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JULY 2026

La Excellence — IAS Academy —

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PREFACE

Current Affairs JULY, 2026

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MONTHLY MAGAZINE
JULY 2026

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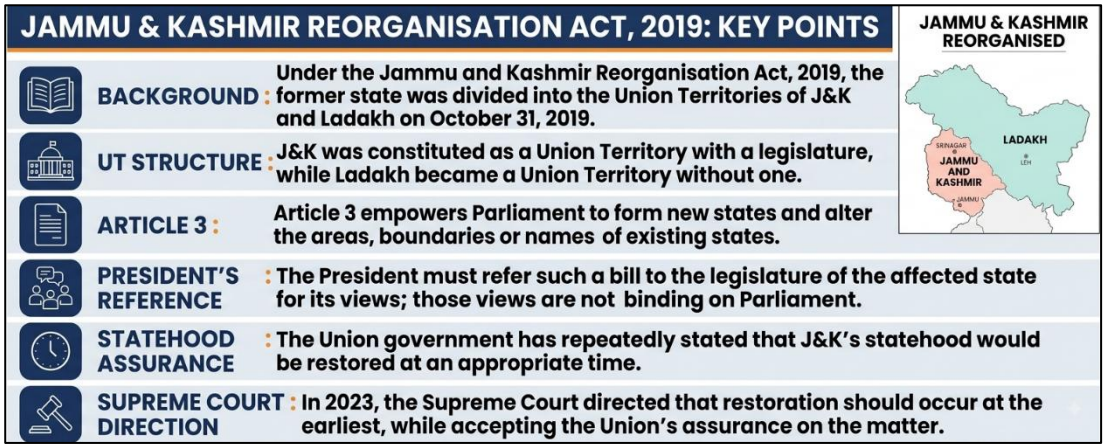
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1. Polity and Governance

1.1. Restoration of Jammu and Kashmir's Statehood

Context:

The prolonged Union Territory status of Jammu and Kashmir has transformed Statehood from an administrative demand into a question of democratic trust, federal representation and political legitimacy. Its restoration requires a transparent, time-bound and negotiated roadmap that reconciles regional aspirations with genuine security concerns.



Explanation:

Why Statehood Matters?

- A State government possesses wider legislative and administrative authority than a Union Territory government.
- In a Union Territory, the **Lieutenant Governor** and Union government exercise greater control over important administrative matters.
- Restoration can strengthen representative government, political accountability and citizen participation.

Security and Governance Concerns:

- The Union government views security, terrorism and administrative stability as important considerations before changing J&K's status.
- However, indefinite delay may weaken public trust and make an exceptional arrangement appear permanent.
- Security and democratic empowerment need not be treated as mutually exclusive; accountable local government can improve legitimacy and intelligence cooperation.

Need for a Negotiated Roadmap:

- Political organisations across regions must develop a broad consensus rather than pursue fragmented demands.
- The roadmap should specify timelines, stages and the division of powers during the transition.

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- Structured dialogue should involve the Union government, elected representatives, regional parties and civil society.
- The transition may be phased, but its constitutional objective and final outcome should remain clear.
- Restoration must address the distinct concerns of the **Kashmir Valley, Jammu region and marginalised communities.**

Conclusion:

Restoring Statehood can deepen federal democracy and rebuild trust between J&K and the Union. A transparent, time-bound and negotiated transition combined with firm security safeguards offers a more durable solution than prolonged constitutional uncertainty.

Mains Practice Question:

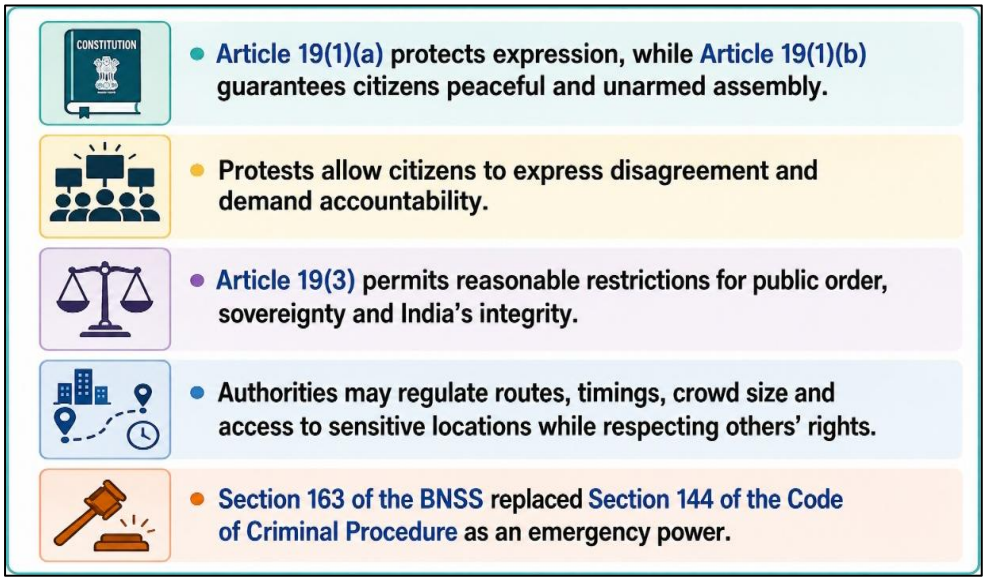
Q. The restoration of Jammu and Kashmir's Statehood is not merely an administrative issue but a test of democratic trust and federal legitimacy." Discuss.

(10 marks, 150 words)

1.2. Right to Protest in India: Constitutional Protection and Police Powers

Introduction:

Police stopped a march towards Parliament using barricades, tear gas and reportedly a lathi charge. The incident renewed debate over protest, preventive restrictions and police force.



Explanation:

- It permits an Executive Magistrate to issue directions against obstruction, danger, riots or disturbances of public tranquillity.
- Orders generally remain effective for two months and must rest on specific facts.

Judicial Standards:

- In *Himat Lal K. Shah v. Commissioner of Police* **(1973),** the Supreme Court permitted regulation of street meetings but rejected arbitrary exclusion.
- In *Anita Thakur v. State of J&K* **(2016),** the Court awarded compensation for excessive police force against protesters.

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- In *Mazdoor Kisan Shakti Sangathan v. Union of India* (2018), the Court rejected permanent protest bans and required balance between protesters' freedoms and residents' rights.
- In *Amit Sahni v. Commissioner of Police* (2020), the Court prohibited indefinite occupation of public roads and supported identified protest areas.

Risks and Safeguards:

- A 2023 study examined nearly 5,400 Delhi Section 144 orders from 2021 - 22. Only about 1.5% concerned unlawful assemblies, indicating wider use.
- Repeated identical orders can transform temporary restrictions into permanent prohibitions. Each renewal must assess current conditions and state clear reasons.
- Police may disperse unlawful assemblies, but force must meet standards of necessity, proportionality, minimum force and accountability.
- Authorities should provide protest spaces, review restrictions and prefer warnings and dialogue before force.

Conclusion:

Peaceful protest remains essential to democratic expression and accountability. Public order permits regulation but not extinction of the right. Section 163 must remain exceptional, while transparent restrictions and restrained policing protect dissent.

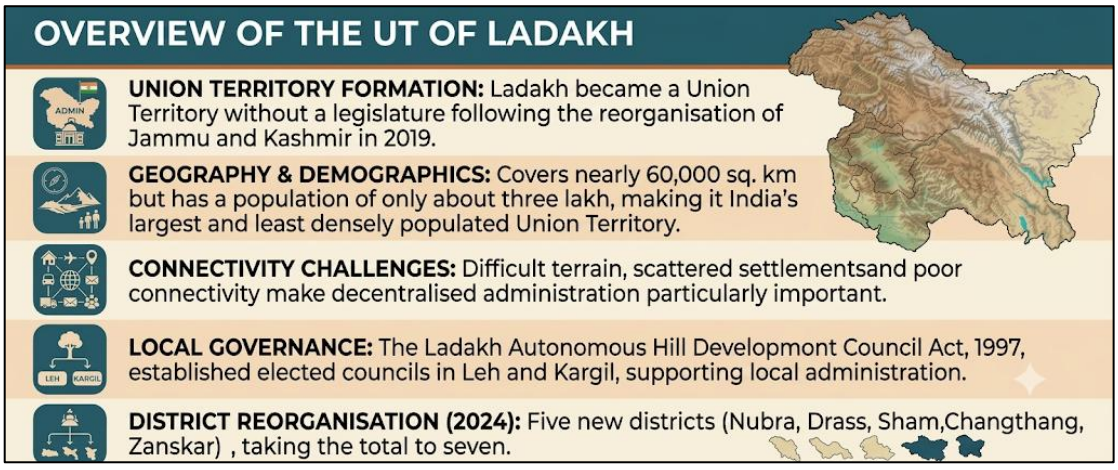
Mains Practice Question:

Q. "The right to peaceful protest is constitutionally protected, but it does not extend to the indefinite occupation of public spaces." Discuss with reference to judicial pronouncements. **(15 marks, 250 words)**

1.3. Ladakh's Seven Hill Councils and the Decentralisation Debate

Context:

The Ladakh administration has proposed establishing an Autonomous Hill Development Council (AHDC) in each of the Union Territory's seven districts. Although intended to deepen grassroots governance, the move has been opposed by major civil society groups, which fear political fragmentation and dilution of Ladakh's demand for constitutional safeguards.



Space for Notes

Explanation:

Rationale for New Councils:

- District-level councils can bring decision-making closer to remote communities and ensure that development reflects their geographic, cultural and livelihood requirements.
- They may improve local participation, administrative accessibility and equitable distribution of public resources.

Powers and Limitations of AHDCs:

- AHDCs undertake district planning and prepare budgets and development programmes.
- They may manage village administration, land use, local roads and certain natural resources, besides collecting specified local taxes.
- However, they are statutory bodies and lack the independent legislative, judicial and constitutional authority enjoyed by Autonomous District Councils under the Sixth Schedule.
- Their effectiveness depends heavily on the powers, finances and personnel transferred by the Union Territory administration.

Concerns of Civil Society:

- The Leh Apex Body and Kargil Democratic Alliance argue that seven councils could divide Ladakh's collective political voice during negotiations with the Union Government.
- They fear that powers expected to be vested in a proposed Union Territory-level representative institution under Article 371 may instead be dispersed among weaker district councils.
- Existing AHDCs allege that their authority over land, recruitment, finances and development has declined since Ladakh became a Union Territory.
- Questions have also arisen over consultation, as representatives reportedly did not approve the proposal recorded during negotiations.
- Thus, multiplying councils without clearly devolving the "three Fs"—functions, funds and functionaries - may create administrative fragmentation rather than substantive decentralisation.

Conclusion:

Ladakh's geography makes decentralised governance indispensable, but institutional expansion alone cannot guarantee self-government. New councils should be established through meaningful consultation and supported by constitutional clarity, adequate finances, administrative authority and safeguards for Ladakh's cultural identity.

Mains Practice Question:

Q. Effective decentralisation requires the transfer of functions, funds and functionaries along with meaningful public consultation. Critically examine with reference to local governance in Ladakh. **(15 Marks, 250 Words)**

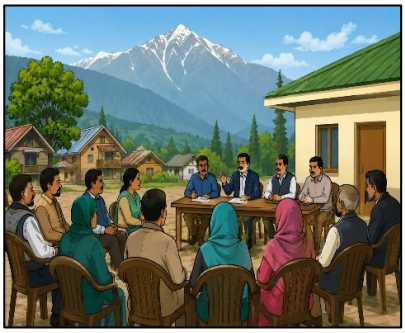
1.4. District Development Councils (DDCs) and Local Governance in Jammu & Kashmir

Context:

The functioning of **District Development Councils (DDCs)** in Jammu & Kashmir has come under debate after completing five years since their establishment in 2021. The discussion focuses on whether DDCs have strengthened grassroots democracy or weakened the constitutional framework of democratic decentralisation.

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Explanation:

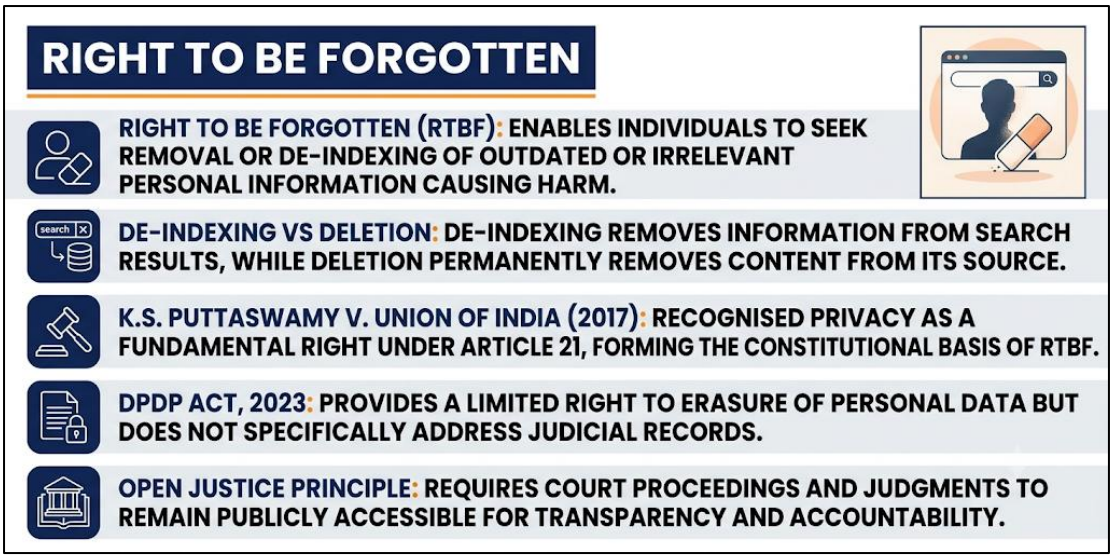


- **District Development Councils (DDCs)** were established in **Jammu & Kashmir in 2020** under the **J&K Panchayati Raj Act, 1989**, with the first elections held in 2020.
- The **73rd and 74th Constitutional Amendments (1992)** institutionalised **Panchayats** and **Urban Local Bodies (ULBs)** as constitutionally mandated local self-governments.
- Under **Article 243ZD**, every State should constitute a **District Planning Committee (DPC)** to consolidate plans prepared by Panchayats and Municipalities into a district development plan.
- Unlike the **constitutional DPC**, **DDCs are statutory bodies** with elected representatives and developmental functions at the district level.
- The debate concerns democratic decentralisation, subsidiarity, district planning, grassroots governance, fiscal devolution, and the balance between executive control and elected local institutions.
- DDCs are significant for strengthening **participatory governance**, but concerns remain regarding their overlap with constitutionally envisaged institutions and planning mechanisms.

1.5. Right to be Forgotten in India

Context:

Recently, the Delhi High Court, in **Laksh Vir Singh Yadav v. Union of India (2026)**, laid down a structured framework for recognising the **Right to be Forgotten (RTBF)**. The Court held that informational privacy under Article 21 may justify masking names in judicial records while preserving the principle of open justice.



Explanation:

Delhi High Court's Ruling:

- The Court recognised RTBF as part of **informational privacy and human dignity** under Article 21.

- It held that courts must balance privacy with transparency using the **principle of proportionality**.
- Instead of deleting judgments, the Court preferred **masking names** while keeping legal reasoning and case records publicly available.
- Legal databases were directed to implement masking within a specified time.

Balancing Fundamental Rights:

- RTBF is **not an absolute right** and must be balanced against **Article 19(1)(a)**, which protects freedom of speech and the public's right to information.
- Privacy claims may be rejected where disclosure serves a larger public interest, such as serious criminal matters or public accountability.
- The judgment seeks **proportional visibility**, ensuring that legal records remain accessible without permanently linking individuals to past disputes.

Challenges in Implementation:

- De-indexing cannot completely erase information because copies, archives and mirror websites may continue to display it.
- Search engines may continue to rank old allegations prominently, even after acquittal, creating a lasting "digital shadow."
- The **Data Protection Board** under the DPDP Act is not yet fully operational, limiting institutional support for RTBF claims.

Way Forward:

- A clear national framework should be evolved through legislation or a Supreme Court ruling.
- The Data Protection Board should become operational to provide an accessible dispute-resolution mechanism.
- Greater coordination among courts, legal databases and digital platforms is necessary for effective implementation.

Conclusion:

The Delhi High Court's ruling marks an important step in protecting digital privacy while preserving judicial transparency. However, the Right to be Forgotten will become truly effective only through robust institutions, clear legal standards and coordinated technological enforcement.

Mains Practice Question:

Q. "The Right to be Forgotten seeks proportional visibility rather than complete erasure of the past." Discuss in the context of informational privacy and open justice.

