven years and excludes serious offences affecting society.
- The objective is to reduce judicial pendency, save litigation costs, and ensure faster disposal of criminal cases.
- Under the Bharatiya Nagarik Suraksha Sanhita (BNSS), plea bargaining provisions continue with procedural safeguards.
- Plea bargaining differs from compounding of offences because plea bargaining still results in conviction, while compounding can lead to acquittal.

1.27. Supreme Court Expands Definition of Acid Attack Victims under RPwD Act

Context:

Supreme Court extends Persons with Disabilities (RPwD) Act, 2016 to persons forced To consume acid & suffer internal injuries without external disfigurement. The judgment broadens access to disability benefits, rehabilitation, and state support for survivors.

Explanation:

- The Supreme Court of India interpreted provisions of the Rights of Persons with Disabilities (RPwD) Act, 2016 in an inclusive manner.
- Acid attack survivors often suffer permanent physical, psychological, social, and economic trauma.

Space for Notes

- The RPwD Act includes "acid attack victims" among specified benchmark disabilities eligible for reservation, rehabilitation, and welfare benefits.
- The case highlighted that acid ingestion can damage internal organs such as the food pipe, stomach, intestines, and respiratory tract even without external scars.
- Disability in law is increasingly interpreted using the "social model of disability," focusing on barriers faced by individuals rather than only visible impairment.
- Article 14 of the Constitution guarantees equality before law and equal protection of laws, which influenced the Court's reasoning.
- The judgment strengthens victim-centric justice, rehabilitation rights, and access to compensation and social welfare schemes.
- The ruling also reflects the judiciary's broader role in expanding substantive rights and inclusive interpretation of welfare legislation.

1.28. Marathi Language Mandate for Taxi Drivers and Its Constitutional-Economic Implications

Context:

The Maharashtra government mandated basic Marathi proficiency for auto and taxi drivers, later extending the deadline after protests. The move has sparked debate over its constitutional validity, impact on migrant workers, and implications for economic efficiency.

Explanation:

- **Article 19(1)(d) & 19(1)(e)** guarantee freedom of movement and residence across India; **Article 19(1)(g)** ensures freedom to practice any profession.
- Restrictions on professions must be reasonable (Article 19(6)), not arbitrary or discriminatory.
- **Internal migration** is vital for urban economies (Mumbai, Delhi); migrant workers support **informal sector and services**.
- Imposing language requirements can create **entry barriers**, affecting **labour mobility, efficiency, and economic growth**.
- Raises issues of **parochialism vs cooperative federalism** and **unity in diversity**.
- Can impact **ease of doing business** and urban service delivery (transport accessibility, affordability).
- Also touches on **fundamental rights vs state policy, inclusive growth**, and **social cohesion in a unified market economy**.

1.29. Sikkim Declared India's First Paperless State Judiciary

Context:

The Chief Justice of India announced that Sikkim has become the first state in India to adopt a fully paperless judiciary. The move is part of broader judicial digitalisation efforts aimed at improving access to justice and overcoming geographical barriers.

Explanation:

- Judicial digitalisation is driven by the **e-Courts Mission Mode Project** under the **National e-Governance Plan (NeGP)**.

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- **e-Courts Mission Mode Project:** A government initiative to digitise the judiciary by enabling e-filing, virtual hearings, and electronic case management for faster and accessible justice delivery.
- Enhances **access to justice (Article 39A)** by reducing barriers of distance, cost, and time.
- Particularly relevant for hilly and remote regions like Sikkim where physical access is difficult.
- Promotes transparency, efficiency, and speedy justice delivery, addressing pendency issues.
- Linked with initiatives like Digital India, e-Governance, and ICT in judiciary.
- Use of video conferencing, e-signatures, and cloud-based storage reduces dependency on physical infrastructure.
- Supports the principle of Rule of Law by making legal processes more accessible and citizen-friendly.
- However, it also raises concerns about digital divide, data privacy, and cybersecurity in judicial processes.
- Overall, reflects shift from paper-based legacy systems to technology-enabled judicial ecosystem for better governance.

Prelims MCQs:

1. With reference to the discretionary powers of the Governor in government formation, consider the following statements:

1. The Governor has unlimited personal discretion in inviting a party to form government.
2. The ultimate test of majority is the confidence of the elected House.
3. The Governor should act within constitutional conventions and judicially evolved principles.

Which of the above statements is/are correct?

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

2. The debate around revival of sedition proceedings is mainly linked to which constitutional concern?

(a) Freedom of trade under Article 301
(b) Free speech, personal liberty and chilling effect on dissent
(c) Reservation in public employment
(d) Centre-State taxation powers

3. The "triple test" requirement for OBC reservation in local bodies includes:

1. Setting up a dedicated commission
2. Conducting empirical inquiry
3. Fixing reservation without breaching overall limits
4. Abolishing elections to local bodies

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Which of the above are correct?
(a) 1 and 2 only
(b) 1, 2 and 3 only
(c) 2, 3 and 4 only
(d) 1, 2, 3 and 4

4. Personality rights recognised by Indian courts mainly protect:
(a) Right to control commercial use of one's name, image, voice and likeness
(b) Right to vote in local elections
(c) Right to receive free legal aid only
(d) Right to compulsory public employment

5. With reference to the strength of Supreme Court judges, consider the following statements:
1. Article 124 establishes the Supreme Court.
2. Parliament can determine the number of Supreme Court judges through law.
3. The sanctioned strength is regulated by the Supreme Court (Number of Judges) Act, 1956.

Which of the above statements is/are correct?
(a) 1 only
(b) 1 and 2 only
(c) 2 and 3 only
(d) 1, 2 and 3

Answer Key

1. (b) **2.** (b) **3.** (b) **4.** (a) **5.** (d)

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2. International Relations

2.1. Prime Minister's Five-Nation Tour, Nordic Partnership and Arctic Strategy



Context:

Prime Minister Narendra Modi's May 15–20, 2026 tour to the UAE, the Netherlands, Sweden, Norway and Italy reflected India's effort to combine energy security, technology diplomacy, green transition and strategic diversification. The visit also coincided with the Third India–Nordic Summit in Oslo, where India's engagement with Norway, Sweden, Finland, Denmark and Iceland acquired wider importance. The tour must be understood as part of India's search for reliable partners amid West Asian instability, China-linked supply-chain concerns, Europe's changing security order and the global race for green and critical technologies.

Background:

- The UAE is a major Gulf partner for India, important for crude oil, LNG, investment, remittances, logistics and food-energy security.
- The Netherlands is a high-technology European economy with strengths in semiconductors, water management, ports, green hydrogen, agriculture and innovation.
- Sweden is a Nordic innovation power with strengths in AI, telecom, defence technology, electric mobility, clean industry, circular economy and advanced manufacturing.
- Norway is a major non-Gulf energy producer and a global leader in offshore wind, green shipping, hydropower, fisheries, Arctic research and maritime technology.
- Italy is a Mediterranean and G7 power with strengths in defence manufacturing, critical minerals cooperation, maritime transport, industrial investment and Europe–Africa connectivity.
- The Nordic countries include Denmark, Finland, Iceland, Norway and Sweden; they are located in Northern Europe and are distinct from the narrower term "Scandinavia", which generally refers to Norway, Sweden and Denmark.

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Explanation:

1. **Overall Strategic Significance:**
   - The tour shows India's move from traditional diplomacy to "technology-and-resilience diplomacy", where foreign relations are linked to semiconductors, AI, clean energy, maritime security and supply-chain diversification.
   - It also reflects India's attempt to strengthen Europe and Gulf partnerships simultaneously: the UAE for energy and investment, and Europe for technology, green growth, defence industry and market access.
   - The European leg was also connected to wider India–EU economic engagement, trade negotiations, technology cooperation and the search for trusted partners in a fragmented global order.



2. **UAE: Energy Security and Investment:**
   - In the UAE, the core focus was energy security, strategic petroleum reserves, LNG/LPG supply, investment flows, AI cooperation and maritime infrastructure.
   - The provided material highlights an expanded UAE role in India's Strategic Petroleum Reserves, a long-term LPG arrangement, investment commitments and a proposed ship-repair cluster at Vadinar.
   - For India, the UAE remains crucial because any disruption in West Asia can affect crude supply, inflation, current account deficit, currency stability and domestic energy prices.
3. **Netherlands: Semiconductors, Water and Innovation:**
   - The Netherlands leg was significant because of cooperation in semiconductors, green hydrogen, water management, smart cities, agriculture and innovation.
   - The ASML–Tata reference in the material is important because ASML represents one of the most critical nodes in the global semiconductor supply chain, while Tata's Dholera fab is central to India's semiconductor ambitions.
   - Dutch expertise in flood protection, coastal management and agriculture is relevant for India's vulnerable coast, urban flooding, climate adaptation and water security.
4. **Sweden: Strategic Partnership and Green Technology:**
   - Sweden's importance lies in innovation, telecom, AI, 5G/6G, clean technologies, defence manufacturing, sustainable mining, electric mobility and circular economy.
   - The visit elevated cooperation around strategic partnership, resilient supply chains, green industrial transition, advanced manufacturing and industry-level collaboration.

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- India–Sweden cooperation is especially relevant for decarbonising hard-to-abate sectors such as steel and cement through initiatives like LeadIT and industry transition partnerships.

5. **Norway: Green Strategic Partnership and Arctic Link:**
   - Norway's role is important because it combines energy production with green transition leadership, especially hydropower, offshore wind, green hydrogen, maritime technology and Arctic research.
   - The Third India–Nordic Summit in Oslo focused on renewable energy, digital technology, innovation, defence, sustainability, Arctic ties and wider strategic cooperation.
   - India's Arctic engagement is anchored in scientific research through Himadri station at Ny-Ålesund, Svalbard, and is linked to climate change, monsoon behaviour, Himalayan glaciers, sea-level rise and marine ecosystems.
6. **Italy: Defence, Mediterranean and Critical Minerals:**
   - Italy's importance for India lies in defence manufacturing, maritime transport, Mediterranean geopolitics, industrial investment, critical minerals and Europe–Africa connectivity.
   - The visit's Italy dimension reflects India's interest in defence industrial cooperation, strategic connectivity and triangular development cooperation in Africa through digital public infrastructure, agriculture, education and healthcare.
   - This gives India an additional European partner beyond France, Germany and the UK in defence, technology and Mediterranean engagement.
7. **India–Nordic and Arctic Strategy:**
   - Nordic countries offer India advanced capabilities in clean energy, welfare innovation, maritime technology, blue economy, digital governance, climate science and sustainable industry.
   - India's Arctic Policy, released in 2022, is based on scientific research, climate protection, economic and human development, transportation and connectivity, governance cooperation and national capacity building.
   - The Arctic matters for India because Arctic warming can influence monsoons, glacier melt, sea-level rise, coastal security, shipping routes, critical minerals and long-term geopolitics.
8. **Challenges and Way Forward:**
   - India's Arctic presence remains limited by distance, cost, logistics, specialised expertise and lack of large-scale polar infrastructure.
   - Russia–West tensions, NATO's expanded northern footprint after Finland and Sweden's accession, and growing competition over Arctic shipping and resources complicate India's balancing strategy.
   - India should expand Himadri's capacity, invest in polar research vessels, strengthen Arctic law and climate expertise, and use Nordic partnerships for green hydrogen, offshore wind, batteries, carbon capture, green ports and blue economy cooperation.
   - India must balance economic interests with climate responsibility, indigenous rights, fragile Arctic ecosystems and international law.

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Conclusion:

The five-nation tour reflects India's diplomatic shift from symbolic engagement to issue-based strategic partnerships. Energy security, semiconductor access, AI capacity, green transition, Arctic research, defence cooperation and supply-chain resilience now form the core of India's external engagement. For UPSC, this topic is important because it connects GS-II international relations with economy, science and technology, environment, energy security and geopolitical strategy.

2.2. Khalistani Extremism Declared National Security Threat by Canada

Context:

Canada has officially designated Khalistani extremist groups as a national security threat, citing their involvement in promoting violent extremist activities. The development comes amid heightened concerns over diaspora-linked extremism and its implications for bilateral relations.

Explanation:

- **Khalistan movement** is a separatist movement seeking an independent Sikh state carved out of India's Punjab region.
- It gained prominence during the **1980s–1990s**, marked by insurgency, terrorism, and counter-insurgency operations in India.
- The movement declined in India but continues to have **diaspora support**, particularly in countries like Canada, UK, and Australia.
- **Extremism and radicalisation** involve the use of ideological narratives to justify violence and separatist agendas.
- The issue is linked to **transnational security threats**, where groups operate across borders using funding, propaganda, and institutional influence.
- The **Air India Flight 182 bombing (1985)** remains one of the deadliest aviation terror attacks linked to Khalistani extremists.
- Countries classify such groups under **national security frameworks**, including anti-terror laws, intelligence monitoring, and counter-extremism policies.
- The issue affects **India–Canada relations**, involving concerns over sovereignty, terrorism, and diplomatic engagement.
- It highlights challenges of balancing **freedom of expression** with prevention of **violent extremism and terrorism financing**.

2.3. CINBAX-II 2026

- **CINBAX-II 2026**, the second edition of the India–Cambodia military exercise, concluded on **16 May 2026 in Cambodia** after a 14-day bilateral defence training programme.
- The exercise involved **120 Indian Army personnel**, mainly from the **Maratha Light Infantry Regiment**, and **160 personnel from the Royal Cambodian Army**.
- Its main aim was to improve **tactical cooperation, interoperability and joint operational preparedness** between the two armies.

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- Key training areas included **counter-terrorism operations, semi-urban drills, combat first aid, drone operations, sniper and mortar training, and disaster relief operations.**
- The exercise strengthens India's **Act East Policy**, expands defence cooperation with **ASEAN countries**, and supports India–Cambodia cooperation in **peacekeeping and regional security.**

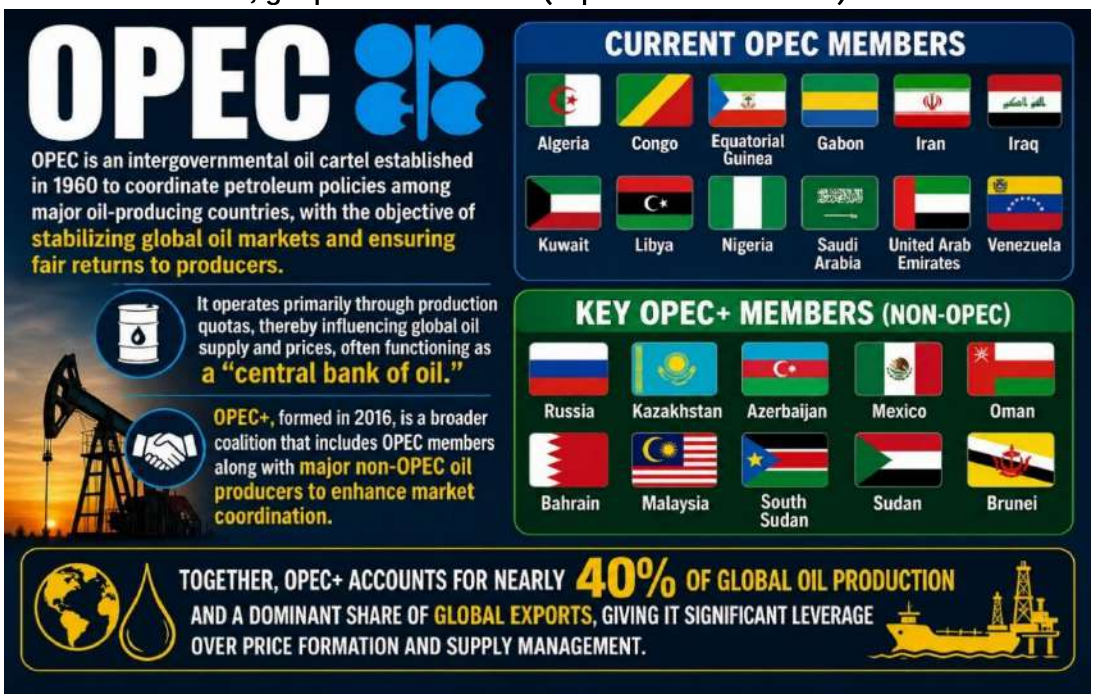
2.4. UAE's Exit from OPEC

Context:

The decision of the **United Arab Emirates (UAE)** to exit the **Organization of the Petroleum Exporting Countries** marks a significant shift in global energy governance, reflecting tensions between collective cartel discipline and national economic strategies. The development has implications for oil price dynamics, geopolitical alignments, and energy security for major importers such as India.

Background:

- **OPEC (1960, Baghdad)** is an intergovernmental organization of major oil-exporting countries to regulate supply and influence global oil prices.
- **OPEC+** formed in 2016 to stabilize prices.
- Works via **production quotas** to control supply-demand balance.
- UAE exit due to **quota disagreements, desire to increase production, diversification into renewables, geopolitical tensions (esp. with Saudi Arabia).**



Reasons for UAE's Exit from OPEC:

- **Production Constraints and Capacity Utilization**: OPEC-imposed quotas restrict the UAE's ability to fully utilize its production capacity, estimated at nearly 5 million barrels per day. The UAE seeks to maximize output to capture greater market share.
- **Strategic Economic Diversification**: The UAE is transitioning towards a **post-oil economy** (technology, finance, services), requiring higher immediate oil revenues to fund structural transformation.
- **Anticipation of Peak Oil Demand**: With the global shift toward renewable energy, the UAE aims to monetize hydrocarbon reserves rapidly before demand structurally declines.

- **Low-Cost Production Advantage**: The UAE enjoys relatively low extraction costs, enabling it to remain competitive even under lower price regimes and incentivizing higher production.
- **Geopolitical Considerations and Strategic Autonomy**: OPEC decision-making is consensus-driven, including members like Iran, which constrains flexibility. Regional tensions, particularly around the Strait of Hormuz, encourage the UAE to pursue independent energy and security strategies.
- **Desire for Independent Energy Diplomacy**: Exit allows the UAE to form bilateral energy partnerships and deploy oil policy as an instrument of national strategy rather than collective cartel policy.

Impact on the Global Oil Market and International System:

- **Weakening of Cartel Cohesion**: The exit of a significant producer undermines OPEC's collective bargaining strength and signals fragmentation within the cartel.
- **Shift Towards Competitive Market Dynamics**: Increased independent production may dilute coordinated supply cuts, leading to a more market-driven pricing mechanism.
- **Downward Pressure on Oil Prices (Long Term)**: Higher supply from UAE and potential imitation by other producers could exert sustained downward pressure on global oil prices.
- **Increased Price Volatility**: Reduced coordination among major producers may lead to supply-demand mismatches, amplifying price fluctuations. **Geopolitical Reconfiguration**: The move reflects a broader transition from multilateral energy governance to **state-centric energy strategies**, intensifying competition among producers.
- **Implications for Energy Transition**: Lower oil prices may slow down global energy transition efforts by making fossil fuels relatively more attractive in the short term.

Impact on India:

- **Reduction in Import Bill**: As a major oil importer (≈85–90% dependence), India benefits directly from lower global oil prices through reduced import expenditure.
- **Macroeconomic Stability**: Lower oil prices contribute to reduced inflation, improved fiscal balance, and enhanced current account stability.
- **Enhanced Energy Security**: Increased supply diversity and weakening of cartel control improve India's bargaining position and access to competitive oil sources.
- **Strategic Opportunity for Diversification**: India can leverage competitive pricing to diversify supply sources and strengthen strategic petroleum reserves.
- **Potential Risk of Volatility**: Increased global price fluctuations may complicate long-term energy planning and pricing strategies.

Conclusion:

The UAE's exit from OPEC represents a structural shift from coordinated cartel-based oil governance to competitive, state-driven energy strategies. While it may weaken OPEC's traditional influence, it simultaneously accelerates the transformation of global energy markets toward greater fragmentation and volatility, with mixed but largely beneficial implications for energy-importing economies like India.

Mains Practice Question:

Q. The UAE's exit from OPEC reflects a shift from collective cartel-based oil governance to state-centric energy strategies. Discuss its implications for global energy politics.

15M (250 Words)

Space for Notes

2.5. India–New Zealand Free Trade Agreement (FTA)

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Context:

India and New Zealand have signed a "historic" Free Trade Agreement (FTA), aiming to deepen trade, investment, and strategic ties. The deal includes tariff reductions, duty-free access for exports, and an investment commitment of about $20 billion from New Zealand over the next 15 years



Background:

- A Free Trade Agreement (FTA) is a pact between countries to reduce or eliminate tariffs and trade barriers.
- India has been selectively negotiating FTAs to balance domestic industry protection with global integration.
- New Zealand is a developed economy with strengths in agriculture, dairy, and services.

Explanation:

1. **Key Provisions of the Agreement:**
   - New Zealand will eliminate tariffs on **100% of goods imported from India**.
   - India will remove or reduce tariffs on **about 95% of imports** from New Zealand.
   - Tariff elimination is phased for sensitive sectors such as petroleum products and machinery.
   - India has excluded critical sectors such as **dairy, animal products, and some agricultural goods**.
2. **Investment and Economic Commitments:**
   - New Zealand has committed to invest **$20 billion in India over 15 years**.
   - Investment is expected in sectors such as infrastructure, services, and supply chains.
   - However, past trends show that investment commitments do not always translate into actual flows.
3. **Sectoral Impacts:**
   - **Positive impacts:**
     - Indian exports such as textiles, pharmaceuticals, and machinery gain better market access.
     - Services sector (IT, professionals, students) gets mobility opportunities.
   - **Concerns:**
     - Dairy sector fears competition from efficient New Zealand producers.
     - Apple growers in Himachal Pradesh and Kashmir may face price competition.
4. **Trade Liberalisation and Market Access:**
   - India has liberalised tariffs on about **70% of tariff lines**, covering 90% of trade value.
   - Preferential access for products like apples and kiwifruit is included with quota limits.
   - A fast-track mechanism is proposed to facilitate smoother trade flows.

The Regional Comprehensive Economic Partnership (RCEP) is the world's largest free trade agreement (FTA) signed by 15 Asia-Pacific nations, including ASEAN members, China, Japan, New Zealand.

India withdrew from RCEP in 2019, primarily due to concerns over surging trade deficits with China, insufficient protections for its domestic manufacturing, and threats to its agricultural/dairy sectors from competitive imports.

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5. Strategic and Policy Significance:
    - Strengthens India's global trade integration strategy post-RCEP withdrawal.
    - Enhances economic ties with a developed, rule-based economy.
    - Signals India's willingness to engage in balanced trade agreements.

Conclusion:

The India–New Zealand FTA represents a calibrated approach to trade liberalisation, balancing export promotion with domestic safeguards. Its success will depend on effective implementation, protection of vulnerable sectors, and realisation of promised investments.

Mains Practice Question:

Q. Free Trade Agreements can expand market access and investment flows, but they also raise concerns for vulnerable domestic sectors. Analyse with reference to the India–New Zealand FTA. **15M (250 Words)**

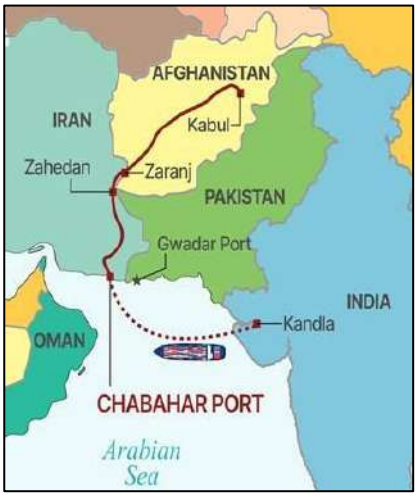
2.6. U.S. Sanctions Waivers on Russian Crude and Chabahar Port

Context:

The United States has extended the sanctions waiver allowing the continued flow of Russian crude oil through certain sanctioned entities while ending the waiver that protected India's involvement in Iran's Chabahar Port project. These contrasting decisions have significant implications for India's energy security, inflation management, regional connectivity, and strategic interests in Eurasia.

Explanation:

- **Meaning of Sanctions:** Sanctions are restrictive measures imposed by countries to influence the behaviour of another state, entity, or individual through limits on trade, finance, banking, shipping, insurance, technology transfer, or energy transactions.
- **Russian Oil Sanctions:** Following the Russia–Ukraine conflict, the U.S. and its allies-imposed sanctions on Russian energy exports to reduce Moscow's revenue and limit its war-financing capacity.
- **Extension of Russian Crude Waiver:** The U.S. has extended a temporary waiver allowing Russian crude already loaded on tankers to reach global markets, preventing abrupt supply disruptions.
- **Global Oil Market Stability:** The waiver aims to avoid supply shocks and sharp increases in oil prices, particularly amid tensions in West Asia and risks around the Strait of Hormuz.
- **Importance for India:** As a major oil importer, India benefits from stable crude prices and discounted Russian oil, which help control inflation, fuel costs, fiscal pressures, and the current account deficit.
- **India's Position:** India maintains that its energy imports are guided by commercial viability and energy security considerations rather than external political decisions.
- **Chabahar Port Significance:** Located in southeastern Iran on the Gulf of Oman, Chabahar provides India access to Afghanistan, Central Asia, Russia, and Europe while bypassing Pakistan.



Space for Notes

- **Strategic Connectivity:** The port is a key component of the International North-South Transport Corridor (INSTC) and serves as a counterbalance to China's Gwadar Port.
- **End of Chabahar Waiver:** The U.S. decision not to renew the Iran-related sanctions waiver exposes Indian entities, including India Ports Global Limited (IPGL), to potential secondary sanctions.
- **Strategic Dilemma for India:** India now faces the challenge of balancing its long-term connectivity and geopolitical interests with the risks of U.S. sanctions compliance.

Conclusion:

The contrasting U.S. decisions highlight the complex intersection of energy security, geopolitics, and economic interests. For India, sustaining affordable energy supplies while preserving strategic connectivity through Chabahar will require careful diplomatic balancing and diversification of partnerships.

Mains Practice Question:

Q. India's foreign policy must balance commercial viability, energy security and geopolitical pressure in an increasingly fragmented global order. Analyse.

10M (150 Words)

2.7. India–Trinidad and Tobago Agreement on Girmitiya Heritage

Context:

India and Trinidad and Tobago recently signed an agreement to help people of Indian origin trace their ancestral roots and reconnect with family histories. The initiative is linked to preserving the legacy of the Girmitiya community and strengthening cultural ties with the Indian diaspora.

Explanation:

- "Girmitiya" refers to Indians taken as indentured labourers to British colonies during the 19th and early 20th centuries after the abolition of slavery.
- The term originated from the word "agreement," locally pronounced as "girmit."
- Large numbers of Indians migrated to Trinidad and Tobago, Fiji, Mauritius, Guyana, Suriname, and South Africa under the indenture system. Most migrants were taken from present-day Bihar, Uttar Pradesh, and surrounding regions.

2.8. India hosts 10th edition of Indian Ocean Dialogue

Context:

India hosted the tenth edition of the Indian Ocean Dialogue in New Delhi May 7 and 8 under the theme "Indian Ocean Region in a Transforming World".

What is Indian Ocean Dialogue?



- The Indian Ocean Dialogue is a premier track 1.5 forum for open and free flowing dialogue among various stakeholders - scholars, experts, analysts, and policy makers from governments, think tanks and civil societies on strategic issues of interest and concern facing the region and beyond.
- It is a flagship initiative of the Indian Ocean Rim Association (IORA), with its origins in the 13th Council of Ministers meeting, held in November 2013 in Perth, Australia.

Space for Notes

What is the Indian Ocean Rim Association (IORA)?

- The Indian Ocean Rim Association (IORA) is an inter-governmental organisation formed in 1997 to foster regional economic cooperation. IORA has evolved into the peak regional group spanning the Indian Ocean.
- Members of IORA (23 countries): Australia, Bangladesh, the Comoros, France, India, Indonesia, Iran, Kenya, Madagascar, Malaysia, Maldives, Mauritius, Mozambique, Oman, Seychelles, Singapore, Somalia, South Africa, Sri Lanka, Tanzania, Thailand, the United Arab Emirates and Yemen.

2.9. Ethiopia–Sudan Tensions over Border Sovereignty and Insurgency

Context:

Ethiopia and Sudan recently exchanged accusations regarding territorial violations and support to armed groups. Sudan alleged drone strikes launched from Ethiopian territory with UAE involvement, while Ethiopia accused Sudanese forces of supporting militants linked to the Tigray conflict.

Explanation:



- Ethiopia and Sudan share a disputed border region called **al-Fashaga**, a fertile agricultural area internationally recognised as part of Sudan but cultivated for years by Ethiopian farmers.
- Border tensions increased after Sudan reasserted military control over parts of al-Fashaga during Ethiopia's internal instability linked to the Tigray conflict.
- The **Tigray People's Liberation Front (TPLF)** was formerly the dominant political force in Ethiopia before conflict erupted with the Ethiopian federal government in 2020.
- Ethiopia accused Sudanese military elements of supporting anti-government fighters and "mercenaries" linked to the TPLF insurgency.
- Sudan alleged that drone strikes against its territory originated from Ethiopia and involved cooperation with the United Arab Emirates.
- Sudan has been facing an ongoing civil war between the **Sudanese Armed Forces (SAF)** and the **Rapid Support Forces (RSF)**, leading to severe humanitarian and political instability.
- The dispute highlights the strategic importance of the **Horn of Africa**, which includes Ethiopia, Sudan, Eritrea, Somalia, and Djibouti.
- The Horn of Africa lies near the **Red Sea** and the **Bab-el-Mandeb Strait**, an important global maritime trade and energy route connecting the Mediterranean Sea and the Indian Ocean.
- Rising regional instability can increase refugee flows, disrupt trade routes, and intensify proxy conflicts involving external powers and regional actors.
- The African Union, headquartered in Addis Ababa, Ethiopia, often plays a mediatory role in regional conflicts and peace negotiations in Africa.

2.10. U.S. – China Relations

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Context:

A summit between Xi Jinping and Donald Trump is taking place in Beijing currently amid intensifying geopolitical instability marked by the Iran crisis, trade tensions, AI and semiconductor rivalry, and growing strategic competition in the Indo-Pacific. The meeting reflects the reality that U.S.–China relations now shape not only bilateral ties but also the broader global economic and security order.



Various Dimensions of U.S.–China Relations and Possible Outcomes of the Meeting:

Trade and Economic Relations:

- Trade tensions remain central, especially regarding tariffs, market access, and supply-chain dependence.
- Limited trade accommodation or tariff easing may emerge to reduce global economic uncertainty.
- However, strategic distrust and efforts toward supply-chain diversification are likely to continue.

Technology and AI Competition:

- AI, semiconductors, and export controls have become core areas of rivalry.
- The U.S. seeks to restrict China's access to advanced chips, while China aims for technological self-reliance.
- Continued technological decoupling may fragment global technology ecosystems.

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Iran and West Asia:

- China may play a mediatory or stabilising role due to its strong ties with Iran.
- The U.S. may seek Chinese cooperation to prevent wider regional escalation and disruption of oil supplies.
- Stability in West Asia is crucial for global energy markets and inflation control.

Taiwan and Indo-Pacific Security:

- Taiwan remains a major flashpoint, with increasing military and diplomatic tensions.
- Any improvement in communication mechanisms may reduce risks of military confrontation in the Indo-Pacific.

Impact on India:

- India may benefit from supply-chain diversification and investments shifting away from China.
- Stable U.S.–China relations could support global economic recovery and energy price moderation, benefiting India's import-dependent economy.
- However, intensified rivalry may increase strategic pressure on India regarding Indo-Pacific alignments, technology partnerships, and balancing relations with both powers.