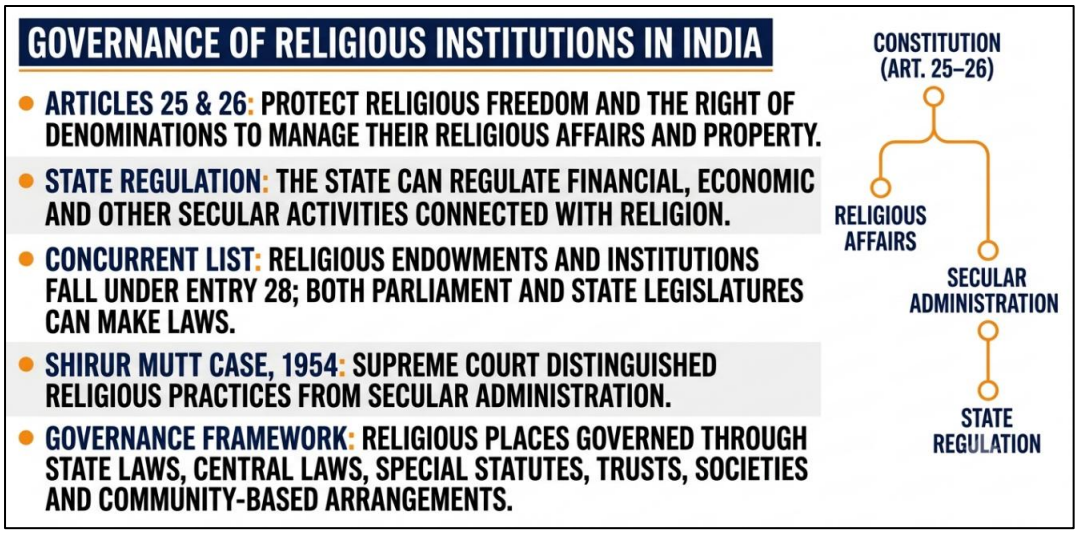
(15 marks, 250 words)

1.6. Governance of Religious Places and Endowments in India

Context:

Recently, the **Ram Janmabhoomi Temple in Ayodhya** came into the news over allegations of mismanagement in handling donations. The issue has raised wider concerns about the auditing, supervision and accountability of religious institutions. It also highlights the need to balance the autonomy of religious bodies with transparent management of public donations, lands and other assets.

Space for Notes



Space for Notes

Explanation:

What the Ram Temple issue highlights?

- Major temples such as Tirupati, Vaishno Devi, Siddhivinayak and Kashi Vishwanath receive large donations and hold valuable assets.
- Donation-counting procedures may be similar, but their systems of supervision and auditing differ.
- Several major temples are governed by special state laws, while the Ram Temple is administered by an independent trust.
- The central concern is the need for independent audits, public disclosure and professional administration.

How religious places are governed:

- **Hindu temples:** Mostly governed through state endowment laws, special temple laws, statutory boards, trusts or hereditary management. State authorities generally supervise finances and property, not rituals.
- **Mosques and waqfs:** Mosques may be managed by local committees. Waqf properties are governed by a central law, amended in 2025, and administered mainly through State Waqf Boards and mutawallis.
- **Churches:** Usually managed by dioceses, bishops, parish councils, trusts, societies or denominational bodies. Their accounts and property are regulated through general trust, society and property laws.
- **Gurudwaras and others:** Major gurudwaras may have statutory committees. Jain, Buddhist and smaller religious institutions are generally managed by trusts, societies, monastic bodies or local communities.

Major Concerns:

- **Different standards:** Laws and auditing requirements vary across religions and states.
- **Weak transparency:** Accounts, donations and property transactions may not be publicly disclosed.
- **Property misuse:** Encroachments, illegal transfers and undervalued leases affect religious lands.
- **Political interference:** Appointments to governing bodies may lack independence.
- **Autonomy concerns:** Excessive state control can interfere with legitimate religious administration.

Space for Notes

Way Forward:

- Introduce common minimum standards for auditing and disclosure.
- Digitise donations, accounts, land records and leases.
- Appoint professionally qualified and independent governing bodies.
- Keep government regulation limited to secular administration and make direct intervention time-bound.

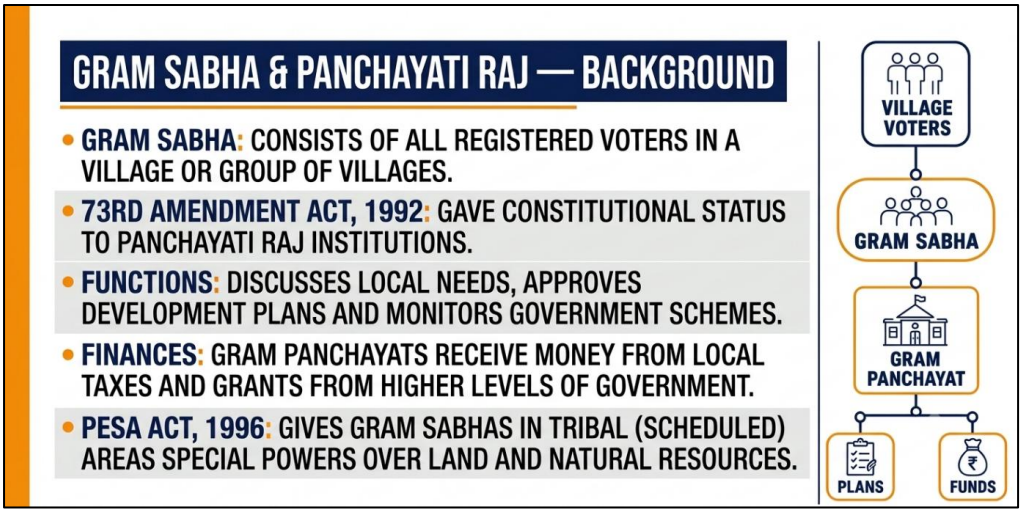
Conclusion:

India needs **autonomy in religious matters, accountability in financial administration and neutrality in state regulation**. This balance can protect both religious freedom and public trust.

1.7. Gram Sabhas and Grass-roots Democracy

Context:

Recently, a report based on surveys of the Ministry of Rural Development highlighted declining participation in gram sabhas. It described the problem as a lack of "vibrancy", but also showed that people often avoid meetings because decisions produce few results, attendance affects their livelihoods, and local bodies have limited real power.



Explanation:

Why Participation Is Falling?

- Many villagers avoid meetings because previous discussions did not produce visible results.
- Poor workers may lose wages by attending, while landlords and contractors can participate more easily.
- This creates **participation fatigue**, where people lose interest in repeated meetings that bring little change.
- Gram sabhas may therefore become a **playground for the leisured elite**, dominated by people with greater time, money and influence.

Limits of Digital Solutions:

- The **NIRNAY App** helps schedule meetings, record decisions and upload minutes.
- Digital records can improve transparency, but excessive data entry may reduce the time available for public discussion.
- Technology cannot increase participation unless citizens have real influence over decisions.

Space for Notes

Weak Decision-Making and Financial Powers:

- Gram sabhas are often treated as **clearinghouses** meaning they often merely approve, record or distribute centrally and State-designed programmes.
- True "vibrancy" means active debate, broad participation and visible implementation, not merely more meetings or uploaded records.
- Panchayats have limited taxation powers and remain dependent on grants tied to schemes such as the Jal Jeevan Mission and Swachh Bharat Mission.
- People may lose interest when locally identified needs cannot receive funds.

Rights in Scheduled Areas:

- Under **Panchayats (Extension to Scheduled Areas) Act, 1996** (PESA), gram sabhas participate in decisions involving land acquisition, mining and forests.
- Governments may sometimes bypass them or use low attendance to claim approval.
- Genuine consent must include the right to say both "yes" and "no".

Way Forward:

- Gram sabhas should receive real authority over local planning and spending.
- Participation by poor workers should be supported so that attending meetings does not cause wage loss.
- Digital tools should assist public discussion rather than increase paperwork.
- Governments must respect gram sabha decisions, including their right to reject projects.

Conclusion:

Gram sabhas cannot be strengthened only through more meetings or digital reporting. They need financial power, inclusive participation and respect for local decisions. This is essential for meaningful grass-roots democracy.

Mains Practice Question:

Q. Analyse the role of Gram Sabhas in strengthening participatory democracy in India. Why has declining participation weakened the objective of democratic decentralisation?

1.8. Fast-Track Courts: Legal Basis, Functioning and Pendency Challenges

Context:

The proposal to expand Fast-Track Courts has renewed attention to their legal basis, jurisdiction and performance. Although intended to expedite trials, many FTCs continue to face heavy pendency, infrastructure shortages and judicial vacancies.

Explanation:



- **Fast-Track Courts (FTCs)** are special courts created through government schemes and judicial directions; there is no single central law governing all FTCs.
- They were initially recommended by the **11th Finance Commission** to clear long-pending criminal cases.
- **Fast-Track Special Courts** primarily try rape cases and offences under the **POCSO Act, 2012**.
- Under **Article 14**, creation of a special court must rest on a reasonable classification and serve a legitimate objective.

Space for Notes

- In **State of West Bengal v. Anwar Ali Sarkar (1952)**, arbitrary selection of cases for special trial was invalidated.
- High Courts may designate courts for speedy trial, but case allocation must follow objective criteria.
- FTCs remain constrained by judicial vacancies, weak infrastructure, prosecution delays, forensic shortages and frequent adjournments.
- Speedy trial forms part of **Article 21**, but expedition cannot override due process and fair-trial safeguards.

1.9. Street Vendors Act and the Regulation of Urban Footpaths

Context:

Bengaluru's drive to clear street vendors from footpaths has raised questions about compliance with the **Street Vendors Act, 2014**. The issue involves balancing pedestrians' right to safe public spaces with vendors' constitutionally protected livelihood.

Explanation:



- The **Street Vendors (Protection of Livelihood and Regulation of Street Vending) Act, 2014** regulates vending while protecting vendors from arbitrary eviction.
- It reflects the right to livelihood under **Article 19(1)(g)** and **Article 21**, subject to reasonable regulation.
- Every local authority must constitute a **Town Vending Committee (TVC)** comprising officials, local representatives and street vendors; at least **40% of its members must be vendors**.
- The TVC conducts surveys, identifies vendors and demarcates vending, restricted-vending and no-vending zones.
- Existing vendors cannot ordinarily be evicted or relocated until the survey is completed and vending certificates are issued.
- A **Certificate of Vending** permits vending at specified locations and under prescribed conditions.
- The Act protects livelihood but does not confer ownership over public land or an unrestricted right to occupy footpaths.
- Removal is permissible only through due process, relocation and rehabilitation provisions under the law.

1.10. Madhya Pradesh Cabinet Approves Draft Uniform Civil Code (UCC) Bill

Context:

The Madhya Pradesh Cabinet has approved the draft Uniform Civil Code (UCC) Bill, which proposes a common legal framework for personal laws across communities while exempting Scheduled Tribes.

Explanation:

- **Uniform Civil Code (UCC)** aims to replace religion-based personal laws with a **common civil law** governing marriage, divorce, inheritance, adoption and maintenance, deriving support from Article 44 (Directive Principles of State Policy).

Space for Notes

- Personal laws in India currently differ across religious communities, while criminal laws are uniform nationwide.
- The draft Bill exempts **Scheduled Tribes**, recognizing constitutional protections under **Articles 342 and 366(25)** and tribal customary practices.
- The proposal bans polygamy, nikah halala, mandates registration of marriages, divorces and live-in relationships, and grants equal legal status to children irrespective of parents' marital status.

1.11. National Anti-Doping Act, 2022 and Amendment Act, 2025 Come into Force

Context:
The Government of India has enforced the National Anti-Doping Act, 2022 and the National Anti-Doping (Amendment) Act, 2025.

Explanation:
- Doping refers to the use of **prohibited substances or methods** to artificially enhance sports performance, violating the principle of **fair play**.
- The National Anti-Doping Act, 2022 provides statutory backing for testing, investigations, results management, education, and dispute resolution in anti-doping matters.
- The National Anti-Doping (Amendment) Act, 2025 strengthens institutional autonomy, transparency, accountability, and procedural safeguards.
- India's anti-doping framework is aligned with the **World Anti-Doping Code (WADA Code)** and fulfils obligations under the UNESCO International Convention against Doping in Sport (2005).
- **National Anti-Doping Agency (NADA)** is India's apex body for implementing anti-doping rules, while **World Anti-Doping Agency (WADA)** sets global anti-doping standards.

1.12. Supreme Court Restricts Use of Special Intensive Revision (SIR) Data to Electoral Purposes

Context:
The Supreme Court has issued notice to the Election Commission of India (ECI) and the West Bengal Government over allegations that data from the **Special Intensive Revision (SIR)** of electoral rolls is being used to deny welfare benefits and cancel caste certificates. The Court reiterated that SIR data is meant solely for electoral purposes and cannot be used to determine citizenship or for non-election administrative actions.

Explanation:
- **Special Intensive Revision (SIR)** is a comprehensive revision of electoral rolls conducted by the Election Commission of India **(Article 324)** to ensure voter lists are accurate and updated.
- Inclusion in an electoral roll is governed by the Representation of the People Act, 1950, while citizenship is determined only under the Citizenship Act, 1955.

Space for Notes

- The ECI has no authority to adjudicate citizenship; doubtful citizenship cases must be referred to the competent authority under the Citizenship Act.
- Electoral roll deletion affects only the **right to vote** and cannot automatically deprive individuals of food security, welfare benefits, caste certificates, or other statutory entitlements.
- The Supreme Court emphasized that electoral data cannot be used for non-poll administrative purposes, safeguarding constitutional rights under **Articles 14, 21 and 326**.

1.13. UDISE+ 2025–26 Report on School Education in India

Context:

The Union Ministry of Education has released the **Unified District Information System for Education Plus (UDISE+) 2025–26 Report**, highlighting improvements in school education indicators such as teacher availability, enrolment, retention, digital infrastructure and gender representation across India.

Explanation:

- **UDISE+ (Unified District Information System for Education Plus)** is India's largest school education database, managed by the **Ministry of Education** to collect annual data from recognised schools across the country.
- It provides comprehensive information on **schools, teachers, students, infrastructure, enrolment, learning facilities and governance**, helping in evidence-based policymaking.
- The system supports monitoring of the **National Education Policy (NEP) 2020**, **Samagra Shiksha**, and progress towards **Sustainable Development Goal (SDG) 4 – Quality Education**.
- Key educational indicators include **Gross Enrolment Ratio (GER), Pupil-Teacher Ratio (PTR), Dropout Rate, Transition Rate and Retention Rate**, which measure access, participation and continuity in education.
- UDISE+ is also used for planning teacher deployment, improving school infrastructure, promoting digital education, ensuring gender equity and tracking inclusive education for children with disabilities.

1.14. Allahabad High Court Upholds Uniform Minimum Marriage Age Across Religions

Context:

The Allahabad High Court has ruled that the minimum age of marriage under the Prohibition of Child Marriage Act (PCMA), 2006 applies to all citizens irrespective of religion. The Court held that personal laws cannot override statutory provisions intended to prevent child marriage and protect children.

Explanation:

- **Child marriage** refers to the marriage of a person below the legally prescribed minimum age under the **Prohibition of Child Marriage Act (PCMA), 2006**.
- Under the **PCMA, 2006**, the minimum legal marriage age is **21 years for males** and **18 years for females**, applicable irrespective of religion.

- The Act seeks to **prohibit, prevent and punish child marriages**, while also providing relief, maintenance and custody for affected children.
- **Personal laws** govern matters such as marriage, divorce and inheritance for different religious communities, but they cannot override a **Central law** enacted for child protection.
- The **Protection of Children from Sexual Offences (POCSO) Act, 2012** defines every person below **18 years** as a child and criminalises sexual offences against children, reinforcing the statutory prohibition on child marriage.

Space for Notes

1.15. Judicial Resignation and the Limits of Parliamentary Removal

Introduction:

The proposed tabling of an inquiry report on Justice Yashwant Varma raises a constitutional question. His resignation challenges Parliament's authority to continue proceedings designed to remove a serving judge.

Constitutional and Statutory Framework:

- Article 121 bars parliamentary discussion of judicial conduct except during removal proceedings.
- Articles 124(4), 217 and 218 permit removal only for proved misbehaviour or incapacity.
- The Judges (Inquiry) Act, 1968 governs the motion, inquiry committee, report and parliamentary consideration.
- A motion requires signatures from 100 Lok Sabha members or 50 Rajya Sabha members. The Speaker or Chairman may admit or reject it.
- An admitted motion creates a committee comprising a Supreme Court judge, a High Court Chief Justice and a distinguished jurist.
- If it proves the charge, each House must approve removal by a total-membership majority and two-thirds of members present and voting. The President may then order removal.
- No judge has been successfully removed through this process in India.

Effect of Resignation:

- Article 217 allows a High Court judge to resign by writing to the President.
- *Union of India v. Shri Gopal Chandra Misra* (1978) recognised resignation as a unilateral act requiring no acceptance unless specified otherwise.
- Effective resignation vacates the office and may render a removal vote purposeless.
- Proceedings against Justices P.D. Dinakaran and Soumitra Sen ended after their resignations in 2011.
- Neither the Constitution nor the Act requires an inquiry to lapse after resignation, creating legal ambiguity.