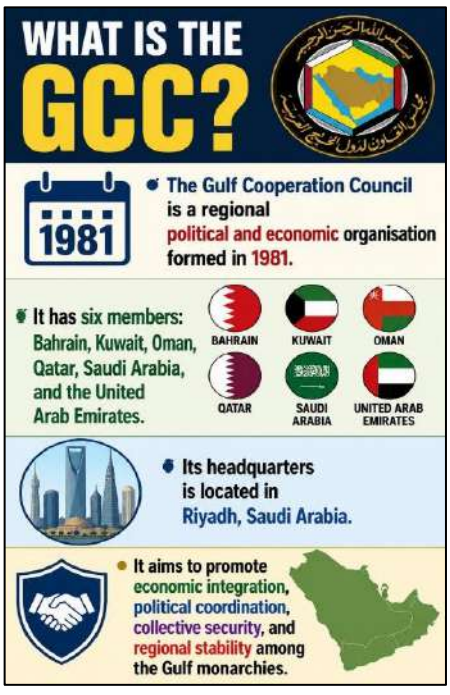
Conclusion:

The Xi–Trump summit represents more than a bilateral diplomatic engagement; it reflects the evolving structure of global power politics in an era shaped by economic interdependence and strategic rivalry. The outcomes of the meeting will significantly influence global trade, technological competition, regional security, and the strategic environment within which India must pursue its national interests.

2.11. India – Gulf Cooperation Council Strategic Ties

Context:

The recent escalation in West Asia has again highlighted the importance of the Gulf Cooperation Council (GCC) for India. The Gulf region is central to India's energy security, trade, investment flows, maritime stability, and diaspora safety, making India-GCC relations a core pillar of India's West Asia policy.



Why is the GCC important for India?

1. **Energy Security:**
   - The GCC is one of India's most important energy partners.
   - India depends heavily on Gulf countries for crude oil, liquefied natural gas, and liquefied petroleum gas.
   - Any conflict near the Strait of Hormuz can directly affect India's oil supply, inflation, current account deficit, and overall economic stability.

2. **Trade and Investment:**
   - India-GCC trade reached USD 178.56 billion in FY 2024–25, accounting for 15.42% of India's global trade.
   - The UAE is India's largest GCC trade partner, followed by Saudi Arabia.
   - GCC sovereign wealth funds are important investors in Indian infrastructure, renewable energy, logistics, digital technology, and financial services.
3. **Indian Diaspora:**
   - Around 8.9 million Indians live in GCC countries, forming nearly 66% of non-resident Indians.
   - Their remittances support Indian households and the wider economy.
   - Therefore, any regional conflict creates a major concern for India regarding evacuation, worker safety, labour rights, and social security.
4. **Strategic and Defence Cooperation:**
   - India-GCC relations have moved beyond oil and trade.
   - Cooperation now includes maritime security, defence exercises, counter-terrorism, cyber security, drones, artificial intelligence, and defence production.
   - Oman, the UAE, and Saudi Arabia are especially important for India's maritime and strategic outreach in the western Indian Ocean.
5. **Diplomatic Importance:**
   - India and the GCC share a common interest in regional stability, secure sea lanes, counter-terrorism, and balanced West Asia diplomacy.
   - The India-GCC Joint Action Plan 2024–2028 has expanded cooperation into health, trade, energy, security, agriculture, food security, transport, and culture.
6. **Challenges in India-GCC Relations:**
   - India remains highly dependent on GCC energy imports, creating vulnerability during regional crises.
   - Trade is still imbalanced because India imports more energy than it exports goods and services.
   - Labour welfare issues, including wage delays, harsh working conditions, and localisation policies such as Saudisation and Emiratisation, can affect Indian workers.
   - Regional instability involving Iran, Israel, Yemen, and the Red Sea creates diplomatic and energy-security risks.
   - China's growing presence in the Gulf adds a strategic challenge for India.
7. **Way Forward:**
   - India should fast-track the India-GCC Free Trade Agreement to deepen trade and services cooperation.
   - India must strengthen labour agreements, grievance redressal systems, and social security portability for Indian workers.
   - Defence cooperation should expand into maritime security, drones, counter-drone systems, and joint production.
   - India should use GCC partnerships for renewable energy, green hydrogen, artificial intelligence, fintech, logistics, and connectivity projects like the India-Middle East-Europe Economic Corridor.
   - A regular India-GCC summit mechanism can institutionalise strategic dialogue.

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Conclusion:

India-GCC relations have evolved from a traditional oil-and-remittance relationship into a broader strategic partnership covering energy, trade, investment, defence, technology, and diaspora welfare. For India, the GCC is not merely part of West Asia; it is an essential pillar of India's extended neighbourhood strategy and economic security architecture.

2.12. India–Cyprus Strategic Partnership and Defence Cooperation

Context:

India and Cyprus have elevated their bilateral ties to a **strategic partnership** and signed a pact for defence cooperation. The move is significant as Cyprus is an important EU member in the eastern Mediterranean and may act as a bridge for India's engagement with Europe and the IMEEC corridor.



Explanation:

- **Cyprus** is an island country in the **eastern Mediterranean Sea**, located near Turkey, Syria, Lebanon and Israel.
- It is a member of the **European Union**, making it diplomatically important for India's outreach to Europe.
- India and Cyprus support each other on issues of **sovereignty and territorial integrity**.
- Cyprus has traditionally supported India's position on **Jammu and Kashmir**, while India supports Cyprus on its territorial concerns.
- Cyprus remains divided between the internationally recognised **Republic of Cyprus** and the Turkish-controlled northern part.
- The new cooperation includes **defence, cybersecurity, maritime domain awareness and emerging technologies**.
- Cyprus can become an entry point for Indian companies into the **EU market**.
- The partnership is also linked to the **India-Middle East-Europe Economic Corridor (IMEEC)**.
- **IMEEC** aims to improve connectivity between India, West Asia and Europe through rail, shipping, energy and digital corridors.

2.13. India Re-Listed by EU for Aquaculture Exports

Context:

The European Union has re-included India in the list of countries permitted to export aquaculture products to EU markets from September 2026. The decision follows India's compliance with EU restrictions on the use of antimicrobials in food-producing animals.

Explanation:

- Aquaculture refers to the farming of fish, crustaceans, molluscs, and other aquatic organisms for commercial production.
- India is one of the world's largest producers and exporters of shrimp and seafood products, with the EU being an important export destination.

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- The European Union imposes strict Sanitary and Phytosanitary (SPS) standards to ensure food safety and prevent health risks from imported food products.
- Antimicrobials and antibiotics are regulated in aquaculture because excessive use can cause Antimicrobial Resistance (AMR), a major global public health concern.
- The EU prohibits use of certain antimicrobials for growth promotion in food-producing animals and closely monitors residue levels in imported seafood.
- India improved traceability systems, residue monitoring, certification, and quality control measures to meet EU norms.
- Compliance with international food safety standards strengthens India's marine exports, foreign exchange earnings, and fisheries sector growth.

2.14. India–Vietnam Relations Elevated to Enhanced Comprehensive Strategic Partnership

Context:

India and Vietnam have agreed to elevate their bilateral ties to an "Enhanced Comprehensive Strategic Partnership," focusing on defence cooperation, maritime security, trade, connectivity, and supply-chain resilience. The development gains significance amid growing concerns over China's assertiveness in the South China Sea and the broader Indo-Pacific region.

Explanation:



- India and Vietnam share close historical, cultural, and strategic relations rooted in civilisational and anti-colonial connections.
- Vietnam is an important member of Association of Southeast Asian Nations, which is central to India's Act East Policy and Indo-Pacific strategy.
- India and Vietnam upgraded ties to a Comprehensive Strategic Partnership in 2016, especially strengthening defence and maritime cooperation.
- The South China Sea is a strategically important sea route connecting the Pacific and Indian Oceans and carries a major share of global trade.
- Both India and Vietnam support freedom of navigation, overflight rights, and peaceful dispute resolution under the United Nations Convention on the Law of the Sea (UNCLOS), 1982.

2.15. India Calls for Unified SCO Action Against Terrorism

Context:

India's Defence Minister Rajnath Singh urged Shanghai Cooperation Organisation (SCO) members to adopt a unified and consistent approach to eliminate terrorism, emphasizing zero tolerance and rejecting double standards, especially on state-sponsored cross-border terrorism in its recent meet in **Bishkek, Kyrgyzstan** on April 28, 2026.

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Explanation:

- **SCO (Shanghai Cooperation Organisation)** is a Eurasian political, economic, and security grouping established in **2001** at Shanghai.
- Originated from the **Shanghai Five (1996)**: China, Russia, Kazakhstan, Kyrgyzstan, Tajikistan; later expanded.
- Current members: **China, Russia, India, Pakistan, Kazakhstan, Kyrgyzstan, Tajikistan, Uzbekistan, Iran (recently added)**.
- Focus areas: **regional security, counter-terrorism, anti-extremism, connectivity, economic cooperation**.
- Key body: **RATS (Regional Anti-Terrorist Structure)** based in Tashkent for intelligence sharing and coordination.
- SCO works on principles of **sovereignty, non-interference, consensus-based decision making**.

2.16. Selection Process of the UN Secretary-General

Context:

The process to select the next UN Secretary-General is underway, with candidates presenting their visions before the UN General Assembly. The selection comes at a time of global crises, making the leadership role crucial.

Explanation:

- The **Secretary-General (SG)** is the **chief administrative officer** of the UN as per **Article 97 of the UN Charter**.
- The SG is **appointed by the UN General Assembly on the recommendation of the UN Security Council (UNSC)**.
- The **UNSC has 15 members**: 5 Permanent Members (USA, UK, Russia, China, France) with **veto power**, and 10 non-permanent members elected for 2-year terms.
- Any one of the **P5 can block a candidate** using veto, making UNSC recommendation decisive.
- The **General Assembly (193 members)** formally appoints the SG by majority vote.
- Traditionally, the SG serves a **5-year term**, renewable once.
- There is an **informal regional rotation system** among continents (Africa, Asia-Pacific, Latin America, Western Europe, Eastern Europe).
- The SG acts as a **global diplomat, mediator, and spokesperson**, using "good offices" for conflict resolution.

2.17. PRAGATI 2026: Multinational Military Exercise in Meghalaya

Context:

A 13-nation military exercise, **PRAGATI 2026**, has commenced at the **Umroi Military Station in Meghalaya**. Apart from India, soldiers from 12 friendly countries are participating to strengthen professional exchange and military-to-military cooperation.

Explanation:

- **Military exercises** are organised to improve interoperability, joint training, tactical coordination and defence diplomacy among participating armed forces.

- **PRAGATI 2026** involves India and countries such as Bhutan, Cambodia, Indonesia, Laos, Malaysia, Maldives, Myanmar, Nepal, Philippines, Seychelles, Sri Lanka and Vietnam.
- Such exercises are important for India's **Act East Policy**, regional security cooperation, capacity building, counter-insurgency preparedness and stronger ties with neighbouring and Indo-Pacific countries.

Space for Notes

Prelims MCQs

1. Consider the following countries:
1. Saudi Arabia
2. United Arab Emirates
3. Qatar
4. Iran
5. Oman

Which of the above are members of the Gulf Cooperation Council?
(a) 1, 2, 3 and 5 only
(b) 1, 2, 3 and 4 only
(c) 2, 3, 4 and 5 only
(d) 1, 2, 3, 4 and 5

2. Consider the following countries:
1. Bahrain
2. Kuwait
3. Iraq
4. Oman
5. Qatar

Which of the above are members of the Gulf Cooperation Council?
(a) 1, 2, 4 and 5 only
(b) 1, 2, 3 and 4 only
(c) 2, 3, 4 and 5 only
(d) 1, 2, 3, 4 and 5

3. Consider the following countries:
1. United Arab Emirates
2. Saudi Arabia
3. Yemen
4. Kuwait
5. Bahrain

Which of the above are members of the Gulf Cooperation Council?
(a) 1, 2, 4 and 5 only
(b) 1, 2, 3 and 4 only
(c) 2, 3, 4 and 5 only
(d) 1, 2, 3, 4 and 5

Answer Key

1. (a) **2.** (a) **3.** (a)

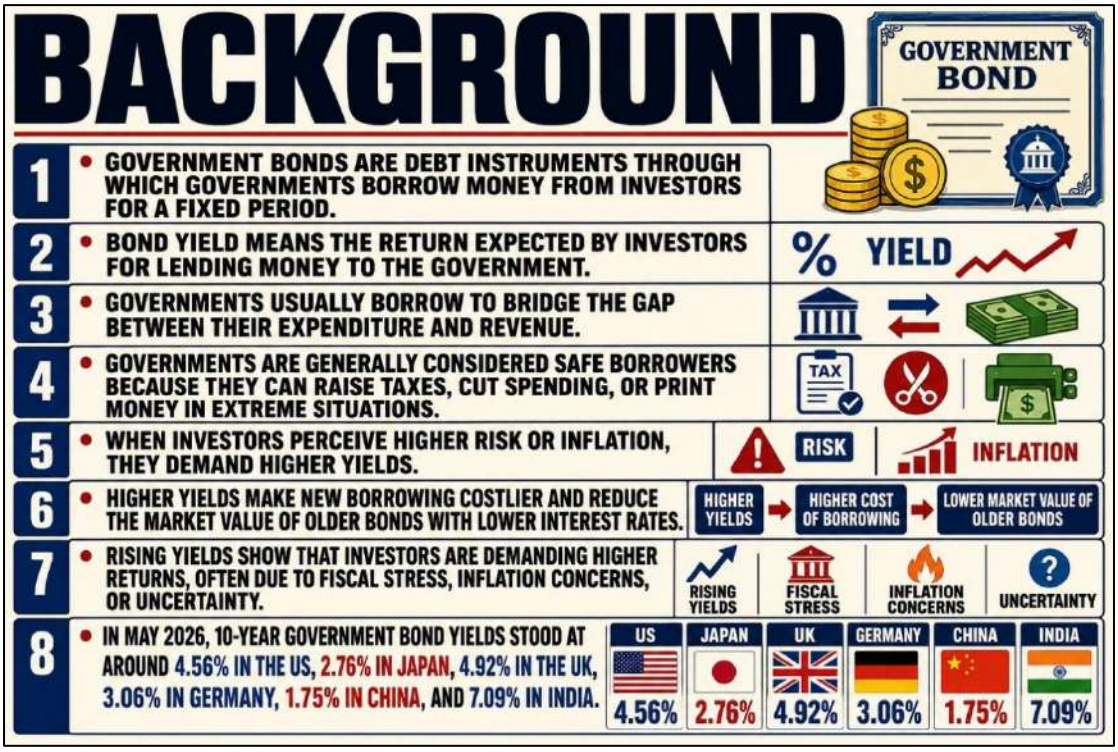
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3. ECONOMY

3.1. The Economic Impact of Rising Government Bond Yields

Context:

Rising government bond yields indicate that it is becoming costlier for governments to borrow money. This trend affects not only public finances but also households, businesses, investors, and the wider economy.



Explanation:

Costlier Government Borrowing:

- When bond yields rise, governments must pay higher interest on fresh borrowings.
- This increases the fiscal burden, especially for countries with high public debt.

Impact on Existing Bonds:

- Older bonds with lower yields become less attractive in the market.
- Investors may sell such bonds at a discount, leading to capital losses.

Pressure on Public Spending:

- Higher interest payments reduce the money available for welfare schemes, infrastructure, defence, health, and education.
- Governments may be forced to cut expenditure or raise taxes.

Impact on People and Businesses:

- Government bond yields act as a benchmark for other interest rates.
- When yields rise, loans for businesses, housing, vehicles, and consumption may also become costlier.
- This can reduce investment, demand, and economic growth.

Global Risk Dimension:

- Rising yields across major economies can create stress in global financial markets.
- Countries with weaker fiscal positions may face greater difficulty in borrowing.

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Conclusion:

Rising government bond yields are a warning signal for the economy. They increase borrowing costs, strain government budgets, reduce bond values, and can make credit costlier for people and businesses.

Mains Practice Question:

Q. Rising government bond yields can strain public finances by increasing interest payments and reducing fiscal space for welfare and development expenditure. Discuss.

15M (250 Words)

3.2. Forex Reserve Management and India's Development Path

Context:

India is facing pressure on its foreign exchange reserves, the rupee, and import bill because of the West Asia crisis, rising oil prices, gold imports, and capital outflows. The government is therefore asking citizens to reduce activities that require large amounts of foreign currency.



Government Appeal and Its Critical Analysis:

Government's Economic Appeal:

1. Reducing Fuel Consumption:
   - Citizens have been encouraged to reduce fuel consumption through greater use of public transport, electric vehicles, and work-from-home arrangements wherever feasible.
   - The objective is to reduce crude oil imports and thereby lower foreign exchange outflows arising from petroleum purchases.

2. **Curtailing Non-Essential Foreign Exchange Expenditure:**
    - People have been advised to avoid unnecessary foreign travel and reduce expenditure involving foreign currency.
    - Such measures aim to conserve foreign exchange reserves during a period of external economic uncertainty.
3. **Discouraging Gold Imports:**
    - Citizens have been encouraged to postpone or reduce gold purchases because India imports most of its gold requirements.
    - Large-scale gold imports increase dollar demand and widen the Current Account Deficit, thereby exerting pressure on the rupee.
4. **Promoting Domestic Consumption:**
    - Greater use of domestically produced goods has been emphasised as a means of reducing import dependence and supporting local industries.
    - The broader objective is to improve economic self-reliance and reduce vulnerability to global supply disruptions.
5. **Reducing Excessive Chemical Fertiliser Usage:**
    - Farmers have been encouraged to reduce excessive dependence on imported chemical fertilisers and gradually adopt balanced agricultural practices.
    - This is linked to rising fertiliser import costs and disruptions in global supply chains.

Critical Analysis of the Appeal:

1. **Risk of Slower Economic Growth:**
    - Excessive emphasis on reducing consumption may weaken aggregate demand and adversely affect sectors dependent on consumer spending.
    - Lower consumption of travel, fuel, and discretionary goods can reduce business activity and slow economic growth.
2. **Structural Dependence on Imports:**
    - India cannot rapidly eliminate dependence on imports because several critical sectors such as energy, fertilisers, and edible oils lack sufficient domestic production capacity.
    - Abrupt reductions in imports may disrupt industrial production and agricultural productivity.
3. **Concerns Regarding Agricultural Output:**
    - Sharp reductions in chemical fertiliser usage without adequate alternatives may reduce crop productivity and worsen food inflation.
    - This concern becomes more significant during periods of climatic uncertainty and supply-side stress.
4. **Limited Immediate Alternatives:**
    - Domestic substitutes for imported edible oils, energy products, and industrial inputs cannot be scaled up quickly enough to fully replace imports.
    - Regional consumption preferences and supply constraints further limit rapid substitution.
5. **Pressure on Inflation and Household Welfare:**
    - Rising import costs and rupee depreciation can increase inflation across fuel, transport, food, and essential commodities.
    - Lower-income households are likely to face a disproportionate burden due to higher living costs.

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Need for Long-Term Structural Solutions:

- Sustainable external sector stability requires higher exports, improved manufacturing competitiveness, stronger productivity growth, and greater investment inflows.
- Merely suppressing consumption may provide temporary relief but cannot substitute long-term economic strengthening.

Conclusion:

The current external economic pressures highlight India's vulnerability to global commodity shocks and geopolitical disruptions. While temporary conservation measures may help reduce foreign exchange stress in the short term, long-term resilience will depend on expanding domestic production capacity, strengthening exports, improving productivity, and reducing structural import dependence through sustained economic reforms.

Mains Practice Question:

Q. India's foreign exchange reserve pressures reveal the economy's vulnerability to global commodity shocks, capital outflows and geopolitical disruptions. Discuss.

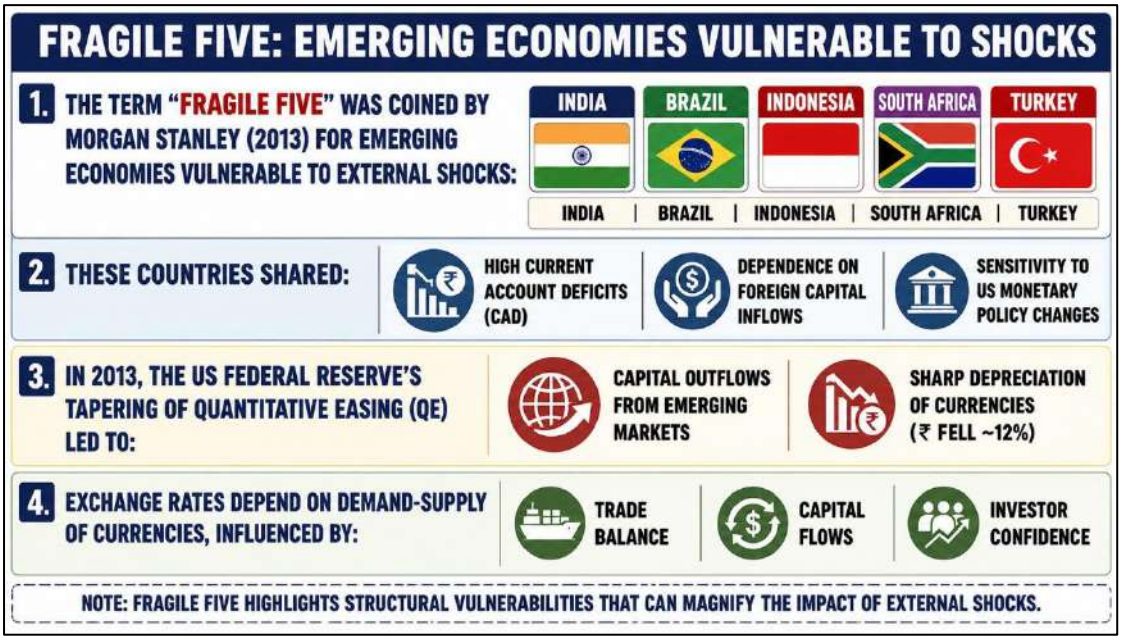
10M (150 Words)

3.3. Rupee Depreciation: Fragile Five Revisited

Context:

The Indian rupee has recently depreciated sharply (around **12% over the past year**), raising concerns about a possible return to the **2013 "Fragile Five" scenario**, when India faced currency instability due to external imbalances.

Background:



Explanation:

1. Current Rupee Weakness (2025–26):
   - Rupee has depreciated ~**12% in the last 12 months**, unusually high compared to normal 3–4% yearly decline
   - Recently touched **historic lows (~₹95/$)**
   - Indicates **external sector stress**

Space for Notes

2. **Comparison with 2013 Crisis:**

Similarity:	Difference:
○ Currency depreciation driven by **external imbalances**	○ 2013 fall was **sudden and sharp (crisis-like)**
○ Pressure due to **capital outflows and global monetary tightening**	○ 2026 fall is **more gradual and spread out** ○ Thus, current situation = **stress but not full-blown crisis**

3. **Balance of Payments (BoP) Concerns:**
   - BoP has two components:
     - **Current Account** → trade in goods & services
     - **Capital Account** → foreign investments
   - Present issue: India faces **deficits in both accounts simultaneously**
   - This is risky because:
     - CAD → more imports than exports
     - Capital outflow → less foreign money coming in
     - Together → **pressure on rupee + forex reserves**

4. **Causes of Current Weakness:**

Current Account Deficit:	Capital Account Issues:
○ Weak export growth due to **global slowdown**	○ Decline in **foreign portfolio investment (FPI)**
○ High import dependence (especially **oil, electronics**)	○ Weak **FDI inflows** in manufacturing
○ Reduced competitiveness in manufacturing	○ Indians investing more abroad → capital outflow

5. **Why Situation is Not Exactly 2013 Yet:**
   - Stronger **forex reserves buffer**
   - Better **macroeconomic management**
   - More stable financial system
   - Controlled inflation compared to earlier

6. **Risks Going Forward:**
   - Continued depreciation can:
     - Increase **import costs (inflation)**
     - Widen **trade deficit**
     - Reduce **investor confidence**
   - If both deficits persist → possibility of **external sector vulnerability**

Conclusion:

While the rupee's depreciation shows signs of external stress similar to 2013, India's stronger macroeconomic fundamentals prevent an immediate crisis. However, persistent twin deficits and weak capital inflows could increase vulnerability if not addressed.

Mains Practice Question:

Q. The recent depreciation of the rupee reflects external sector stress but not necessarily a repeat of the 2013 Fragile Five crisis. Analyse. **10M (150 Words)**

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3.4. India's 1st Mega Greenfield Shipyard at Thoothukudi

India signed a tripartite Memorandum of Understanding to establish its first **Mega Greenfield Shipyard** at Thoothukudi, Tamil Nadu. The project will be developed jointly by **HD Korea Shipbuilding & Offshore Engineering (HD KSOE)**, **NSHIP-TN** and **Sagarmala Finance Corporation Limited (SMFCL)**.

- The proposed shipyard will have an annual capacity of **2.5 million Gross Tonnage (GT)** and is expected to create around **15,000 direct jobs**, making it one of the most significant maritime industrial investments in India's recent history.

3.5. Withholding Tax Cut to Attract Foreign Investors

Context:

The Government of India is considering reducing withholding tax on government bonds for foreign investors to attract greater foreign capital inflows. The move comes amid concerns over foreign exchange reserves, capital outflows, and pressure on the rupee due to global economic uncertainty.

Explanation:

- Withholding tax is a tax deducted at source on income earned by non-resident investors, such as interest earned on government securities and bonds.
- India currently imposes relatively high withholding tax rates on foreign investors compared to several other economies.
- Lower withholding tax can increase attractiveness of Indian government bonds for Foreign Portfolio Investors (FPIs) seeking better post-tax returns.
- FPIs invest in stocks, bonds, and financial assets, while Foreign Direct Investment (FDI) involves long-term investment in productive sectors.
- Higher foreign capital inflows help strengthen foreign exchange reserves, stabilise the rupee, and support the Current Account Deficit (CAD).
- India's forex reserves are managed by the Reserve Bank of India (RBI) to ensure external sector stability and currency confidence.
- Global geopolitical tensions, oil price volatility, and capital flight from emerging markets affect exchange rates and investment flows.

3.6. Growth of Agricultural Exports Amid Protectionism

Context:

India's agricultural exports recorded moderate growth in 2025–26 despite higher tariff barriers and protectionist measures imposed by the United States. Indian farm exports diversified toward alternative global markets and high-demand products such as marine products, buffalo meat, coffee and basmati rice, reducing excessive dependence on the U.S. market.

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Background:



Explanation:

What Exactly is Happening?

- The United States increased tariffs on several imported products under its protectionist trade policies. Such tariffs normally reduce export competitiveness by increasing prices in the importing country.
- Despite these challenges, India's agricultural exports still grew because exporters successfully diversified markets and products instead of depending excessively on the U.S. market.
- India's overall agricultural exports increased to more than $53 billion in 2025–26, although the growth rate remained moderate.

Major Performing Agricultural Exports:

- Marine products remained India's largest agricultural export category due to strong demand in East Asia, West Asia and Europe.
- Buffalo meat exports increased significantly because of rising demand from countries such as Vietnam, Malaysia, UAE and Saudi Arabia.
- Coffee exports performed strongly because global coffee shortages and climate-related disruptions in Brazil and Vietnam increased international prices.
- Basmati rice continued to remain an important export item due to India's strong comparative advantage in aromatic rice production.

Diversification of Export Markets:

- Indian exporters shifted toward Asian, Gulf and African markets to reduce dependence on Western economies.
- This diversification reduced the economic impact of U.S. tariff barriers and created greater resilience in India's export sector.
- Processed food exports and value-added agricultural products are increasingly becoming important in India's export strategy.

Space for Notes

Emerging Challenges:

- Agricultural imports, especially edible oils, pulses and fruits, have also increased significantly, narrowing India's agricultural trade surplus.
- Climate change, global price volatility, sanitary standards and supply-chain disruptions remain major risks for agricultural exports.
- Dependence on a few commodities such as rice and marine products can create export vulnerability in the long term.

Conclusion:

India's agricultural export sector has demonstrated resilience through market diversification, competitive pricing and strong production capacity. However, sustaining long-term export growth will require better logistics, value addition, quality standards, climate-resilient agriculture and reduced dependence on a few export commodities.

Mains Practice Question:

Q. India's agricultural exports have shown resilience despite rising protectionism and tariff barriers. Discuss the role of market diversification, product competitiveness and value-added exports in sustaining this growth. **15M (250 Words)**

3.7. RBI's Reduced Risk Buffer and Higher Dividend Transfer to Centre

Context:

The RBI has transferred a record **₹2.69 lakh crore surplus/dividend** to the Centre for FY2025-26 after reducing its **Contingent Risk Buffer (CRB)** from **7.5% to 6.5%**. The reduction increased the transferable surplus, helping the government's fiscal position amid lower expected tax and excise collections.

Explanation:

- **RBI dividend** refers to the surplus income transferred by the Reserve Bank of India to the Central Government after meeting its expenses and risk provisions.
- RBI earns income mainly from **interest on government securities, foreign exchange operations, liquidity operations**, and returns on its investments.
- Before transferring surplus, RBI keeps a part of its funds as a safety cushion called the **Contingent Risk Buffer (CRB)**.
- **CRB** protects RBI against unexpected risks such as **currency depreciation, market losses, monetary policy risks, and financial stability shocks**.
- The CRB is part of the RBI's **Economic Capital Framework (ECF)**, which decides how much capital RBI should retain and how much surplus can be transferred.
- The ECF was reviewed by the **Bimal Jalan Committee**, which recommended a CRB range of **5.5% to 6.5%**.
- A lower CRB generally means **higher dividend transfer** to the government.
- A higher RBI dividend improves Centre's **non-tax revenue** and can help manage the **fiscal deficit**.
- However, excessive dividend dependence may reduce RBI's financial cushion during crises.

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3.8. RBI Variable Rate Repo Auction and Transient Liquidity Injection

Context:

The RBI injected ₹81,590 crore into the banking system through a three-day Variable Rate Repo auction. This was done to manage temporary liquidity fluctuations, as banking system surplus liquidity had sharply declined.

Explanation:

- **Liquidity** refers to the availability of cash or easily usable funds in the financial system.
- When banks face short-term shortage of funds, RBI can inject liquidity so that money market rates remain stable.
- **Transient liquidity** means temporary liquidity stress caused by short-term factors such as tax outflows, government cash balances, currency demand, or market settlement pressures.
- **Repo** means banks borrow money from RBI by selling government securities with an agreement to repurchase them later.
- **Variable Rate Repo (VRR)** is a liquidity injection tool where RBI lends money to banks, but the interest rate is decided through auction.
- In a **fixed rate repo**, the rate is pre-decided by RBI; in **VRR**, banks bid for funds and the cut-off rate emerges through auction.
- VRR is part of RBI's **Liquidity Adjustment Facility (LAF)** framework.
- It helps RBI manage short-term liquidity without changing the policy repo rate.
- A **cut-off rate** is the rate at which the final accepted bid gets funds in the auction.
- If demand is lower than the notified amount, it may show that banks are not facing severe liquidity stress.
- Such operations are important for monetary transmission, call money rate stability, and overall financial market stability.

3.9. Gold Loan Concentration in Southern India

Context:

Gold loans have become the fastest-growing segment in India's lending market, with outstanding loans rising sharply. Five southern States — Tamil Nadu, Andhra Pradesh, Karnataka, Telangana and Kerala — account for nearly 75% of India's total gold loan outstanding.

Explanation:

- **Gold loan** is a secured loan in which borrowers pledge gold ornaments or coins as collateral to obtain quick credit from banks, NBFCs or other lenders.
- Southern India has a strong cultural preference for gold ownership, higher household gold holdings, dense jewellery networks and wider lending infrastructure, making it India's major **gold loan market.**
- Gold loans are popular because they offer faster processing, lower documentation, flexible end-use and relatively easier access compared to unsecured personal loans.
- The sector includes both **banks and Non-Banking Financial Companies (NBFCs)**, with NBFCs playing a major role due to faster customer service and wider reach.