Transparency and Continuing Accountability:

- Tabling the report would preserve an official record, disclose a publicly funded inquiry and strengthen transparency.
- Parliament may acknowledge or discuss the report only within constitutional limits. It cannot use removal proceedings to impose independent punishment, censure or disqualification without legal authority.

Space for Notes

- Resignation does not extinguish criminal, civil or tax liability. Independently admissible evidence may support proceedings under ordinary law.
- Pension and retirement benefits remain governed by separate statutes. The findings may inform relevant decisions but cannot automatically withdraw benefits.
- Continuing a vote could establish retrospective parliamentary scrutiny of former judges.

Conclusion:

Parliament may table the inquiry report to preserve transparency, but removal after an effective resignation lacks a clear constitutional purpose. Resignation must not erase lawful accountability or expand Parliament's punitive jurisdiction. A clearer legal framework must define the consequences of resignation during removal proceedings.

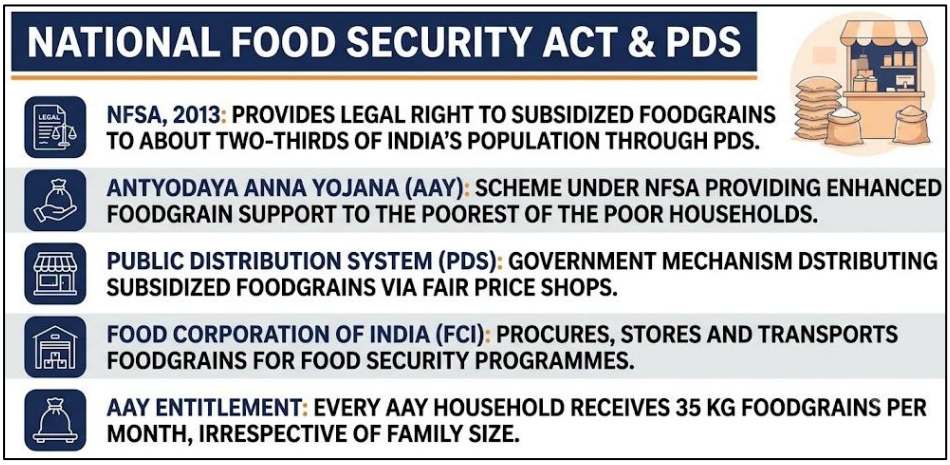
Mains Practice Question:

Q. What is the significance of tabling a judicial inquiry report when the judge concerned has already resigned? Evaluate its implications for transparency and parliamentary accountability. **(15 marks, 250 words)**

1.16. National Food Security Act (NFSA), 2013 Amendment

Context:

Recently, the Union Food and Public Distribution Department released a draft amendment to the National Food Security Act (NFSA), 2013, proposing changes in foodgrain entitlements under the Antyodaya Anna Yojana (AAY). The proposal has been opposed by states such as Tamil Nadu and Kerala, which argue that it would reduce foodgrain allocations for poor households with smaller family sizes.



Explanation:

Proposed Amendment:

- The draft proposes replacing the household-based entitlement with **7 kg of foodgrains per person per month**, subject to a maximum of **35 kg per household**.
- Under the proposal, households with five members would continue receiving 35 kg, while smaller households would receive proportionately lower quantities.

Rationale of the Centre:

- The government argues that the present system creates **intra-category inequity**, as households of different sizes receive the same quantity.

Space for Notes

- A per-capita approach is expected to make foodgrain allocation more equitable and better aligned with actual consumption needs.
- However, the proposal does not address the issue of ineligible beneficiaries remaining in the AAY list.

Concerns Raised by States:

- Tamil Nadu and Kerala have a high proportion of **nuclear families**, making many AAY households vulnerable to reduced entitlements.
- Tamil Nadu estimates that its monthly AAY allocation could decline by more than one-third, increasing food expenditure for poor families.
- Kerala argues that it is a foodgrain-deficit, consumption-oriented state that depends heavily on the PDS and therefore requires special consideration.
- Food rights groups also contend that states with larger average household sizes may benefit relatively more, raising concerns of regional imbalance.

Way Forward:

- A balanced approach should combine **equity with food security**, ensuring that reforms do not adversely affect vulnerable households.
- One suggested alternative is to provide a fixed household entitlement of **30 kg**, which could reduce subsidy costs while avoiding steep cuts for small families.
- Periodic revision of beneficiary lists and improved targeting should complement any change in allocation methodology.

Conclusion:

The proposed amendment seeks to improve fairness in foodgrain distribution by linking benefits to household size. However, it also raises concerns regarding regional equity and the protection of vulnerable households. A balanced reform should preserve the objectives of food security while ensuring that efficiency does not come at the cost of social justice.

1.17. Citizenship, Passports and the Constitutional Right to Belong

Context:

The Ministry of External Affairs recently clarified that a passport is primarily a travel document not conclusive proof of citizenship has reignited debate over how Indian citizenship is legally established. While documents like passports, Aadhaar, and voter ID facilitate identification and access to services, they do not by themselves constitute definitive proof of citizenship.



Space for Notes

Explanation:

Passport and citizenship are legally distinct:

- A passport confirms the holder's identity and enables international travel under the protection of the issuing State.
- Although possession of an Indian passport is strong evidence of citizenship, the government's clarification suggests that it may not conclusively determine citizenship in every legal proceeding.
- A passport may therefore create a **presumption of citizenship**, but citizenship can still be examined under the Citizenship Act and other applicable laws.

Constitutional evolution of citizenship:

- The Constituent Assembly rejected proposals that sought to link citizenship with religion and adopted a broadly **secular and non-discriminatory framework**.
- However, citizenship by birth was progressively restricted, particularly through amendments connected with irregular migration.
- **Section 6A of the Citizenship Act**, introduced following the Assam Accord, created special citizenship rules for persons who migrated to Assam during specified periods.
- In 2024, the Supreme Court upheld Section 6A and recognised Parliament's wide authority under Article 11 to determine citizenship policy.

Scrutiny by Electoral and Administrative Authorities:

- The **Election Commission** may verify electoral eligibility, but not conclusively determine citizenship.
- Citizenship disputes must be decided through legally prescribed authorities and due process.
- In **Assam**, "Doubtful Voters (D-Voters)" may be referred to **Foreigners Tribunals**, leading to prolonged uncertainty and possible disenfranchisement.

The Documentation Problem:

- **Aadhaar** proves identity and residence, not citizenship.
- **Voter ID** confirms electoral enrolment, not citizenship.
- **Passport** is primarily a travel document and is not conclusive proof of citizenship.
- Reliance on documentary proof disproportionately affects migrants, poor families and those lacking formal records.

Citizenship and Personhood:

- **Articles 14 & 21** protect all persons, while **Article 19** rights are exclusive to citizens.
- Citizenship enables political rights, including voting and democratic participation.
- Citizenship determination must follow **due process, natural justice, equality and the right to appeal**.

Conclusion:

Citizenship cannot depend solely on possession or absence of a particular document. While the State may verify citizenship, constitutional democracy requires that no person be deprived of legal membership or basic rights through arbitrary administrative action, uncertain standards or indefinite proceedings.

Mains Practice Question:

Q. **"Citizenship is a legal status that goes beyond identity documents."** Analyse this statement in the context of constitutional safeguards, due process and democratic rights in India.

Space for Notes

1.18. Model Guidelines for Development and Regulation of Retirement Homes for Senior Citizens

Context:

The Ministry of Social Justice and Empowerment has issued Model Guidelines for the Development and Regulation of Retirement Homes to all States and Union Territories.

Explanation:

- The **Model Guidelines** provide a reference framework for States and Union Territories to regulate and develop retirement homes for senior citizens.
- **Land** and **Colonization** fall under Entry 18, List II (State List) of the **Seventh Schedule**, making regulation primarily a State responsibility.
- The guidelines prescribe **elder-friendly infrastructure**, including wheelchair-accessible ramps, lifts, handrails, power backup, ambulance services and panic alarm systems.
- Retirement home projects are covered under the **Real Estate** (Regulation and Development) **Act, 2016 (RERA)**, ensuring transparency, accountability and consumer protection.
- The initiative complements the **Maintenance and Welfare of Parents and Senior Citizens Act, 2007**, promoting dignity, independent living and quality care for India's ageing population.

1.19. Draft Advocates (Amendment) Bill, 2026 Released for Public Consultation

Context:

The Bar Council of India (BCI) has released the Draft Advocates (Amendment) Bill, 2026 for stakeholder and public consultation.



Explanation:

- The **Advocates Act, 1961** regulates the legal profession in India and provides for the constitution of the Bar Council of India (BCI) and State Bar Councils.
- The Bar Council of India (BCI) is a statutory body established under the Advocates Act, 1961, responsible for legal education, professional ethics, enrolment standards, and disciplinary oversight of advocates.
- A Draft Bill is released for public consultation before introduction in Parliament, allowing stakeholders to suggest changes and improving the quality of legislation through **participative law-making**.
- Comments have been invited until 31 July 2026, reflecting the government's commitment to a transparent and participative legislative process.
- After consultation, the draft may be revised, approved by the Union Cabinet, introduced in Parliament, and becomes law only after passage by both Houses and Presidential assent.

Space for Notes

1.20. Maharashtra's Mukhyamantri Majhi Ladki Bahin Yojana under CAG Scrutiny

Context:

The **Mukhyamantri Majhi Ladki Bahin Yojana** in Maharashtra has come under scrutiny following **CAG observations** on excess expenditure, financial management, and verification of beneficiaries. Large-scale beneficiary removals after e-KYC verification have also raised concerns regarding the scheme's implementation.

Explanation:

- **Mukhyamantri Majhi Ladki Bahin Yojana** is a **Direct Benefit Transfer (DBT)** scheme providing **₹1,500 per month** to eligible women for financial empowerment.
- Eligible beneficiaries are **women aged 21–65 years**, resident of Maharashtra, with an **Aadhaar-linked bank account** and prescribed income criteria.
- **Direct Benefit Transfer (DBT)** transfers subsidies directly into beneficiaries' bank accounts to improve transparency and reduce leakages.



- **e-KYC (Electronic Know Your Customer)** uses Aadhaar-based identity verification to authenticate beneficiaries.
- **Comptroller and Auditor General (CAG)** is a constitutional authority under **Article 148**, auditing Union and State government finances to ensure accountability and financial propriety.

1.21. Supreme Court's Draft Regulations on the Use of Artificial Intelligence in Courts

Context:

The Supreme Court of India has released the Draft Regulations for use of Artificial Intelligence (AI) in Courts, 2026 for public consultation. The draft seeks to regulate AI use in judicial administration while ensuring that judicial decision-making remains exclusively human-led.

Explanation:

- **Artificial Intelligence (AI)** refers to computer systems capable of performing tasks requiring human intelligence, such as language processing, pattern recognition, and data analysis.
- The draft permits AI for administrative and assistive functions, including legal research, translation, transcription, case management, scheduling, accessibility, and court administration.



Space for Notes

- AI is prohibited from performing judicial decision-making, predicting case outcomes, assessing witness credibility, determining guilt or innocence, sentencing, or generating final judicial orders.
- The framework mandates human oversight, transparency, accountability, and disclosure whenever AI tools assist court processes.
- It discourages the use of **black-box (non-explainable) AI** and emphasizes **Explainable AI (XAI),** data privacy, fairness, and protection against algorithmic bias.
- The regulations align with constitutional principles of natural justice, due process, judicial independence, and the right to a fair trial.

1.22. Government Tightens Regulation of Alcohol-Containing Medicinal Products

Context:

The Union Health Ministry has amended the Drugs Rules, 1945, making it mandatory for medicinal formulations containing more than 12% ethyl alcohol (v/v) in quantities above 30 ml to obtain licences. The move aims to prevent misuse of high-alcohol medicinal products and strengthen regulatory oversight.

Explanation:



- The Drugs and Cosmetics Act, 1940 and the Drugs Rules, 1945 regulate the manufacture, sale, distribution, and licensing of drugs and cosmetics in India.
- Schedule K of the Drugs Rules provides exemptions from certain licensing requirements for specified drugs and formulations under prescribed conditions.
- The amendment removes the exemption for medicinal formulations containing more than 12% v/v ethyl alcohol in containers exceeding 30 ml, bringing them under mandatory licensing.
- Such formulations may contain 80–90% alcohol, making them vulnerable to misuse for intoxication instead of therapeutic purposes.
- Ethyl alcohol (ethanol) is used in medicines as a solvent, preservative, and extraction medium, especially in herbal and tincture preparations.
- The amendment strengthens record-keeping, prescription monitoring, and regulated pharmaceutical supply, helping curb misuse while ensuring legitimate medical availability.

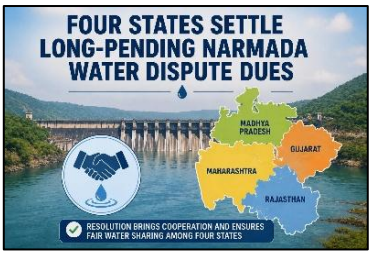
1.23. Four States Settle Long-Pending Narmada Water Dispute Dues

Context:

Gujarat, Madhya Pradesh, Maharashtra, and Rajasthan signed a historic agreement to settle outstanding financial dues arising from the **Narmada Water Disputes Tribunal (NWDT) Award, 1979**. The agreement resolves long-pending issues related to the **Sardar Sarovar Project**, **Indira Sagar Project**, rehabilitation costs, and cost-sharing among the beneficiary states.

Space for Notes

Explanation:



- The **Narmada River** originates from **Amarkantak Plateau (Madhya Pradesh)** and flows west into the **Arabian Sea**, forming the **estuary of Bharuch (Gujarat)**.
- It is India's **largest west-flowing river**, traversing **Madhya Pradesh, Maharashtra, and Gujarat**, while benefiting **Rajasthan** through canal irrigation.
- The **Narmada Water Disputes Tribunal (NWDT)** was constituted in **1969** under the **Inter-State River Water Disputes Act, 1956**, and delivered its **Award in 1979**.
- The Award allocated **water shares, hydropower sharing**, and laid down **cost-sharing** arrangements among the four states.
- Major projects include the **Sardar Sarovar Dam, Indira Sagar Dam, River Bed Power House**, and **Canal Head Power House**.
- The **Narmada Control Authority (NCA)** oversees implementation of the NWDT Award, dam operations, and **Resettlement & Rehabilitation (R&R)** of project-affected families.

1.24. Right to Legal Representation and Professional Ethics of Advocates

Context:

The Faizabad Bar Association recently resolved not to provide legal representation to the accused in the Ram Temple embezzlement case. The decision has revived discussion on a 2010 Supreme Court judgment, which held that every accused person, irrespective of the nature of the crime, has a fundamental right to be defended by a lawyer.

Explanation:



- Article 22(1) of the Constitution guarantees every arrested person the right to consult and be defended by a legal practitioner of their choice.
- The right to legal representation is an essential component of natural justice, fair trial, and Article 21 (Right to Life and Personal Liberty).
- In A.S. Mohammed Rafi v. State of Tamil Nadu (2010), the Supreme Court held that Bar Associations cannot pass resolutions preventing advocates from defending any accused, calling such resolutions illegal and against professional ethics.
- The Bar Council of India (BCI) is a statutory body under the Advocates Act, 1961, responsible for regulating the legal profession and prescribing Standards of Professional Conduct and Etiquette.
- Under the BCI Rules, an advocate is generally bound to accept a legal brief unless there are valid reasons for refusal, ensuring equal access to justice.
- Indian criminal jurisprudence follows the principle that an accused is presumed innocent until proven guilty, and legal representation is necessary for a fair adjudication.
- Article 39A (Directive Principles of State Policy) directs the State to ensure equal justice and free legal aid, reinforcing access to legal representation irrespective of economic or social status.

Space for Notes

1.25. SHE-LEAPS Platform for Lakhpati Didis

Context:

The government launched SHE-LEAPS to digitally support women-led Self-Help Group enterprises across rural India. It will track enterprise creation, income growth and livelihood performance under the Lakhpati Didi initiative.

Explanation:



- SHE-LEAPS stands for Self-Help Entrepreneur-Livelihoods and Enterprise Application for Prosperity and Sustainability.
- It is a digital platform for women SHG entrepreneurs involved in farm and non-farm rural enterprises.
- It was developed by Digital India Corporation and implemented under the LokOS platform.
- LokOS digitises activities of SHGs, Village Organisations and Cluster Level Federations.
- SHE-LEAPS captures real-time enterprise data, livelihood records, financial details and performance indicators.
- It supports enterprise creation, financial inclusion, value-chain integration and data-driven governance.
- The platform will help State Rural Livelihood Missions monitor women-led rural enterprises.
- Lakhpati Didi refers to SHG women earning at least ₹1 lakh annually.

1.26. Delhi High Court Declares NSE a Public Authority under the RTI Act

Context:

The Delhi High Court has upheld that the National Stock Exchange (NSE) is a **'public authority'** under **Section 2(h) of the Right to Information (RTI) Act, 2005**. The ruling makes the NSE subject to RTI obligations, including disclosure of information, subject to exemptions under the Act.