Space for Notes

- Rising gold prices increase the collateral value of pledged gold, allowing borrowers to access higher loan amounts.
- Gold loans are used by households, small traders and informal sector workers for consumption needs, business working capital, medical expenses and emergency liquidity.
- From a regulatory angle, the issue involves **RBI supervision, Loan-to-Value ratio, secured lending, household debt, financial inclusion and regional credit patterns.**

3.10. India's Labour Force Participation and Worker Population Ratio Trends (PLFS 2025)

Context:

The latest Periodic Labour Force Survey (PLFS) 2025 shows that India's worker population ratio and labour force participation rate have improved since 2022, with a notable rise in women's participation, especially in rural areas. However, concerns continue regarding urban female participation, educated unemployment, and high youth unemployment.



Explanation:

- The Periodic Labour Force Survey (PLFS) is conducted by the National Statistical Office (NSO) under the Ministry of Statistics and Programme Implementation (MoSPI) to measure employment and unemployment trends in India.
- PLFS estimates important indicators such as Labour Force Participation Rate (LFPR), Worker Population Ratio (WPR), and Unemployment Rate (UR).
- Labour Force includes persons who are employed or actively seeking employment.
- Labour Force Participation Rate (LFPR) represents the percentage of population participating in economic activity through work or job search. India's overall LFPR stood at 44.9% in 2025 compared to 44.7% in 2024.

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- Worker Population Ratio (WPR) measures the proportion of employed persons in the total population. India's overall WPR increased from 39.7% in 2022 to 43.5% in 2025, while female WPR rose from 24.6% to 29.8% during the same period.
- Unemployment Rate (UR) refers to the percentage of unemployed persons within the labour force. India's overall unemployment rate declined from 3.6% in 2022 to 3.1% in 2025.
- Rural female labour force participation reached 34.6%, significantly higher than urban female participation at 22.2%, mainly due to agricultural and household-based work.
- Male LFPR remains substantially higher, with rural male participation at 58.8% and urban male participation at 59.7%.
- Youth unemployment (15–29 years) remains a major concern. Urban young women recorded the highest unemployment rate at 18.9%, while urban young men recorded 11.8%.
- Educated unemployment remains relatively high, especially in urban areas, where unemployment among educated persons reached 7.2% compared to the all-India average of 3.1%.
- Employment categories in PLFS include self-employment, regular wage/salaried employment, and casual labour. About 70.7% of rural working women are self-employed, whereas 50.9% of urban working women are engaged in regular salaried employment.
- High self-employment in rural India often reflects subsistence agriculture and informal work rather than productive formal-sector employment.

3.11. SEBI Classifies Large Benchmark Indices as "Significant Indices"

Context:

Securities and Exchange Board of India (SEBI) has introduced a new regulatory framework to classify certain stock market benchmark indices as "Significant Indices" if very large amounts of mutual fund money are linked to them. Major indices such as BSE Sensex and NIFTY 50 are expected to fall under this category.

Explanation:

- SEBI is the statutory regulator of India's securities market, established under the SEBI Act, 1992.
- A stock market index measures the performance of a selected group of securities and reflects overall market trends.
- Benchmark indices are used by mutual funds to compare their performance with the broader market.
- Examples of major Indian benchmark indices include the BSE Sensex and NIFTY 50.
- An index provider selects constituent stocks using criteria such as market capitalisation, liquidity, and free-float methodology.
- AUM (Assets Under Management) refers to the total market value of investments managed by a mutual fund or financial institution.
- Passive investment instruments such as Index Funds and Exchange Traded Funds (ETFs) replicate benchmark indices instead of actively selecting stocks.

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- Large benchmark-linked investments can influence stock prices, capital flows, and market stability; therefore, governance and transparency of indices become important.
- SEBI's proposal defines a "significant index" based on average cumulative AUM exceeding ₹20,000 crore over six months.
- Greater regulation of significant indices may improve investor protection, reduce conflict of interest, and strengthen market integrity in India's growing passive investment ecosystem.

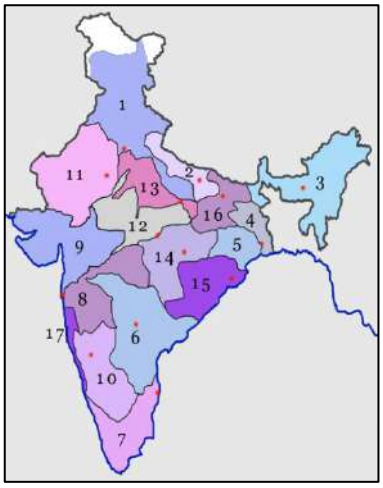
3.12. South Coast Railway Zone: India's 18th Railway Zone

Context:

The Ministry of Railways has announced that the new **South Coast Railway (SCoR)** zone, headquartered at **Visakhapatnam**, will become operational from June 1. The move fulfils a long-pending commitment made to Andhra Pradesh under the Andhra Pradesh Reorganisation Act, 2014.

Explanation:

- Indian Railways is divided into administrative units called Railway Zones for efficient management of operations, infrastructure, freight, and passenger services.
- A railway zone is headed by a General Manager (GM) and consists of multiple railway divisions managed by Divisional Railway Managers (DRMs).
- India currently has **18 railway zones**; the newest is the **South Coast Railway (SCoR)** headquartered at **Visakhapatnam**.
- The new zone integrates the **Guntakal, Guntur, Vijayawada**, and the newly created **Visakhapatnam division**.
- The demand for a separate railway zone for Andhra Pradesh had existed for nearly four decades and gained importance after the bifurcation of the State in 2014.



- Railway zones are created administratively by the Ministry of Railways based on operational efficiency, freight traffic, infrastructure requirements, and regional demands.
- The proposal for a new railway zone is examined by the **Railway Board**, which is the apex executive and policy-making body of Indian Railways established in 1905.
- The Railway Board functions under the Ministry of Railways and supervises railway planning, safety, finance, infrastructure expansion, and coordination among railway zones.
- The South Coast Railway zone is strategically important because Andhra Pradesh has major ports and heavy freight movement; the zone reportedly handles nearly 17% of India's railway freight loading.
- Creation of new railway zones can improve regional connectivity, freight logistics, project implementation, and administrative efficiency, but may also increase financial costs, coordination challenges, and political demands for further restructuring.

Space for Notes

3.13. Revenue Deficit in States and Emerging Fiscal Stress

Context:

The Union Finance Ministry has warned that several Indian States with revenue deficits and high debt levels may face fiscal stress, especially amid external shocks. Nine out of 18 large States are projected to be in revenue deficit for 2026–27, limiting their fiscal flexibility.

Explanation:

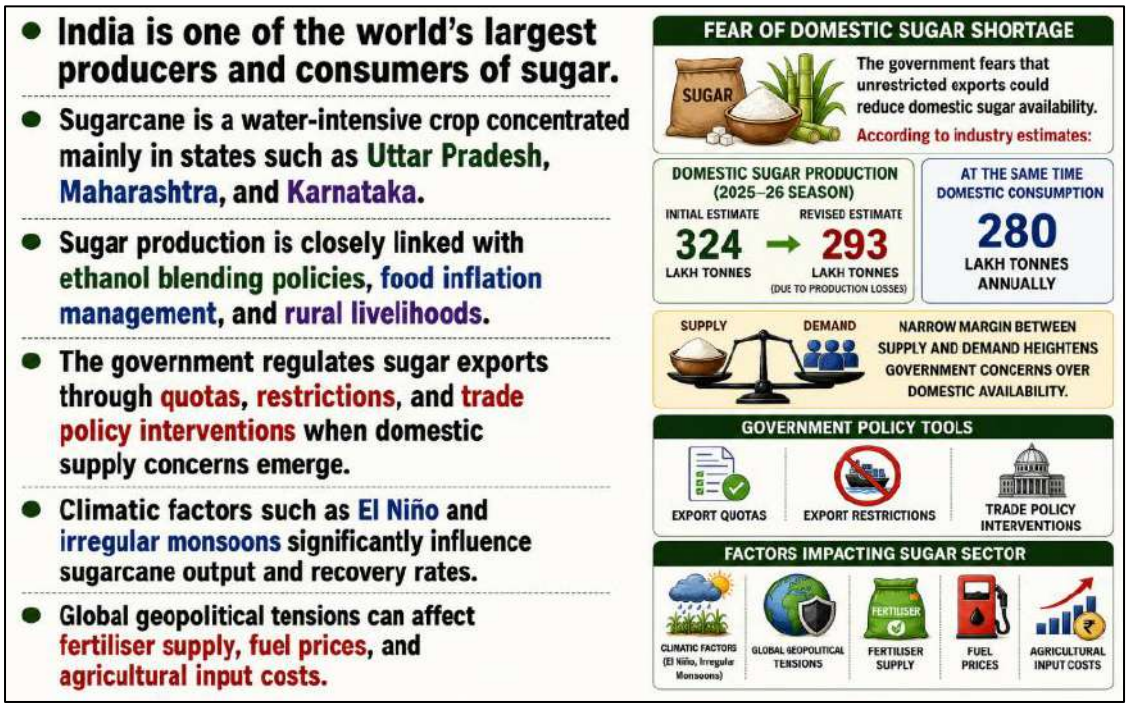
- **Revenue Deficit**: Occurs when revenue expenditure is greater than the revenue receipts, indicating that the government is unable to meet its routine expenses from its regular income.
- **Revenue Receipts**: Include tax revenues (GST, income tax share) and non-tax revenues (fees, dividends, interest).
- **Revenue Expenditure**: Covers salaries, pensions, subsidies, interest payments that is non-asset creating expenditure.
- Persistent revenue deficit implies states spending more than they earn and borrowing for consumption, not investment.
- Leads to higher fiscal deficit and rising public debt.
- Affects ability to invest in capital expenditure (infrastructure, growth).

3.14. India Bans Sugar Exports

Context:

India has banned the export of raw, white and refined sugar until September 2026, while permitting limited exports to the United States and the European Union under quota commitments. The decision reflects concerns over domestic availability, food inflation, lower production estimates and uncertain climatic conditions. Since sugar is linked with farmer income, consumer prices, ethanol blending and trade policy, the issue has wider economic significance.

Background:



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Explanation:

Core Rationale Behind the Export Ban:

- The government's main concern is to ensure adequate domestic sugar availability and prevent a rise in retail prices.
- Sugar production estimates have declined due to crop losses and uncertain agricultural conditions.
- Lower closing stocks reduce the government's ability to stabilise the market during supply stress.
- Therefore, domestic consumption has been prioritised over export earnings.

Climate and Production Concerns:

- Sugarcane is a water-intensive crop and is concentrated in states such as Uttar Pradesh, Maharashtra and Karnataka.
- El Niño and irregular monsoon patterns can reduce sugarcane productivity and sugar recovery rates.
- Weak rainfall, drought-like conditions or uneven irrigation access can directly affect cane output.
- This makes sugar supply vulnerable to climate variability.

Ethanol Diversion and Policy Trade-off:

- A part of sugarcane and sugar is diverted for ethanol production under India's ethanol blending programme.
- Ethanol blending supports energy security, reduces crude oil imports and promotes cleaner fuel use.
- However, excessive diversion can reduce sugar availability for domestic consumption and exports.
- The government must therefore balance food security with energy security.

Global and Input Cost Pressures:

- West Asian tensions, including Iran-related risks, can raise crude oil prices and transport costs.
- Higher energy prices also increase fertiliser and irrigation costs.
- These pressures affect sugarcane cultivation, mill operations and farmer profitability.

Limited Exports to U.S. and EU:

- India continues limited exports to the U.S. and EU due to quota-based trade commitments.
- Such exports help maintain international obligations and trade credibility.

Conclusion:

India's sugar export ban shows the close link between agriculture, inflation control, energy policy and climate risk. The immediate priority is to protect domestic consumers and maintain price stability. In the long term, India needs predictable export policy, climate-resilient sugarcane cultivation, better buffer stocks and balanced ethanol diversion.

3.15. Intermediary-Led Competition and Profitability Stress in General Insurance

Context:

A report has highlighted that aggressive competition through intermediaries such as agents, brokers, bancassurance partners and OEM channels is affecting the profitability of general insurers. It also reflects IRDAI's concern over rising commissions and weakening underwriting discipline in the insurance sector.

Space for Notes

Explanation:

- **General insurance** covers non-life risks such as health, motor, fire, marine, travel and property insurance.
- Insurance companies collect **premium** from policyholders and pay claims when insured risks occur.
- **Underwriting** means assessing risk before issuing an insurance policy and deciding the premium.
- If insurers focus only on growth and ignore risk-based pricing, it weakens **underwriting discipline**.
- **Intermediaries** are distribution channels that sell insurance products on behalf of insurers.
- They include **agents, brokers, bancassurance partners, OEMs**, web aggregators and corporate agents.
- **Bancassurance** means selling insurance through banks.
- **OEM channels** are common in motor insurance, where insurance is sold through vehicle manufacturers or dealers.
- High dependence on intermediaries can increase **commission costs** for insurers.
- When commission-led growth becomes excessive, premium growth may rise but profitability may fall.
- IRDAI regulates the insurance sector and has introduced the **Expense of Management framework** to control operational and commission-related expenses.

3.16. Centre Extends Bid Timeline for Rare Earth Magnet Manufacturing Scheme

Context:

The Ministry of Heavy Industries has extended the bidding deadline for the ₹7,280 crore scheme aimed at promoting rare earth magnet manufacturing in India. The extension was made following requests from industry stakeholders to facilitate wider participation in the bidding process.

Explanation:

- Rare earth magnets are high-strength permanent magnets mainly made using **Rare Earth Elements (REEs)** such as **Neodymium, Praseodymium, Samarium, and Dysprosium**.
- These magnets are critical for **electric vehicles (EVs), wind turbines, semiconductors, defence systems, robotics, smartphones, and aerospace technologies**.
- Rare earth elements belong largely to the **Lanthanide series** in the periodic table.
- China dominates the global supply chain of rare earth processing and magnet manufacturing, creating concerns regarding **strategic dependence and supply chain security**.
- India possesses notable rare earth reserves, especially in **monazite sands** found along coastal regions.
- The scheme seeks to strengthen **domestic manufacturing, import substitution, critical mineral security, and self-reliance under Atmanirbhar Bharat**.
- The issue is linked with India's push for **clean energy transition, advanced manufacturing, and strategic technologies**

Space for Notes

3.17. Bharat Maritime Insurance Pool (BMIP) and Maritime Risk Coverage

Context:

Amid rising geopolitical tensions in West Asia and increasing risks to maritime trade, the Government of India has launched the Bharat Maritime Insurance Pool (BMIP). The initiative aims to ensure uninterrupted marine insurance coverage for Indian-flagged vessels operating in high-risk regions.

Explanation:

- The Bharat Maritime Insurance Pool (BMIP) is a government-supported marine insurance mechanism created to provide risk coverage for Indian shipping vessels.
- The scheme operates under the Department of Financial Services (DFS) with a sovereign guarantee support mechanism.
- Marine insurance protects ships, cargo, freight, and related maritime interests against losses arising from sea transport.
- Coverage under BMIP includes hull and machinery insurance, cargo insurance, Protection and Indemnity (P&I) insurance, and war-risk insurance.
- Hull and machinery insurance covers physical damage to ships and onboard machinery.
- Protection and Indemnity (P&I) insurance covers third-party liabilities such as crew injury, pollution, collision liabilities, and repatriation costs.
- War-risk insurance covers losses arising from war, piracy, armed conflict, terrorism, or geopolitical instability.
- India's maritime trade is highly dependent on strategic sea routes such as the Strait of Hormuz and the Red Sea region.
- Rising geopolitical tensions in West Asia increase shipping costs, insurance premiums, and supply-chain vulnerabilities for global trade.

3.18. UDGAM Portal and Tracing of Unclaimed Deposits

Context:

The Reserve Bank of India informed the Supreme Court of India that 30 banks have been integrated with the UDGAM portal to help depositors and legal heirs trace unclaimed deposits of deceased or inactive account holders. These banks account for nearly 90% of deposits held in the Depositor Education and Awareness Fund (DEAF).



Explanation:

- **UDGAM** stands for **Unclaimed Deposits – Gateway to Access Information** and is a centralized web portal launched by the RBI to enable individuals to search for unclaimed bank deposits across multiple banks through a single platform.
- A bank deposit becomes "unclaimed" when there has been no customer-initiated transaction or activity for **10 years or more**, after which the amount is transferred to the **Depositor Education and Awareness Fund (DEAF)** maintained by the RBI.

- DEAF was established by the RBI in **2014** to receive unclaimed deposits from banks and to promote depositor awareness and financial literacy.
- The portal facilitates only the **identification and tracing** of unclaimed deposits; actual settlement or withdrawal of funds must be carried out through the concerned bank as per applicable banking procedures and succession norms.
- Dormant accounts and unclaimed deposits commonly arise due to death of account holders, absence of nominee details, migration, forgotten accounts, or lack of awareness among legal heirs.
- The petition before the Supreme Court highlighted that deposits held in post offices, provident funds, and insurance schemes are not yet integrated into the portal, creating difficulties for legal heirs in tracing all financial assets of deceased persons.
- The initiative is significant for improving financial transparency, depositor protection, banking accessibility, and reducing idle unclaimed funds, while also encouraging better nominee registration and financial record maintenance.

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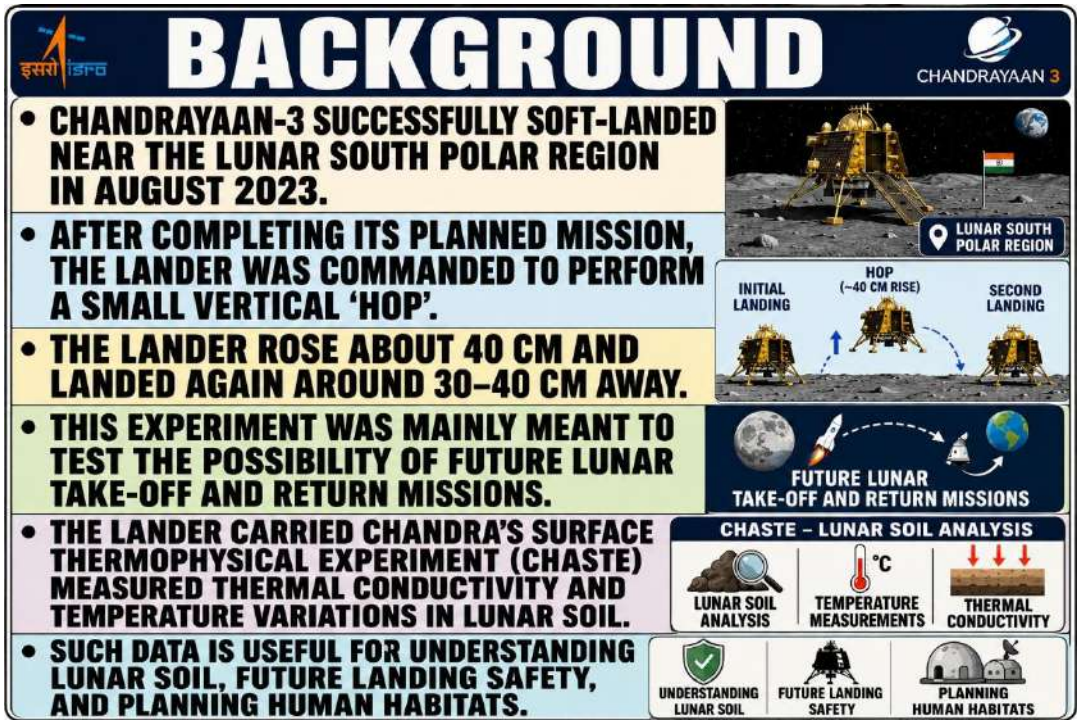
4. SCIENCE AND TECHNOLOGY

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4.1. Chandrayaan-3 Hop Experiment and Lunar Surface Layers

Context:

The Chandrayaan-3 lander's short "hop" experiment has provided important scientific information about the upper surface of the Moon. Data from the ChaSTE instrument suggests that the lunar surface has two distinct layers within just a few centimetres.



Explanation:

1. Discovery of Two Surface Layers:
   - The experiment revealed that the Moon's upper surface is not uniform.
   - A very thin upper layer, about **2–3 cm**, appears to be loosely packed and easily disturbed.
   - Below it lies a denser layer, beginning roughly around **6 cm depth**.
   - This shows that even the top few centimetres of lunar regolith have different physical properties.
2. Importance of the Hop Experiment:
   - The rocket plume during the hop displaced the loose upper soil.
   - This exposed the lower layer and allowed ChaSTE to collect fresh thermal data.
   - Earlier data mainly reflected the undisturbed surface, but the hop created an opportunity to study newly exposed subsurface material.
3. Scientific and Mission Value:
   - The findings help scientists understand the **thermal behaviour, compactness, and layering** of lunar regolith.
   - The temperature was found to fall sharply with depth, showing that the Moon's subsurface can behave very differently from its surface.
   - Such information is important for designing landers, rovers, drilling systems, and future lunar bases.
   - It can also help assess possible locations where water ice may remain stable.

Space for Notes

Conclusion:

The Chandrayaan-3 hop experiment became more than a technology demonstration. It provided valuable evidence about the Moon's near-surface structure and thermal conditions. This knowledge will support future lunar exploration, resource assessment, and long-term human missions.

Mains Practice Question:

Q. Chandrayaan-3 has strengthened India's role in lunar science by contributing to knowledge on near-surface lunar structure, thermal behaviour and resource assessment. Examine. **15M (250 Words)**

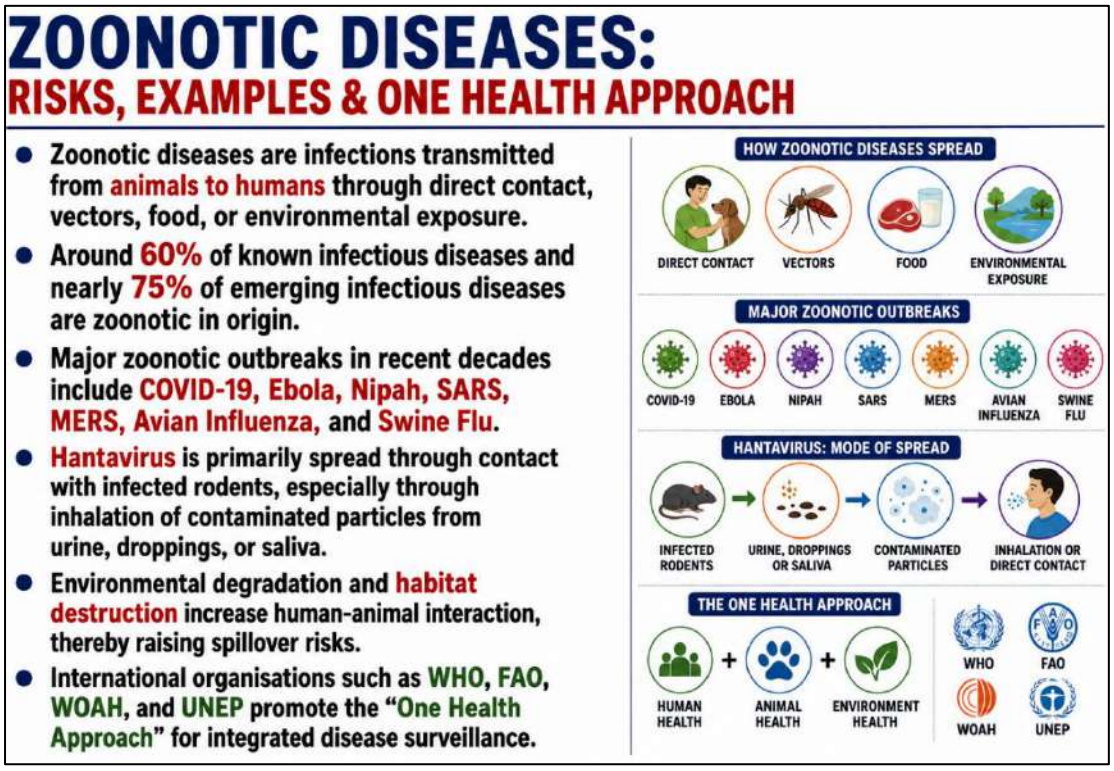
4.2. Hantavirus as a Warning for Future Pandemics

Context:

A recent Hantavirus outbreak linked to the Dutch-flagged polar expedition cruise ship MV Hondius, which travelled across the South Atlantic after departing from Argentina, has renewed global concern regarding zoonotic diseases that spread from animals to humans.

Background:

- The outbreak involves the Andes virus (ANDV) strain, which is unique because it is the only known hantavirus capable of limited human-to-human transmission.
- Experts warn that increasing human intrusion into forests, climate change, biodiversity loss, and intensive farming practices are creating favourable conditions for the emergence of new infectious diseases worldwide.



Explanation:

What is Hantavirus?

- Hantavirus is a rodent-borne viral disease caused by viruses belonging to the Hantaviridae family.

- While hantaviruses usually spread through inhalation of aerosolised particles from infected rodent droppings or urine, the Andes virus (ANDV) strain involved in the recent outbreak is capable of limited human-to-human transmission.
- Humans usually get infected by inhaling aerosolised particles contaminated with rodent excreta.
- The disease can cause severe respiratory illness known as Hantavirus Pulmonary Syndrome (HPS) or kidney-related disease called Hemorrhagic Fever with Renal Syndrome (HFRS).
- There is currently no widely available specific antiviral cure or vaccine for most hantavirus infections.

Why Are Zoonotic Outbreaks Increasing?

Deforestation and Habitat Encroachment:

- Forest destruction forces wild animals and rodents to move closer to human settlements.
- Human expansion into wildlife habitats increases opportunities for pathogen spillover.

Climate Change:

- Rising temperatures and changing rainfall patterns alter the distribution of vectors and reservoir species.
- Rodents, mosquitoes, and bats are expanding into newer geographical regions.

Industrial Agriculture and Livestock Intensification:

- High-density animal farming creates conditions for rapid mutation and transmission of pathogens.
- Poor biosecurity in farms and live animal markets increases infection risks.

Globalisation and Urbanisation:

- Increased travel and trade allow local outbreaks to spread rapidly across borders.
- Urban crowding accelerates disease transmission.

One Health Approach:

- One Health recognises the interconnectedness of human, animal, and environmental health.
- It promotes coordination between medical professionals, veterinarians, ecologists, and policymakers.
- India has strengthened surveillance systems through Integrated Disease Surveillance Programme (IDSP) and zoonotic monitoring mechanisms.

Challenges in Disease Preparedness:

- Weak wildlife disease surveillance in many countries.
- Limited coordination between environmental and health agencies.
- Inadequate early-warning systems and laboratory capacity.
- Insufficient investment in public health infrastructure.

Conclusion:

The rise of hantavirus and similar zoonotic outbreaks reflects growing ecological imbalance caused by human activities. Preventing future pandemics requires strengthening disease surveillance, protecting ecosystems, improving public health systems, and adopting a comprehensive One Health strategy at national and global levels.

Mains Practice Question:

Q. Human intrusion into forests, climate change, biodiversity loss and intensive farming are creating favourable conditions for future pandemics. Analyse in the context of zoonotic disease outbreaks. **10M (150 Words)**

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4.3. PCOS Renamed as PMOS to Improve Diagnosis and Awareness

Context:

The Endocrine Society has proposed renaming Polycystic Ovary Syndrome (PCOS) as Polyendocrine Metabolic Ovarian Syndrome (PMOS). The change aims to better reflect the disorder's hormonal, metabolic, and reproductive dimensions and improve early diagnosis and treatment.

Explanation:

- PCOS is one of the most common endocrine disorders affecting women of reproductive age and is associated with hormonal imbalance and metabolic dysfunction.
- The condition is diagnosed using criteria such as irregular ovulation (oligo-anovulation), hyperandrogenism, and polycystic ovaries detected through ultrasound or Anti-Müllerian Hormone (AMH) levels.
- Symptoms include irregular menstruation, acne, excess hair growth, obesity, infertility, and insulin resistance.
- The term "PCOS" is considered misleading because ovarian cysts are not always present and the disorder involves multiple endocrine and metabolic disturbances.
- Associated comorbidities include type-2 diabetes, hypertension, dyslipidaemia, endometrial cancer, and psychological stress.
- The proposed PMOS terminology highlights endocrine, metabolic, and ovarian dysfunction together, aiming to reduce stigma and improve clinical understanding.

4.4. GalaxEye's 'Drishti' – India's First Dual-Mode Earth Observation Satellite

Context:

Indian startup GalaxEye has launched its satellite 'Drishti' aboard a SpaceX rocket, marking a major milestone in private space innovation. The satellite can capture both optical and radar images simultaneously, enhancing Earth observation capabilities.

Explanation:



- **GalaxEye** is an Indian space-tech startup focused on advanced **Earth Observation (EO) technologies** and satellite imaging solutions.
- '**Drishti**' is designed to provide **synchronous optical and Synthetic Aperture Radar (SAR) imaging**, a first-of-its-kind capability globally.
- EO satellites are crucial for **agriculture monitoring, disaster management, climate studies, urban planning, and defence surveillance**.
- **Optical imaging** uses visible spectrum light to generate high-resolution images but is limited by **cloud cover and night-time conditions**.

Space for Notes

- SAR (Synthetic Aperture Radar) uses microwave signals, enabling **all-weather, day-night imaging**, and works on the principle of **microwave backscatter**.
- The integration of optical with SAR payloads allows **continuous, reliable, and high-frequency data capture** of the same geographical location.

4.5. First Indigenous Hydrogen Train: India's Green Rail Transition

Context:

India's first indigenous hydrogen-powered train is a 10-car set approved for the **Jind–Sonipat section in Haryana**. Powered by a **1200 kW fuel-cell propulsion system**, the train can reach a top speed of **75 kmph**. This zero-emission technology produces only water vapor, aligning with India's sustainable mobility goals. The initiative places India in a select group of countries utilizing hydrogen transport, including **Germany, Japan, China & United States.**

How Hydrogen Fuel Cell Technology Works?

- **Chemical Reaction:** Electricity is generated through an electrochemical reaction between hydrogen and oxygen, entirely avoiding combustion.
- **Energy Flow:** Hydrogen stored in high-pressure tanks enters the fuel-cell stack, where it produces electricity to power the train's traction motors.
- **Key Benefits:** Compared to traditional diesel engines, this system offers zero tailpipe emissions, higher energy efficiency, and significantly reduced noise pollution.

Safety Infrastructure:

To support this new technology, an indigenous hydrogen storage and refueling facility has been established at Jind. Safety measures include:

- Hydrogen leak and flame detectors
- Round-the-clock monitoring of the refuelling system
- Accompaniment by certified, trained technical personnel during initial operations.

4.6. Discovery of an Ultra-Short Period Blue Straggler–Brown Dwarf Binary System

Researchers from Gauhati University, the Indian Institute of Astrophysics (IIA), and the Aryabhatta Research Institute of Observational Sciences (ARIES), in collaboration with Italian astronomers, have discovered the first confirmed blue straggler star hosting a brown dwarf companion in an extremely compact binary system.

Key Discovery Details:

- **The Cosmic Dance:** The binary system completes one orbit in just **5.6 hours** (0.234 days), making it one of the shortest-period stellar binaries ever recorded.
- **The Companion:** The brown dwarf companion has a mass of only **0.056 solar masses**, placing it well below the hydrogen-burning limit.
- **The "Brown Dwarf Desert":** The system exists within this region—an observed rarity where brown dwarf companions are seldom found closely orbiting stars.
- **Evolutionary Path:** Scientists suggest the system evolved from a complex triple-star interaction, where gravitational forces and mass transfer caused stars to merge, eventually forming the blue straggler and stabilizing its tight orbit.