Explanation:

- The Right to Information (RTI) Act, 2005 promotes transparency, accountability and citizen participation by providing access to information held by public authorities.
- Section 2(h) defines a Public Authority as any authority or body established by the Constitution, law, government notification, or one that is owned, controlled or substantially financed by the government.
- A public authority must appoint Public Information Officers (PIOs) and provide information unless covered under exemptions in Sections 8 and 9 of the RTI Act.
- The National Stock Exchange (NSE) is India's largest stock exchange and functions as a Market Infrastructure Institution (MII) regulated by the Securities and Exchange Board of India (SEBI) under the SEBI Act, 1992 and the Securities Contracts (Regulation) Act, 1956 (SCRA).
- SEBI is the statutory regulator of India's securities market, while NSE provides the platform for trading in equities, derivatives and debt securities.

Space for Notes

MCQs

1. With reference to the Right to Protest in India, consider the following statements:

1. The Constitution explicitly mentions the "Right to Protest" as a Fundamental Right.
2. The right to assemble peacefully is guaranteed under Article 19(1)(b) of the Constitution.
3. The State may impose reasonable restrictions on peaceful assemblies in the interest of public order.

Which of the statements given above is/are correct?

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

2. With reference to the removal of judges in India, consider the following statements:

1. A motion for the removal of a High Court or Supreme Court judge may be initiated only after being signed by at least 100 members of the Lok Sabha or 50 members of the Rajya Sabha.
2. If the presiding officer admits the motion, a three-member inquiry committee is constituted to investigate the charges.
3. The Constitution refers to the process as the "impeachment of a judge."

Which of the statements given above is/are correct?

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

3. Match List-I with List-II:

List-I	List-II
A. Article 124(4)	1. Procedure for investigation into allegations against judges
B. Judges (Inquiry) Act, 1968	2. Removal of Supreme Court judges
C. Union of India v. Gopal Chandra Misra (1978)	3. Resignation of a judge is a unilateral constitutional act

Select the correct answer using the code below:

(a) A–2, B–3, C–1
(b) A–1, B–2, C–3
(c) A–2, B–1, C–3
(d) A–3, B–1, C–2

4. Match List-I with List-II:

List-I	List-II
A. Autonomous Hill Development Councils (AHDCs)	1. Constitutional bodies under the Sixth Schedule
B. Sixth Schedule Autonomous District Councils	2. Statutory bodies with limited administrative powers
C. Three Fs of decentralisation	3. Functions, Funds and Functionaries

Space for Notes

Select the correct answer using the code below:
(a) A–3, B–1, C–2
(b) A–1, B–2, C–3
(c) A–2, B–3, C–1
(d) A–2, B–1, C–3

5. **Assertion (A):** The proposed amendment to the National Food Security Act (NFSA), 2013 aims to make foodgrain allocation more equitable by linking entitlements to household size.
Reason (R): Under the existing Antyodaya Anna Yojana (AAY), all eligible households receive the same quantity of foodgrains irrespective of family size.
Choose the correct answer using the code below:
(a) Both A and R are true, and R is the correct explanation of A.
(b) Both A and R are true, but R is not the correct explanation of A.
(c) A is true, but R is false.
(d) A is false, but R is true.

6. With reference to the Right to be Forgotten (RTBF) in India, consider the following statements:
1. The Right to be Forgotten has been recognised as part of the right to privacy under Article 21.
2. The Right to be Forgotten requires all judicial records concerning an individual to be permanently deleted.
3. Claims under the Right to be Forgotten may be rejected where disclosure serves a larger public interest.

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

7. **Assertion (A):** The Delhi High Court preferred masking the names of individuals in judicial records instead of deleting the judgments.
Reason (R): The principle of open justice requires judicial decisions to remain accessible while protecting individual privacy where appropriate.
(a) Both A and R are true, and R is the correct explanation of A.
(b) Both A and R are true, but R is not the correct explanation of A.
(c) A is true, but R is false.
(d) A is false, but R is true.

8. **Assertion (A):** The Supreme Court has recognised the voter's right to know the criminal, educational and financial background of electoral candidates as part of Article 19(1)(a).
Reason (R): The Supreme Court has held that the right to vote itself is a Fundamental Right guaranteed under Part III of the Constitution.
(a) Both A and R are true, and R is the correct explanation of A.
(b) Both A and R are true, but R is not the correct explanation of A.
(c) A is true, but R is false.
(d) A is false, but R is true.

9. With reference to the right to vote in India, consider the following statements:
1. In *N.P. Ponnuswami v. Returning Officer* (1952), the Supreme Court held that election rights are statutory in nature.
2. In the *PUCL* judgment (2003), the Supreme Court recognised that an informed vote is linked to freedom of expression.
3. The NOTA judgment (2013) declared the right to vote itself to be a Fundamental Right under Article 21.

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

10. Which of the following statements regarding the right to vote in India is/are correct?
1. The Constitution expressly declares the right to vote as a Fundamental Right.
2. Parliament is competent to regulate electoral rolls, qualifications and election procedures through legislation.
3. The secrecy of the ballot has received constitutional protection through judicial interpretation.
4. The Supreme Court has recognised the voters' right to know candidates' antecedents as part of Article 19(1)(a).

Select the correct answer using the code below:
(a) 1 and 2 only
(b) 2, 3 and 4 only
(c) 1, 3 and 4 only
(d) 2 and 4 only

11. With reference to citizenship and official documents in India, consider the following statements:
1. Aadhaar is conclusive proof of Indian citizenship.
2. Voter Identity Card primarily establishes electoral enrolment and is not conclusive proof of citizenship.
3. Article 19 of the Constitution guarantees certain Fundamental Rights exclusively to citizens.
4. Article 21 guarantees protection of life and personal liberty only to citizens of India.

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

12. With reference to the Gram Sabha and the Panchayats (Extension to Scheduled Areas) Act, 1996 (PESA), consider the following statements:
1. Under PESA, the Gram Sabha has a role in decisions relating to land acquisition, mining and management of minor forest produce in Scheduled Areas.
2. PESA applies to all rural areas covered under Part IX of the Constitution.
3. The Gram Sabha may approve or reject proposals affecting local resources in Scheduled Areas.

Space for Notes

Which of the statements given above is/are correct?

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

Space for Notes

Answers

1. Answer: A
2. Answer: A
3. Answer: C
4. Answer: D
5. Answer: A
6. Answer: B
7. Answer: A
8. Answer: C
9. Answer: D
10. Answer: B
11. Answer: C
12. Answer: C

Space for Notes

2. International Relations

2.1. Steady in Turbulence: India's Indo-Pacific Partnerships and Act East Policy

Introduction:

The Prime Minister's 2026 tour of Indonesia, Australia and New Zealand strengthened India's defence, maritime, energy, trade and education partnerships. The outreach advances strategic autonomy amid geopolitical rivalry, supply-chain disruption and uncertainty over the United States' regional role.



Strategic and Maritime Framework:

- Southeast Asia links India to markets and sea routes, while the Northeast can serve as a land bridge.
- India balances China's influence without confrontation or permanent alignment. Its "G Minus Two" approach widens partnerships without rejecting either US presence or economic ties with China.
- The Quad links India, the US, Japan and Australia. SAGAR, IPOI and MAHASAGAR support security, development, connectivity, disaster response and action against piracy and illegal fishing.
- ASEAN ties became a Comprehensive Strategic Partnership in 2022. India also supports Pacific Island states through health, education, fintech and disaster relief.

Country Partnerships:

- Indonesia agreed to purchase BrahMos supersonic cruise missiles and Astra missiles and cooperate on nickel, rare earths, maritime security, space, agriculture, health and disaster relief.
- Joint development of Sabang Port, 160 km from India's planned Great Nicobar port, strengthens access near the Malacca Strait.
- Australia adopted a Joint Declaration on Defence and Security Cooperation and a Maritime Security Collaboration Roadmap.
- AUSINDEX, Malabar and Talisman Sabre exercises support interoperability. Cooperation covers cybersecurity, counterterrorism, defence technology, solar energy, green hydrogen, lithium, cobalt, education and ECTA-supported trade.
- New Zealand established a Strategic Partnership and Roadmap to 2030 covering defence, trade, education, technology and maritime cooperation.

Space for Notes

Trade, Energy and Supply Chains:

- India–New Zealand merchandise trade totalled $1.3 billion in 2024–25; Indian exports were about $711 million. The proposed FTA offers duty-free access across New Zealand's tariff lines while shielding sensitive Indian sectors such as dairy.
- Textiles, garments, leather and handicrafts previously faced duties up to 10%. Digital certificates, faster customs, regulatory cooperation and rules-of-origin compliance can reduce tariff and non-tariff barriers.
- Easier professional mobility and a proposed $20 billion investment over 15 years can expand services and investment.
- Australia holds over one-fourth of known uranium reserves. The 2014 civil nuclear agreement entered into force in 2015 after India's 2008 NSG waiver; IAEA safeguards restrict imports to civilian facilities.

Constraints and Priorities:

- Regional instability, weak Northeast infrastructure, delayed Myanmar connectivity and shifting US priorities impede implementation.
- India must modernise defence industry, complete connectivity projects, deepen ASEAN trade and preserve inclusive cooperation.

Conclusion:

India's Indo-Pacific strategy combines partnerships, de-risking and strategic autonomy. Its success requires implementation, domestic reform, resilient supply chains and management of trade sensitivities. ASEAN centrality and flexible cooperation can protect India's interests without creating a rigid military alliance.

Mains Practice Question:

Q. Evaluate the significance of India's emerging defence and maritime partnerships with Indonesia, Australia and New Zealand. How can these partnerships strengthen security in the Indo-Pacific without creating a rigid military alliance? **(15 marks, 250 words)**

2.2. NATO's Ankara Summit: Warning Signals for India

Context:

Recently, leaders of 32 North Atlantic Treaty Organization members met at the **Ankara Summit** on July 7–8, 2026. Their plans to increase defence spending and military production may strain global weapon supplies, creating serious concerns for India's defence preparedness.



Space for Notes

Explanation:

NATO's Changing Strategic Role:

- **Evolving purpose:** NATO shifted from containing the Soviet Union to Balkan operations and counterterrorism.
- **Renewed rivalry:** It now prioritises **collective defence** amid Russia's aggression and growing Russia–China cooperation.
- **Expansion debate:** Russia sees eastward expansion as threatening, while NATO considers enlargement necessary for European security.

> **Finland** and **Sweden** joined NATO as its 31st and 32nd members respectively, while Ukraine remains outside NATO.

Ankara Commitments:

- Members reaffirmed **Article 5**, supported Ukraine and promised higher spending, technological innovation and industrial expansion.
- The summit aimed to convert political promises into military capability through investment and production.

Competition for Limited Supplies:

- **Limited production**: Europe cannot quickly produce enough missiles and ammunition. Its **dependence on American suppliers** makes European and Asian buyers compete for limited supplies.
- **Operation Epic Fury:** The United States reportedly fired over 850 Tomahawk missiles **against Iran**, while annual production was only 85.
- Modern conflicts consume weapons faster than factories replace them, transforming arms trade into a **sellers' market.**

Implications and Way Forward for India:

- India may face higher prices, delayed deliveries and weaker bargaining power for imported weapons and critical components.
- **Delayed** American General Electric **F404 engines for Tejas** show how one imported component can disrupt an indigenous programme.
- India should **strengthen domestic capacity** in propulsion, ammunition, drones, electronics, artificial intelligence, cyber systems and electronic warfare.
- **Self-reliance** should ensure control over critical technologies, upgrades and wartime supplies, supported by selective foreign partnerships.

Conclusion:

NATO's defence revival may strengthen Western security but strain global weapon supplies. India must combine domestic capability with partnerships to preserve military preparedness and strategic autonomy.

Mains Practice Question:

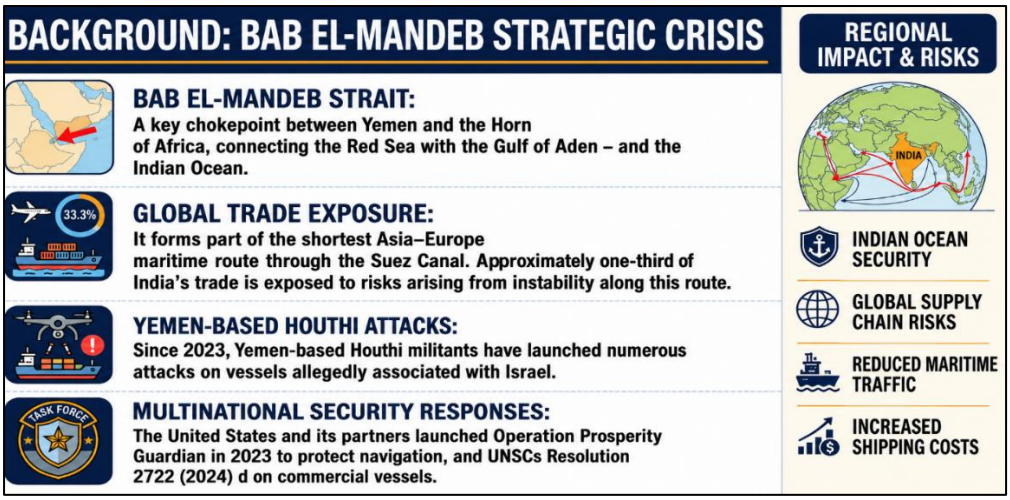
Q. "The growing demand for weapons has transformed the international arms market into a sellers' market." Analyse its implications for India's defence preparedness and strategic autonomy. **(15 marks, 250 words)**

2.3. Protection of maritime trade and freedom of navigation in the Red Sea

Context:

Renewed threats to commercial shipping through the **Bab el-Mandeb Strait** have raised concerns for India's trade, supply chains and seafarers. Its disruption, alongside tensions around the Strait of Hormuz, could expose India to simultaneous shocks across two critical maritime chokepoints.

Space for Notes



Explanation:

Economic and Human-Security Risks:

- Nearly one-third of India's trade is vulnerable to disruptions along this route.
- Diversion around the **Cape of Good Hope** raises freight, fuel and insurance costs while delaying critical imports.
- Restrictions on deploying Indian mariners could affect the employment and welfare of thousands of seafarers.
- Prolonged insecurity would also reduce Suez Canal revenues and disturb global supply chains.

Geopolitical Constraints:

- Strategic rivalry and divisions within the UN Security Council limit effective collective action.
- Regional countries differ over the Gaza conflict and participation in Western-led coalitions.
- The simultaneous Hormuz crisis could stretch international naval capabilities and intensify India's economic exposure.

Implications for India:

- Simultaneous disruption at the **Strait of Hormuz** and Bab el-Mandeb would endanger India's energy and trade security.
- Restrictions on deploying Indian mariners through high-risk waters could affect the employment and welfare of thousands of seafarers.
- Continued instability would weaken India's connectivity with Europe and undermine its ambition to become a major maritime and trading power.

Way Forward:

- India should establish a theatre-specific **Trade Protection Task Force** with France, Japan and other willing partners.
- Egypt and Saudi Arabia should be engaged because their economic interests are directly affected.
- The **Information Fusion Centre–Indian Ocean Region** can provide maritime-domain awareness.
- Participating navies should adopt common rules of engagement and escort vulnerable commercial vessels.
- India should combine naval preparedness with diplomacy under its **SAGAR - Security and Growth for All in the Region vision.**

Space for Notes

Conclusion:
Securing Bab el-Mandeb is essential for India's economic resilience and freedom of navigation. A cooperative, rules-based response under the **SAGAR vision** can protect trade without drawing India into rigid military alliances.

Mains Practice Question:
Q. "Maritime-security crises are simultaneously challenges of trade security, energy security and human security." Discuss with reference to the instability in the Red Sea.
(15 marks, 250 words)

2.4. AI Governance and India's Global South Role

Context:
Recently, India hosted the **India Artificial Intelligence (AI) Impact Summit 2026** in New Delhi with the theme "People, Planet, Progress". The summit aimed to bring Global South concerns, such as equity, inclusion and real-world AI harms, into global AI governance debates.



Explanation:
India's Original Opportunity:
- India used the summit to highlight Global South concerns such as user safety, inclusion, regulatory capacity and unequal access to technology.
- The summit drew large participation and produced a declaration endorsed by many countries.
- This gave India a chance to lead a fairer AI governance agenda centred on real-world impact.

Shift Towards Middle Power Politics:
- India later began presenting itself as a "middle power" in AI diplomacy.
- This position may help attract investment and technology partnerships.
- However, it may weaken India's image as a Global South leader.
- India's colonial past, low per capita realities and development challenges still connect it strongly with developing countries.

Pax Silica and Strategic Autonomy:
- India joined Pax Silica during the summit period, signalling closer alignment with the United States-led technology bloc.
- This may support India's access to semiconductor and AI supply chains.
- However, it also raises concerns that India may accept a pro-innovation regulatory approach at the cost of strategic autonomy.

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Risk of AI Dependence:

- India may become mainly a market for foreign AI systems rather than a rule-maker.
- Indian data, labour, minerals, land, water and electricity may support foreign technology companies.
- Data centres have already raised concerns over land, power, water and local community impacts.
- India's foundational AI model capacity remains limited, while semiconductor development is still focused on lower-value assembly.

Way Forward:

- India should use the **United Nations (UN) Global Dialogue on AI** to rebuild a Global South-centred agenda.
- It should promote cooperation on data, compute, standards, protocols and governance.
- Domestic AI ecosystems, user safety, consumer protection, skilling and regulatory capacity must be strengthened.
- AI development should serve public purpose and protect local communities from harm.

Conclusion:

India faces a choice between becoming a market for foreign AI and leading fair AI governance. Its strength lies in combining technical capacity with Global South credibility. AI policy must protect people, build domestic capability and preserve strategic autonomy.

Mains Practice Question:

Q. "India's technological ambitions need not come at the cost of its leadership role in the Global South." Discuss in the context of emerging global AI governance.

(10 marks, 150 words)

2.5. US Restrictions on Frontier AI: Two Possible Outcomes

Context:

Recently, the US company Anthropic developed advanced AI models such as Claude Fable and Claude Mythos. The US government temporarily directed the company to restrict access outside America, affecting users worldwide, including India. This showed that one government can influence global access to an important technology. It raised a concern: can advanced AI become a geopolitical weapon, and should India depend on foreign-controlled models?

Explanation:



Space for Notes

View 1: AI May Not Automatically "Trickle Down"

A Lasting Technology Gap May Develop:

- Some assume that every new technology eventually becomes cheaper and reaches all countries.
- However, AI improves rapidly. By the time India receives an older model, advanced countries may already be several generations ahead.
- Temporary restrictions can therefore create a long-term technological disadvantage.

AI Can Become a Strategic Weapon:

- Countries already use control over vaccines, energy, critical minerals and semiconductor chips as leverage.
- AI is especially important because it affects defence, governance, healthcare, finance, education and scientific research.
- Access may be withdrawn, made expensive or linked to political conditions.

Risks for India:

- India has strong software talent but lacks sufficient advanced chips, computing power, research funding and university–industry cooperation.
- Dependence on American models creates the risk of sudden denial of access.
- Chinese open models may be cheaper, but they raise concerns about security, data control and political influence.

View 2: US Gatekeeping Will Accelerate AI Diffusion:

Restrictions Will Create Alternatives:

- Countries denied access will invest in their own AI models, chips and computing systems.
- US chip controls have already pushed China to strengthen domestic production.
- Similar AI restrictions may encourage China, Europe, Japan and developing countries to build independent systems.

Open Models May Spread Faster:

- Chinese companies are promoting cheaper open or open-weight AI models.
- Countries may adopt them if American models become restricted or unreliable.
- Thus, US controls may unintentionally increase China's technological influence.

America May Lose Trust:

- Even US allies may feel that American technology cannot be treated as permanently reliable.
- They may diversify towards domestic, European, Japanese or Chinese systems.
- Software, knowledge and skilled workers are also harder to control than physical goods.

Common Conclusion: What Should India Do?

Both views agree that India should not depend entirely on foreign AI companies. India must build a **sovereign AI ecosystem** through:

- Advanced chips and national computing capacity;
- Data centres, reliable electricity and secure cloud systems;
- Indian-language datasets and indigenous foundation models;
- Skilled researchers, long-term finance and strong research institutions;
- Cybersecurity, data protection and diversified international partnerships.

India can cooperate internationally, but its essential systems should not stop functioning because of a decision taken abroad.

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Conclusion:

The two views differ on whether US restrictions will preserve American dominance or create new AI centres. For India, the lesson is clear: foreign technology can support development, but indigenous capability is essential for technological security and strategic autonomy.

Mains Practice Question:

Q. What constitutes a sovereign AI ecosystem? Suggest how India can build indigenous capabilities while continuing to benefit from international technological cooperation.

(15 marks, 250 words)

2.6. India–Japan Relations: Trade, Technology and Strategic Cooperation

Context:

Japanese Prime Minister Sanae Takaichi is visiting India for the **16th India–Japan Annual Summit**. The visit aims to deepen bilateral cooperation in trade, investment, technology, critical minerals, defence and the Indo-Pacific amid global supply-chain disruptions and evolving geopolitical challenges.

Explanation:

Evolution of Relations:

- India–Japan relations began as a **Global Partnership** in 2000, became a **Strategic and Global Partnership** in 2006, and were upgraded to a **Special Strategic and Global Partnership** in 2014.

Trade and Investment:

- Bilateral trade reached about **$27.5 billion in 2025–26**.
- Nearly **1,400 Japanese companies** operate in India, and about half are engaged in manufacturing.
- Japan is a major investor in India and supports infrastructure, industrial and financial projects.



Technology and Economic Security:

- Both countries are cooperating in semiconductors, critical minerals, **Artificial Intelligence (AI)** and advanced manufacturing.
- Japan offers capital, technology and industrial experience, while India provides a large market, skilled workers and manufacturing potential.
- This cooperation can reduce excessive dependence on China-centred supply chains.

Strategic and Defence Cooperation:

- India and Japan support a **free, open and rules-based Indo-Pacific**, freedom of navigation and respect for international law.

Space for Notes

- Both are members of the **Quadrilateral Security Dialogue (Quad)** along with the United States and Australia.
- Defence exercises, maritime cooperation and strategic coordination have expanded.
- Their partnership also acts as a balance to China's growing influence in the region.

Cooperation in the North-East:

- Japan is the only country with which India has a special mechanism for the North-East, called the **India–Japan Act East Forum**.
- It supports projects in roads, agriculture, tourism, skills and connectivity.

Wider Areas of Cooperation:

- Cooperation also covers mobility, environment, healthcare, people-to-people exchanges and regional development.
- State-prefecture ties, student exchanges and professional mobility are gradually expanding.

Conclusion:

India–Japan relations now extend beyond trade and infrastructure to technology, security and supply-chain resilience. Their cooperation is important for economic growth and regional stability.

Mains Practice Question:

Q. India and Japan possess complementary strengths in capital, technology, labour and markets. Examine how these complementarities can promote resilient supply chains and economic security. **(15 marks, 250 words)**

2.7. U.S.–Saudi Arabia Civil Nuclear Cooperation Agreement

Context:

The United States has announced a civil nuclear cooperation agreement with Saudi Arabia, subject to safeguards and Saudi–Israel normalisation. The possibility of domestic uranium enrichment has raised concerns regarding nuclear proliferation and a regional arms race.

Explanation:



- Civil nuclear agreements permit cooperation in nuclear reactors, fuel, technology, training and electricity generation for peaceful purposes.
- **Uranium enrichment** increases the concentration of fissile **uranium-235**; higher enrichment levels create greater proliferation risks.
- The **IAEA safeguards system** uses inspections, surveillance and nuclear-material accounting to prevent diversion towards weapons.
- Saudi Arabia is a **non-nuclear-weapon State** under the **Nuclear Non-Proliferation Treaty (NPT)** and retains the right to peaceful nuclear energy subject to safeguards.
- The United States generally concludes nuclear cooperation arrangements under **Section 123 of the U.S. Atomic Energy Act**.
- Restrictions on **enrichment and reprocessing** are crucial because both are sensitive dual-use technologies.

Space for Notes

- The proposed agreement is linked with the **Abraham Accords** and Saudi–Israel normalisation.
- Critics fear that enrichment capability could intensify strategic rivalry involving **Saudi Arabia, Iran and Israel**.

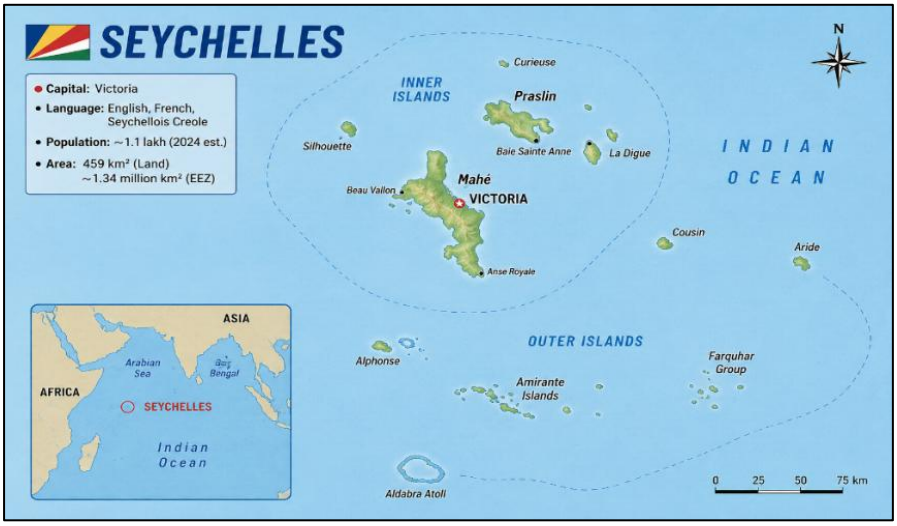
2.8. India–Seychelles Relations and the Indian Diaspora

Context:

Prime Minister Narendra Modi is visiting Seychelles, highlighting the importance of the Indian diaspora, maritime cooperation and India's role as a key development partner in the Indian Ocean Region. The visit is expected to further strengthen bilateral ties under India's SAGAR/MAHASAGAR vision.

Explanation:

- Seychelles is an archipelagic island nation in the Western Indian Ocean, strategically located along important Sea Lanes of Communication (SLOCs).
- Indians first migrated to Seychelles in the 18th century, and today the Indian diaspora (PIOs/NRIs) forms about 5% of its population, mainly of Gujarati and Tamil origin.
- India established diplomatic relations with Seychelles after its independence in 1976 and has remained a major development and security partner.
- Seychelles occupies an important place in India's Neighbourhood First Policy, Vision SAGAR (Security and Growth for All in the Region) and the broader MAHASAGAR (Mutual and Holistic Advancement for Security and Growth Across Regions) initiative.
- Bilateral cooperation covers maritime security, anti-piracy operations, counter-terrorism, Exclusive Economic Zone (EEZ) surveillance, capacity building, defence training, healthcare, education and infrastructure development.



2.9. Pax Silica and India's Technology Supply-Chain Strategy

Context:

Recently, India joined 35 other countries in signing the United States-led Pax Silica initiative at its second summit in Washington. The initiative seeks to build secure supply chains for critical minerals, semiconductors, Artificial Intelligence (AI) and digital infrastructure. India expects it to attract investment, reduce import dependence and strengthen domestic manufacturing.

Space for Notes



Explanation:

What Is Pax Silica?

- "Pax" means peace, stability and long-term prosperity, while "Silica" refers to the source material used to produce silicon.
- Pax Silica is a strategic partnership covering critical minerals, energy inputs, advanced manufacturing, semiconductors, AI infrastructure and logistics.
- India joined the initiative in February 2026 at the AI Impact Summit in New Delhi, after not being part of its founding group in December 2025.

Why Was It Created?

- China has periodically restricted rare-earth exports, signalling willingness to use supply chains as geopolitical leverage.
- The COVID-19 semiconductor shortage exposed the risks of single-source supply chains.
- Controlling the silicon supply chain increasingly determines leadership in AI.

Importance for India:

- India depends heavily on imports for semiconductors, rare-earth processing and advanced technology components.
- Pax Silica can attract capital, technology and skills from trusted partners.
- It can support domestic value addition and help India become part of global supply-chain diversification away from China.
- It may also strengthen India's limited large-scale AI and semiconductor infrastructure.

What Rare-Earth Data Shows:

- India has about 6.9 million tonnes of rare-earth reserves, but produced only around 4,200 tonnes of rare-earth oxides annually during 2020–22.
- China had about 44 million tonnes of reserves and produced nearly 210,000 tonnes in 2022.
- This shows that reserves alone are insufficient; mining, separation, refining and manufacturing capacity are equally important.

Related Indian Initiatives:

- India joined the Minerals Security Partnership (MSP) in 2023 to support secure critical-mineral supply chains.
- It launched the National Critical Mineral Mission in 2025.
- India and the US have also signed a bilateral critical-minerals framework.
- India plans to build 6,000 metric tonnes per annum of Rare Earth Permanent Magnet (REPM) capacity.

Space for Notes

Conclusion:

Pax Silica can help India strengthen its mineral, semiconductor and AI supply chains. Its success will depend on domestic processing, technology, investment and environmentally responsible production.

Mains Practice Question:

Q. Why have critical minerals and semiconductor supply chains acquired strategic significance in contemporary geopolitics? Explain with reference to the Pax Silica initiative. **(10 marks, 150 words)**

2.10. China's Export Controls on EU Entities Amid Russia Sanctions

Context:

China has imposed export controls on 14 European Union entities in retaliation for the EU's sanctions on Chinese firms allegedly supporting Russia's war effort in Ukraine.

Explanation:

- **Export controls** are government restrictions on the export of specified goods, technology or software for **national security, foreign policy or non-proliferation** purposes.
- **Dual-use items** are goods, software or technologies with **both civilian and military applications**, such as advanced electronics, drones, semiconductors and machine tools.
- The European Union has imposed sanctions on entities allegedly aiding Russia in its war against Ukraine, including firms outside Russia.
- **Sanctions** include asset freezes, export restrictions, financial measures and trade prohibitions to influence state behaviour.
- China cites **national security** and **non-proliferation obligations** to justify its export controls while responding to the EU's measures.
- Such retaliatory actions can disrupt **global supply chains**, strategic industries and international trade in sensitive technologies.

2.11. India Opposes Plurilateral Agreements within the WTO Framework

Context:

During India's WTO Trade Policy Review, several members questioned its opposition to plurilateral agreements on e-commerce and investment facilitation

Explanation:



- The **World Trade Organization (WTO)** is based on **multilateralism**, where agreements generally apply to all members.
- The World Trade Organization (WTO) is headquartered in **Geneva, Switzerland**.
- **Plurilateral agreements** are negotiated by a limited group and bind only participating members.
- India argues that their incorporation into WTO law requires **consensus**.

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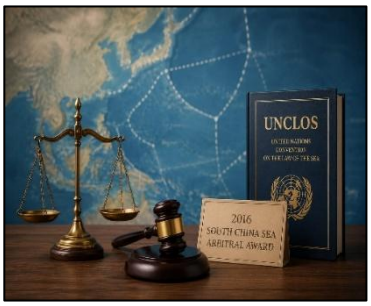
- The **Marrakesh Agreement** permits plurilateral agreements under **Annex 4**.
- India opposes the **Investment Facilitation for Development Agreement**, as investment is not considered a core trade issue.
- It has also questioned interim arrangements for the **Agreement on Electronic Commerce**.

2.13. 2016 South China Sea Arbitral Award and UNCLOS

Context:

The European Union and 14 countries have reaffirmed the 2016 South China Sea arbitral ruling, declaring China's expansive maritime claims inconsistent with international law. China has rejected the ruling, maintaining that it is "null and void" and has no binding effect.

Explanation:



- The South China Sea is a strategically important water body connecting the Pacific and Indian Oceans, through which nearly one-third of global maritime trade passes.
- China claims most of the sea through the **Nine-Dash Line**, overlapping with the **Exclusive Economic Zones (EEZs)** of countries such as the Philippines, Vietnam, Malaysia, Brunei, and Indonesia.
- In 2013, the Philippines initiated arbitration under Annex VII of the **United Nations Convention on the Law of the Sea (UNCLOS),** 1982.
- In 2016, the **Permanent Court of Arbitration (PCA),** The Hague, ruled that China's Nine-Dash Line has no legal basis under UNCLOS and that several disputed features are rocks or low-tide elevations, not full islands generating EEZs.
- UNCLOS defines Territorial Sea (12 nautical miles), Contiguous Zone (24 nautical miles), Exclusive Economic Zone (200 nautical miles), and Continental Shelf, forming the legal basis for maritime rights.
- The dispute highlights issues of freedom of navigation, rules-based international order, maritime security, and peaceful dispute settlement under international law.

2.14. 'Hummus Trail' and Universal Jurisdiction under the Geneva Conventions

Context:

A complaint has been filed in India seeking action against a former Israeli soldier visiting Himachal Pradesh for alleged war crimes committed in Gaza. The case has brought attention to the **'Hummus Trail'**, a popular travel route for Israeli tourists in India, and raised questions about India's obligations under the **Geneva Conventions** and the principle of **universal jurisdiction**.

Explanation:

- The **'Hummus Trail'** refers to popular destinations in India frequently visited by **Israeli tourists**, especially after completing their mandatory military service.
- Common destinations include **Kasol, Dharamkot, Rishikesh, Pushkar, Goa, Hampi, Varanasi and Kodaikanal**.