Space for Notes

Why This Discovery Matters for India?

- **Advancing Fundamental Science:** This breakthrough showcases the growing capability of Indian scientific institutions in understanding complex stellar evolution, binary interactions, and substellar objects.
- **Global Collaboration:** The study, supported by the **DST INSPIRE programme**, was published in the *Monthly Notices of the Royal Astronomical Society: Letters*, solidifying India's position in frontier astrophysical research.

Static Background:

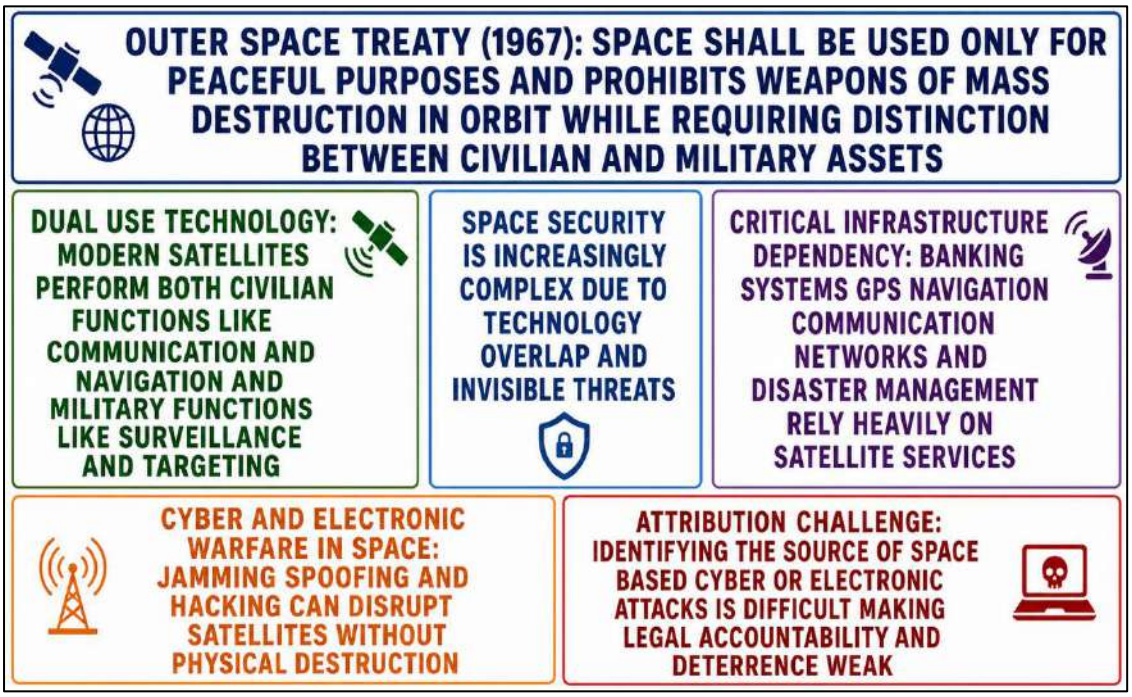
- **Blue Straggler Stars:** Stars that appear unusually hotter, brighter, and younger than neighboring stars, despite forming at the same time. They are believed to gain extra mass through stellar mergers or mass transfer.
- **Brown Dwarf:** A substellar object that is more massive than a planet but less massive than a true star (\(<0.075\) solar masses), meaning it cannot sustain stable hydrogen fusion.

4.7. Dual-Use Satellites and the Militarisation of Outer Space

Context:

The growing reliance on satellites for civilian and military purposes has blurred the distinction between peaceful and hostile uses of outer space. This transformation is reshaping the nature of conflict, making space an increasingly contested and ambiguous domain.

Background:



Explanation:

1. Changing Nature of Space Warfare:
    - Modern space conflict is increasingly non-kinetic, characterized by signal interference, cyber intrusions, and system manipulation rather than physical destruction.

Space for Notes

- Initial phases of conflict may involve disabling communication networks or navigation systems, thereby affecting both military operations and civilian life.
- *Example:* A cyberattack disabling satellite internet can disrupt military coordination without any missile strike.

2. **Dual-Use Satellites and Blurred Boundaries:**
   - Satellites used for civilian purposes, such as GPS and broadband services, are often leveraged for military applications like intelligence gathering and drone operations.
   - This dual-use nature complicates the legal distinction between civilian and military targets, increasing the risk of unintended escalation.
   - *Example:* GPS used for navigation in cars can also guide precision missiles.
3. **Vulnerability of Civilian Infrastructure:**
   - Since essential services depend on satellites, disruptions in space systems can cascade into failures in energy, banking, transportation, and emergency response systems on Earth.
   - Cyberattacks on satellite networks can paralyze societies without a single physical strike.
   - *Example:* Jamming satellite signals can disrupt aircraft navigation systems.
4. **Legal and Normative Gaps:**
   - Existing international frameworks struggle to address cyber and electronic operations in space, particularly regarding what constitutes "use of force."
   - The ambiguity in legal interpretation allows states to operate in grey zones below the threshold of open conflict.
   - *Example:* Signal spoofing may not clearly qualify as an "armed attack" under current law.
5. **Attribution and Deterrence Challenges:**
   - Difficulty in identifying perpetrators reduces the effectiveness of deterrence, as states can act through proxies or conceal their involvement.
   - This encourages low-intensity, persistent disruptions that undermine stability without triggering direct retaliation.
6. **Emergence of Persistent Low-Level Conflict:**
   - Space is evolving into a domain of continuous competition, where states engage in constant surveillance, disruption, and signaling activities.
   - The objective is shifting from destruction of assets to degradation of systems and erosion of adversary capabilities.
   - *Example:* Repeated temporary jamming of communication satellites during tensions.
7. **Need for Secure-by-Design Systems:**
   - There is a growing emphasis on integrating cybersecurity at every stage of satellite development and operation.
   - Strengthening cooperative mechanisms for attribution and establishing enforceable norms are essential to maintain stability.

Conclusion:

The increasing integration of civilian and military functions in space systems has transformed space into a domain of silent yet pervasive conflict. Addressing legal ambiguities and enhancing resilience through technological and institutional measures is essential to ensure stability and prevent escalation in this critical frontier.

Mains Practice Question:

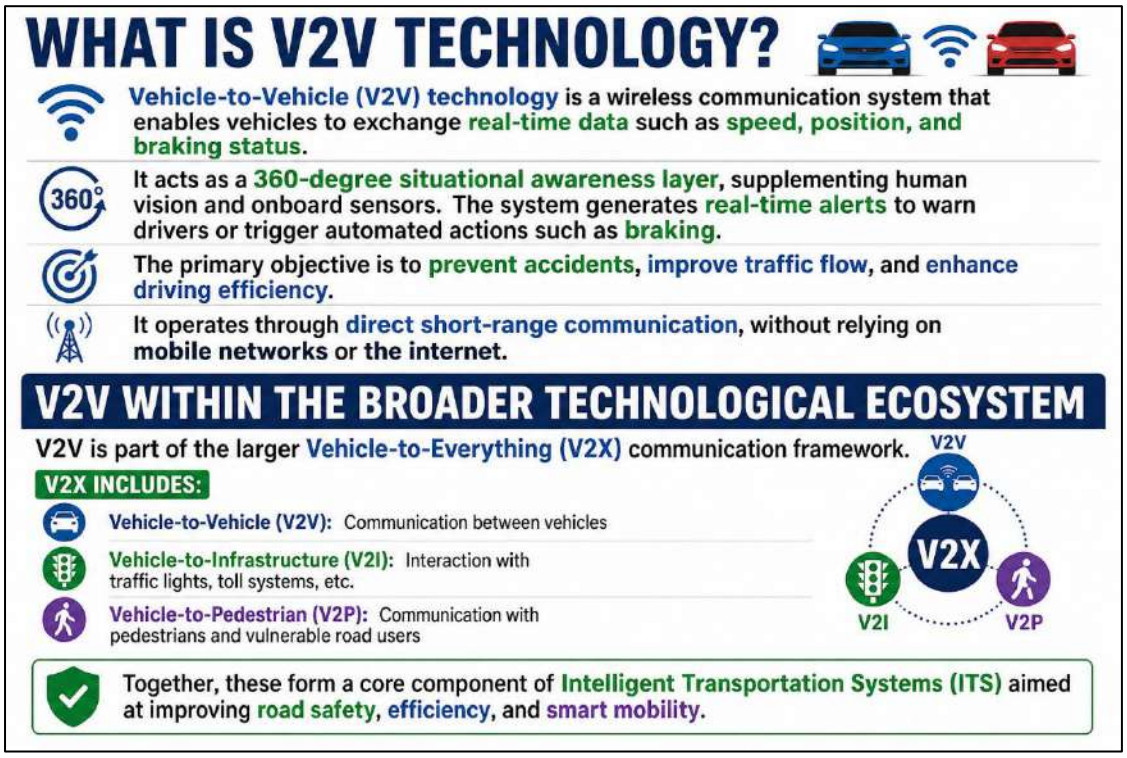
Q. The militarisation of outer space exposes major gaps in existing international legal frameworks. Examine the need for secure-by-design space systems, global norms and cooperative mechanisms to prevent escalation in space conflicts. **15M (250 Words)**

Space for Notes

4.8. V2V Technology

Context:

India is planning to introduce Vehicle-to-Vehicle (V2V) communication to improve road safety amid rising accidents. However, concerns have emerged that without adequate road infrastructure, interoperability, and institutional readiness, such advanced technologies may deliver limited benefits.



Explanation:

Core Issue:

- The main concern is that India may be adopting advanced mobility technologies before fixing basic transport-system gaps.
- Poor road design, weak traffic enforcement, mixed traffic conditions and inadequate digital infrastructure can reduce the effectiveness of V2V.
- This creates a "cart before the horse" problem, where technological deployment precedes systemic preparedness.

How V2V Works:

- Vehicles continuously send and receive Basic Safety Messages containing speed, position, direction and braking status.
- Communication generally occurs over a short range, often around 300 metres.
- It may use Dedicated Short-Range Communication or Cellular Vehicle-to-Everything technologies.
- Unlike ordinary mobile-based systems, V2V allows direct and rapid communication between vehicles.

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Potential Benefits:

- V2V can improve road safety by warning drivers about sudden braking, blind-spot risks and possible collisions.
- It can detect hazards beyond the driver's direct line of sight, including risks around curves or behind obstacles.
- It may improve traffic flow by helping vehicles maintain better spacing and speed.
- In the long run, it can support intelligent transportation systems and autonomous driving by complementing sensors such as cameras, radar and LiDAR.

Key Challenges:

- India's mixed traffic, involving cars, buses, trucks, two-wheelers, pedestrians and non-motorised vehicles, complicates implementation.
- Lack of common technical standards may create interoperability problems between different vehicle manufacturers.
- Hardware costs may increase the burden on vehicle owners unless supported by incentives.
- Drivers may not be trained to understand or respond properly to alerts.
- Cybersecurity risks are serious because false signals or hacking could create dangerous road situations.
- Network congestion and data loss may affect reliability during high-traffic conditions.

Conclusion:

V2V technology can become an important tool for safer and smarter mobility in India. However, it cannot substitute basic reforms in road design, traffic management, enforcement and driver behaviour. A phased approach combining infrastructure upgrades, common standards, cybersecurity safeguards and user training is essential for meaningful outcomes.

4.9. Private Sector Firing Trials of Indigenous Suryastra Rockets

Context:

Pune-based private defence manufacturer **Nibe Ltd.** has conducted firing trials of indigenous **Suryastra rockets** with strike ranges of **150 km and 300 km** at the Integrated Test Range. This marks an important milestone in India's private sector-led defence manufacturing and long-range rocket capability.

Explanation:

- India is promoting **defence indigenisation** through Make in India, Atmanirbhar Bharat, private sector participation, and reduced dependence on imported weapon systems.
- **Rocket systems** are artillery weapons used for long-range precision or area strikes, strengthening battlefield firepower and deterrence capability.
- The development reflects the rise of India's **Defence Industrial Base**, involving private firms, testing infrastructure like the **Integrated Test Range**, and indigenous defence technology.

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4.10. SMILE Mission: Studying Earth's Magnetic Shield Against Solar Storms

Context:

China and the European Space Agency are launching the **SMILE mission** to study how Earth's magnetic shield interacts with solar winds and solar storms. The mission will help improve understanding of space weather, which can affect satellites, GPS, communication systems, aviation and power grids.

Explanation:

- The Sun continuously emits **solar wind**, which consists of charged particles, magnetic fields and energy flowing through space.
- Earth is protected by its **magnetosphere**, a magnetic shield created mainly by Earth's internal magnetic field.
- The magnetosphere deflects many harmful charged particles from the Sun and helps make Earth suitable for life.
- When solar particles interact with Earth's upper atmosphere near polar regions, they produce **auroras**, also called northern and southern lights.
- Strong solar activity can create **solar storms** or **geomagnetic storms**, which may disturb satellites, radio communication, GPS navigation, power grids and airline operations.
- The **SMILE mission** stands for **Solar wind Magnetosphere Ionosphere Link Explorer**.
- It is a joint mission of **China** and the **European Space Agency (ESA)**.
- The mission will capture images of Earth's magnetosphere and study the interaction between **solar wind, magnetosphere and ionosphere**.
- It will provide better real-time understanding of **space weather** and help forecast harmful solar events.
- The mission will carry scientific instruments to observe **X-rays, ultraviolet wavelengths, charged particles and magnetic fields**.

4.11. India Expands Semiconductor Mission to Strengthen Domestic Chip Manufacturing

Context:

The Union Cabinet has approved additional semiconductor projects under the India Semiconductor Mission (ISM), taking the total number of approved semiconductor and chip-related facilities to 12. The initiative aims to reduce import dependence, strengthen supply-chain resilience, and position India as a major player in the global semiconductor ecosystem.

Explanation:

- Semi-conductor chips or integrated circuits are essential for smartphones, computers, automobiles, defence systems, AI, telecommunications, and industrial equipment.
- The global semiconductor supply chain is highly concentrated in countries such as Taiwan, South Korea, the United States, Japan, and China.
- India launched the India Semiconductor Mission (ISM) in 2021 with a financial outlay of ₹76,000 crore to promote semiconductor manufacturing and design.

Space for Notes

- Semiconductor fabrication plants (fabs) manufacture chips using advanced lithography and wafer-processing technologies in highly controlled clean-room environments.
- The semiconductor ecosystem also includes ATMP/OSAT facilities for Assembly, Testing, Marking, Packaging, and outsourced semiconductor assembly.
- India seeks to develop a full semiconductor value chain including chip design, fabrication, packaging, materials, and research capabilities.
- Semiconductor self-reliance is linked to economic security, digital sovereignty, electronics manufacturing, and strategic sectors such as defence and space.
- Supply-chain disruptions during the COVID-19 pandemic and geopolitical tensions highlighted the importance of domestic chip production.
- India's semiconductor strategy complements initiatives such as Make in India, Production Linked Incentive (PLI) schemes, and electronics manufacturing expansion.

4.12. India's Rising Fungal Disease Burden and Diagnostic Challenges

Context:

Fungal diseases are infections caused by fungi that affect the skin, nails, lungs, eyes, blood or internal organs. They are gaining public health importance due to rising cases, antifungal resistance, weak diagnostic capacity and greater risk among immunocompromised people.

Explanation:

- **Fungal diseases**, also called **mycoses**, are infections caused by fungi such as yeasts, moulds and dermatophytes.
- Fungi are naturally present in soil, air, water, plants, animals and the human body, but some species can become pathogenic under suitable conditions.
- Common superficial fungal infections affect the **skin, hair and nails**, such as ringworm, athlete's foot and nail fungal infection.
- Some fungi infect mucous membranes and cause diseases such as **oral thrush** and vaginal candidiasis.
- Serious fungal diseases can affect the **lungs, brain, blood and internal organs**, especially in people with weak immunity.
- Examples include **candidiasis, aspergillosis, cryptococcosis, mucormycosis and histoplasmosis**.
- Fungal infections spread through inhalation of spores, direct skin contact, contaminated surfaces or overgrowth of normal body fungi.
- Hot and humid climates favour fungal growth, making tropical countries more vulnerable.
- Major risk factors include diabetes, HIV/AIDS, cancer treatment, organ transplant, prolonged antibiotic use, steroid use and poor hygiene.
- Treatment generally involves **antifungal drugs**, but delayed diagnosis and **antifungal resistance** can make some infections difficult to manage.

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4.13. Carbon-Free Ferrocene Analogue Developed Using Boron Rings

Context:

Researchers from **IIT Madras and IISc Bengaluru** have developed a stable, carbon-free analogue of **ferrocene** by using **boron rings** and **osmium**. This marks an important development in organometallic and inorganic chemistry.

Explanation:

- **Ferrocene** is a landmark **organometallic compound** discovered in the 1950s, with the formula **$Fe(C_5H_5)_2$**.
- It is called a **"sandwich compound"** because one **iron atom** is placed between two flat carbon-based **cyclopentadienyl rings**, like a filling between two slices of bread.
- Ferrocene changed modern chemistry because it showed that metals can form highly stable compounds with organic ring systems in unusual structures.
- Its stability is due to strong bonding between the central metal atom and the electron-rich carbon rings.
- Ferrocene is important in **organometallic chemistry, catalysis, electrochemistry, fuel additives, materials science and medicinal chemistry**.
- It shows useful **redox behaviour**, meaning it can gain or lose electrons easily, making it valuable in sensors, batteries and electron-transfer studies.
- The recent study by **IIT Madras and IISc Bengaluru** is significant because researchers created a **carbon-free analogue of ferrocene**.
- Instead of carbon rings, they used **boron rings**, and instead of iron, the compound involved **osmium**, a transition metal.
- **Boron** is placed next to carbon in the periodic table and can form unique bonding arrangements.
- This discovery expands the idea of sandwich compounds beyond traditional carbon-based chemistry.

4.14. WHO Declares Ebola Outbreak in Congo and Uganda a Global Health Emergency

Context:

The World Health Organization has declared the Ebola outbreak caused by the **Bundibugyo virus** in the Democratic Republic of Congo and Uganda as a **Public Health Emergency of International Concern (PHEIC)**. WHO clarified that it is **not a pandemic emergency**, but the risk of cross-border spread requires a coordinated international response.

Explanation:

- **Ebola Virus Disease (EVD)** is a severe, often fatal viral haemorrhagic fever transmitted through **bodily fluids** such as blood, vomit, saliva and semen.
- The disease was first identified in **1976** near the **Ebola River** in present-day Democratic Republic of Congo.
- The present outbreak is linked to the **Bundibugyo ebolavirus**, a rarer Ebola strain for which approved vaccines and therapeutics are limited.

Space for Notes

- Common symptoms include **fever, weakness, vomiting, diarrhoea, internal bleeding, and organ failure**.
- The disease has a high **case fatality rate**, especially where healthcare systems are weak.
- Outbreak control measures include **isolation, contact tracing, quarantine, PPE use, vaccination, and safe burial practices**.
- The **World Health Organization (WHO)** and **Africa CDC** play major roles in surveillance and emergency response.
- Frequent outbreaks in Central Africa are linked to **forest ecosystems, human-animal interaction, conflict zones, and poor health infrastructure**.
- A **Public Health Emergency of International Concern (PHEIC)** is declared under the **International Health Regulations, 2005** when an extraordinary health event risks international spread and may need global coordination.
- WHO's role includes **risk assessment, issuing temporary recommendations, coordinating surveillance, mobilising medical supplies, supporting contact tracing and guiding countries on travel/health measures**.
- WHO has advised against blanket border closures, as such steps can disrupt aid, surveillance and health response.

4.15. India's First Orbital Data Centre Satellite

Context:

Bengaluru-based startup Pixxel, in collaboration with US firm Axiom Space, is planning to launch India's first orbital data centre satellite. The mission aims to test whether data processing and AI workloads can be performed directly in space instead of relying entirely on Earth-based data centres.

Explanation:

- An orbital data centre is a satellite-based computing facility that processes and stores data in space.
- Conventional satellites usually transmit raw data to Earth, whereas orbital data centres can process information onboard before transmission.
- Space offers natural cooling due to vacuum conditions, potentially reducing energy consumption of data centres.
- Radiation, microgravity, heat dissipation, and hardware reliability are major technological challenges in space computing.

4.16. China's Atlas Drone Swarm System and Emerging Warfare Technologies

Context:

China has showcased the Atlas drone swarm system, a mobile platform capable of launching and coordinating multiple drones simultaneously. The system highlights advancements in autonomous warfare and raises concerns for regional security, including India and the Indo-Pacific.

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Explanation:



- Drone swarm refers to **multiple unmanned aerial vehicles (UAVs)** operating in coordination using algorithms and artificial intelligence.
- Swarm systems rely on **autonomous decision-making, real-time communication, and distributed control**, reducing human intervention.
- Such systems create a **force multiplier effect**, overwhelming enemy defenses through numbers and coordination.
- Swarm drones can be used for **reconnaissance, electronic warfare, and precision strikes**.

4.17. Naval Expansion vs Maritime Preparedness in the Indian Ocean

Context:

India is expanding its advanced naval capabilities through the construction of modern stealth frigates under Project 17A. While these warships strengthen maritime presence and deterrence, concerns remain regarding delays, technological dependence, sensor gaps, and whether naval expansion is fully aligned with India's evolving security challenges in the Indian Ocean Region.

Background



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Explanation:

Problems and Concerns:

- Repeated delays in warship construction have affected operational readiness and fleet modernisation timelines.
- Many vessels face shortages of critical systems such as radars, sonars, engines, and advanced sensors despite formal delivery.
- India still depends heavily on imported high-end defence electronics and propulsion systems, limiting true strategic self-reliance.
- Expansion of naval platforms has not always been matched by adequate surveillance networks, underwater sensors, and maritime domain awareness systems.
- Existing sensor coverage in the Indian Ocean remains incomplete, reducing effective detection of submarines and maritime threats.
- Expensive high-end frigates may not always be the most efficient response to non-traditional threats such as piracy, smuggling, and drone attacks.
- Increasing Chinese submarine presence in the Indian Ocean demands stronger anti-submarine warfare capabilities, premium sensors, and integrated detection architecture.

Way Forward:

- India should prioritize timely integration of combat systems and improve project management in naval shipbuilding.
- Greater investment is needed in indigenous development of radars, sonars, propulsion systems, and defence electronics.
- Maritime security strategy should focus equally on surveillance infrastructure, coastal security, satellites, and underwater sensor networks.
- The Indian Navy and Coast Guard should adopt a balanced force structure combining high-end warships with cost-effective surveillance and patrol assets.
- Indigenous defence manufacturing should be guided by strategic threat assessment and technological capability rather than only production targets.
- Stronger coordination between shipyards, defence research institutions, and private industry can improve technological reliability and reduce import dependence.

Conclusion:

India's naval modernisation is essential for securing sea lanes, protecting trade, and responding to growing strategic competition in the Indian Ocean. However, long-term maritime strength will depend not only on increasing the number of warships, but also on improving technological self-reliance, surveillance capability, combat readiness, and integrated maritime security architecture.

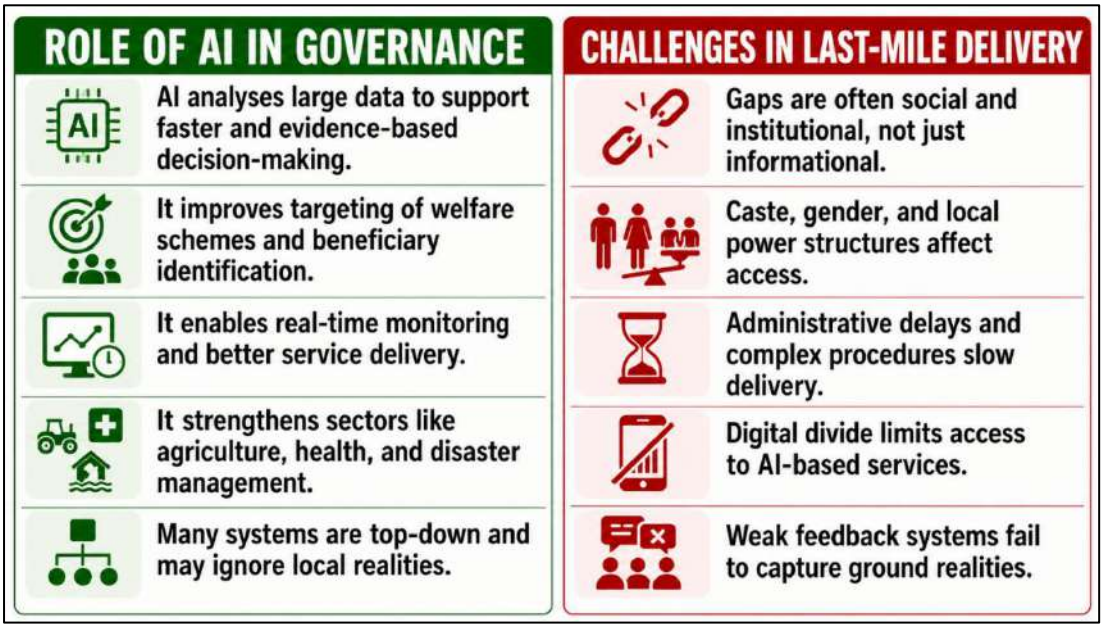
4.18. Rajasthan Shows Human-Centred AI Model

Context:

Artificial Intelligence is increasingly being applied in governance and development to improve service delivery. A recent initiative in Rajasthan demonstrates how AI, when combined with community participation, can strengthen water resilience and enhance last-mile governance outcomes.

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Background:



Explanation:

Nature of the AI Intervention:

- The initiative in Rajasthan focused on improving water resilience in drought-prone districts.
- Instead of pushing information outward, the AI system was designed to **listen to communities and gather feedback**.
- It used simple technologies such as voice-based conversations in local languages through widely accessible platforms.

Community-Centric Approach:

- The system interacted with local stakeholders such as community volunteers, village leaders, and frontline workers.
- It enabled individuals, especially women, to share their experiences and concerns in a structured manner.
- This approach recognised that development outcomes depend on understanding local realities rather than imposing external solutions.

Key Findings from the Field:

- Communities reported tangible improvements such as better water availability.
- Women highlighted the burden of water collection and the impact of delays in local governance processes.
- The feedback revealed gaps in implementation, such as delays in approvals and lack of awareness of schemes.

Role of AI in Enhancing Governance:

- The AI system analysed large volumes of qualitative data to identify recurring patterns and issues.
- It enabled rapid synthesis of feedback, which would otherwise take months through traditional surveys.
- This allowed policymakers to make timely adjustments in programme design and implementation.

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Importance of Human Intermediaries:

- The initiative emphasised that AI should **support and not replace human intermediaries** such as community workers.
- Trusted local actors facilitated participation and ensured that responses were genuine and contextually grounded.
- This hybrid model combined technological efficiency with social trust.

Shift from Passive to Active Participation:

- Traditional governance often treats beneficiaries as passive recipients of services.
- This model enabled communities to act as **active contributors in co-designing solutions**.
- It strengthened accountability by creating a feedback loop between citizens and institutions.

Limitations and Considerations:

- Digital divide issues, including access to smartphones and connectivity, can limit participation.
- Social inequalities may influence who participates and whose voices are heard.
- Effective scaling requires institutional capacity and sustained engagement.

Conclusion:

The Rajasthan experience demonstrates that AI can significantly enhance development outcomes when it is used as a tool for participatory governance. The key lesson is that technology must complement human systems and empower communities, rather than replace them, to achieve sustainable and inclusive development.

Mains Practice Question:

Q. AI should act as a tool for strengthening participatory governance rather than replacing human intermediaries. Examine in the context of last-mile service delivery and rural development. **15M (250 Words)**

4.19. DRDO's ULPGM-V3: Precision Strike and Anti-Drone Capability

Context:

DRDO has successfully carried out final development trials of the UAV-Launched Precision Guided Missile **ULPGM-V3**. The missile is designed for **precision strikes, anti-drone combat**, and **network-centric warfare**, strengthening India's indigenous drone-launched missile capability.

Explanation:

- **ULPGM** stands for **UAV-Launched Precision Guided Missile**.
- It is a **drone-launched missile system** developed by **DRDO** for modern battlefield requirements.
- The latest version, **ULPGM-V3**, is an upgraded variant compared to earlier **V1 and V2** versions.
- **V1** was a basic free-fall precision missile, while **V2** had longer range, mid-course target updates, and better battlefield utility.

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- **V3** adds capability to engage **drones, helicopters, moving targets, armoured vehicles, tanks, bunkers and fortified structures.**
- It has an advanced guidance system using **multiple sensors** to track targets accurately.
- It can operate in **day and night conditions**, increasing all-weather battlefield usefulness.
- The missile has **fire-and-forget capability**, meaning once launched, it can independently track and hit the target.
- It can carry different types of warheads such as **anti-armour warheads, fragmentation warheads**, and **bunker-busting warheads.**
- It is useful against **asymmetric threats**, where small drones and mobile targets are increasingly used in warfare.
- The project reflects India's focus on **indigenous defence technology**, involving DRDO and private defence companies.
- The system supports **network-centric warfare**, where drones, sensors, communication systems and command centres share real-time data

4.20. DRDO–IAF Trial of TARA Glide Weapon System

Context:

The Defence Research and Development Organisation (DRDO) and the Indian Air Force (IAF) have successfully conducted the maiden trial of the Tactical Advanced Range Augmentation (TARA) glide weapon system off the Odisha coast. TARA is India's first indigenous glide weapon kit designed to convert conventional unguided bombs into precision-guided munitions.

Explanation:



- A glide weapon is a precision-guided, unpowered, stand-off munition equipped with wings or flight control surfaces that allow it to glide toward a target after being released from an aircraft, rather than falling along a standard ballistic trajectory. It allows aircraft to strike ground targets from a safe distance, often over 100 km, outside the range of enemy air defenses.

Key aspects of glide weapons include:

- **Stand-off Capability:** They are launched far from the target, ensuring pilot safety.
- **Precision Targeting:** Often equipped with guidance systems (satellite/laser), turning "dumb" bombs into smart, accurate weapons.
- **Low Detectability:** Due to their small radar signature, lack of engine noise, and low flight altitude, they are very difficult for surface-to-air missiles to intercept.
- **Cost-Effectiveness:** They can be developed by fitting kits onto existing conventional bombs, making them cheaper than cruise missiles.
- **TARA (Tactical Advanced Range Augmentation):** India successfully tested this indigenous glide kit on May 7, 2026, to upgrade conventional warheads.
- **Gaurav:** A 1000 kg Indian indigenous precision-guided glide bomb.

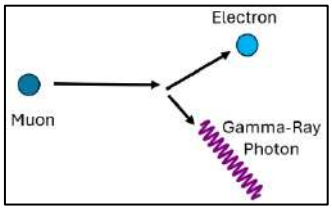
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4.21. Muons and Their Expanding Scientific Applications

Context:

Muons, produced by cosmic-ray interactions in the atmosphere, are highly penetrating subatomic particles increasingly used beyond fundamental physics. Their unique properties enable advanced imaging techniques like muography, making them valuable across multiple scientific and practical domains.

Explanation:



- **Muons are subatomic particles** (leptons) formed when cosmic rays collide with Earth's atmosphere.
- Around 10,000 muons reach every square metre per minute, making them naturally abundant.
- They resemble electrons but are ~207 times heavier ("fat electrons").
- Due to their mass, they can penetrate hundreds of metres of rock and dense materials.
- They are highly unstable, surviving only ~2.2 microseconds before decaying into electrons and neutrinos.
- Their penetrating ability is used in **muography (muon tomography)** to image large internal structures.
- **Archaeology:** Detection of hidden chambers in pyramids (e.g., Giza).
- **Volcanology:** Mapping internal magma pathways in volcanoes (e.g., Mount Vesuvius).
- **Nuclear science:** Imaging damaged reactors like **Fukushima** for internal assessment.
- **Security & industry:** Used in cargo scanning, customs inspection, and structural integrity analysis of large infrastructure.

4.22. Manus AI Deal Blocked - Rise of Agentic AI in Geopolitics

Context:

China blocked Meta's $2-billion acquisition of Manus AI citing national security concerns, highlighting how advanced AI systems are now viewed as strategic assets. The episode reflects intensifying US–China technological rivalry and the growing importance of next-generation "agentic" AI systems.

- **What is Manus AI:** Manus is described as a *general AI agent* capable of performing complex, multi-step tasks beyond simple chatbot responses.
- **Key Capability:** Unlike traditional AI (like chatbots), it uses *tool-calling*, enabling interaction with external apps (emails, calendars) and real-time web data retrieval.
- **Functional Nature:** It can execute tasks autonomously—such as coding, planning, and decision-making—making it closer to human-like digital assistants.
- **Strategic Concern:** China fears transfer of critical data, algorithms, and talent to foreign firms, treating AI as a core national asset.
- **What is Agentic AI:** Agentic AI refers to systems that can *independently plan, decide, and act* to achieve goals with minimal human intervention.
- **Examples of Use:** Automated research assistants, personal productivity agents, cybersecurity monitoring systems, and enterprise decision tools.

4.23. Rising Ethane Imports and Global Petrochemical Supply Chains

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Context:

China's ethane imports reached 3.462 million tons in 2026, with the United States emerging as the sole supplier. Increased imports were driven by strong petrochemical demand and disruptions in West Asian feedstock supplies due to regional geopolitical tensions.

Explanation:



- Ethane (C_2H_6) is a colourless, odourless hydrocarbon belonging to the alkane family and is a major component of natural gas.
- Ethane is primarily obtained during natural gas processing and petroleum refining.
- It is a fossil-fuel-based hydrocarbon and is highly flammable.
- The most important application of ethane is as a petrochemical feedstock for producing ethylene through steam cracking.
- Ethylene is a basic petrochemical used in manufacturing polyethylene plastics, PVC products, synthetic fibres, packaging materials, detergents, solvents, and industrial chemicals.
- Ethane-based ethylene production is generally cheaper and more energy-efficient than naphtha-based production.
- Ethane is also used as a refrigerant in cryogenic systems because of its low boiling point.
- In laboratories and industries, ethane may be used as a calibration gas and specialty fuel gas.
- Large-scale ethane trade is linked with natural gas production, LNG infrastructure, shale gas extraction, and global petrochemical industries.
- The United States is a major global exporter of ethane due to abundant shale gas reserves.

Prelims MCQs

1. With reference to the Chandrayaan-3 Hop Experiment, consider the following statements:

1. It demonstrated the ability of a lunar lander to lift off and land again on the Moon.
2. It can help future sample-return and human lunar missions.
3. It proved that the Moon has a thick atmosphere suitable for aircraft flight.

Which of the above statements is/are correct?

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

2. Hantavirus infection is mainly associated with which of the following?
(a) Mosquito bites in tropical wetlands
(b) Contact with urine, droppings or saliva of infected rodents
(c) Consumption of contaminated seafood
(d) Transmission through polluted air from vehicles

3. GalaxEye's 'Drishti' satellite is significant because it is described as India's first:
(a) Human spaceflight module
(b) Dual-mode Earth Observation satellite
(c) Interplanetary spacecraft to Mars
(d) Nuclear-powered communication satellite

4. V2V technology refers to:
(a) Vaccine-to-vaccine technology for disease control
(b) Vehicle-to-vehicle communication for road safety and traffic management
(c) Village-to-village digital payment transfer
(d) Volcano-to-volcano seismic communication

5. The SMILE Mission is associated with the study of:
(a) Earth's magnetic shield and solar storm interactions
(b) Deep ocean mining in the Indian Ocean
(c) Black holes in distant galaxies
(d) Human immune response to vaccines

6. Muons are scientifically useful mainly because they can:
(a) Replace oxygen in human blood
(b) Penetrate dense materials and help in imaging hidden structures
(c) Stop all nuclear reactions permanently
(d) Convert plastic waste directly into electricity

Answer Key

1. (a) **2.** (b) **3.** (b) **4.** (b) **5.** (a) **6.** (b)

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5. ENVIRONMENT

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5.1. Dust Pollution in Delhi: Road Dust as a Major Urban Air Pollutant

Context:

Delhi's air pollution problem is not limited to smoke, vehicle exhaust, or industrial emissions. Road dust and toxic dust hidden in plain sight have emerged as major contributors to particulate pollution, affecting public health and urban liveability.

Background:



Explanation:

1. **Why Dust Persists:**
   - Dust remains suspended in the air because vehicle movement repeatedly lifts loose particles from roads.
   - Poorly maintained road edges, broken pavements, unpaved areas, and open construction material add to the dust burden.
   - Water sprinkling gives only temporary relief because dust rises again after the surface dries.
2. **Health Concerns:**
   - PM10 and PM2.5 exposure can cause respiratory diseases, asthma, coughing, lung irritation, and chronic obstructive pulmonary disease.
   - Long-term exposure may increase risks of heart disease, lung damage, and reduced lung development in children.
   - Toxic elements in roadside dust may increase cancer and other serious health risks.
3. **Limits of Current Measures:**
   - Mechanical road sweeping, water sprinkling, and anti-smog guns help only when used scientifically and regularly.
   - Without removing dust sources, cleaning roads alone cannot solve the problem.

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4. Required Solutions:
    - Delhi needs better road design, regular vacuum sweeping, strict construction dust control, and scientific monitoring of dust hotspots.
    - Green barriers, vegetation along roads, covered construction material, paved shoulders, and restoration of natural dust barriers like the Aravallis are essential.

Conclusion:

Dust pollution is a serious but often underestimated component of Delhi's air crisis. Long-term control requires moving beyond temporary sprinkling and adopting scientific, source-based dust management through urban planning, enforcement, and ecological restoration.

Mains Practice Question:

Q. Road dust is an underestimated but significant contributor to Delhi's air pollution crisis. Discuss the causes of road dust pollution and suggest long-term corrective measures.

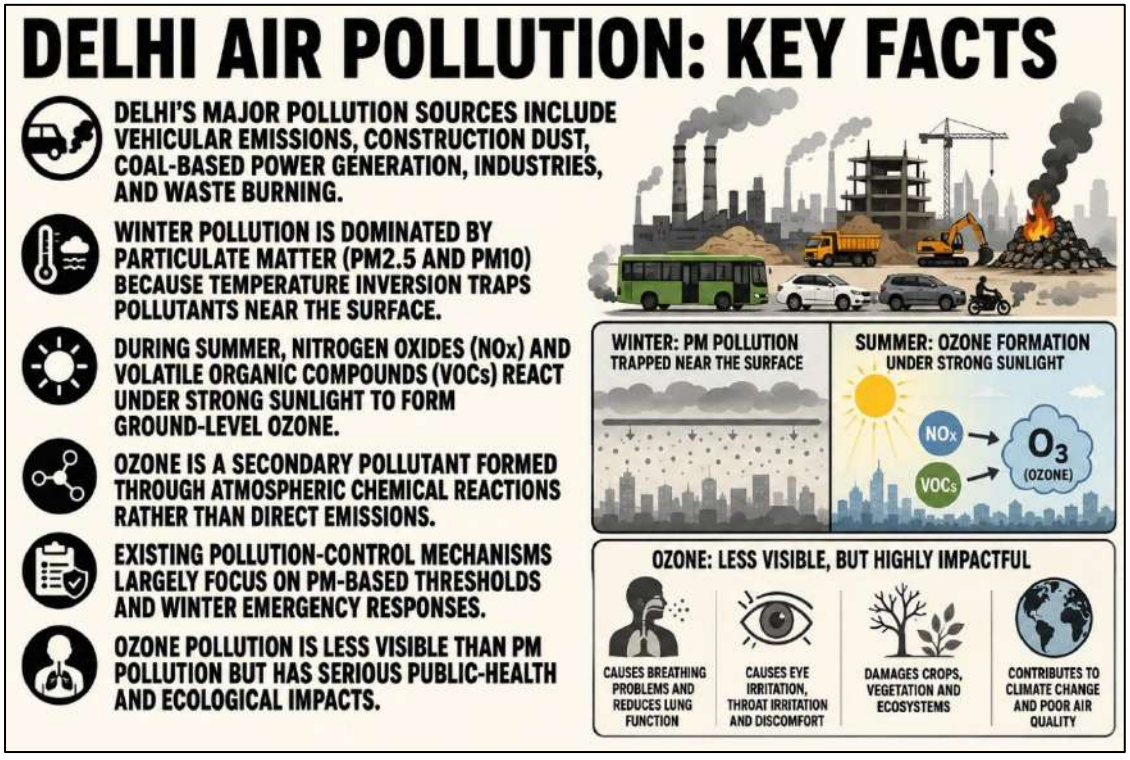
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5.2. Delhi's new Summer's Air Pollution Crisis

Context:

Air pollution in Delhi has traditionally been associated with winter smog and particulate matter (PM) pollution. However, recent assessments indicate that air pollution is increasingly becoming an all-season problem, with ozone pollution emerging significantly during summer months due to atmospheric and chemical interactions.

Background:



Explanation:

Major Concerns and Challenges:

Seasonal Variation in Pollution:

- Different pollutants dominate in different seasons, requiring distinct policy responses.
- Winter conditions favour PM accumulation, while summer conditions accelerate ozone formation.

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Increasing Ground-Level Ozone Pollution:

- Ground-level ozone causes respiratory irritation, asthma aggravation, and long-term lung damage.
- Ozone also affects crops, vegetation, and urban ecosystems.

Narrow Regulatory Focus:

- Pollution-control frameworks primarily target particulate matter and visible smog.
- Limited attention is given to precursor pollutants such as NOx and VOCs.

Vehicular and Industrial Emissions:

- Vehicular exhaust and thermal power plants remain major contributors to NOx emissions.
- VOC emissions originate from fuels, solvents, waste burning, and industrial activities.

Weak Monitoring Mechanisms:

- VOC emissions are difficult to measure because they arise from multiple dispersed sources.
- Monitoring systems remain inadequate for real-time ozone management.

Urbanisation and Energy Dependence:

- Rising vehicle ownership and dependence on fossil fuels continue to increase emission loads.
- Coal-based energy generation contributes substantially to urban pollution.

Public Health Risks:

- Air pollution has become a continuous public-health concern rather than a seasonal issue.
- Vulnerable groups such as children and the elderly face greater health risks.

Way Forward:

- Adopt a multi-pollutant and all-season air-quality management strategy.
- Strengthen public transport and promote cleaner mobility systems.
- Tighten fuel-quality standards and reduce coal dependence through renewable energy expansion.
- Improve monitoring of NOx, VOCs, and ozone alongside particulate matter.

Conclusion:

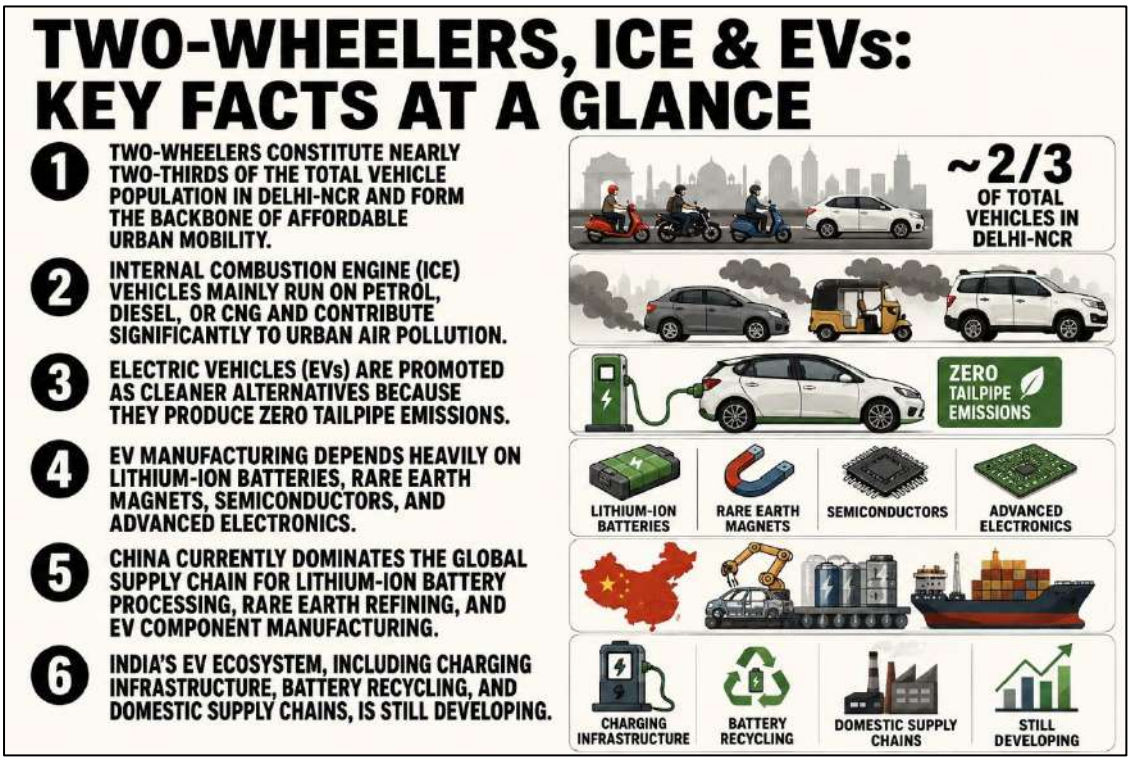
Delhi's air pollution challenge extends beyond winter smog and particulate matter. Effective pollution control now requires an integrated, year-round strategy that addresses changing atmospheric conditions, multiple pollutants, and long-term structural sources of emissions.

5.3. Delhi's new proposed EV policy

Context:

The Delhi Government has proposed the EV Policy 2.0 to accelerate the transition towards electric mobility and reduce vehicular pollution in the National Capital Region (NCR). Under the proposed policy, only electric two-wheelers may be permitted for new registrations from April 2028. The policy is intended to improve urban air quality, reduce dependence on fossil fuels, and support India's broader climate and clean-energy objectives.

Background:



Explanation:

Major Concerns and Challenges:

Dependence on China for Critical Minerals and Components:

- EV batteries require critical minerals such as lithium, cobalt, nickel, graphite, and rare earth elements.
- China controls a major share of global battery processing, rare earth refining, and EV component manufacturing capacities.
- India currently imports a large share of battery cells, magnets, and advanced EV components from China.
- Excessive import dependence may create supply-chain vulnerabilities and strategic risks.

Inadequate Charging Infrastructure:

- Public charging stations remain insufficient for large-scale EV adoption.
- Many urban areas still lack reliable fast-charging networks.
- Long charging duration and limited charging access create range anxiety among consumers.

Livelihood and Employment Risks:

- Thousands of mechanics, repair shops, and informal-sector workers depend on servicing conventional vehicles.
- EVs require fewer moving parts and different maintenance systems, reducing demand for traditional automobile repair services.
- Small workshops and low-skilled workers may struggle to adapt quickly to new technologies.

High Initial Cost of Electric Vehicles:

- EV purchase prices remain relatively high despite lower operating costs.
- Battery costs continue to form a major portion of vehicle prices.
- Lower- and middle-income consumers may face affordability challenges during the transition.

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Technological and Safety Concerns:

- Battery performance in extreme temperatures remains a concern in Indian climatic conditions.
- Fire hazards, battery degradation, and recycling challenges continue to raise safety and environmental concerns.
- Domestic expertise in advanced battery technologies remains limited.

Environmental Concerns Beyond Tailpipe Emissions:

- EVs reduce direct vehicular emissions but electricity generation in India still relies heavily on coal-based thermal power.
- If electricity comes mainly from fossil fuels, overall carbon reduction benefits may remain limited.
- Battery disposal and e-waste management also pose emerging environmental challenges.

Industrial and Manufacturing Challenges:

- Automobile manufacturers and ancillary industries require time to restructure production systems and investments.
- Rapid policy shifts may disrupt existing supply chains, manufacturing units, and dealer networks.
- Domestic EV manufacturing ecosystems are still evolving and may not yet support large-scale demand.

Way Forward:

- Adopt a gradual and predictable EV transition with realistic timelines for industries and consumers.
- Expand renewable energy generation to ensure cleaner electricity for EV charging.
- Strengthen domestic production of batteries, semiconductors, and critical EV components under initiatives such as Make in India and PLI schemes.
- Develop large-scale skill-development and reskilling programmes for mechanics, technicians, and small enterprises involved in the automobile sector.

Conclusion:

Electric mobility is essential for improving urban air quality and supporting climate goals, but the transition must remain technologically feasible, economically practical, and socially inclusive. A balanced approach that combines environmental sustainability, domestic manufacturing capacity, energy security, and livelihood protection is necessary for achieving a successful long-term EV transition.

Mains Practice Question:

Q. Delhi's proposed ban on new registration of non-electric two-wheelers from 2028 reflects the urgency of clean mobility. Critically examine its feasibility.

5.4. Madhya Pradesh Tiger Issues

Context:

Madhya Pradesh, India's leading tiger state, is witnessing a rapid rise in tiger population crossing 1,000, raising concerns about whether forests can sustain such numbers. The issue highlights a transition from conservation success to ecological management challenges.

1. CURRENT SITUATION IN MADHYA PRADESH (BASED ON ARTICLE)

- MADHYA PRADESH HAS RECORDED THE FASTEST INCREASE IN TIGER POPULATION IN INDIA.
- INDIA'S TOTAL TIGER POPULATION ROSE BY 65% BETWEEN 2014 AND 2022 (2,226 TO 3,682).
- INCREASE IN MP:
  FROM 224 (2014) → ~526 (2020 ESTIMATE) → CONTINUING RISE.
- WHILE THIS REFLECTS CONSERVATION SUCCESS, IT HAS LED TO:
  - HIGHER HUMAN-TIGER CONFLICT
  - INCREASED RETALIATORY KILLINGS
  - PRESSURE ON FOREST ECOSYSTEMS

2. KEY ECOLOGICAL CONCERN: CARRYING CAPACITY

- CARRYING CAPACITY REFERS TO THE MAXIMUM NUMBER OF TIGERS THAT A HABITAT CAN SUSTAIN.
- IT DEPENDS ON:
  - AVAILABILITY OF PREY BASE
  - FOREST COVER AND TERRITORY
  - WATER AND ECOLOGICAL CONDITIONS
- ACCORDING TO EXPERTS:
  MP FORESTS MAY SUPPORT ~350 TIGERS SUSTAINABLY, BUT CURRENT NUMBERS EXCEED THIS IN CERTAIN AREAS.
- WHEN EXCEEDED:
  - TIGERS ARE FORCED TO MOVE OUT OF PROTECTED AREAS
  - LEADS TO CONFLICT AND MORTALITY.

3. SHRINKING CORRIDORS AND DISPERSAL ISSUES

- TIGER POPULATIONS DEPEND ON FOREST CORRIDORS FOR MOVEMENT.
- IN MP:
  - CORRIDORS ARE FRAGMENTED DUE TO MINING, ROADS, AND DEFORESTATION
- CONSEQUENCES:
  - RESTRICTED GENE FLOW
  - INCREASED INBREEDING RISKS
  - HIGHER CHANCES OF HUMAN-WILDLIFE CONFLICT

4. SURPLUS TIGER MANAGEMENT PROBLEM

- EXCESS TIGER POPULATION CREATES:
  - TERRITORIAL COMPETITION
  - DISPLACEMENT OF SUB-ADULT TIGERS
- OBSERVATIONS FROM THE ARTICLE:
  - SURPLUS TIGERS EITHER:
    - MOVE INTO HUMAN-DOMINATED AREAS, OR
    - FACE CONFLICT WITHIN FORESTS
- SUGGESTED SOLUTIONS:
  - HABITAT RESTORATION
  - TRANSLOCATION TO UNDERPOPULATED FORESTS

5. THE "DESIRED NUMBER" DEBATE

- CONSERVATION IS NOT ABOUT MAXIMUM NUMBERS, BUT OPTIMAL ECOLOGICAL BALANCE.
- THE "DESIRED NUMBER" DEPENDS ON:
  - ECOLOGICAL FACTORS
  - SOCIAL TOLERANCE
  - ECONOMIC CONDITIONS
- EXCESS POPULATION MAY:
  - INCREASE POACHING INCENTIVES
  - INTENSIFY CONFLICT

6. CATTLE CRISIS AND CHANGING PREY DYNAMICS

- RISING TIGER POPULATION HAS LED TO:
  - INCREASED LIVESTOCK PREDATION
- EVIDENCE:
  - IN MP, NEARLY 40% OF TIGER DIET COMES FROM CATTLE
- IMPLICATIONS:
  - EASY PREY ENCOURAGES TIGERS TO MOVE OUTSIDE FORESTS
  - RAISES RETALIATORY KILLING RISKS

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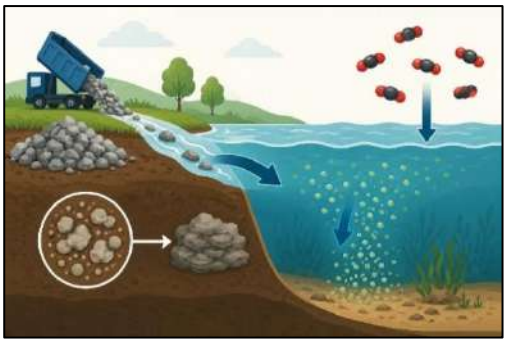
Conclusion:
India's tiger conservation success has entered a second phase, where the challenge is not increasing numbers but ensuring ecological balance, habitat connectivity, and conflict mitigation. Sustainable conservation now requires a landscape-level, science-based approach beyond protected areas.

Mains Practice Question:
Q. The future of tiger conservation in India depends not merely on increasing tiger numbers but on ensuring habitat connectivity and landscape-level management. Analyse.

5.5. Enhanced Alkalinity and Doubts over Rock-Based Climate Mitigation

Context:
A climate mitigation method called **enhanced alkalinity** involves spreading crushed silicate rocks on land or in water to help oceans absorb and store more **CO_2**. New research has raised doubts, saying that minerals released from rocks may get trapped in secondary minerals like **clay**, reducing the method's carbon-storage efficiency.

Explanation:



- **Enhanced alkalinity** is a proposed **carbon dioxide removal technique** aimed at increasing the natural ability of oceans to absorb CO_2.
- It involves spreading crushed **silicate rocks** or alkaline minerals on land, rivers, coasts or oceans.
- When these rocks dissolve, they release ions such as **calcium, magnesium and bicarbonate**, which increase water alkalinity.
- Higher alkalinity helps convert dissolved CO_2 into more stable forms, supporting long-term **carbon sequestration**.
- The method is linked to natural **rock weathering**, but enhanced alkalinity tries to accelerate this process artificially.
- It is considered part of **geoengineering** or negative emissions strategies.
- The concern is that released minerals may form secondary minerals like **clay**, trapping alkalinity before it reaches the ocean.
- This can reduce the ability of oceans to absorb and store atmospheric carbon dioxide.
- Other challenges include mining impacts, energy use for crushing rocks, ecological risks and monitoring difficulties.

5.6. Union Cabinet Approves ₹37,500-Crore Coal Gasification Package

Context:
The Union Cabinet has approved a ₹37,500-crore incentive package to promote coal gasification projects in India. The scheme aims to reduce import dependence on products such as LNG, methanol, ammonia, and urea while supporting the target of 100 million tonnes of coal gasification by 2030.

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Explanation:



- Coal gasification is a process in which coal or lignite is converted into syngas (synthetic gas) through partial oxidation at high temperatures.
- Syngas mainly contains carbon monoxide, hydrogen, carbon dioxide, and methane and can be used to produce methanol, ammonia, synthetic natural gas (SNG), fertilizers, and chemicals.
- India possesses large coal reserves but depends heavily on imports of LNG, coking coal, methanol, ammonia, and urea, affecting energy security and foreign exchange reserves.
- Surface coal gasification is considered a cleaner alternative compared to direct coal combustion because pollutants can be removed during processing.
- The scheme provides financial incentives, extended coal linkage tenure, and support for downstream industries to encourage private investment.
- Coal gasification is linked to India's goals of energy security, import substitution, industrial growth, and diversification of the energy mix.

5.7. Green Methanol Production from Invasive Weed in Kutch

Context:

India's first green methanol plant is being set up in Kandla to convert the invasive weed *Prosopis juliflora* into marine fuel. The project aims to reduce emissions in shipping and address ecological damage caused by the species in Kutch.

Explanation:



- ***Prosopis juliflora*** is an invasive alien species (IAS) introduced in India during British colonial rule that has spread aggressively in Banni grasslands (Kutch), displacing native biodiversity and degrading ecosystems.
- IAS are non-native species that outcompete local flora/fauna, affecting ecology and livelihoods; management includes eradication, control, and utilisation.
- **Methanol (CH_3OH) is a liquid fuel and chemical feedstock, used in shipping as a cleaner alternative to bunker fuel.**
- Conventional methanol is produced from fossil fuels (coal/natural gas) via gasification or reforming, leading to emissions.
- **Green methanol** is produced from renewable biomass or CO_2 + green hydrogen, reducing lifecycle carbon footprint.
- The process involves **biomass gasification. Biomass is heated in limited oxygen (gasification) to produce syngas (CO + H_2). This syngas is then converted using a catalyst into liquid methanol fuel.**
- Aligns with **International Maritime Organization (IMO)** norms to reduce shipping emissions (CO_2, NOx, SOx).
- Supports India's goals of **energy transition, green ports, and circular economy** by converting waste biomass into fuel.
- Also addresses **land restoration and invasive species management** while generating economic value.

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5.8. Colombia's "Cocaine Hippos" and India's Vantara Relocation Proposal

Context:

Colombia is struggling to control the rapidly growing population of invasive "cocaine hippos" introduced by Pablo Escobar. India's Vantara has proposed relocating these animals as a humane alternative to culling.

Explanation:



- Hippopotamus is a **large semi-aquatic mammal native to sub-Saharan Africa**, commonly found in rivers and lakes.
- It is known for its **aggressive and territorial behaviour**, especially in water, and is considered one of the most dangerous large animals.
- Hippos **spend daytime in water** to regulate body temperature and come out at night to graze on grass.
- They typically **give birth in water**, and calves can swim soon after birth, reflecting adaptation to aquatic habitats.
- In the 1980s, **Pablo Escobar imported four hippos to Colombia**, which were left unmanaged after his death.
- Due to **absence of natural predators and favourable conditions**, their population has grown to around 200, spreading across river systems.
- ®These hippos are classified as an **invasive species**, as they are non-native and disrupt local ecosystems.
- They threaten **indigenous biodiversity**, alter water chemistry (nutrient loading, algal blooms), and increase risks of human-wildlife conflict.
- Scientists recommend **population control (including culling)**, as sterilisation is costly and relocation is logistically complex.
- India's **Vantara wildlife centre has proposed relocation**, offering veterinary care and habitat management as a humane alternative, though feasibility and acceptance remain uncertain.

5.9. E100 (100% Ethanol) as Approved Automotive Fuel in India

Context:

The Ministry of Road Transport and Highways has proposed recognizing E100 (100% ethanol) as an approved fuel under the Central Motor Vehicles Rules. This will enable certification and large-scale deployment of vehicles running entirely on ethanol.

Explanation:

- Ethanol is a **biofuel** produced from sugarcane, maize, and biomass etc.
- India promotes **ethanol blending (E10, E20)** to reduce crude oil imports. India already achieved E20 (a petrol blend containing 20% ethanol and 80% petrol).
- E100 refers to **pure ethanol fuel**, requiring specially designed engines.

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- Governed under **Central Motor Vehicles Rules (CMVR)** for fuel standards and vehicle approval.
- **Homologation** = official, mandatory certification process that ensures a vehicle or its components comply with government safety, technical, and environmental regulations before it can be sold or used on public roads.
- Ethanol is **renewable & cleaner-burning. Hence Ethanol blended fuel** reduces greenhouse gas emissions.
- E100 implementation aims to achieve energy independence, reduce carbon emissions, and boost farmer incomes.
- key benefits include lowering the massive oil import bill and achieving Net-Zero targets.
- However, challenges include the need for special Flex-Fuel Vehicles (FFVs), lower fuel efficiency, and high-water consumption for feedstock.

5.10. Saranda Forests: Ecological Importance

Context:

The Saranda forests of Jharkhand are ecologically significant sal forests and an important elephant corridor. The present issue concerns the delay in giving stronger legal protection to this forest landscape despite judicial directions, rising mining pressure, and increasing ecological damage.



Explanation:

1. **Problem: Delay in Forest Protection:**
   - The major concern is the delay in notifying Saranda as a protected wildlife area despite its ecological importance.
   - Delay weakens conservation efforts and allows continued degradation of the forest ecosystem.
2. **Mining Pressure and Ecological Damage:**
   - Mining has disturbed forest continuity, damaged habitats, and affected wildlife movement.
   - Fragmentation of forests reduces biodiversity and makes ecosystems more vulnerable to long-term decline.

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3. **Elephant Corridors and Human–Animal Conflict:**
    - Saranda is important for elephant migration.
    - When forest corridors are disturbed, elephants are forced to move through villages and agricultural fields.
    - This increases crop loss, human casualties, elephant deaths, and social tension.
4. **Forest Rights and Conservation Debate:**
    - A common fear is that protected area status may affect the rights of tribal and forest-dwelling communities.
    - However, conservation and community rights need not be treated as opposites.
    - The Forest Rights Act recognises individual and community forest rights, and these must be protected even while conserving forests.
5. **Weak Environmental Governance:**
    - The issue also reflects poor implementation of environmental laws and court directions.
    - Environmental governance suffers when governments give assurances but delay actual action.
    - Such delays reduce public trust in institutions and weaken rule-based governance.

Way Forward:

- The state must complete legal notification and prepare a science-based management plan.
- Mining should be strictly regulated through ecological assessment, "go" and "no-go" zoning, and continuous monitoring.
- Elephant corridors must be restored and protected.
- Gram Sabhas and local communities should be involved in conservation planning.
- Tribal livelihoods, forest rights, compensation, and rehabilitation support must be ensured.
- Conservation should be treated as long-term ecological security, not merely as a restriction on development.

Conclusion:

Saranda represents the larger challenge of balancing environment, minerals, tribal rights, and governance. Protecting the forest is essential not only for wildlife but also for water security, soil conservation, climate resilience, and local livelihoods. A rights-based, community-centred, and scientifically planned conservation model is the most sustainable way forward.