Space for Notes

- India is a **State Party to the four Geneva Conventions (1949)** and enacted the **Geneva Conventions Act, 1960** to implement them.
- The Act criminalises **grave breaches (war crimes)** such as wilful killing of civilians and attacks on protected persons.
- **Universal jurisdiction** allows a country to investigate or prosecute certain grave international crimes **irrespective of where they were committed or the nationality of the accused**.
- If prosecution is not feasible, authorities may initiate **deportation or cooperate with other jurisdictions** under international law.

2.15. India Expands LNG Regasification Capacity: IGU World LNG Report 2025

Context:

According to the **International Gas Union (IGU) World LNG Report 2025**, India added **52.5 million tonnes per annum (MTPA)** of LNG regasification capacity across eight terminals, surpassing Spain to become the **world's fourth-largest regasification market**. The expansion supports India's strategy to increase the share of natural gas in its energy mix.

Explanation:



- **Liquefied Natural Gas (LNG)** is **natural gas cooled to about −162°C**, reducing its volume for economical storage and transportation.
- **Regasification Terminal** converts imported **LNG back into gaseous form** before supplying it through the **natural gas pipeline network**.
- **International Gas Union (IGU)** is a global organisation promoting sustainable development of the natural gas industry through the **World LNG Report**.
- **MTPA (Million Tonnes Per Annum)** is the standard unit for measuring LNG handling and regasification capacity.
- India aims to increase the **share of natural gas in the primary energy mix to 15% by 2030** (from around 6–7% currently) through **City Gas Distribution (CGD)**, industrial use, fertilizers, and power generation.
- Major LNG terminals include **Dahej (Gujarat), Hazira, Kochi, Ennore, Dabhol, Mundra, Jaigarh, and Chhara**.

2.16. China's Ban on Helium Exports and Its Strategic Significance

Context:

China has temporarily banned helium exports amid tightening global supply conditions and rising geopolitical tensions. The move is expected to worsen global helium shortages, affecting critical sectors such as semiconductors, healthcare, aerospace, and quantum technologies.

Space for Notes

Explanation:



- **Helium (He)** is a **noble gas (Group 18)** with the **lowest boiling point (-269°C)**, making it indispensable as a **cryogenic coolant**.
- It is a **non-renewable natural resource**, produced through the **radioactive decay of uranium and thorium** in the Earth's crust and extracted mainly from **natural gas fields**.
- Major producers include the United States, Qatar, Russia, Algeria, and Canada, while China produces only a small share but is a major consumer.
- Helium is a critical mineral due to its irreplaceable role in MRI scanners, semiconductor wafer fabrication, aerospace, quantum computing, leak detection, fibre-optic manufacturing, and scientific research.
- Storage and transport are expensive because helium liquefies only at **ultra-low temperatures**, requiring **vacuum-insulated cryogenic containers** with minimal leakage.
- Supply disruptions expose the vulnerability of global critical supply chains, highlighting the importance of strategic reserves, resource security, and supply-chain diversification.

MCQs

1. With reference to India's Indo-Pacific initiatives, consider the following statements:

1. SAGAR focuses on security and growth in the Indian Ocean region.
2. The Indo-Pacific Oceans Initiative promotes practical cooperation in areas such as maritime security and disaster-risk reduction.
3. The Quad is a treaty-based collective-defence alliance.

Which of the statements given above are correct?

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

2. Consider the following pairs:

Exercise	Participating partner mentioned
1. AUSINDEX	Australia
2. Malabar	Japan
3. Talisman Sabre	Indonesia

How many of the pairs given above are correctly matched?

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

3. With reference to the North Atlantic Treaty Organization (NATO), consider the following statements:

1. NATO currently has 32 member countries.
2. Article 5 embodies the principle of collective defence.
3. Invocation of Article 5 automatically places the armed forces of all members under a unified NATO command.

Which of the statements given above are correct?

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

4. Consider the following pairs:

Maritime passage	Water bodies connected
1. Bab el-Mandeb	Red Sea and Gulf of Aden
2. Strait of Hormuz	Persian Gulf and Gulf of Oman
3. Suez Canal	Mediterranean Sea and Red Sea

How many of the pairs given above are correctly matched?

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

5. India and Japan are both members of which of the following groupings?

1. Quadrilateral Security Dialogue
2. Group of Twenty
3. East Asia Summit
4. Shanghai Cooperation Organisation

Select the correct answer using the code given below:

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

Space for Notes

Answers

1. Answer: (a)
2. Answer: (b)
3. Answer: (a)
4. Answer: (d)
5. Answer: (c)

Space for Notes

3. Economy

3.1. India as the World's Office: Rise of Global Capability Centres

Context:

Recently, India's Global Capability Centre ecosystem crossed 2,100 centres and employed nearly 23 lakh professionals. These centres now earn close to $100 billion every year. Their rise shows India's strength in high-value services, but it also exposes weak manufacturing growth and regional concentration.



Explanation:

Why India Became the "World's Office"?

- India has a large pool of English-speaking engineers, managers and finance professionals.
- Labour costs are lower than in many developed countries.
- India also has a strong Information Technology (IT) sector and digital infrastructure.
- These advantages attracted foreign companies to set up their own offices (GCCs).
- China became the "world's factory" through manufacturing. India became the "world's office" through services.

Changing Nature of GCCs:

- Earlier, GCCs mainly handled data entry, accounting and customer support.
- Today, many develop software platforms and digital products.
- They also conduct engineering research, clinical research and Artificial Intelligence-based drug discovery.
- This shift has increased the quality and value of work done in India.
- It has also improved skill development and knowledge transfer.

Economic Importance:

- GCCs create high-paying jobs and bring foreign exchange.
- They strengthen India's services exports.
- India has a large merchandise trade deficit because goods imports exceed goods exports.
- At the same time, India earns a strong surplus from services trade.
- This surplus helps reduce pressure on the overall external account.

Space for Notes

Major Concerns:

- GCC jobs mainly benefit highly skilled and educated workers.
- They cannot provide enough jobs for India's large less-skilled workforce.
- Most GCCs are concentrated in Bengaluru, Hyderabad, Chennai, Pune, Mumbai and Delhi-National Capital Region.
- Smaller cities often lack airports, office space, transport and skilled workers.
- Heavy dependence on foreign companies also creates risks during global recessions or corporate restructuring.

Way Forward:

- Tier-2 and Tier-3 cities need better universities, transport and digital infrastructure.
- India should link GCCs with domestic start-ups, research institutions and local suppliers.
- Labour-intensive sectors such as textiles, leather and food processing must also grow.
- India needs both high-skill services and large-scale manufacturing jobs.

Conclusion:

India's rise as the world's office is a major economic strength. However, services alone cannot meet its employment and regional development needs. India must expand GCC-led innovation while strengthening labour-intensive manufacturing. A balanced model will make growth more inclusive, resilient and widely shared.

Mains Practice Question:

Q. Global Capability Centres strengthen India's services exports but cannot by themselves resolve its employment challenge. Critically examine. **(15 marks, 250 words)**

3.2. U.S. Section 301 Tariffs, Forced Labour Rules and India–U.S. Trade

Context:

The United States has imposed a **10% Section 301 tariff** on imports from India—lower than the 12.5% rate proposed earlier—after India amended its Foreign Trade Policy to prohibit imports of goods produced using forced labour. The move comes amid ongoing India–U.S. trade negotiations and a U.S. review under Section 301 of the U.S. Trade Act.

Explanation:

- **Section 301 of the U.S. Trade Act, 1974** empowers the **United States Trade Representative (USTR)** to investigate and act against unfair foreign trade practices that burden U.S. commerce.
- It allows the U.S. to impose additional tariffs, import restrictions or other trade measures against countries found violating fair trade principles.
- **Forced labour** refers to work extracted under coercion, threats or without voluntary consent, as defined by the **International Labour Organization (ILO) Forced Labour Convention, 1930 (No. 29).**
- India recently amended its Foreign Trade Policy (FTP) through the Directorate General of Foreign Trade (DGFT) to prohibit the import of goods produced wholly or partly using forced labour.
- The amendment aligns India's trade regime with global **ESG (Environmental, Social and Governance)** standards and responsible supply-chain practices.

- **Most Favoured Nation (MFN)** under the WTO requires members to extend any tariff concession granted to one trading partner equally to all WTO members unless covered by permitted exceptions such as FTAs or customs unions.
- The policy shift may strengthen India's credibility in global value chains and support ongoing India–U.S. trade negotiations.

Space for Notes

3.3. Government Revises Index of Core Industries (ICI) with New Base Year and Expanded Coverage

Context:

The Union Government has released a revised series of the Index of Core Industries (ICI) by changing the base year to 2022–23, expanding sectoral coverage and updating weights.

Explanation:

- The **Index of Core Industries (ICI)** measures the performance of core infrastructure sectors, which together have significant weight in the **Index of Industrial Production (IIP).**
- The base year has been revised from 2011–12 to 2022–23 to reflect the current industrial structure.
- The number of sectors has increased from eight to nine with the inclusion of the iron ore sector.
- The revised ICI now measures output on a gross output basis and updates sectoral weights in line with the revised IIP methodology.
- The coal sector now **excludes washed coal** and counts only raw coal to avoid double counting.
- The ICI is compiled monthly by **the Office of the Economic Adviser (OEA),** Department for Promotion of Industry and Internal Trade **(DPIIT),** Ministry of Commerce & Industry.

3.4. Union Cabinet Approves Semicon 2.0, Mobile Manufacturing, Urea Expansion and National Highway Projects

Context:

The Cabinet Committee on Economic Affairs (CCEA), chaired by the Prime Minister, approved the second phase of the India Semiconductor Mission (Semicon 2.0), an expanded Mobile Phone Manufacturing Scheme (MPMS), establishment of nine new gas-based urea plants, and two major National Highway projects in Varanasi.

Explanation:

- **Cabinet Committee on Economic Affairs (CCEA)** approves major economic and infrastructure projects.
- The CCEA is an **extra-constitutional body**, framed under **Article 77 of the Constitution**.
- **India Semiconductor Mission (ISM)** aims to build a domestic semiconductor ecosystem covering chip design, fabrication, packaging, minerals, gases, and R&D to reduce import dependence.

Space for Notes

- **Mobile Phone Manufacturing Scheme (MPMS)** promotes domestic value addition, local sourcing, exports, and employment under the **Make in India** initiative.
- **National Investment Policy (NIP)** for urea encourages private investment to enhance indigenous fertilizer production and reduce imports.
- **Hybrid Annuity Model (HAM)** is a PPP model where project cost is shared between the government and the private developer, reducing financial risk.



3.5. Global Bids Invited under PLI Scheme for 10 GWh Advanced Chemistry Cell (ACC) Batteries

Context:

The Ministry of Heavy Industries has invited global bids to establish **10 GWh Advanced Chemistry Cell (ACC) battery manufacturing capacity** under the Production Linked Incentive (PLI) Scheme.

Explanation:



- **Advanced Chemistry Cell (ACC)** batteries are next-generation rechargeable batteries with high energy density, long life, and improved safety, used in **Electric Vehicles (EVs)** and **Battery Energy Storage Systems (BESS)**.
- The **Production Linked Incentive (PLI) Scheme** provides financial incentives linked to incremental production to promote domestic manufacturing and global competitiveness.
- ACC batteries enable large-scale storage of electricity generated from **renewable energy** sources like solar and wind, ensuring grid stability.
- The scheme supports **Make in India**, **Atmanirbhar Bharat**, **energy security**, import substitution, and the development of a domestic battery manufacturing ecosystem.

3.6. India's Container Shipping Vulnerability and Domestic Container Manufacturing

Context:

Recent global shipping disruptions, particularly around the **Strait of Hormuz** and **Red Sea**, have exposed India's dependence on foreign-owned containers and shipping lines. In response, the Government has launched initiatives to boost **domestic container manufacturing** and strengthen India's maritime logistics resilience.

Explanation:

- A **shipping container Twenty-foot Equivalent Unit (TEU)** is a standardized cargo unit enabling **intermodal transport** by ships, rail, and trucks.
- India relies heavily on **foreign shipping lines**, which carry nearly **90 to95% of India's EXIM (Export-Import) cargo**, making supply chains vulnerable to global disruptions.

Space for Notes



- Geopolitical chokepoints such as the **Strait of Hormuz**, **Bab el-Mandeb**, and the **Suez Canal** significantly affect freight costs, transit time, and container availability.
- The Union Budget 2026–27 announced a ₹10,000 crore Container Manufacturing Scheme to enhance domestic production and reduce import dependence.
- India is also promoting an indigenous container shipping ecosystem through the proposed **Bharat Container Shipping Line**, alongside port-led logistics under the **PM Gati Shakti** and **Sagarmala Programme**.
- Strengthening maritime logistics is essential for trade competitiveness, supply chain resilience, export growth, and economic security.

3.7. Women's Employment in Indian Cities

Context:

India's latest Periodic Labour Force Survey (PLFS) shows that large cities provide more salaried employment and better wages than rural areas. However, despite these opportunities, women's labour force participation in urban India remains significantly lower than men's due to barriers such as unsafe mobility, unpaid care work, gender discrimination, and limited access to finance.



Explanation:

What does the latest PLFS data reveal?

- India's 46 million-plus cities offer better quality employment than the national average.
- Around **65% of employed women in these cities work in salaried jobs**, compared to nearly half nationally.
- Women employed in cities also receive relatively higher wages and better employment benefits.
- Yet, **only about one-fourth of urban women participate in the labour force**, showing that access - not availability - is the major challenge.

Why are cities not attracting more women into employment?

A. **Safety and Mobility Constraints:**
   - Women often face harassment while commuting through buses, metro stations and public spaces.
   - Poor street lighting, unsafe last-mile connectivity and unreliable public transport discourage regular travel.
   - Many women reject employment opportunities located far from home due to safety concerns.

Space for Notes

B. High Burden of Unpaid Care Work:
   - Women continue to shoulder childcare, eldercare and household responsibilities.
   - Limited availability of affordable childcare facilities increases the opportunity cost of employment.
   - Career interruptions after childbirth reduce long-term career progression.

C. Gender Discrimination in Labour Markets:
   - Women experience unequal hiring practices, lower wages and slower promotions.
   - Employers often assume women will take career breaks for caregiving.
   - Persistent gender stereotypes reduce women's access to leadership positions.

D. Restrictive Social Norms:
   - Many families still expect women to prioritise domestic responsibilities over paid employment.
   - Working late hours or travelling independently is often socially discouraged.
   - These norms reduce women's ability to fully utilise urban employment opportunities.

E. Limited Access to Finance and Entrepreneurship:
   - Women entrepreneurs face greater difficulty obtaining formal credit.
   - Lower ownership of assets and weaker financial networks limit business expansion.
   - Consequently, many women-owned enterprises remain small despite urban market opportunities.

Conclusion:

Indian cities have successfully generated better jobs but have not yet become equally accessible workplaces for women. Improving urban safety, affordable childcare, gender-sensitive workplaces, reliable public transport and financial inclusion can transform cities into engines of inclusive growth and significantly raise women's workforce participation.

Mains Practice Question:

Q. Unpaid care work and unsafe mobility are major structural constraints on women's economic participation in urban India. Discuss. **(15 marks, 250 words)**

3.8. India's Pesticide Regulation

Context:

Recently, concerns have intensified over India's continued use of pesticides that are banned or restricted in many countries, including paraquat, glyphosate, and 2,4-D. Rising export rejections due to pesticide residues and increasing evidence of pesticide-related health risks have brought India's regulatory framework under renewed scrutiny.



Space for Notes

Explanation:

Regulatory Challenges:

- Pesticide approval in India often relies on data given by manufacturers, not independent tests.
- Health experts have little say in deciding which pesticides are allowed.
- Some pesticides banned in many countries, like paraquat, are still legal in India.
- A national ban on paraquat is still pending before the Supreme Court.
- Doctors get little training in pesticide-related illness, so many cases go undetected.

Public Health Concerns:

- Paraquat has no known antidote and can cause kidney damage and Parkinson's disease.
- Glyphosate is called a probable cancer-causing chemical by health experts.
- 2,4-D is linked to possible cancer risk in animal studies.
- District hospitals often lack basic tests to detect pesticide poisoning.
- Health clusters have been reported in Punjab's Malwa region, Maharashtra's Yavatmal, and Kerala's Kasaragod.
- Chronic pesticide exposure may also add to India's persistent anaemia problem.

Trade and Environmental Implications:

- Between 2024 and 2026, the European Union rejected 365 Indian farm export consignments over pesticide residues.
- Nepal recently restricted Indian mango imports over similar concerns, joining Japan, the EU, and Saudi Arabia.
- Export rejections raise costs for Indian farmers and traders.
- Some pesticides, like acephate, harm bees and butterflies, affecting crop pollination.

Way Forward:

- Establish an independent scientific risk assessment mechanism for pesticide approvals.
- Include doctors and health experts in pesticide regulatory bodies.
- Strengthen toxicology laboratories and pesticide surveillance in district hospitals.
- Promote safer alternatives like Integrated Pest Management.
- Gradually align India's **Maximum Residue Limits (MRLs)** with international standards.