Mains Practice Question:

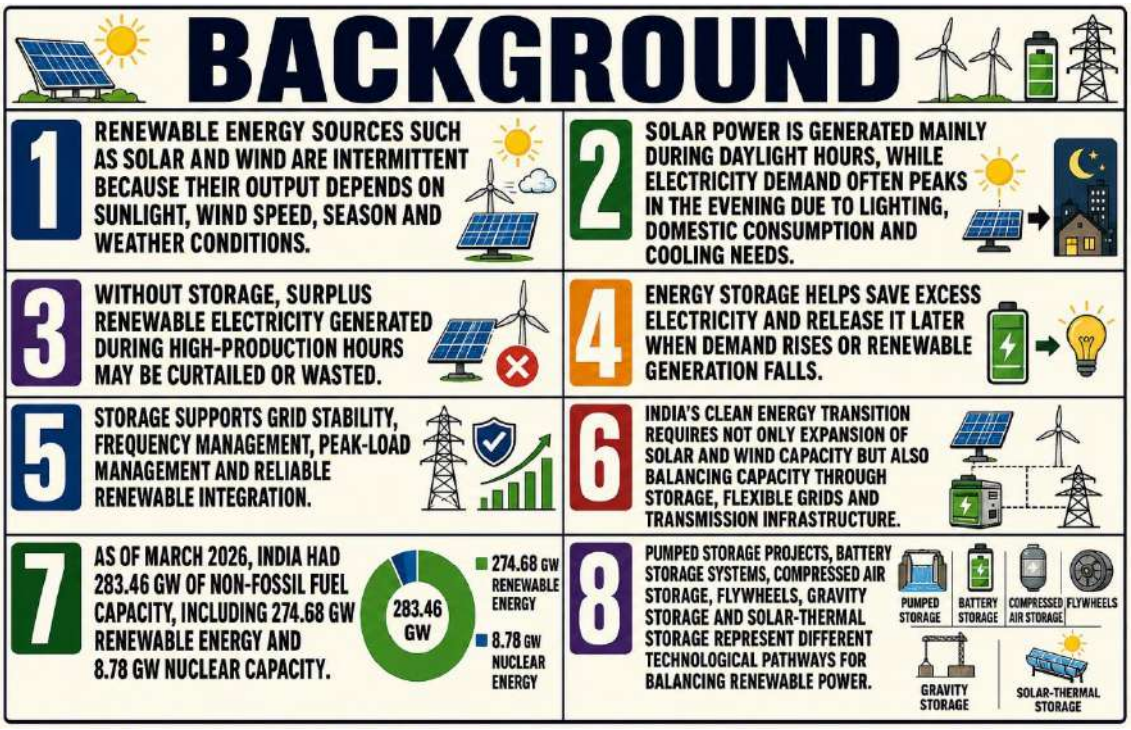
Q. Delay in granting legal protection to ecologically sensitive forest landscapes weakens both environmental governance and rule-based administration. Analyse with reference to Saranda forests. **15M (250 Words)**

5.11. India's Renewable Surge and the Energy Storage Challenge

Context:

India's renewable energy expansion has made storage a central requirement for energy security, grid stability and climate goals. Solar and wind power are variable in nature; therefore, India needs storage systems that can save surplus clean electricity and supply it during evening peaks, low-generation periods and grid stress. India has also set a target of 500 GW non-fossil electricity capacity by 2030, making storage a backbone of the clean energy transition.

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Drivers of the Storage Challenge:

- **Solar generation and evening demand are mismatched.** Solar power contributes strongly during afternoon hours but declines sharply after sunset, while demand often remains high in the evening.
- **Wind power is variable and weather-dependent.** Sudden changes in wind speed can create fluctuations in electricity supply, requiring backup and balancing mechanisms.
- **India's electricity demand is rising rapidly.** Urbanisation, industrialisation, digitalisation and increasing cooling requirements are increasing round-the-clock power demand.
- **Renewable capacity is expanding faster than storage capacity.** India's growing solar and wind capacity requires parallel investment in storage to avoid instability and wastage.
- **Non-fossil expansion increases balancing needs.** As non-fossil sources form a larger part of the electricity mix, the power system must become more flexible and storage-dependent.

Why Storage is Essential:

- **Storage solves the core mismatch between generation and demand.** It stores electricity when renewable generation is high and releases it when generation is low or demand is high.
- **It reduces renewable energy curtailment.** Without storage, surplus daytime solar power may be wasted even when clean electricity is available.
- **It improves grid reliability.** Storage systems can provide fast response during supply fluctuations and reduce the risk of blackouts or grid stress.
- **It reduces dependence on fossil-fuel-based peaking power.** Battery and pumped hydro storage can reduce the need for coal or gas backup during evening peaks.
- **It supports climate goals and energy security together.** Storage enables India to increase renewable energy use without compromising stable electricity supply.
- **It strengthens frequency management.** Grid-scale storage can help maintain balance between electricity demand and supply in real time.

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Types of Energy Storage:

- **Pumped Hydro Storage:** Surplus electricity is used to pump water from a lower reservoir to a higher reservoir, and the water is released later through turbines to generate power during peak demand.
- **Battery Energy Storage Systems:** Electricity is stored chemically in batteries, especially lithium-ion and lithium iron phosphate batteries, which are useful for fast response and short-duration storage.
- **Concentrating Solar-Thermal Storage:** Mirrors concentrate sunlight to generate heat, which is stored in molten salt or similar materials and later used to produce steam and electricity.
- **Compressed Air Energy Storage:** Excess electricity compresses air into underground caverns or tanks, and the stored air is later released to run turbines.
- **Flywheel Energy Storage:** Electricity spins a rotor at high speed, and the stored kinetic energy is converted back into electricity when needed.
- **Gravity Energy Storage:** Surplus electricity lifts heavy weights, which are later lowered to generate electricity through gravitational movement.
- **Green Hydrogen-Based Storage:** Surplus renewable electricity can produce hydrogen through electrolysis, which may later be used for power, industry or transport, though costs and efficiency remain challenges.

Challenges / Issues:

- **Insufficient Storage Capacity:** Storage infrastructure lags behind renewable energy expansion.
- **Battery Dependence:** Heavy reliance on imported lithium-ion cells and critical minerals creates vulnerabilities.
- **Concentrated Supply Chains:** Dependence on a few countries increases geopolitical and cost risks.
- **High Capital Costs:** Grid-scale battery deployment requires significant investment and policy support.
- **Pumped Hydro Constraints:** Land, environmental and rehabilitation issues delay projects.
- **Transmission Bottlenecks:** Grid congestion can hinder renewable energy integration.
- **Financial Burden on Utilities:** Balancing costs and compensation payments strain DISCOM finances.
- **Limited Short-Duration Storage:** Batteries alone cannot meet long-duration and seasonal storage needs.

Impacts:

- **Underutilisation of Renewables:** Solar and wind power may be wasted without adequate storage.
- **Continued Coal Dependence:** Coal-based backup may remain necessary for reliability.
- **Grid Instability Risks:** Variable renewable energy can affect grid reliability and frequency control.
- **Higher Electricity Costs:** Curtailment and backup power requirements can increase costs.
- **Technology-Linked Energy Security:** Storage needs make technology and mineral access strategically important.
- **Climate Goals at Stake:** Reliable storage is essential for achieving decarbonisation targets.

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Opportunities:

- **Domestic Battery Ecosystem:** Storage demand can boost battery manufacturing and recycling industries.
- **Green Job Creation:** Storage projects can generate employment across multiple sectors.
- **Reliable Hybrid Projects:** Solar-storage and wind-solar-storage systems can provide stable power.
- **Technology Diversification:** Multiple storage options can reduce dependence on a single technology.
- **Smart Grid Development:** Digital tools can improve renewable energy management and efficiency.

Government / Policy Measures:

- **500 GW Non-Fossil Capacity Target:** Storage is critical for achieving India's 2030 clean energy goals.
- **Battery Energy Storage Promotion:** Policies increasingly support storage-linked renewable deployment.
- **Pumped Storage Development:** Government is encouraging expansion of pumped hydro capacity.
- **Rapid Renewable Expansion:** Renewable capacity has grown significantly, increasing storage needs.
- **Future Storage Planning:** Large-scale storage requirements are being incorporated into long-term energy planning.

Way Forward:

- **Integrate Storage with Renewable Auctions:** Link future solar and wind projects with storage systems.
- **Accelerate Grid-Scale BESS:** Prioritise deployment in renewable-rich states.
- **Expand Pumped Hydro Sustainably:** Balance faster approvals with environmental safeguards.
- **Strengthen Domestic Manufacturing:** Promote battery production, recycling and alternative chemistries.
- **Secure Critical Minerals:** Develop overseas partnerships and recycling ecosystems.
- **Upgrade Grid Infrastructure:** Expand transmission networks and smart-grid technologies.
- **Promote Demand-Side Management:** Use smart meters and time-of-day tariffs to manage peak demand.
- **Invest in Long-Duration Storage:** Support research in hydrogen, thermal, gravity and compressed-air storage.
- **Ensure Policy Stability:** Provide clear revenue models, funding support and long-term contracts.

Conclusion:

Energy storage is the backbone of India's renewable energy transition. Without adequate storage, rapid solar and wind expansion may create curtailment, grid instability and continued dependence on fossil-fuel backup. With timely investment in batteries, pumped hydro, smart grids, domestic manufacturing and long-duration storage, India can build a cleaner, more reliable and energy-secure power system.

Mains Practice Question:

Q. Energy storage is the backbone of India's renewable energy transition. Discuss in the context of solar and wind power variability

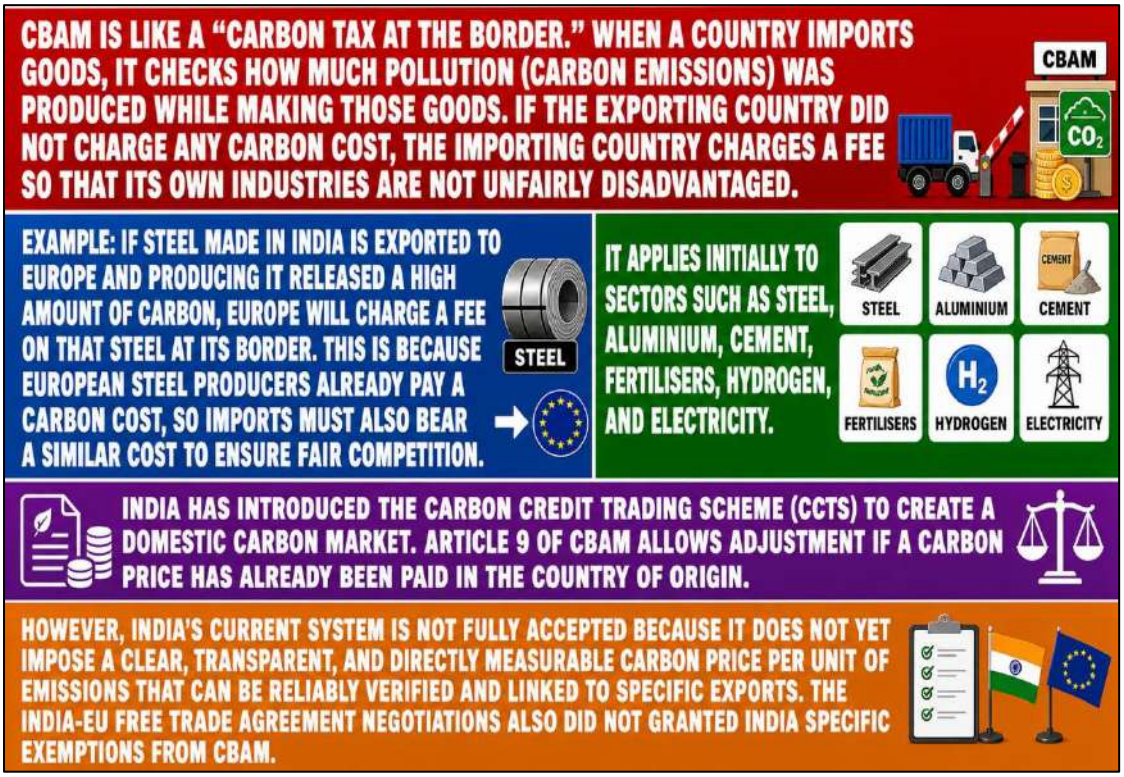
5.12. CBAM: Implications for Developing Economies

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Context:

The European Union has operationalised its Carbon Border Adjustment Mechanism (CBAM) to impose a carbon price on imports. This development raises concerns for exporting countries, as it may shift economic value linked to carbon pricing away from them unless appropriate domestic measures are adopted.

Background:



Explanation:

Nature of the Issue:

- CBAM claims to ensure fair competition by aligning carbon costs between domestic EU producers and foreign exporters. However, it effectively transfers part of the carbon revenue from exporting countries to the EU.
- Countries lacking domestic carbon pricing systems become "price takers," bearing external regulatory costs without retaining associated economic benefits.

Implications for Exporting Economies:

- Exporters may face increased production costs, reducing competitiveness in global markets.
- There is a risk of revenue loss, as payments made under CBAM accrue to the importing jurisdiction.
- This also raises concerns related to climate equity, as developing economies bear adjustment burdens.

Existing Domestic Mechanism:

- A domestic carbon pricing system, such as a Carbon Credit Trading Scheme (CCTS), can generate tradable emission permits.
- If properly designed, it can align with international requirements and be recognised under CBAM provisions.
- This allows exporters to offset EU carbon costs through credits already paid domestically.

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Example: How CBAM Currently Works:

- Suppose an Indian steel exporter ships steel to the EU with embedded emissions of 2 tonnes of CO_2 per tonne of steel.
- If the EU carbon price is €80 per tonne, the exporter must pay €160 per tonne at the EU border (after adjusting for any domestic carbon price already paid).
- If no domestic carbon pricing exists, the full amount is paid to the EU.

Suggested Approach:

- Introduce a domestic carbon levy or border adjustment mechanism on exports to ensure carbon payments are made within the country.
- Align domestic pricing with global standards so it qualifies for recognition under CBAM rules.
- Use revenues generated domestically to fund green transition initiatives such as renewable energy, green hydrogen, and industrial decarbonisation.
- Ensure transparency, robust monitoring, and credible verification to gain international acceptance.

Example: Suggested Mechanism:

- Instead of paying €160 at the EU border, the exporter pays an equivalent carbon charge domestically.
- This amount is then credited against CBAM obligations, reducing or eliminating payments to the EU.
- The revenue remains within the country and can be reinvested in sustainability efforts.

Conclusion:

A strategic domestic carbon pricing framework can convert a potential economic loss into an opportunity for green transformation. By aligning with global standards while retaining revenues, countries can protect competitiveness and strengthen their climate policy autonomy.

Mains Practice Question:

Q. The Carbon Border Adjustment Mechanism reflects the growing interface between climate policy and international trade. Discuss its implications for developing economies like India. **10M (150 Words)**

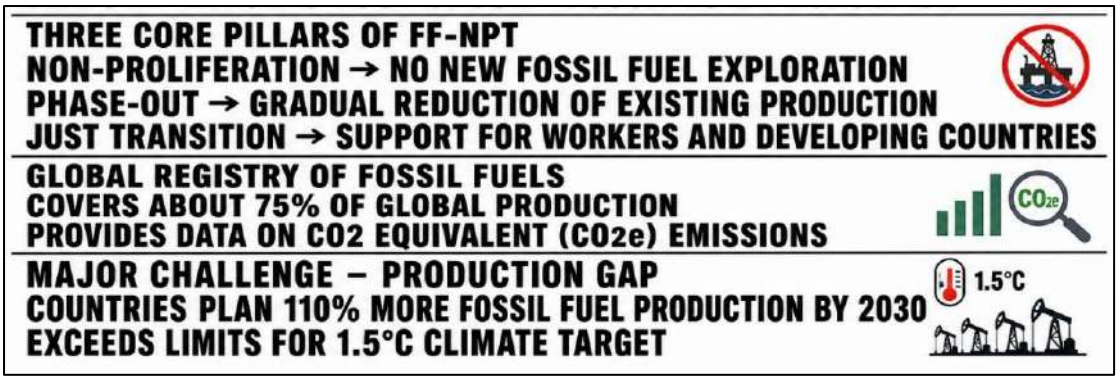
5.13. Climate Vows, now for delivery

Context:

A climate conference held in Santa Marta, Colombia (2026) brought together 50+ countries to push for national roadmaps to phase out fossil fuels, reflecting frustration with slow UN climate negotiations. The initiative is closely linked to the broader Fossil Fuel Non-Proliferation Treaty (FF-NPT) movement.

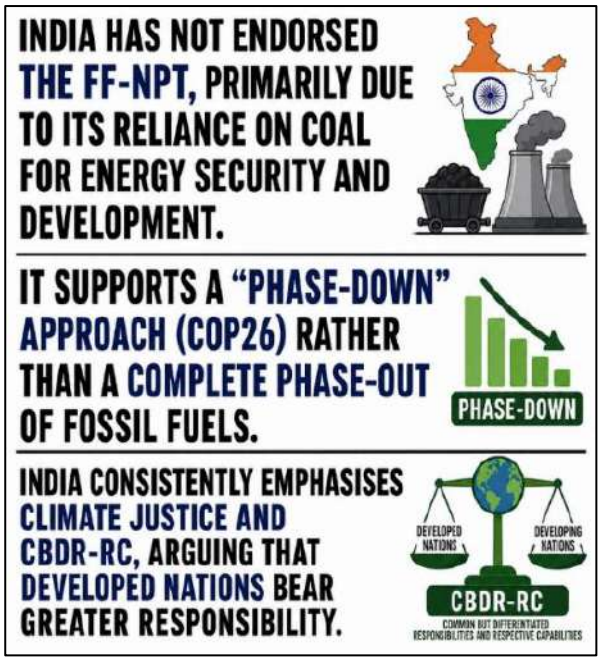
Background:





Explanation:

1. Emergence & Nature of Santa Marta Conference:
   - The Santa Marta conference reflects a shift from slow, consensus-based UNFCCC negotiations to faster, action-oriented coalitions of willing countries.
   - It is formally linked to the FF-NPT initiative, acting as the first in a series of efforts to build a global framework for phasing out fossil fuels.
   - By operating outside the UN system, it avoids negotiation deadlocks and enables quicker policy direction.
2. Key Outcomes of the Conference:
   - Participating countries agreed to prepare national roadmaps for reducing and eventually ending fossil fuel use.
   - Some countries (e.g., France) indicated clear timelines (2030–2050) for phasing out oil and gas.
   - A major focus is on aligning economic systems (trade and finance) with climate goals (decarbonisation), signalling a move toward policy integration.



3. Significance of the Initiative:
   - Countries involved represent around 50% of global GDP, giving the initiative economic credibility.
   - It brings together diverse actors (developed, developing, and small island nations), helping bridge traditional divides in climate negotiations.
   - Marks a shift from symbolic climate pledges to implementation-oriented frameworks, addressing long-standing inaction.
4. Limitations Highlighted:
   - The absence of major emitters like USA, China, and India significantly limits global impact.
   - Since these countries contribute a large share of emissions, their non-participation weakens effectiveness.
   - The coalition-based approach may also lead to fragmentation in global climate governance.

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5. Structural Issues in Global Climate Action:
    - UN climate processes often delay difficult decisions due to consensus requirements.
    - They primarily focus on reducing emissions, while ignoring fossil fuel production itself.
    - Many countries continue expanding fossil fuel production despite climate commitments, reflecting policy contradictions.
    - There is also a lack of binding enforcement mechanisms and sufficient climate finance, especially for developing nations.
6. Need for Multi-Level Climate Governance:
    - Climate change requires action beyond a single global institution like UNFCCC.
    - Effective transition needs coordination among: Governments, Civil society & Private sector
    - Hence, alliances of willing countries and actors are essential to accelerate progress.

Conclusion:

The Santa Marta conference signals a crucial shift from climate commitments to actionable frameworks, driven by initiatives like FF-NPT. However, meaningful global impact depends on including major emitters and ensuring equitable climate finance for a just transition.

Mains Practice Question:

Q. Climate commitments must now be converted into delivery-oriented roadmaps. Analyse in the context of fossil fuel phase-out, climate finance and just transition.

10M (150 Words)

Space for Notes

5.14. Kalai-II Hydroelectric Project and White-bellied Heron Habitat Concerns

Context:

The proposed 1,200 MW Kalai-II Hydroelectric Project in Arunachal Pradesh has come under scrutiny because project documents reportedly did not adequately mention the presence of the critically endangered White-bellied Heron habitat in the region. The issue highlights tensions between hydropower expansion and biodiversity conservation in ecologically sensitive Himalayan ecosystems.

Explanation:

- The Kalai-II project is a proposed hydropower project on the Lohit River basin, a tributary of the Brahmaputra River in Arunachal Pradesh.
- The project involves diversion of forest land and requires approval under the Forest (Conservation) Act, 1980 and environmental clearance under the Environment Protection Act, 1986.
- Arunachal Pradesh is part of the Eastern Himalaya biodiversity hotspot, known for rich endemic flora and fauna.
- The White-bellied Heron (*Ardea insignis*) is one of the world's rarest birds and is classified as Critically Endangered by the IUCN Red List.

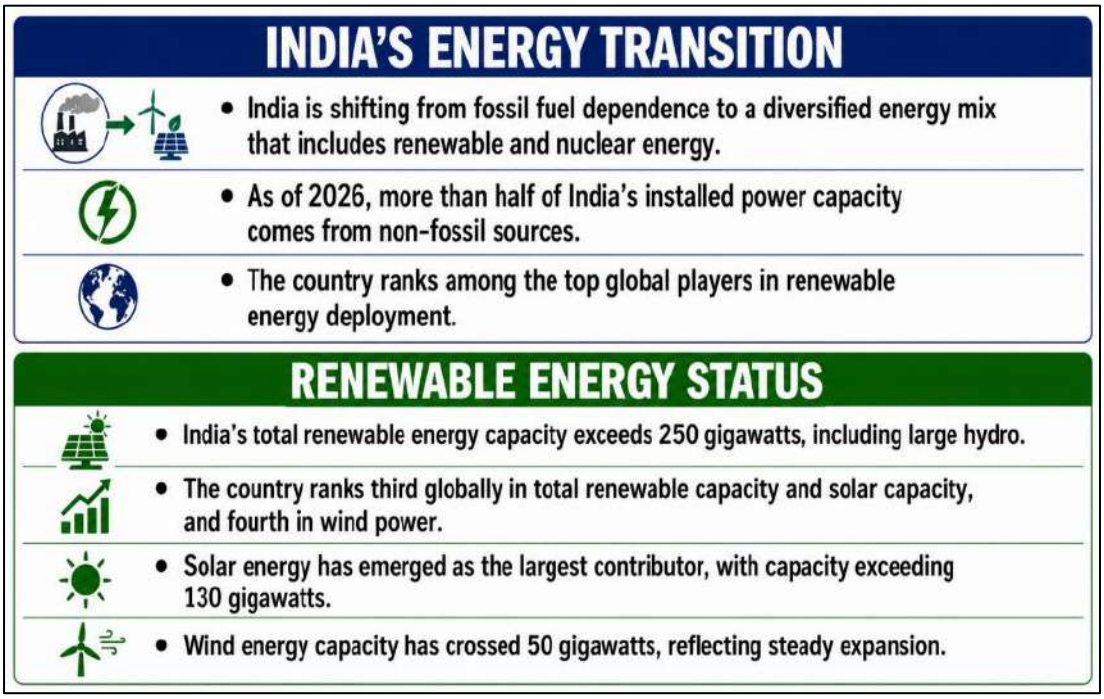
- The species inhabits undisturbed riverine forests and freshwater ecosystems in Bhutan, northeast India and parts of Myanmar.
- It is protected under Schedule I of the Wildlife Protection Act, 1972, providing the highest legal protection in India.
- Hydropower projects can affect river ecology through habitat fragmentation, altered water flow, sedimentation and disturbance to nesting areas.

Space for Notes

5.15. Nuclear and Renewables Power Transition

Context:

India has made significant progress in clean energy, with strong advancements in both renewable and nuclear sectors. Recent developments highlight achievements in fast breeder nuclear technology and rapid expansion of wind and solar capacity, reflecting a broader transition towards non-fossil energy sources.



Background:

Nuclear Energy Basics:

- Nuclear energy is generated through controlled nuclear reactions, primarily fission.
- It provides stable baseload power and complements intermittent renewable sources.
- India follows a unique three-stage nuclear programme to ensure long-term fuel sustainability.

Explanation:

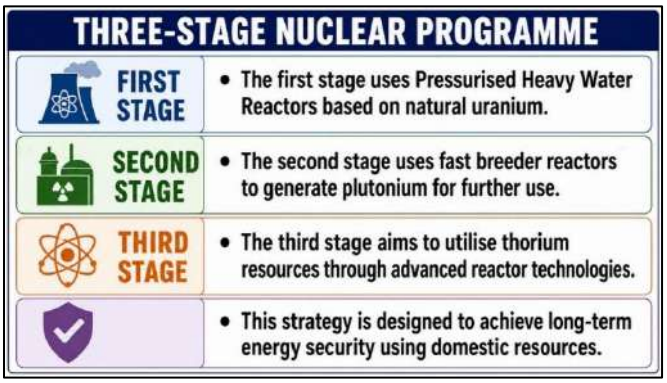
Progress in Nuclear Energy:

Fast Breeder Reactor Achievement:

- India has achieved a milestone with the fast breeder reactor at Kalpakkam reaching criticality.
- Criticality refers to a stage where a self-sustaining nuclear chain reaction is established.
- This marks progress in the second stage of India's nuclear programme.

Space for Notes

Current Status and Future Focus:



- India's nuclear capacity stands at about 8.78 gigawatts.
- The country is exploring Small Modular Reactors to improve safety, flexibility, and cost efficiency.
- Nuclear power complements renewables by providing continuous power supply.

Progress in Renewable Energy:

Solar and Wind Expansion:

- Solar energy has witnessed rapid growth and forms the backbone of renewable expansion.
- Wind energy continues to grow, with several states leading installations.
- On certain days, renewable energy has contributed more than half of India's electricity demand.

Policy and Targets:

- India aims to achieve 500 gigawatts of non-fossil capacity by 2030.
- Long-term vision includes reaching significantly higher clean energy capacity by 2047.
- Policy measures include incentives, investment promotion, and infrastructure development.

Significance of Energy Transition:

- Reduces dependence on fossil fuel imports and enhances energy security.
- Helps in achieving climate commitments and reducing carbon emissions.
- Promotes industrial growth, employment generation, and technological innovation.

Conclusion:

India's progress in nuclear and renewable energy reflects a strategic approach to achieving energy security and sustainability. Continued investment, technological advancement, and policy support will be essential to sustain this transition and meet long-term climate and development goals.

Mains Practice Question:

Q. Nuclear energy and renewable energy can play complementary roles in India's clean energy transition. Discuss. **10M (150 Words)**

5.16. Barn Swallows in Manipur Show Shift from Migration to Resident Breeding

Context:

A study has found that some **barn swallows** in Manipur's Imphal Valley have stopped long-distance migration and are now breeding locally throughout the year. The finding highlights how birds may alter migration and nesting behaviour due to ecological and human-induced changes.

Space for Notes

Explanation:

- **Barn swallow** is a small passerine bird scientifically known as **Hirundo rustica**.
- It is a widespread **migratory species**, usually breeding in temperate regions and migrating to warmer areas during winter.
- In India, barn swallows are generally winter visitors, but some populations are now showing **resident breeding behaviour**.
- The Manipur study suggests a shift from **migratory trait to sedentary trait** in parts of the Imphal Valley.
- Possible reasons include **climate change, land-use change, urbanisation, suitable nesting sites and year-round food availability**.
- Barn swallows are **insectivorous birds**, so their presence can indicate ecological changes in insect populations.
- The study is important for understanding **avian migration, behavioural adaptation, speciation, subspecies variation and ecological plasticity**.

5.17. Nicobarese Tribal Opposition to Proposed Wildlife Sanctuaries in Great Nicobar Region

Context:

The Tribal Council in Nicobar has opposed the notification of three wildlife sanctuaries in Little Nicobar, Meroe, and Menchal islands, alleging lack of consultation with indigenous communities. The issue is linked to concerns over tribal rights, cultural practices, and the implementation of the Great Nicobar Island development project.

Explanation:

- Great Nicobar Island is part of the Andaman and Nicobar archipelago and is ecologically important due to tropical forests, coral reefs, mangroves, and endemic wildlife.
- The proposed sanctuaries aim to protect species such as the leatherback turtle and Nicobar megapode, which are ecologically sensitive and protected under the Wildlife (Protection) Act, 1972.
- The Forest Rights Act (FRA), 2006 recognises traditional forest rights of Scheduled Tribes and forest-dwelling communities over land, resources, and cultural practices.
- Indigenous Nicobarese communities argue that the sanctuary declaration and eco-sensitive zone process lacked prior consultation and informed consent.
- The Great Nicobar Infrastructure Project includes a transshipment port, airport, township, and power infrastructure with strategic and economic significance.
- The issue highlights the balance between biodiversity conservation, tribal rights, environmental governance, and strategic development in island ecosystems.

5.18. Tiger Rediscovered in D'Ering Memorial Wildlife Sanctuary

Context:

A tiger was recently photographed through a camera trap inside Arunachal Pradesh's D'Ering Memorial Wildlife Sanctuary after nearly two decades.

Space for Notes

Explanation:

- D'Ering Memorial Wildlife Sanctuary is located near Pasighat in East Siang district of Arunachal Pradesh along the Brahmaputra floodplains.
- It is named after Daying Ering, a noted political leader and former chairman of the Ering Commission.
- The sanctuary consists mainly of riverine forests, grasslands, marshes, and wetlands supporting rich biodiversity.
- It is known for species such as tiger, elephant, wild buffalo, hispid hare, and Chinese pangolin.
- Camera trapping is an important wildlife monitoring technique used in tiger estimation and biodiversity assessment.
- The sighting is being viewed as evidence of improving ecological conditions and successful long-term conservation and monitoring efforts in the region.

5.19. Hasdeo Forest Diversion and Compensatory Afforestation under CAMPA

Context:

Rajasthan Rajya Vidyut Utpadan Nigam Limited (RVUNL) has sought permission to divert forest land in the ecologically sensitive Hasdeo-Arand region of Chhattisgarh for coal mining and proposed compensatory afforestation elsewhere. The proposal has revived debates regarding biodiversity conservation, tribal livelihoods and the effectiveness of compensatory afforestation.

Explanation:

- Hasdeo-Arand is a dense forest region spread across Korba, Surguja and Surajpur districts of Chhattisgarh and is considered one of central India's largest contiguous forest landscapes.



- The region is ecologically important due to rich biodiversity including elephants, leopards, sloth bears and several Schedule-I species under the Wildlife Protection Act, 1972.
- Hasdeo forests also function as a major catchment area for the Hasdeo River and support tribal communities dependent on forest resources.
- Forest diversion for mining requires approval under the Forest (Conservation) Act, 1980 and environmental clearance under the Environment Protection Act, 1986.
- Compensatory afforestation refers to planting forests on non-forest or degraded land when forest land is diverted for non-forest purposes.
- CAMPA stands for Compensatory Afforestation Fund Management and Planning Authority, created to manage funds collected from user agencies for afforestation and ecological restoration.
- The Compensatory Afforestation Fund Act, 2016 institutionalised utilisation of these funds by Centre and States.

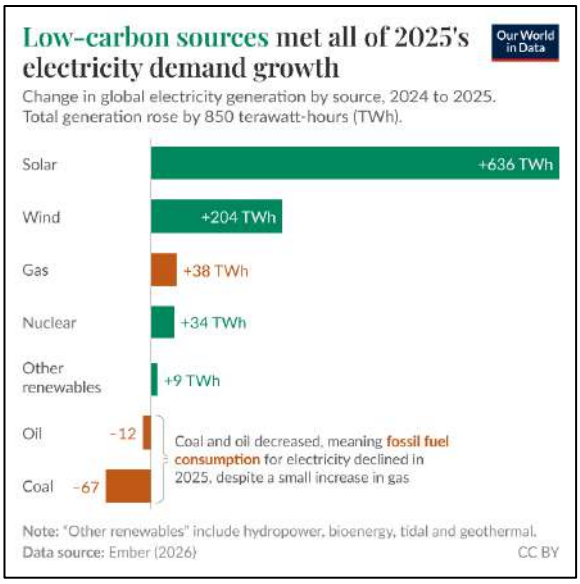
5.20. Renewable Energy Meets Rising Global Electricity Demand for the First Time

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Context:

According to data released by the **Ember Energy Institute**, the **entire increase in global electricity demand in 2025 was met by renewable energy sources**, mainly solar and wind power, without requiring additional fossil fuel-based electricity generation. However, geopolitical disruptions in West Asia exposed India's continued dependence on imported fossil fuels.