Conclusion:

India's pesticide policy must balance agricultural productivity, public health, and export competitiveness. Strengthening scientific regulation, improving healthcare capacity, and promoting safer farming practices can ensure sustainable agriculture while protecting both farmers and consumers.

Mains Practice Question:

Q. India's pesticide regulation must reconcile agricultural productivity with public health, environmental protection and export competitiveness. Discuss. **(10 marks, 150 words)**

3.9. Central Government Bans Paraquat Dichloride Herbicide

Context:

The Union Ministry of Agriculture and Farmers Welfare has notified a nationwide ban on paraquat dichloride due to its severe toxicity, repeated poisoning deaths and absence of a specific antidote. India joins more than 70 countries that have banned or severely restricted the herbicide.

Space for Notes

Explanation:



- Paraquat dichloride is a **non-selective herbicide** used to destroy weeds and clear fields after harvesting.
- Exposure through ingestion, inhalation or skin contact can cause serious organ damage and death.
- It has **no specific antidote**, making accidental and intentional poisoning particularly fatal.
- Pesticides are regulated under the **Insecticides Act, 1968** and the **Insecticides Rules, 1971**.
- Andhra Pradesh, Telangana, Odisha and Kerala had previously imposed bans or restrictions on it.
- The **Registration Committee** regulates their registration, manufacture, import, distribution and use.
- The ban prohibits its manufacture, import, transport, storage, distribution, sale and use.
- The draft notification allows **30 days for objections and suggestions**, following which the final prohibition may be enforced by States.

3.10. Cabinet Approves BHAVYA Rasayan Scheme for Dedicated Chemical Parks

Context:

The Union Cabinet has approved the Bharat Audyogik Vikas Yojana Rasayan (BHAVYA Rasayan) Scheme to establish three dedicated Chemical Parks with a total outlay of ₹3,030 crore during FY 2026–27 to FY 2030–31.

Explanation:



- **BHAVYA Rasayan** is a Central Sector Scheme announced in the Union Budget 2026–27 to establish **three Chemical Parks** through the Challenge Route.
- The scheme aims to strengthen India's chemical manufacturing ecosystem through world-class common infrastructure, improve global competitiveness and promote sustainable industrial growth.
- The Centre will provide up to ₹1,000 crore per park, subject to a minimum ₹500 crore contribution by the concerned State Government.
- Each Chemical Park must have at least 8 sq. km. (2,000 acres) of contiguous, encumbrance-free land with **plug-and-play infrastructure**.
- Common infrastructure includes **Common Effluent Treatment Plant (CETP),** Treatment, **Storage and Disposal Facility (TSDF),** hazardous waste management, solvent recovery, utilities, logistics and pipeline networks.
- The scheme promotes cluster-based industrial development, economies of scale, **Global Value Chains (GVCs)**, import substitution, export competitiveness, Atmanirbhar Bharat and environmentally sustainable chemical manufacturing.

Space for Notes

3.11. RBI Reconsiders Durable Polymer Banknotes

Context:
The Reserve Bank of India has invited bids for a fresh trial of polymer ₹10 banknotes, reviving an initiative first attempted in 2012–13. Polymer notes are expected to last longer, improve security and reduce recurring currency-printing costs, though import dependence remains a concern.

Explanation:
- Polymer banknotes use a durable **polypropylene-based substrate** instead of cotton-based currency paper.
- They resist water, dirt, folding and tearing, giving them a longer circulation life than paper notes.
- Longer life can lower the RBI's recurring expenditure on printing, replacement, transport and destruction of soiled notes.
- Transparent windows, holographic features and complex designs improve **anti-counterfeiting security**.
- Worn polymer notes can be granulated and recycled into useful plastic products.
- Australia first introduced modern polymer banknotes in 1988; several countries subsequently adopted them.
- India's earlier trial involved proposed circulation in selected cities with different climatic conditions.
- Import dependence for polymer sheets may affect cost, supply security and domestic self-reliance.

3.12. NSE Launches Nifty500 Ahimsa Index for Ethical and Animal-Cruelty-Free Investing

Context:
The National Stock Exchange (NSE) has launched the Nifty500 Ahimsa Index, India's first stock market index based on animal-cruelty-free investing.

Explanation:



- A **thematic index** tracks companies based on a specific investment theme rather than the overall market.
- The **Nifty500 Ahimsa Index** includes companies from the Nifty 500 that satisfy the **Ahimsa Investment Movement (AIM)** framework, developed with the **Ahimsagain Foundation**.
- The **AIM framework** classifies companies into green, orange and red bands; only green category companies are included.
- The index excludes businesses involved in animal cruelty, including meat, poultry, leather, dairy, animal testing, and related sectors.
- It may serve as a benchmark for **Exchange-Traded Funds (ETFs), Index Funds,** and other passive investment products, reflecting the growing trend of ESG and ethical investing.
- Recently, BSE also launched the **Saatvik 100 Index,** promoting companies aligned with broader Saatvik principles.

Space for Notes

3.13. Mission Golden Spice Launched to Develop Meghalaya's GI-Tagged Lakadong Turmeric

Context:

The Union Government has launched Mission Golden Spice, a ₹175.45-crore mission to strengthen the value chain of GI-tagged Lakadong Turmeric in Meghalaya.

Explanation:



- **Lakadong Turmeric** is a **Geographical Indication (GI)-tagged (2024)** turmeric grown mainly in the West Jaintia Hills and East Jaintia Hills of Meghalaya, renowned for its exceptionally high curcumin content (7–10%), compared to the global average of about 2–3%.
- **Curcumin** is the principal bioactive compound responsible for turmeric's anti-inflammatory, antioxidant and nutraceutical properties.
- The five-year project (2025–2030) aims to enhance cultivation, processing, branding and exports, positioning Lakadong turmeric as a premium global spice.
- **Mission Golden Spice** is a ₹175.45-crore, convergence-based initiative led by MDoNER and the North Eastern Council (NEC), with support from APEDA, Spices Board, National Turmeric Board, ICAR, NABARD and SFAC.
- The mission focuses on value-chain development, GI monetisation, processing, branding, exports, farmer-producer organisations and integrated curcumin extraction facilities.
- The initiative aligns with the vision of Atmanirbhar North East and promotes "Brand North East" through value addition and sustainable agricultural exports.

3.14. NITI Aayog Launches Investment Friendliness Index (IFI)

Context:

NITI Aayog has released the Investment Friendliness Index (IFI) to benchmark the investment ecosystem across States and Union Territories. The Index aims to promote competitive and cooperative federalism by encouraging reforms that improve the ease of investment and support the vision of Viksit Bharat @2047.

Explanation:

- NITI Aayog: Established in 2015, it is the Union government's policy think tank and promotes cooperation between the Centre and States.
- **The Investment Friendliness Index (IFI)** is a data-driven composite index assessing State's ability to attract and sustain investments.
- It evaluates 28 States and 8 UTs across **8 pillars**: Infrastructure, Business Climate, Resources, Government Policy, Regulatory Ease, Institutional Environment, Financial Health, and Environmental Resilience.
- The framework uses **84 indicators**, combining **secondary data** and **investor perception surveys**.

Space for Notes

- States are classified as Top Performers, Frontrunners, Emerging Performers, and Aspiring States; Gujarat, Maharashtra, Tamil Nadu, Goa, and Odisha emerged as overall Top Performers.
- The Index promotes Ease of Doing Business (EoDB), policy predictability, investor confidence, peer learning, and cooperative federalism to enhance domestic and foreign investment.

3.15. Gujarat Unveils Green Data Centre Policy 2026–29

Context:

The Gujarat Government has launched the **Data Centre Policy 2026–29** to attract investments, promote green data centres, and achieve **7.5 GW data centre capacity**. The policy offers financial incentives while mandating renewable energy use and high sustainability standards.

Explanation:



- A **Data Centre** is a facility that stores, processes and manages digital data using servers, networking equipment and cooling systems.
- **Gujarat is the eighth state** to introduce a dedicated data centre policy after Tamil Nadu, Uttar Pradesh, West Bengal, Odisha, Maharashtra, Haryana, and Andhra Pradesh.
- **Dholera Special Investment Region (SIR)** is being developed as a hub for hyperscale and AI-enabled green data centres.
- **Green Data Centres** use renewable energy, advanced cooling technologies, and energy-efficient infrastructure to reduce carbon emissions.
- **Power Usage Effectiveness (PUE)** is a key indicator of data centre energy efficiency.
- Data centres support cloud computing, Artificial Intelligence (AI), Digital India, and the digital economy.

3.16. Cabinet Approves Mobile Phone Manufacturing Scheme (MPMS)

Context:

The Union Cabinet has approved the **Mobile Phone Manufacturing Scheme (MPMS)** with a budgetary outlay of **₹62,500 crore** for five years (FY 2026–27 to FY 2030–31). The scheme aims to boost domestic value addition, strengthen supply chains, promote Indian brands, and enhance India's global competitiveness in mobile phone manufacturing.

Explanation:

- **Mobile Phone Manufacturing Scheme (MPMS)** succeeds the **PLI Scheme for Large Scale Electronics Manufacturing (PLI-LSEM)** to accelerate electronics manufacturing.
- It provides **production-linked incentives** on eligible sales, higher incentives for **domestic sourcing** of components, and additional support for **design and R&D** to develop Indian brands.

Space for Notes

- The scheme promotes **Make in India, Atmanirbhar Bharat**, technological sovereignty, and integration into **Global Value Chains (GVCs)**.
- It seeks to increase exports, generate employment, deepen domestic value addition, and strengthen India's electronics manufacturing ecosystem.

3.17. Government Mandates TReDS for Settlement of MSME Invoices by CPSEs

Context:

The Ministry of MSME has made it mandatory for all Central Public Sector Enterprises (CPSEs) to settle invoices of MSME suppliers through the Trade Receivables Discounting System (TReDS). The move aims to ensure timely payments, improve liquidity, and provide collateral-free working capital to MSMEs.

Explanation:



- Trade Receivables Discounting System (TReDS) is an RBI-regulated electronic platform that facilitates financing of trade receivables of Micro, Small and Medium Enterprises (MSMEs) through competitive bidding by banks and NBFCs.
- Under invoice discounting, an MSME can sell its approved invoice to a financier at a discount and receive immediate funds without waiting for the buyer's payment.
- TReDS provides collateral-free, without-recourse financing, improving working capital and reducing the impact of delayed payments.
- The platform is governed by the Reserve Bank of India (RBI) under the Payment and Settlement Systems Act, 2007. Current platforms include RXIL, M1xchange, Invoicemart, C2treds, and DTX.
- The mandate requires all CPSEs to route MSME invoices through TReDS and disclose compliance during annual audits, strengthening payment discipline, transparency, and ease of doing business.
- The initiative supports the objectives of the MSME Development Act, 2006, promoting timely payments and improving MSME access to formal finance.

3.18. India's Rising Battery Storage Requirement and Clean Energy Transition

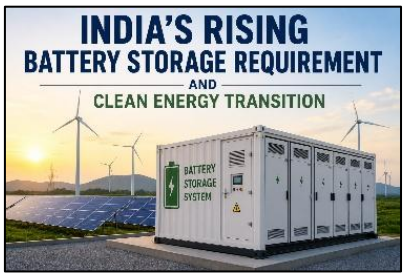
Context:

India's energy storage requirement is projected to rise to **888 GWh by 2035-36**, driven by rising power demand, renewable energy integration, electric vehicles, data centres and AI. Experts stress that storage must become a core part of India's electricity system, not merely an add-on to solar and wind projects.

Explanation:

- India's power demand is rising rapidly and peak demand may touch **300 GW next year**, requiring reliable supply even when solar and wind generation fluctuate.

Space for Notes



- **Energy Storage Systems (ESS)** store electricity when generation is high and release it when demand rises, especially during evening peak hours after solar generation falls.
- India's projected storage need of **888 GWh by 2035-36** includes **Battery Energy Storage Systems (BESS)** and **Pumped Storage Projects (PSP)**.
- **BESS** uses batteries, especially lithium-ion batteries, to store electricity, while **PSP** stores energy by pumping water uphill and releasing it through turbines.
- Storage supports **grid stability, renewable energy integration, ancillary services**, and reduces dependence on coal during peak demand.
- Key challenges include high financing costs, lack of operational data, battery degradation, safety risks, uncertain revenues and weak tender design.

3.19. Regulatory Gaps in Pesticide-Coated Seeds in India

Context:

A letter to Union ministries has raised concerns over the absence of clear rules for pesticide-coated seeds in India. It has urged mandatory labelling, safety checks and stronger regulation of hazardous chemicals used in seed processing units.

Explanation:



- Pesticide-coated seeds are seeds treated with insecticides, fungicides or other chemicals to protect them from pests and diseases during germination.
- Such treatment may improve crop survival, but it can create risks of accidental consumption, pesticide exposure and environmental contamination.
- Seed treatment can affect farmers, agricultural workers, soil organisms, beneficial insects and possibly food safety if residues persist.
- In India, pesticides are regulated under the Insecticides Act, 1968 and monitored by the Central Insecticides Board and Registration Committee (CIBRC).
- Seed quality is regulated under the Seeds Act, 1966, but specific rules on treated-seed labelling remain a concern.
- Seed processing units may use hazardous chemicals like concentrated sulphuric acid, requiring effluent treatment and worker safety norms.

3.20. India as the World's Second-Largest Steel Producer

Context:

India has become the world's second-largest steel producer, with crude steel output rising from 28 million tonnes in FY02 to 152 million tonnes in FY25. However, India still depends on imports for speciality steel, while also facing green-transition pressures such as the EU's CBAM.

Space for Notes

Explanation:

- Steel is a key industrial material used in infrastructure, construction, railways, automobiles, defence and manufacturing.
- India's steel growth is driven by urbanisation, infrastructure expansion, domestic demand and capacity addition.
- India mainly produces basic steel, while speciality steel with advanced properties is imported for sectors like automobiles and high-end construction.
- The PLI Scheme for Speciality Steel aims to reduce import dependence and promote advanced steel manufacturing.
- Steel is a hard-to-abate sector due to high carbon emissions.
- EU-CBAM may affect Indian steel exports by imposing carbon-linked costs.



3.21. India Secures Global Food Standards Milestone at Codex Alimentarius Commission

Context:

The Codex Alimentarius Commission (CAC49) Geneva, adopted international standards for **Large Cardamom, Coriander, and Vanilla**, developed under the India-hosted Codex Committee on Spices and Culinary Herbs (CCSCH).

Explanation:

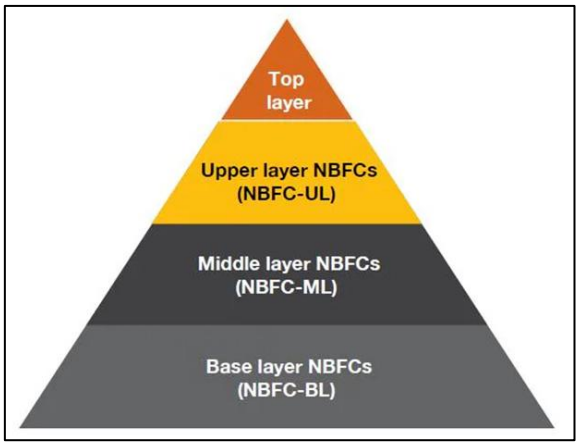
- **Codex Alimentarius Commission (CAC)** is a **FAO–WHO** joint body that develops **science-based international food safety and quality standards**.
- It aims to **protect consumer health** and ensure **fair practices in international food trade**.
- India hosts the **Codex Committee on Spices and Culinary Herbs (CCSCH)**; the **Spices Board** acts as its Secretariat.
- **Codex Standards** harmonise global quality, labelling, sampling and safety requirements, facilitating **market access** and reducing trade barriers.
- India was also accepted as **Co-Chair of the Electronic Working Group (EWG)** on risk analysis for new food products, strengthening its role in global food standard-setting.
- The **Electronic Working Group (EWG)** prepares technical guidance between Codex sessions through virtual collaboration.
- Large Cardamom is indigenous to India's **North-Eastern Himalayas**, while India is a leading producer and exporter of **Coriander**.

3.21. RBI's Revised Upper Layer NBFC Framework

Space for Notes

Context:

Non-Banking Financial Companies are in news as the Reserve Bank of India (RBI) has revised the regulatory framework for Upper Layer Non-Banking Financial Companies (NBFC-ULs), changing the criteria for mandatory listing.



Explanation:

- Non-Banking Financial Companies (NBFCs) are companies registered under the Companies Act, 2013 that provide financial services such as loans, investments and asset financing but do not hold demand deposits like banks.
- NBFCs are regulated by the Reserve Bank of India (RBI) under the Reserve Bank of India Act, 1934.
- RBI follows a Scale-Based Regulation (SBR) framework that classifies NBFCs into Base Layer (NBFC-BL), Middle Layer (NBFC-ML), Upper Layer (NBFC-UL) and Top Layer (NBFC-TL) according to their size, risk and systemic importance.
- NBFC-ULs are subject to stricter prudential norms, governance standards, disclosure requirements and enhanced regulatory supervision.