Explanation:



- Renewable Energy (RE) refers to energy generated from naturally replenishing sources such as solar, wind, hydropower, biomass, and geothermal energy.
- In 2025, global electricity demand increased by nearly 850 TWh, and this additional demand was met mainly through solar (~636 TWh) and wind (~204 TWh) generation.
- Earlier, despite rapid renewable expansion, fossil fuel use continued because electricity demand grew faster than renewable capacity additions.
- Coal remains the single largest source of global electricity generation, though its share declined from around 40% in 2015 to nearly 33% in 2024.
- Solar and wind energy costs have fallen sharply over the past decade due to technological improvements, economies of scale, and better battery storage systems.
- China played a major role in renewable expansion, with solar and wind accounting for most of the increase in its electricity demand in 2025.
- India added large renewable capacity in FY 2024-25, with renewables accounting for nearly 89% of new power capacity additions. India is among the fastest-growing renewable energy markets globally.
- Despite renewable growth, India remains highly dependent on fossil fuel imports: about 89% of crude oil, 47% of natural gas, and significant quantities of coal are imported.
- A major portion of India's crude oil, LNG, and LPG imports comes from West Asia through the Strait of Hormuz, a critical global maritime chokepoint.
- Energy Security refers to uninterrupted availability of affordable energy supplies, while Decarbonisation refers to reducing dependence on carbon-intensive fossil fuels to limit greenhouse gas emissions.

Space for Notes

5.21. NGT Directs Southern States on Utilisation of Clean Air Funds

Context:

The National Green Tribunal (NGT) has directed southern States and Puducherry to ensure strict and time-bound implementation of State Action Plans under the National Clean Air Programme.

Explanation:

- **National Clean Air Programme (NCAP)** is a central sector scheme launched in 2019 aiming to reduce **PM10 and PM2.5 concentrations** in non-attainment cities.
- Targets include **20–30% reduction (later revised to 40% by 2026)** in particulate pollution levels using 2017 as the base year.
- Cities prepare **State Action Plans (SAPs) / City Action Plans (CAPs)** focusing on sector-specific interventions like transport, industry, construction, and waste management.



- **Particulate Matter (PM2.5 & PM10)** are key pollutants causing respiratory and cardiovascular diseases, making air pollution a major **public health concern**.
- Funds are allocated under schemes like **NCAP and Fifteenth Finance Commission grants** for air quality improvement.
- **NGT** is a statutory body under the **National Green Tribunal Act, 2010**, empowered to enforce environmental laws and provide relief and compensation.
- **Under-utilisation of funds** reflects governance and implementation gaps, affecting pollution mitigation outcomes.

Southern cities, though less highlighted than Delhi-NCR, are witnessing **rising urban pollution due to vehicular emissions, industrialisation, and construction dust**.

5.22. Canine Distemper Virus Threat to Tigers in Kanha Tiger Reserve

Context:

A sixth tiger has reportedly died in Madhya Pradesh's Kanha Tiger Reserve due to suspected Canine Distemper Virus infection. The incident raises concerns about disease transmission from domestic or stray dogs to wildlife in protected areas.

Explanation:

- **Canine Distemper Virus (CDV)** is a highly contagious viral disease mainly affecting dogs, but it can also infect wild carnivores such as tigers, lions, leopards, foxes and wolves.
- It spreads through **respiratory droplets, body fluids and close contact** with infected animals, especially unvaccinated domestic or stray dogs near forest areas.
- In big cats, CDV can cause **fever, lung infection, neurological symptoms, weakness and death**, making it a serious wildlife health concern.

- **Kanha Tiger Reserve** is located in Madhya Pradesh and forms part of the Central Indian tiger landscape.
- Disease spillover from domestic animals to wildlife is an example of the **One Health approach**, which links human, animal and environmental health.
- Such outbreaks highlight the need for **wildlife disease surveillance, vaccination of dogs near buffer zones, carcass testing, habitat management and control of human–wildlife interface**.

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5.23. Separate Free-Ranging Asiatic Lion Population and Conservation Concerns

Context:

The government is considering the creation of a separate free-ranging Asiatic lion population outside Gujarat after consultation with states and scientific bodies. This is significant because India's Asiatic lions remain concentrated in and around Gir, making them vulnerable to disease outbreaks, disasters and genetic risks.

Explanation:

- **Asiatic lions** are found naturally only in India, mainly in the **Gir landscape of Gujarat**, making them an isolated population.
- A single concentrated population faces risks from **epidemics, natural disasters, habitat pressure, genetic bottleneck and human–wildlife conflict**.
- The Supreme Court had earlier supported translocation of some lions to **Kuno National Park, Madhya Pradesh**, to create a second secure habitat.
- **Free-ranging population** means lions living in open natural habitats, not permanently kept in enclosures.
- Diseases such as **Canine Distemper Virus (CDV)** can spread from dogs or other animals to wild carnivores and may threaten big cat populations.
- Lion conservation requires **habitat preparedness, prey base management, disease surveillance, veterinary care, genetic monitoring and inter-state coordination**.
- India's big cat conservation is linked with **Project Lion, Wildlife Protection Act, 1972, National Board for Wildlife, protected areas and landscape-level conservation**.

5.24. Decline of Dragonfly and Damselfly Species in the Western Ghats

Context:

A recent biodiversity survey across the Western Ghats reported that nearly 35% of historically recorded dragonfly and damselfly species could not be documented, indicating possible ecological decline.

Explanation:

- Dragonflies and damselflies belong to the order Odonata and are important indicator species of freshwater ecosystem health.
- Dragonflies are generally stronger fliers with broader bodies, while damselflies are slender and usually fold wings at rest.

Space for Notes



- Their life cycle includes aquatic larval stages, making them highly sensitive to water pollution and habitat degradation.
- Western Ghats is a UNESCO World Heritage biodiversity hotspot extending along India's western coast
- Researchers highlighted habitat loss, pollution, hydropower projects, forest fires, tourism pressure, and climate change as major threats to these freshwater-dependent insects.

5.25. Seasonal Salinity Changes and Cyanobacteria in Chilika Lake Ecology

Context:

A recent genomic study on Odisha's Chilika Lake found that seasonal and salinity changes strongly influence cyanobacterial communities and ecological functions in the lagoon. The study highlighted how environmental stress can alter biodiversity, nutrient cycling and the stability of fragile coastal ecosystems.

Explanation:

- Chilika Lake is Asia's largest brackish water lagoon located on the east coast of Odisha at the mouth of the Daya River flowing into the Bay of Bengal.
- A brackish water ecosystem contains a mixture of freshwater and seawater, making salinity variation a key ecological factor.
- Chilika Lake is recognised as a Ramsar Wetland Site and is famous for biodiversity, fisheries, migratory birds and Irrawaddy dolphins.
- Cyanobacteria are photosynthetic microscopic organisms that help in nitrogen fixation, oxygen production and carbon sequestration in aquatic ecosystems.
- Excessive cyanobacterial growth can cause harmful algal blooms, reducing dissolved oxygen and threatening fisheries, biodiversity and public health.
- Salinity, phosphate, silicate, biological oxygen demand (BOD) and water transparency influence aquatic microbial composition and nutrient cycling.
- Metagenomic sequencing is an advanced genomic technique used to study genetic material collected directly from environmental samples.

5.26. India's Emergency Cell Broadcast Messaging System

Context:

India has operationalised a nationwide emergency alert system that sends instant warning messages directly to mobile phones. It was recently demonstrated through a countrywide test involving loud alarms and multilingual alerts.

Explanation:

- **Cell Broadcast Technology**: It enables simultaneous transmission of alerts to all mobile devices within a defined geographic area without requiring individual phone numbers.

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- Difference from SMS Alerts: Unlike SMS, which may be delayed due to congestion and is sent individually, cell broadcast delivers instant messages to all devices connected to a cell tower.
- Global Adoption: Developed in the 1990s, this technology is widely used in regions such as Europe, the United States, Japan, and South Korea for emergency warnings.
- Institutional Framework in India: The system is implemented under the telecommunications administration with alignment to international telecom standards and protocols.
- **Use Cases**: It is used for disaster alerts such as cyclones, floods, earthquakes, and other public safety emergencies requiring immediate communication.
- **Operational Mechanism**: Powered by the **SACHET platform (developed by C-DOT)**, Alerts are transmitted via cell towers to all connected devices in a specific area, ensuring location-based and targeted dissemination.
- Key Features and Advantages: The system overrides silent mode, uses distinctive alert tones, requires no app or subscription, and maintains user privacy by not using personal data.
- Relevance in Disaster Management: It enhances early warning systems, improves last-mile connectivity, and helps reduce casualties and damage during increasing climate-related disasters.

5.27. Sikkim's Natural Farming Model Gains National Recognition

Context:

The Prime Minister highlighted Sikkim as a model for the country in adopting natural/organic farming, emphasizing its early transition and success in promoting sustainable agriculture and boosting tourism and rural income.

Explanation:



- **Natural farming** is a chemical-free farming system relying on **local inputs (cow dung, urine, bio-cultures)**, soil biology, and ecological processes; linked with **Zero Budget Natural Farming (ZBNF)**.
- Focus on **soil health, biodiversity, low input cost, climate resilience**, and reduced dependence on synthetic fertilizers/pesticides.
- **Pros**: improves **soil fertility**, reduces input costs, enhances **sustainability**, promotes **nutritional quality**, eco-friendly and climate adaptive.
- **Cons**: lower yields initially, requires **knowledge/skill-intensive practices**, transition period risk, market linkage challenges for premium pricing.
- **Sikkim became India's first fully organic state (2016)** by banning chemical inputs and converting entire cultivable land.
- Government support through **policy push, certification, farmer training, and supply chains** ensured success.
- Result: improved **brand value, export potential, eco-tourism growth**, and preservation of fragile **Himalayan ecosystem**.

Space for Notes

5.28. Light Pollution Threatens Dark Sky Regions and Astronomy

Context:

Light pollution is increasingly affecting some of the world's clearest skies, including Chile's Atacama Desert, a major hub for astronomical research. Rising urbanisation and industrial activity are degrading ideal observing conditions.

Explanation:

- **Light pollution** refers to excessive or misdirected artificial light that brightens the night sky.
- It reduces visibility of **celestial objects** and affects astronomical observations.
- Ideal observation sites require **dry climate, high altitude, low humidity, and minimal light pollution**.
- **Atacama Desert (Chile)** is one of the best locations due to clear skies and over **300 cloudless nights/year**.
- Hosts major observatories like **Paranal Observatory** and projects like **Extremely Large Telescope (ELT)**.
- Expansion of **urbanisation, mining, and energy projects** increases sky brightness.
- Impacts **astronomy, ecosystems, and human circadian rhythms**.
- Highlights need for **dark sky conservation policies and regulation of artificial lighting**.

Prelims Questions

1. Consider the following statements regarding particulate matter:

1. PM10 refers to particulate matter having diameter of 10 micrometres or less.
2. PM 2.5 can penetrate deeper into the lungs than PM10.
3. PM 2.5 is also called coarse particulate matter.

Which of the above statements is/are correct?

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

2. Consider the following pairs:

Component	Function
1. Battery	Stores electrical energy
2. Electric motor	Converts electrical energy into mechanical energy
3. Semiconductor	Refines crude oil into petrol

Which of the pairs given above is/are correctly matched?

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

3. Consider the following statements regarding Electric Vehicles (EVs):

1. Electric Vehicles produce zero tailpipe emissions.
2. Electric Vehicles do not require any battery system.
3. Electric Vehicles may still indirectly contribute to emissions depending on the source of electricity used for charging.

Which of the above statements is/are correct?

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

4. Which of the following factors influence the carrying capacity of tiger habitats?

1. Prey density
2. Water availability
3. Habitat connectivity
4. Human disturbance

How many of the above are correct?

(a) Only one
(b) Only two
(c) Only three
(d) All four

5. Which one of the following best explains the role of crushed silicate rocks in enhanced alkalinity?

(a) They release alkaline ions after dissolution.
(b) They directly produce fossil fuels.
(c) They reduce ocean alkalinity.
(d) They prevent all forms of carbon storage.

6. Consider the following statements regarding coal gasification:

1. Coal gasification converts coal or lignite into synthesis gas.
2. It takes place through partial oxidation at high temperature.
3. It is the same as direct burning of coal in thermal power plants.

Which of the above statements is/are correct?

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

Space for Notes

Answer

1. A **2.** A **3.** B **4.** D **5.** A **6.** D

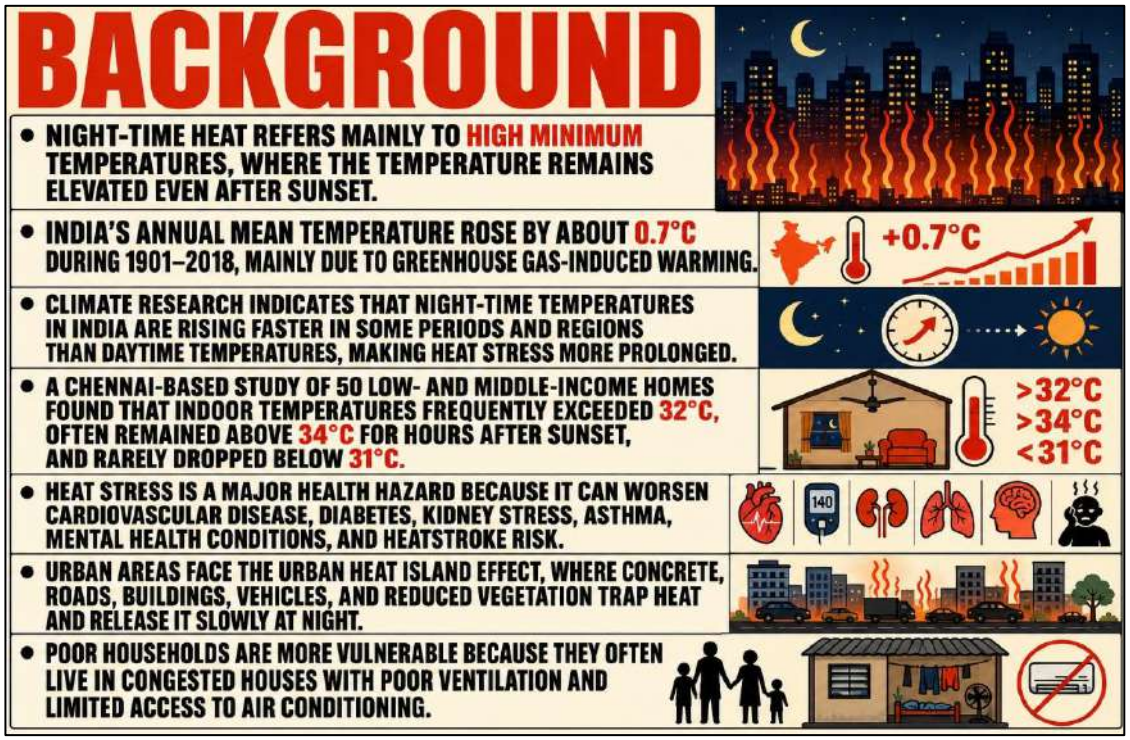
6. GEOGRAPHY

Space for Notes

6.1. Rising Night-Time Heat: India's Emerging Public Health Crisis

Context:

India's heat-risk debate usually focuses on peak daytime temperatures, but warmer nights are now emerging as a serious public health concern. When nights do not cool sufficiently, the human body loses its recovery period, making heat exposure continuous, especially for people living in low-income and poorly ventilated urban houses.



Explanation:

Why Night-time Heat is Dangerous?

- Night-time heat is dangerous because it converts heat exposure from a daytime problem into a **24-hour health burden**.
- When nights remain hot, the body does not get enough time to cool down, leading to prolonged stress on the heart, kidneys, respiratory system, and nervous system.
- The article points out that hotter nights are linked with higher mortality, especially among elderly people, children, outdoor workers, pregnant women, and people with existing illnesses.

Evidence from the Article:

- The article mentions that India's average temperature has increased over the last century, but the rise in night-time temperature is becoming a growing concern.
- A study cited in the article notes that even small increases in night-time temperature can significantly increase discomfort and health risks.
- An example from Ahmedabad shows that when night-time temperatures cross certain thresholds, all-cause mortality rises sharply.

Urban Heat Island Effect:

- Cities remain hotter at night because concrete, asphalt, bricks, and glass absorb heat during the day and release it slowly after sunset.

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- Lack of trees, water bodies, open spaces, and natural ventilation further reduces night-time cooling.
- Dense high-rise buildings and narrow lanes restrict air movement, making low-income settlements especially vulnerable.

Need for Relief Measures:

- Relief measures must go beyond heatwave warnings and drinking water points.
- Passive cooling methods such as whitewashed roofs, reflective coatings, improved ventilation, shaded streets, urban greenery, and better housing design can reduce heat exposure.
- Heat action plans should include night-time temperature indicators, ward-level vulnerability mapping, public cooling shelters, and targeted support for poor households.

Conclusion:

Rising night-time heat is not merely a climate issue; it is a public health, urban planning, and social justice challenge. India's heat action plans must shift from only managing extreme daytime heat to addressing sustained 24-hour heat exposure through climate-resilient housing, urban cooling, and protection of vulnerable populations.

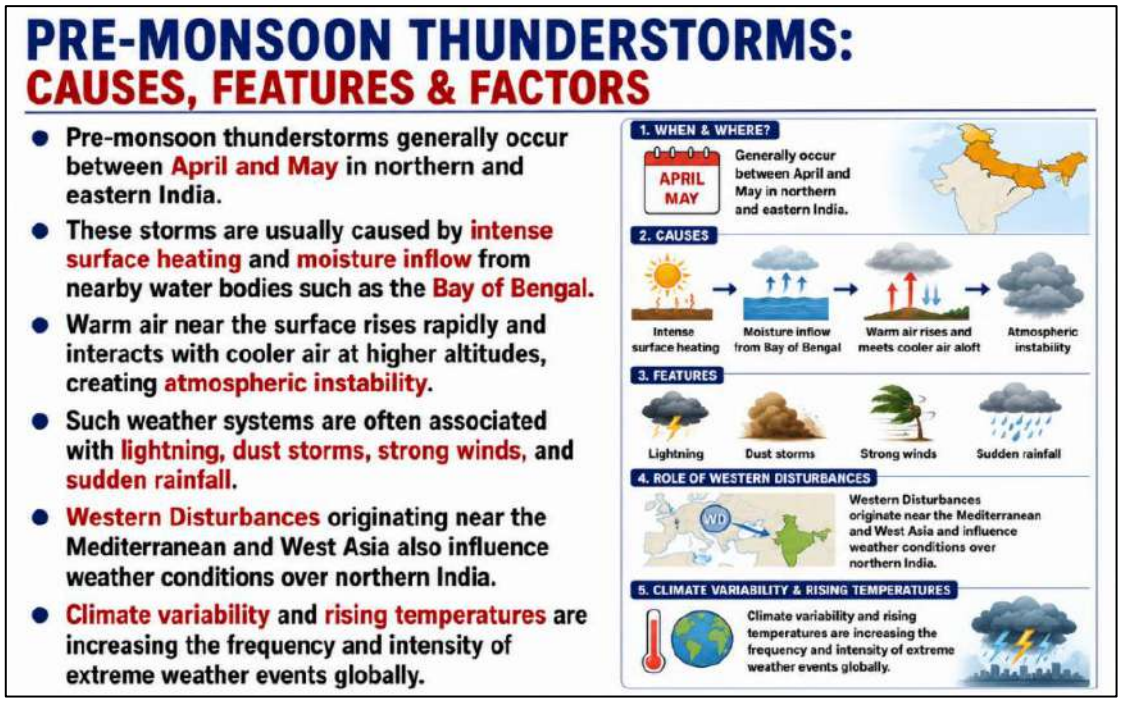
Mains Practice Question:

Q. Rising night-time heat has converted heat exposure from an episodic daytime risk into a continuous public health burden. Discuss its implications for vulnerable populations in India.

6.2. Pre-Monsoon Thunderstorms in Northern India

Context:

Northern India recently witnessed unusually intense pre-monsoon thunderstorms accompanied by very high wind speeds, lightning, rainfall, and dust storms. The severe weather caused large-scale destruction, loss of life, damage to infrastructure, and disruption of electricity and transport services across several districts.



Space for Notes

Explanation:

The Problem:

- Extremely high wind speeds damaged houses, uprooted trees, and toppled electric poles, causing widespread destruction.
- Lightning strikes during thunderstorms resulted in significant casualties in rural and open-field areas.
- High temperatures combined with moisture-rich winds created ideal conditions for severe atmospheric instability.
- Western Disturbances interacted with hot surface air, further intensifying storm activity over northern India.
- Thunderstorms are highly localized and fast-moving, making precise prediction difficult despite modern forecasting systems.
- Unlike cyclones, these storms occur simultaneously across multiple districts, limiting evacuation opportunities.
- Weak disaster preparedness, poor public awareness, and vulnerable infrastructure increased the impact of the storms.

Way Forward:

- Weather forecasting systems should be strengthened through improved radar coverage and real-time monitoring technology.
- Early warning messages must reach local communities quickly through mobile alerts, television, radio, and local administration.
- Public awareness campaigns should educate people about lightning safety and precautions during severe weather events.
- Urban planning and infrastructure development must include disaster-resilient designs for electricity and communication networks.
- State disaster management authorities should conduct regular preparedness drills before the pre-monsoon season.
- Scientific research on climate change and extreme weather patterns should be expanded for better long-term planning.
- Local governments should create community-level emergency response systems in highly vulnerable districts.

Conclusion:

Pre-monsoon thunderstorms are natural climatic events in northern India, but their growing intensity is becoming a major disaster management challenge. Strengthening forecasting, public preparedness, resilient infrastructure, and climate adaptation measures will be essential to reduce future loss of life and property.

6.3. Atlantic Meridional Overturning Circulation (AMOC)

Context:

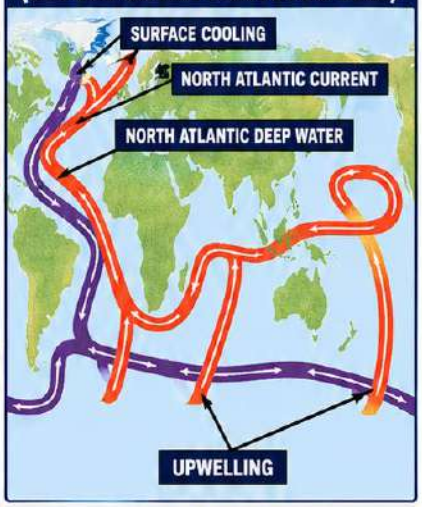
Recent scientific studies have warned that the Atlantic Meridional Overturning Circulation (AMOC), a major system of ocean currents in the Atlantic Ocean, may weaken significantly due to climate change. Scientists fear that a severe slowdown or collapse of this system could disrupt global climate patterns, including rainfall systems, monsoons, sea levels, and extreme weather events.

Background:

Space for Notes

GLOBAL THERMOHALINE CIRCULATION IS THE PLANET-WIDE OCEAN CONVEYOR BELT INVOLVING: ATLANTIC OCEAN, PACIFIC OCEAN, INDIAN OCEAN, SOUTHERN OCEAN. IT IS DRIVEN MAINLY BY: TEMPERATURE (THERMO) & SALINITY (HALINE).

GLOBAL THERMOHALINE CIRCULATION (GLOBAL OCEAN CONVEYOR BELT)

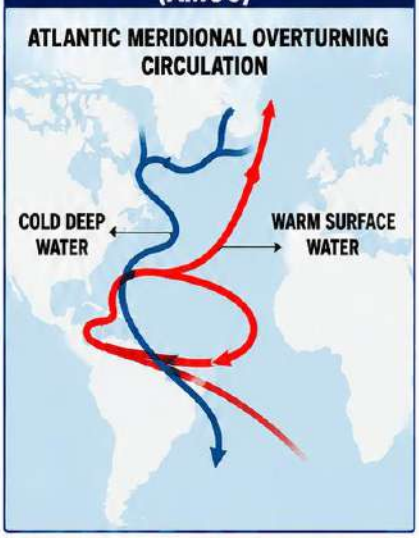


ATLANTIC MERIDIONAL OVERTURNING CIRCULATION (AMOC) IS THE ATLANTIC BRANCH OF THE GLOBAL THERMOHALINE CIRCULATION (GLOBAL OCEAN CONVEYOR BELT).

BREAK THE NAME:

- ATLANTIC → OCCURS MAINLY IN THE ATLANTIC OCEAN
- MERIDIONAL → NORTH-SOUTH MOVEMENT
- OVERTURNING → WARM WATER MOVES ON SURFACE, COLD WATEIR SINKS AND RETURNS DEEP BELOW
- CIRCULATION → CONTINUOUS CURRENT SYSTEM.

ATLANTIC MERIDIONAL OVERTURNING CIRCULATION (AMOC)



IT IS A IS A GIANT SYSTEM OF OCEAN CURRENTS IN THE ATLANTIC OCEAN.

IT TRANSPORTS:

- WARM SURFACE WATER FROM TROPICAL REGIONS TOWARDS EUROPE AND THE ARCTIC.
- COLD DEEP WATER BACK TOWARDS THE SOUTH.

THIS CIRCULATION HELPS REGULATE:

- GLOBAL CLIMATE
- RAINFALL PATTERNS
- MONSOONS
- TEMPERATURE DISTRIBUTION.

HOW DOES IT WORK?

STEP 1: WARM WATER MOVES NORTH

WARM, SALTY WATER FROM THE TROPICS MOVES TOWARDS THE NORTH ATLANTIC. EXAMPLE: GULF STREAM SYSTEM.

STEP 2: COOLING AND SINKING

NEAR GREENLAND AND THE ARCTIC, THE WATER COOLS. COLD WATER BECOMES DENSER AND SINKS DEEP INTO THE OCEAN.

STEP 3: DEEP OCEAN RETURN FLOW

THE COLD DEEP WATER TRAVELS SOUTHWARD. EVENTUALLY, IT RISES AGAIN AND THE CYCLE CONTINUES.

THIS CONSTANT CIRCULATION REDISTRIBUTES HEAT ACROSS THE PLANET.

EVEN THOUGH IT IS IN THE ATLANTIC, AMOC STRONGLY AFFECTS THE ENTIRE PLANET BECAUSE OCEANS ARE INTERCONNECTED.

THE ATLANTIC IS ESPECIALLY IMPORTANT BECAUSE:

- LARGE AMOUNTS OF COLD DENSE WATER SINK THERE.
- THIS SINKING ACTS LIKE A MAJOR "ENGINE" POWERING GLOBAL DEEP OCEAN CIRCULATION.

Space for Notes

Explanation:

How Climate Change Affects AMOC:

- Rising global temperatures are accelerating the melting of Arctic ice sheets and Greenland glaciers.
- Large quantities of freshwater are entering the North Atlantic Ocean.
- Freshwater is less salty and less dense, reducing the sinking process that drives AMOC circulation.
- This weakens the "engine" of the ocean conveyor belt.

Importance of AMOC in Global Climate:

- AMOC transfers heat from tropical regions to northern latitudes.
- It influences atmospheric circulation, rainfall patterns, and storm systems across multiple continents.
- A strong AMOC helps maintain stable climatic conditions in Europe, Africa, Asia, and the Americas.

Possible Consequences of AMOC Collapse:

- Europe may experience severe cooling despite overall global warming.
- Sea levels along the eastern coast of North America could rise sharply.
- Extreme weather events such as droughts, floods, storms, and heatwaves may intensify globally.
- Agricultural productivity and freshwater availability may decline in several regions.

Connection with El Niño and Global Climate Systems:

- Ocean and atmospheric systems are interconnected.
- A weakened AMOC may disturb Pacific Ocean circulation and influence El Niño patterns.
- This could make climate events more frequent, irregular, and extreme.

Impact on India:

- India depends heavily on the southwest monsoon for agriculture, water supply, and food security.
- Weakening of AMOC may disrupt monsoon circulation and reduce moisture transport.
- This can lead to irregular rainfall, droughts, floods, and increased climate uncertainty.
- Sectors such as agriculture, fisheries, water management, and rural livelihoods may face serious risks.

Conclusion:

The possible weakening of AMOC highlights the deep interconnection between climate change and Earth's ocean systems. Although uncertainty remains regarding the exact timeline of collapse, the issue underlines the urgent need for global climate mitigation, stronger adaptation policies, and scientific monitoring of ocean circulation systems.

Mains Practice Question:

Q. The possible weakening of Atlantic Meridional Overturning Circulation shows that climate change can destabilise not only temperatures but also global ocean and rainfall systems. Discuss. **15M (250 Words)**

6.4. Mexico City Sinking Rapidly: A Growing Urban Crisis

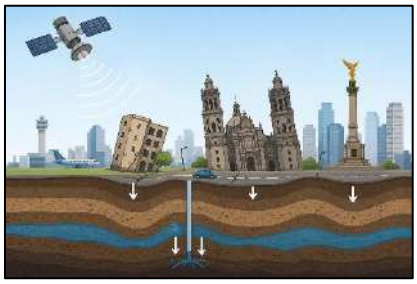
Context:

Mexico City (Capital of Mexico) is sinking at an alarming rate of nearly 20–25 cm per year, as observed by recent satellite data from NISAR satellite. The phenomenon is clearly visible from space, making it one of the fastest-subsiding cities in the world.

Space for Notes

Explanation:

- The city is built on the former **Lake Texcoco**, composed of soft clay that is highly compressible.
- Massive **groundwater extraction** to meet urban demand has significantly depleted the aquifer.



- Loss of underground water reduces soil support, leading to land subsidence.
- The clay layers undergo irreversible compaction, meaning the land cannot recover.
- Some regions are sinking at 2 cm per month, especially near the airport and central zones.
- Over the past century, parts of the city have sunk by more than 10–12 metres.
- Uneven sinking causes tilting of buildings, cracks in roads, and misalignment of structures.
- Critical infrastructure like subways, drainage systems, and pipelines is severely affected.
- Subsidence worsens the water crisis by damaging water supply networks and increasing leakages.
- **Satellite monitoring (InSAR) helps track changes and supports better urban planning and disaster management.**

Mains Practice Question:

Q. The interaction of high surface temperatures, moisture-rich winds and Western Disturbances can intensify severe thunderstorm activity. Explain the climatological factors behind pre-monsoon thunderstorms in northern India. **15M (250 Words)**

6.5. Terms in News: Western Disturbances, ENSO, Heat Wave and Wet Bulb Temperature

Context:



India is witnessing multiple climate-related extreme weather events during summer, including heat waves, humidity stress, and irregular rainfall patterns. Terms such as Western Disturbances, El Niño, La Niña, Wet Bulb Temperature and Heat Index have again become important in understanding India's monsoon and extreme weather conditions.

Key Highlights:

- Western Disturbances are extra-tropical cyclones originating near the Mediterranean region and moving eastward with the subtropical westerly jet stream. They bring winter rainfall and snowfall to northwestern India and the Himalayas.
- El Niño Southern Oscillation (ENSO) is a coupled ocean-atmosphere phenomenon in the equatorial Pacific Ocean influencing global climate patterns.
- El Niño refers to abnormal warming of sea surface temperatures in the eastern and central Pacific Ocean, often weakening Indian monsoon rainfall and increasing drought and heat wave frequency in India.

Space for Notes

- La Niña refers to abnormal cooling of Pacific Ocean waters, generally strengthening Indian monsoon rainfall and sometimes increasing floods.
- Neutral ENSO conditions occur when neither El Niño nor La Niña dominates the Pacific circulation.
- Thermocline is the transition layer separating warmer surface ocean water from colder deep water and plays an important role in ENSO dynamics.
- Heat Wave in India is declared by IMD based on departure from normal maximum temperature or when temperatures cross specific thresholds in plains and coastal areas.
- Wet Bulb Temperature measures combined effects of heat and humidity and indicates the lowest temperature achievable through evaporation. High wet bulb values are dangerous because the human body cannot cool efficiently through sweating.
- Heat Index or "feels like temperature" combines temperature and humidity to represent perceived human discomfort during extreme heat conditions.

6.6. Nicobar Visit Highlights Tribal Concerns over Great Nicobar Project

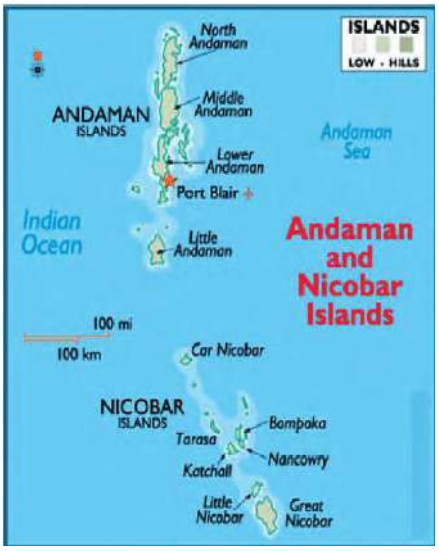
Context:

Opposition leader visited Great Nicobar Island and met the Nicobarese community, who expressed concerns over the proposed ₹72,000-crore infrastructure project, including fears of displacement, ecological damage, and loss of ancestral lands.

Tribes of Andaman & Nicobar:

Andaman Group (Negrito tribes):

1. **Sentinelese:**
   - **Location:** *North Sentinel Island*
   - **Key point:** Completely isolated; no external contact allowed
2. **Jarawa:**
   - **Location:** *South Andaman & Middle Andaman*
   - **Lifestyle:** Nomadic hunter-gatherers
3. **Onge:**
   - **Location:** *Little Andaman Island*
   - **Status:** Particularly Vulnerable Tribal Group (PVTG), declining population
4. **Great Andamanese:**
   - **Location:** *Strait Island*
   - **Status:** Highly reduced population



Nicobar Group (Mongoloid tribes):

1. **Shompen:**
   - **Location:** *Great Nicobar Island*
   - **Nature:** Semi-nomadic hunter-gatherers
2. **Nicobarese:**
   - **Location:** *Nicobar Islands*
   - **Key point:** Most assimilated tribe; practice agriculture & Christianity widely.

Space for Notes

Prelims Questions

1. With reference to rising night-time heat in Indian cities, consider the following statements:

1. Night-time heat is dangerous because it prevents the human body from recovering after daytime heat exposure.
2. Urban Heat Island effect can make cities remain hotter at night.
3. Night-time heat mainly affects only coastal populations.

Which of the above statements is/are correct?

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

2. Which of the following best explains the concern regarding weakening of Atlantic Meridional Overturning Circulation (AMOC)?

(a) It may increase volcanic activity in the Atlantic region.
(b) It may disturb heat transfer, rainfall systems, sea levels and monsoon patterns.
(c) It will completely stop all ocean currents in the world.
(d) It affects only Europe and has no link with India.

Answer

1. A **2.** B

Space for Notes

7. HISTORY

7.1. Veera Pasi: Remembering a Local Hero of the 1857 Revolt

Context:

Opposition leader unveiled a statue of Veera Pasi in Rae Bareli, Uttar Pradesh, highlighting the role of marginalised communities in the 1857 Revolt.

- Veera Pasi is remembered in local folklore as a Pasi warrior and companion of Rana Beni Madhav Baksh Singh, who fought against the British during the Revolt of 1857.
- The Revolt of 1857 was India's first major anti-colonial uprising, involving soldiers, peasants, zamindars, local rulers and various social groups across North India.
- Many local and marginalised heroes were not prominently recorded in colonial or mainstream histories, but survived through oral traditions, folk songs and community memory.
- The Pasi community is a Dalit community with significant presence in Uttar Pradesh, making such commemorations socially and politically important.
- The event has brought attention to Dalit history, local memory, and the political importance of the Pasi community in Uttar Pradesh.

7.2. Return of Chola-Era Copper Plates and Cultural Repatriation

Context:

The Netherlands has returned the **Chola-era Anaimangalam copper plates** to India, marking an important step in the repatriation of Indian heritage objects. These plates are valuable historical records linked to the **Chola dynasty**, land grants, temple culture and medieval South Indian administration.

Explanation:



- **Copper plate inscriptions** were official royal records used in ancient and medieval India to document **land grants, tax exemptions, donations and administrative orders**.
- The returned plates are associated with the **Chola period**, especially the age of **Rajaraja Chola I and Rajendra Chola I**.
- The Cholas ruled mainly from the **Kaveri delta region** of present-day Tamil Nadu and were known for **naval power, temple architecture, bronze images and efficient administration**.
- These plates mention grants to a **Buddhist vihara near Nagapattinam**, showing religious patronage and maritime-cultural contacts.
- Such inscriptions help reconstruct **political history, revenue systems, village administration, land measurements and royal genealogy**.
- Repatriation means the return of cultural property taken away through colonial or illegal channels.

Space for Notes

7.3. Somnath Temple: History, Reconstruction and Civilisational Significance

Context:

The Prime Minister highlighted the historical and cultural importance of the Somnath Temple while marking milestones related to its reconstruction and national heritage. The article emphasised Somnath as a symbol of civilisational continuity, cultural resilience and spiritual unity in India.

Key Highlights:

- Somnath Temple is located at Prabhas Patan near Veraval in Gujarat on the Arabian Sea coast and is one of the 12 Jyotirlingas dedicated to Lord Shiva.
- The temple has immense religious significance in Shaivism and is associated with ancient pilgrimage traditions mentioned in Puranic literature.
- Historically, Somnath became a prosperous temple due to maritime trade, royal patronage and donations from rulers across western India.
- The temple was repeatedly attacked and looted, most notably by Mahmud of Ghazni in 1025 CE, making it a symbol of resistance and reconstruction.
- Several rulers including the Chalukyas, Solankis, Marathas and local dynasties contributed to rebuilding the shrine across centuries.
- After Independence, Sardar Vallabhbhai Patel initiated the reconstruction of Somnath as a symbol of national revival and cultural restoration.

The present temple was inaugurated in 1951 by President Dr. Rajendra Prasad despite political debates regarding state involvement in religious reconstruction.

7.4. Exposition of Buddha Relics in Ladakh during Buddha Purnima

Context:

Sacred Piprahwa relics of Gautam Buddha were ceremoniously brought to Leh (Ladakh) for public display on occasion of Buddha Purnima. The relics are being displayed across Leh and Zanskar, offering a rare spiritual opportunity for devotees.

Explanation:

- **Buddha relics** refer to the physical remains and sacred objects associated with Gautama Buddha, such as ashes, bones, or items used by him, which are traditionally enshrined in stupas and monasteries and hold deep religious significance in Buddhism.
- Buddha Purnima commemorates the birth, enlightenment, and Mahaparinirvana of Buddha, making it one of the most important festivals for Buddhists globally.
- Excavators discovered the **Piprahwa Relics** in 1898 at the Piprahwa Stupa in Uttar Pradesh, believed to be ancient Kapilavastu, the birthplace/early childhood place of Lord Buddha (Lumbini, located in modern-day Nepal, is currently recognized as the birthplace of Lord Buddha). These relics, unearthed by British colonial engineer William Claxton Peppé.

Space for Notes

7.5. St. Francis Xavier and Cultural Controversy in Goa

Context:

A controversy arose after derogatory remarks about St. Francis Xavier, Goa's patron saint, leading to protests and legal action. The issue highlights religious sentiments and cultural significance associated with the saint.

- St. Francis Xavier was a 16th-century Spanish Jesuit missionary and member of the Society of Jesus.
- He arrived in India in 1542 during Portuguese rule and worked in Goa and coastal regions.
- Known as the "Apostle of the Indies" for spreading Christianity in Asia.
- His mortal remains are kept in Basilica of Bom Jesus (UNESCO World Heritage Site), Goa.
- The body is considered incorruptible, attracting religious significance.
- Exposition of relics is held periodically, drawing pilgrims globally.
- Goa was a major centre of Portuguese colonial influence and Christian missionary activity.
- Reflects issues of religious harmony, cultural heritage, and freedom of expression.

7.6. Komagata Maru Incident (1914) and Colonial Discrimination

Context:

The Komagata Maru incident of 1914 is being revisited as a symbol of racial discrimination under colonial rule. The ship carrying Indian migrants was denied entry into Canada, highlighting exclusionary immigration policies and imperial injustice.

Key highlights:

- In 1914, the Japanese ship *Komagata Maru*, chartered by Gurdit Singh, carried 376 passengers (mostly Sikhs from Punjab) from Hong Kong to Canada.
- Canada enforced the "Continuous Journey Regulation" (1908), requiring migrants to arrive directly from their country of origin - effectively targeting Indians.
- The ship was denied docking at Vancouver and remained stranded for about 2 months, facing shortages of food and water.
- The incident exposed racial discrimination and exclusionary immigration laws in British dominions despite Indians being British subjects.
- The passengers were forced to return to India; upon arrival at Budge Budge (Calcutta), British authorities attempted to arrest leaders.
- This led to a clash in which around 20 passengers were killed, many arrested.
- The episode became a rallying point for the Ghadar Movement, which aimed to overthrow British rule in India.
- It highlighted contradictions of colonial citizenship, equality before law, and imperialism.
- The incident strengthened anti-colonial nationalism and revolutionary activities among overseas Indians.

Space for Notes

7.7. 500 years of First Battle of Panipat (1526)

Context:

The year 2026 marks 500 years of the First Battle of Panipat, where Babur defeated Ibrahim Lodi. This victory led to the establishment of the Mughal Empire in India, laying the foundation for early modern imperial rule.

- **Battle Between & Location:** Fought between **Zahir-ud-din Babur** and **Ibrahim Lodi** near **Panipat (present-day Haryana)**.
- **Political Context:** Conflict between **Central Asian invading forces** and the **Lodi dynasty of the Delhi Sultanate**.
- **Nature of War:** Primarily a **political and dynastic struggle**, not a religious conflict.
- Common belief: Babur won due to superior gunpowder weapons, however, victory was mainly due to innovative tactics (Tulughma & Araba), not just new technology.
- **Tulughma Strategy:** Army divided into **left, right, and centre**, with further subdivisions, enabling **encirclement of enemy forces**.
- **Araba System:** Use of **carts tied with rawhide ropes** forming defensive barricades to protect artillery and infantry.
- **Military Innovation:** Early use of **gunpowder firearms and field artillery in open battle**, combined with mobility.

Significance:

- Marked the **beginning of Mughal rule in India & End of Delhi Sultanate**
- Demonstrated **superiority of strategy over numerical strength**
- Introduced **new battlefield tactics combining cavalry, artillery, and defense systems.**

7.8. Nalanda University Revives the Ancient Śāstrārtha Debate Tradition

Context:

Nalanda University in Bihar has formally included **Śāstrārtha**, an ancient Indian tradition of philosophical and scholarly debate, in its convocation programme. The initiative, called **Śāstrārtha 2026**, aims to revive India's classical culture of reasoned dialogue and academic disputation.

Explanation:

- **Śāstrārtha** literally means a discussion or debate based on **śāstra** or authoritative knowledge texts.
- It was an important intellectual tradition in ancient India, especially in centres of learning such as **Nalanda, Vikramashila, Takshashila and Kanchi**.
- It involved structured debate on philosophy, religion, logic, metaphysics, ethics and social questions.
- Major Indian traditions such as **Buddhism, Jainism, Nyaya, Vedanta, Mimamsa and Samkhya** used debate to defend doctrines and refine ideas.
- Śāstrārtha was not merely argument; it emphasised **reasoning, evidence, scriptural interpretation and intellectual discipline**.
- It helped preserve India's traditions of **pluralism, critical inquiry and dialogic learning**.

Space for Notes

7.9. Restoration of the Kakatiya-era Thousand Pillar Temple Pavilion

Context:

The Archaeological Survey of India (ASI) has restored the sunken dance pavilion (Kalyana Mandapam) of the Thousand Pillar Temple at Hanamkonda, Telangana, after a 42-year-long conservation effort. The restoration revived the Kakatiya-era architectural structure using traditional sand-box foundation techniques and scientific stone-by-stone reconstruction methods.

Key Highlights:



- The Thousand Pillar Temple is located at Hanamkonda in Telangana and was built during the Kakatiya dynasty in the 12th century under King Rudra Deva.
- The temple is dedicated to the trinity of Shiva, Vishnu and Surya, reflecting the syncretic temple traditions of medieval South India.
- Kakatiya architecture is known for highly polished dolerite stone, intricately carved pillars, star-shaped platforms, mandapams and advanced structural engineering techniques.
- The temple's famous Kalyana Mandapam (dance pavilion) reportedly sank due to weakening of the traditional sand-box foundation system caused by water seepage and structural neglect.
- Sand-box technique is an ancient temple foundation technology using sand, lime, gravel and charcoal layers to absorb vibrations and improve stability during earthquakes or soil movement.
- The monument is protected by the Archaeological Survey of India (ASI), the premier organisation responsible for conservation of centrally protected monuments under the Ancient Monuments and Archaeological Sites and Remains Act, 1958.
- The Kakatiya Rudreshwara (Ramappa) Temple in Telangana was inscribed as a UNESCO World Heritage Site in 2021, highlighting the global recognition of Kakatiya architectural heritage.

7.10. Sant Dhanna Bhagat Ji and the Bhakti Tradition

Context:

The Government of Haryana marked the birth anniversary of Sant Dhanna Bhagat Ji on April 27, 2026. The occasion highlights his contributions as a prominent Bhakti saint known for simple devotion and egalitarian teachings.

Explanation:

- Sant Dhanna Bhagat (15th century) was a Bhakti saint from Rajasthan, associated with the Nirguna Bhakti tradition (emphasizing devotion to a formless God).
- He was a Vaishnav devotee and is believed to have been influenced by the teachings of Ramananda, a key Bhakti reformer.

- His teachings stressed faith, humility, and direct devotion (bhakti) over ritualism, priesthood, and caste-based hierarchy.
- He is one of the saints whose hymns are included in the Guru Granth Sahib, the holy scripture of Sikhism.
- The Bhakti Movement (7th–17th century) was a socio-religious reform movement that spread across India, promoting devotion as the path to salvation.
- It opposed rigid caste practices and emphasized equality, accessibility of God, and use of vernacular languages for religious expression.

Space for Notes

Prelims Questions:

1. **Veera Pasi is remembered in relation to which of the following historical contexts?**
(a) Revolt of 1857 and local anti-colonial resistance
(b) Non-Cooperation Movement
(c) Swadeshi Movement in Bengal
(d) Quit India Movement

2. **With reference to Somnath Temple, consider the following statements:**
1. It is located at Prabhas Patan near Veraval in Gujarat.
2. It is one of the 12 Jyotirlingas dedicated to Lord Shiva.
3. Its post-Independence reconstruction was initiated by Sardar Vallabhbhai Patel.

Which of the above statements is/are correct?
(a) 1 only
(b) 1 and 2 only
(c) 2 and 3 only
(d) 1, 2 and 3

3. **In the First Battle of Panipat, Babur's victory over Ibrahim Lodi was mainly due to:**
(a) Only numerical superiority
(b) Naval power and maritime blockade
(c) Innovative battlefield tactics such as Tulughma and Araba system
(d) Guerrilla warfare in forests

4. **The Komagata Maru incident of 1914 is best associated with:**
(a) Racial discrimination in colonial immigration policy
(b) Peasant revolt against land revenue in Bengal
(c) Naval mutiny in Bombay
(d) Tribal uprising in Central India

Answer

1. A **2.** D **3.** C **4.** A

Space for Notes

8. SOCIETY AND SOCIAL JUSTICE

8.1. Vande Mataram and the Challenge to Multicultural Nationalism

Context:

The debate around *Vande Mataram* has intensified after recent Union Government decisions regarding its official use and legal protection. In 2026, the Union Cabinet approved a proposal to amend the **Prevention of Insults to National Honour Act, 1971** to make intentional insult or obstruction during the singing of *Vande Mataram* a punishable offence, similar to protections available for the National Anthem. The government also issued guidelines encouraging the singing of the full six stanzas at selected official events.

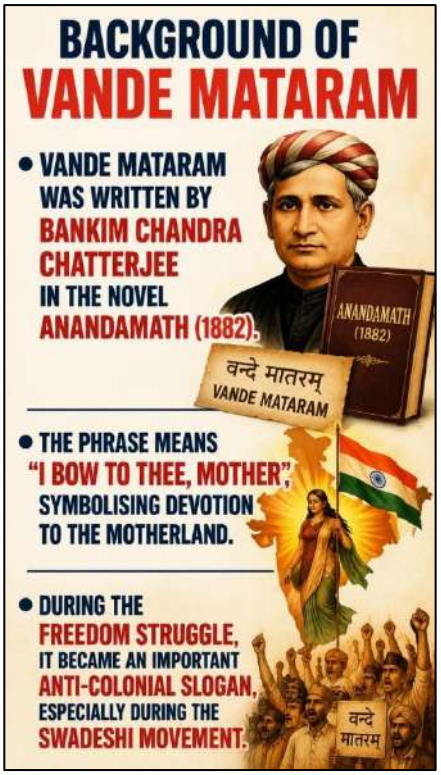
Why is the Song Controversial?

Religious Imagery:

- The later stanzas portray the motherland using imagery associated with Hindu goddesses such as Durga.
- Critics argue that this gives the song a distinctly Hindu religious tone.

Concerns of Minority Communities:

- Some Muslim organisations historically opposed compulsory singing of the full version because Islamic monotheism discourages devotional expressions directed toward figures other than God.
- Therefore, mandatory singing has often been viewed as conflicting with religious freedom.



Debate over Secularism:

- India is constitutionally secular and culturally diverse.
- Critics argue that linking patriotism with a culturally specific religious symbol may weaken inclusive nationalism.

Historical Accommodation:

Congress Position (1937):

- To address concerns, the Indian National Congress decided that only the first two stanzas would be officially used.
- These stanzas mainly praise the motherland and avoid strong religious imagery.

Constituent Assembly Decision:

- During Constitution-making debates:
  - **Jana Gana Mana** was adopted as the National Anthem.
  - *Vande Mataram* received the status of National Song.
- This compromise balanced historical significance with pluralistic concerns.

Space for Notes

Recent Developments:

Legal Changes:

The proposed amendment to the Prevention of Insults to National Honour Act seeks to:

- Extend statutory protection to *Vande Mataram*
- Punish intentional disruption or insult during its rendition
- Place it closer to the legal status of the National Anthem

Political Debate:

- Recent controversies in Tamil Nadu and Puducherry over whether *Tamil Thai Vaazhthu* or *Vande Mataram* should be played first at official ceremonies revived discussions on regional identity, federalism, and cultural nationalism.

Multicultural Nationalism in India:

Indian nationalism traditionally emphasises:

- Religious pluralism
- Linguistic diversity
- Constitutional secularism
- "Unity in Diversity"

Therefore, many scholars argue that national symbols should remain inclusive and voluntary rather than culturally majoritarian.

Conclusion:

The *Vande Mataram* debate reflects the continuing tension between cultural nationalism and constitutional pluralism in India. While the song remains an important symbol of the freedom struggle, its official enforcement raises broader questions about secularism, minority rights, and the inclusive character of Indian nationalism.

Mains Practice Question:

Q. The Vande Mataram debate reflects the tension between cultural nationalism and constitutional pluralism in India. Discuss. **10M (150 Words)**

8.2. JANANI Platform

Context:

The Union Ministry of Health & Family Welfare launched the **JANANI** (Journey of Antenatal, Natal and Neonatal Integrated Care) platform to establish continuous, longitudinal digital health records for women throughout their reproductive years.

Developed as a major upgrade to the legacy Reproductive and Child Health (RCH) portal, JANANI aligns with the broader *Ayushman Bharat Digital Mission (ABDM)* architecture to track maternal and child health outcomes comprehensively.

Key Features and Capabilities:

- **Longitudinal Health Records:** Digitally integrates the entire continuum of care—from antenatal and delivery preparation to postnatal, newborn care, and family planning.
- **Digital MCH Cards:** Introduces QR-enabled Mother and Child Health (MCH) cards that allow beneficiaries to easily carry and access their medical records.
- **Interoperability:** Seamlessly links with national health initiatives like **U-WIN** (immunization) and **POSHAN** (nutrition) to provide holistic, data-driven services.

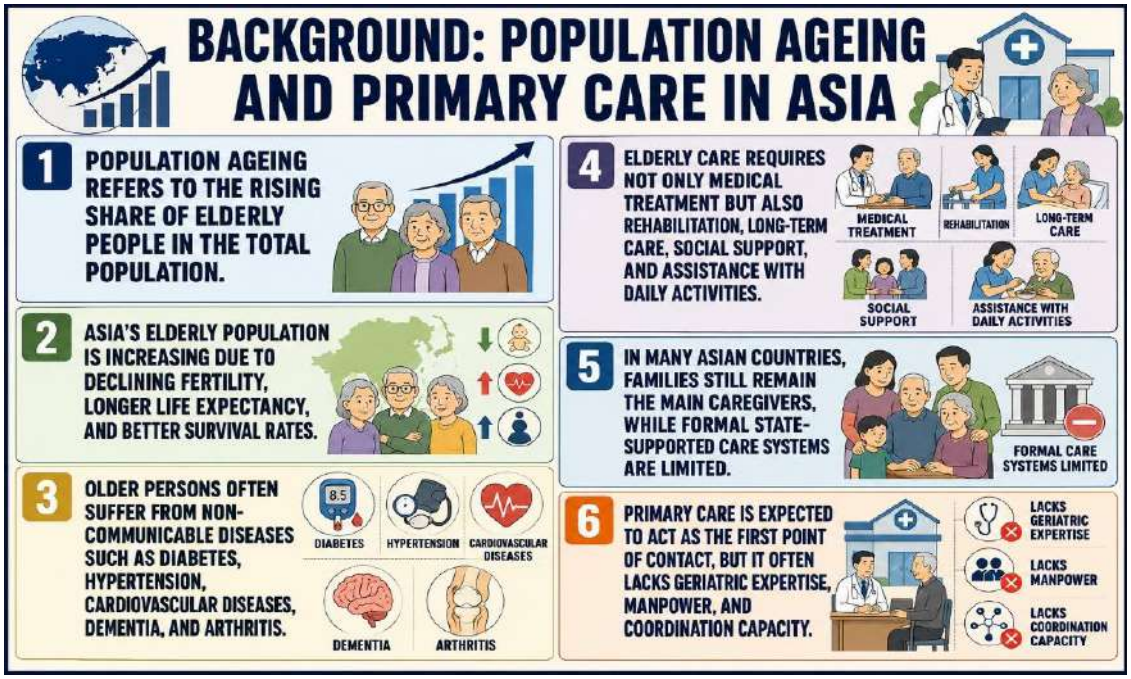
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- **Automated Alert System:** Generates real-time alerts for high-risk pregnancies and creates automated due-lists for medical interventions.
- **Migration Tracking:** Features pan-India search functionalities that ensure continuity of care for migratory populations and prevent data duplication.
- **Beneficiary Access:** Allows users to self-register via web or mobile apps, enabling them to easily locate nearby healthcare facilities and access nutritional guidance.

8.3. Asia's Ageing Population Challenge

Context:

Asia is witnessing rapid population ageing, with a sharp rise in the elderly population and age-related diseases. The central issue is whether primary healthcare systems can move beyond basic first-contact treatment and provide sustained, coordinated, long-term care for older persons.



Explanation:

1. **Ageing as a Health-System Challenge:**
   - Ageing is not merely a demographic issue; it is a major public health and governance challenge.
   - Older adults require repeated, continuous, and multidimensional care rather than one-time clinical treatment.
   - Their needs include disease management, mental health support, physiotherapy, assistive devices, home-based care, and social security.
   - Therefore, health systems must shift from episodic treatment to life-cycle-based care.
2. **Limits of Present Primary Care:**
   - Primary healthcare in many countries is still designed mainly for maternal care, child health, immunisation, infectious diseases, and basic outpatient treatment.
   - It is often not equipped to manage chronic diseases and long-term elderly care.

Space for Notes

- Many centres lack trained geriatric staff, diagnostic support, follow-up systems, and referral coordination.
- As a result, elderly patients often directly approach hospitals, even for problems that could be managed at the primary level.

3. **Fragmented Care System:**
   - Elderly care involves both health and social welfare departments.
   - However, these services are often planned separately, leading to duplication, gaps, and weak accountability.
   - Hospitals, community health centres, family caregivers, rehabilitation services, and welfare schemes often operate without proper coordination.
   - This fragmentation increases household burden and reduces care quality.
4. **Burden on Families and Hospitals:**
   - When formal care systems are weak, families become the default caregivers.
   - This creates emotional, financial, and time-related pressure, especially on women.
   - Hospitals also become overcrowded because primary care fails to manage long-term conditions.
   - This makes healthcare costly, inefficient, and less accessible for the elderly poor.

Way Forward:

- Primary care must be redefined as a continuous care platform, not just a first-contact clinic.
- Geriatric training, community health workers, digital health records, home-based care, telemedicine, and regular screening must be strengthened.
- Health and social welfare systems should be integrated through clear roles and accountability.
- Public financing for elderly care is essential to reduce household expenditure.

Conclusion:

Asia's ageing population will test the sustainability of healthcare systems. The solution lies in strengthening primary care as a coordinated, long-term, elderly-friendly system. Without this shift, hospitals and families will continue to bear an unsustainable burden.

Mains Practice Question:

Q. Ageing in Asia is not merely a demographic transition but a major public health and governance challenge. Discuss. **10M (150 Words)**

9. INTERNAL SECURITY

Space for Notes

9.1. Operation WHITE STRIKE:

Context:

The **Narcotics Control Bureau (NCB)** conducted **Operation WHITE STRIKE** in the Mumbai logistics corridor and seized a major cocaine consignment, exposing a transnational narcotics syndicate. The operation shows how drug trafficking is increasingly linked with organised crime, money laundering, logistics networks and internal security threats.

Narcotics Control Bureau: Basic Details:

- **NCB** is India's **nodal drug law enforcement agency**.
- It functions under the **Ministry of Home Affairs**.
- It coordinates anti-drug action with **state police, customs, DRI, intelligence agencies and international agencies**.
- Its role includes **intelligence collection, investigation, seizure operations, inter-agency coordination and international cooperation**.

NDPS Act, 1985:

- The **Narcotic Drugs and Psychotropic Substances Act, 1985** is India's main anti-drug law.
- It criminalises **production, possession, sale, purchase, transport, trafficking and consumption** of narcotic drugs and psychotropic substances.
- It provides for **strict punishment**, including imprisonment, fines and seizure of illegally acquired property.
- It also regulates **precursor chemicals** used in the manufacture of narcotic substances.

Significance:

- Shows the importance of **intelligence-led policing**.
- Highlights the need to monitor **ports, warehouses, transport networks and financial flows**.
- Strengthens India's response to **transnational organised crime** and narco-financing.

Way Forward:

India needs stronger **inter-agency coordination**, technology-based surveillance, faster NDPS trials, international intelligence sharing, and parallel focus on **de-addiction, rehabilitation and awareness**.

Mains Practice Question:

Q. Intelligence-led policing and inter-agency coordination are crucial for combating narcotics trafficking in India. Discuss the role of the Narcotics Control Bureau in this context.

9.2. BRO's Project Deepak

Context:

Project Deepak of the **Border Roads Organisation (BRO)** celebrated its **66th Raising Day on 4 May 2026**. It highlights BRO's role in **border connectivity, defence logistics and disaster response** in the Western Himalayas.

Space for Notes

Border Roads Organisation (BRO):

- **Formation:** BRO was formed on **7 May 1960**.
- **Headquarters: New Delhi.**
- **Ministry:** It functions under the **Ministry of Defence**.
- **Nature:** BRO is a **road construction executive force** supporting the Indian Armed Forces; it is generally treated as an executive organisation, not a constitutional body.

Project Deepak:

- Project Deepak is one of the oldest and most significant infrastructure projects undertaken by the Border Roads Organisation (BRO).
- Established in 1961 and headquartered in Shimla, it is responsible for constructing and maintaining critical, high-altitude roads in the Western Himalayas to enhance India's border security and regional connectivity.
- It maintains around 1,100 km of strategic road network.

Significance:

- Supports troop movement, equipment transport and border preparedness.
- Strengthens connectivity towards the **Ladakh sector**.
- Connects remote tribal regions with markets, healthcare and education.
- Helps in rescue and relief during landslides, snow blockages and high-altitude emergencies.

Mains Practice Question:

Q. Border infrastructure plays a crucial role in national security, strategic mobility and regional development. Examine the significance of organisations such as the Border Roads Organisation in strengthening India's border management. **15M (250 Words)**

9.3. India Assumes Chair of the Common Criteria Development Board (CCDB)

India assumed the Chairmanship of the Common Criteria Development Board (CCDB) from April 2026 to April 2028, solidifying its leadership in setting global IT security standards.

The **Common Criteria Development Board (CCDB)** is the foundational technical body of the **Common Criteria Recognition Arrangement (CCRA)**. It functions as the technical core of the global IT certification framework, with responsibilities that include:

- **Standards Evolution:** Managing the ongoing evolution of the **Common Criteria** (ISO/IEC 15408) and the **Common Evaluation Methodology** (CEM).
- **Technical Harmonization:** Developing, updating, and harmonizing the security evaluation criteria used to test and certify IT products worldwide.
- **Facilitating Global Trade:** Establishing the technical protocols that allow certificates issued in one member nation to be mutually recognized globally, eliminating the need for redundant re-testing.

India's Institutional Role:

India has been a **Certificate Authorizing Nation** under the CCRA since September 16, 2013. Under this framework:

- **National Representation:** The **Ministry of Electronics and Information Technology (MeitY)** acts as the primary representative for India.

- **Certification Body:** The **STQC Directorate** functions as the official national certification body.
- **International Reciprocity:** IT security certificates issued by India are recognized by the other 38 member countries (including 20 certificate-authorizing nations), which enables seamless international trade in secure IT products.

Space for Notes

9.4. NCB Arrests Factory Owner in Captagon Manufacturing Case

Context:

The **Narcotics Control Bureau (NCB)** has arrested a factory owner in Dehradun for allegedly allowing his facility to be used for illicit manufacturing of **Captagon tablets**. The arrest is linked to **Operation RAGEPILL**, under which India made its first major seizure of Captagon tablets/powder worth around ₹182 crore.

Explanation:

- **Captagon** is an illicit synthetic stimulant linked to **fenethylline**, an amphetamine-type psychotropic substance.
- It is abused mainly for temporary **alertness, euphoria, reduced fatigue, increased stamina and suppressed fear**.
- Its harmful effects may include **addiction, anxiety, aggression, insomnia, cardiovascular stress, hallucinations and long-term neurological damage**.
- Captagon trafficking is a major concern in the **Middle East**, where it has been linked to organised crime and conflict networks.
- **Operation RAGEPILL** is an NCB-led anti-narcotics operation that uncovered an international trafficking network involving Captagon.
- The operation led to seizure of about **227.7 kg of Captagon tablets/powder** and highlighted concerns over India being used as a **transit or manufacturing point**.

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