MCQs

1. With reference to the India Semiconductor Mission (ISM), consider the following statements:

1. It aims to develop a domestic semiconductor ecosystem.
2. Its scope includes semiconductor fabrication, packaging, chip design and R&D.
3. It seeks to reduce India's dependence on imported semiconductors.

Which of the statements given above are correct?

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

2. Consider the following statements:

Statement I: Domestic container manufacturing can contribute to India's supply-chain resilience.

Statement II: India is heavily dependent on foreign-owned containers and shipping lines for international trade.

Which one of the following is correct?

(a) Both Statement I and Statement II are correct, and Statement II explains Statement I.
(b) Both Statement I and Statement II are correct, but Statement II does not explain Statement I.
(c) Statement I is correct, but Statement II is incorrect.
(d) Statement I is incorrect, but Statement II is correct.

3. With reference to the Cabinet Committee on Economic Affairs (CCEA), consider the following statements:

1. It is an extra-constitutional body.
2. Its functioning is associated with the executive framework under Article 77.
3. It deals with important economic and infrastructure-related decisions.

Which of the statements given above are correct?

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

4. With reference to the Hybrid Annuity Model (HAM), consider the following statements:

1. It is a form of Public-Private Partnership (PPP).
2. Project costs are shared between the government and the private developer.
3. It helps reduce the financial burden and risk on the private developer.

Which of the statements given above are correct?

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

Space for Notes

Answers

1. Answer: D **2.** Answer: A **3.** Answer: D **4.** Answer: D

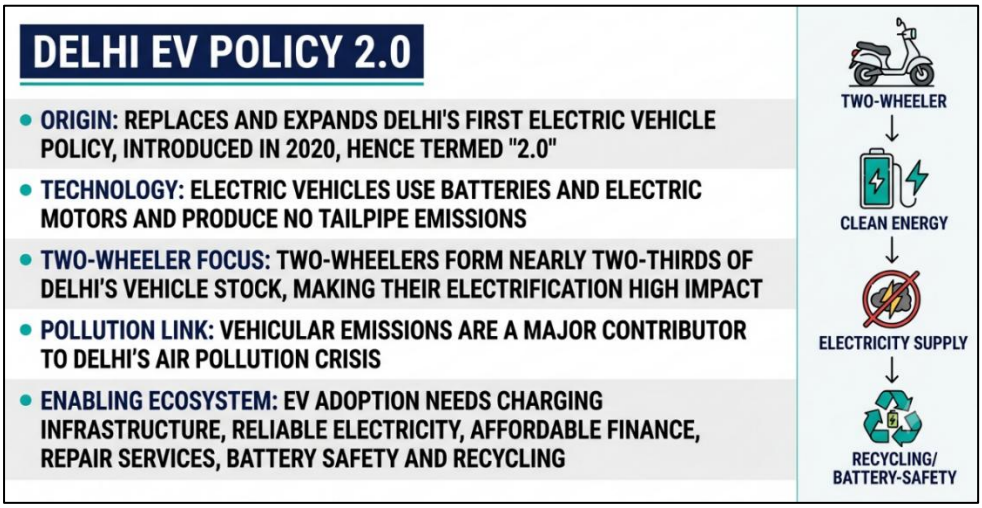
4. Environment and Ecology

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4.1. Delhi Electric Vehicle Policy 2.0

Context:

Delhi has approved Electric Vehicle Policy 2.0 to accelerate the transition from petrol and CNG vehicles to electric mobility. It combines financial incentives, registration restrictions and charging infrastructure to reduce vehicular pollution. Its success will depend on whether the transition remains affordable, reliable and socially equitable.



Explanation:

Major Policy Measures:

- From **January 1, 2027**, only electric passenger and goods three-wheelers and electric N1 goods carriers weighing up to 3.5 tonnes are proposed to receive new registrations.
- From **April 1, 2028**, only electric two-wheelers will be registered. Existing petrol vehicles are not immediately prohibited and may continue under prevailing rules.
- Purchase incentives are proposed for electric two-wheelers, autorickshaws and light goods vehicles. The incentives decline over time to encourage early adoption.
- Electric cars priced up to ₹30 lakh are proposed to receive complete road-tax and registration-fee waivers. Scrappage incentives support the replacement of older polluting vehicles.
- Schools must gradually increase the electric share of their bus fleets to 10%, 20% and 30% at different stages up to 2030. Government vehicle procurement will also favour electric vehicles.
- More than 30,000 additional charging points, battery-swapping facilities and charging-ready buildings are proposed. Strong hybrid vehicles are excluded from the main incentive framework.

Expected Benefits:

- Electric mobility can reduce nitrogen oxides, carbon monoxide and exhaust particulate matter, thereby improving public health.
- It can lower petroleum consumption, reduce dependence on imported crude oil and protect users from fluctuating fuel prices.

Space for Notes

- High-use vehicles such as autorickshaws, buses, delivery vehicles and goods carriers can achieve substantial operating-cost savings.
- The transition can generate employment in batteries, charging equipment, software, maintenance and recycling.
- Scrappage-linked incentives can remove older and disproportionately polluting vehicles from the roads.

Major Challenges:

- Charging facilities may remain inadequate or unevenly distributed, particularly in rented housing, unauthorised colonies and areas without private parking.
- Simultaneous charging can overload local transformers unless distribution networks, smart charging and time-based tariffs are developed.
- High purchase prices and limited access to credit may burden autorickshaw drivers, gig workers and small traders.
- Battery fires and informal recycling require strict safety standards, traceability and producer responsibility.
- Delhi-specific restrictions may encourage vehicle registration in neighbouring National Capital Region cities unless regional coordination is ensured.
- EVs reduce exhaust pollution but cannot by themselves solve congestion, accidents, parking shortages, tyre dust or excessive dependence on private vehicles.

Way Forward:

- Delhi must expand buses and last-mile transport, provide affordable loans and battery-leasing options, protect gig workers and ensure prompt subsidy payments.
- Charging performance must be measured through location, uptime, speed and affordability, rather than merely the number of chargers.
- Readiness reviews, public dashboards, trained technicians, battery recycling and coordination with neighbouring states are essential.

Conclusion:

Delhi EV Policy 2.0 marks a shift from voluntary incentives towards a mandate-supported transition. However, deadlines must be matched by affordable vehicles, reliable charging, grid readiness and worker protection. The objective should be cleaner and less congested mobility, rather than merely replacing petrol vehicles with electric ones.

Mains Practice Question:

Q. What are the environmental benefits of electric vehicles? Examine the challenges involved in making electric mobility affordable and sustainable in Indian cities.

(10 Marks, 150 words)

4.2. Fire Safety in India - Technical Gaps and Ethical Failures

Context:

Recently, major fires in Delhi and Lucknow caused heavy loss of life and exposed serious weaknesses in India's buildings and fire-safety systems. Hundreds of commercial buildings have also been found without valid fire clearances or in violation of building rules. These incidents show that fire tragedies arise from both unsafe design and failures of public ethics.

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Background:

- Fire safety must be incorporated into the planning, construction, occupation, renovation and maintenance of every building.
- A mixed-use building must follow the safety standards applicable to its highest-risk activity, such as a restaurant, hotel or coaching centre.
- Smoke inhalation, panic and blocked escape routes often cause more deaths than direct contact with flames.
- Fire protection includes passive measures, such as fire-resistant walls, and active measures, such as alarms, sprinklers and extinguishers.
- The constitutional right to life (Art 21) creates corresponding duties for building owners, employers, inspectors, municipal bodies and fire departments.

Explanation:

Why Are Urban Buildings Vulnerable to Fire? – Technical Aspects?

- **Unsafe escape routes:** Corridors and staircases are often blocked by furniture, storage or commercial installations. Buildings may lack smoke-proof staircases, emergency lighting, fire doors and clearly marked exits.
- **Absence of alternative exits:** A single staircase may become unusable when fire or smoke enters it. Commercial and high-occupancy buildings therefore require a protected second staircase or alternative escape route.
- **Lack of compartmentation:** Compartmentation divides a floor into smaller fire-resistant sections. Its absence allows flames and smoke to spread rapidly across the entire building.
- **Combustible materials:** Plastic cladding, hoardings, false ceilings, curtains and wall panels can accelerate fire and release toxic smoke. Burning façades may also spread flames vertically to upper floors.
- **Defective equipment:** Alarms, sprinklers, hydrants and extinguishers may exist only for certification. They become ineffective without proper installation, water supply, regular testing and trained staff.
- **Unauthorised change of use:** Residential buildings are frequently converted into shops, restaurants, hotels or coaching centres without upgrading exits, wiring and fire-control systems.
- **Unplanned urbanisation:** Narrow roads, roadside parking and encroachments delay fire engines. Such delays may allow a fire to reach **flashover**, when most combustible materials ignite almost simultaneously.

Kant's Duty Ethics

Immanuel Kant held that a truly moral act is done because it is right, not for reward or result. A local shopkeeper who offered his own mattresses to cushion people jumping from a burning building exemplified this principle.

Why Is It a broader Governance and Ethical Issue?

- **Weak enforcement:** Safety laws may exist, but inspections often become routine paperwork. Unsafe buildings may continue to operate despite known violations.
- **Integrity deficit:** Fire certificates obtained through bribery or false reporting represent corruption and a serious betrayal of public trust.
- **Failure of accountability:** Accountability must begin before a disaster through risk assessment, genuine inspections and timely correction. Compensation and inquiries after deaths represent only reactive accountability.
- **Shared responsibility:** Owners, tenants, engineers, contractors, inspectors and licensing authorities may all bear legal and moral responsibility for foreseeable harm.

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- **Utilitarian perspective:** Jeremy Bentham's principle of the greatest good requires authorities to prioritise measures that prevent large-scale suffering and loss of life.
- **Justice and equity:** John Rawls' conception of justice supports greater protection for children, patients, workers, older persons and persons with disabilities because they face greater vulnerability.

Integrated Reforms Needed:

- Mandate protected staircases, alternative exits, compartmentation and fire-retardant materials.
- Require fresh approval whenever a building's use, occupancy or interior design changes.
- Digitise fire clearances and publish inspection reports to improve transparency.
- Conduct surprise audits and fix personal liability for negligent or fraudulent certification.
- Protect whistleblowers and enable citizens to report blocked exits and defective equipment.
- Regularly conduct evacuation drills and train staff in first response and crisis communication.
- Remove encroachments and ensure adequate access for fire engines.
- Promote ethical leadership based on integrity, empathy, competence and preventive accountability.

Conclusion:

A fire may begin accidentally, but a mass tragedy usually results from accumulated neglect. Safer buildings require sound design, maintenance and preparedness, while safer institutions require integrity and accountability. The true measure of governance lies not merely in rescuing people after a fire, but in preventing the disaster altogether.

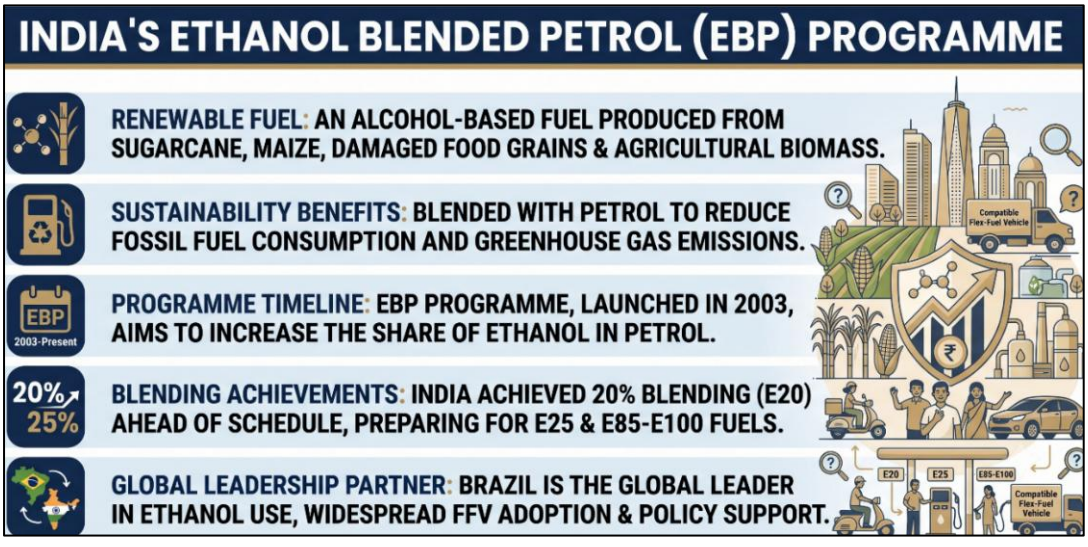
Mains Practice Question:

Q. Despite the existence of building codes and fire-safety regulations, urban fire accidents continue to cause heavy loss of life in India. Examine the reasons. **(10 Marks, 150 words)**

4.3. Brazil's Ethanol Model and India's Biofuel Transition

Context:

India is rapidly increasing ethanol blending in petrol to reduce crude oil imports, improve energy security and promote cleaner transportation. Brazil's long-term success in ethanol adoption demonstrates that a stable policy framework, strong infrastructure, consumer choice, and technological innovation are essential for building a sustainable biofuel ecosystem.



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Explanation:

Why is Ethanol Blending Important?

- Ethanol reduces dependence on imported crude oil, strengthening India's energy security.
- It lowers greenhouse gas emissions and supports India's climate commitments.
- It creates an additional market for agricultural produce, increasing farmers' incomes.
- Domestic biofuel production generates rural employment and supports the circular economy.

How Did Brazil Build a Successful Ethanol Ecosystem?

- Brazil adopted ethanol gradually through consistent policies over several decades.
- It developed dedicated infrastructure for production, storage, and nationwide fuel distribution.
- The country promoted **Flex-Fuel Vehicles (FFVs)** that can operate on petrol, ethanol, or any mixture of both.
- Consumers were given the freedom to choose fuels based on market prices, increasing public acceptance.
- Automobile manufacturers and fuel retailers expanded together, ensuring smooth adoption.

India's Progress:

- The EBP Programme has significantly increased ethanol blending from low single digits to **20%** nationally.
- India is promoting **E20-compatible vehicles** while encouraging investment in ethanol production.
- Policies such as the **National Policy on Biofuels, 2018 (amended)** support diversified feedstocks and advanced biofuels.

Challenges Before India:

- Existing vehicles and fuel infrastructure are not fully compatible with higher ethanol blends.
- Ethanol has lower energy content than petrol, which may slightly reduce fuel efficiency.
- Large-scale ethanol production requires sustainable feedstock without affecting food security or water resources.
- Consumer awareness, vehicle availability, and fuel distribution networks need further strengthening.

The Way Forward:

- Expand ethanol infrastructure and dedicated dispensing stations across the country.
- Encourage manufacturing of affordable FFVs and higher-blend compatible vehicles.
- Promote second-generation (2G) ethanol from agricultural residues to avoid pressure on food crops.
- Ensure long-term policy stability, transparent pricing, and consumer awareness to support wider adoption.

Conclusion:

Ethanol blending is an important pillar of India's clean energy transition, but its long-term success depends on a balanced approach that combines infrastructure development, technological innovation, sustainable feedstock management, and consumer confidence. A gradual, well-planned transition can help India achieve both energy security and environmental sustainability.

Mains Practice Question:

Q. Brazil's ethanol transition demonstrates that technological change must be supported by policy stability, infrastructure and consumer choice. Examine the lessons it offers for India. **(15 marks, 250 words)**

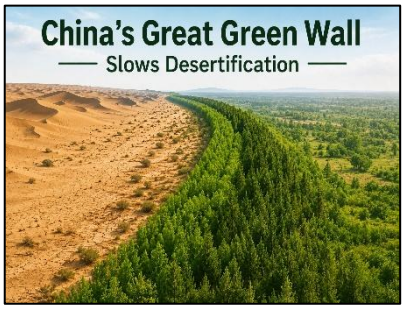
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4.4. China's Great Green Wall and the Fight against Desertification

Context:

China's **Three-North Shelterbelt Programme**, popularly called the **Great Green Wall**, has helped slow desert expansion and increase vegetation cover in northern China. However, scientists caution that sustained ecological restoration and long-term monitoring remain essential.

Explanation:



- The Three-North Shelterbelt Programme (TNSFP), launched in 1978, is the world's largest afforestation programme and is scheduled for completion by 2050.
- It spans 13 provinces/regions across northern, northeastern, and northwestern China and targets the expansion of the **Gobi Desert**, Taklamakan Desert, and other arid regions.
- The programme employs the **Straw Checkerboard Technique**, in which straw is placed in square grids to stabilize sand dunes, reduce wind erosion, retain soil moisture, and improve sapling survival.
- China has reported that desertified land has reduced by over 1,000 sq km annually since 2000, while **forest cover increased from about 5% (1978) to around 14% (2022)** in the project region.
- The initiative contributes to China's commitments under the **United Nations Convention to Combat Desertification (UNCCD)** and promotes sustainable land management.
- UNCCS remains the only **legally binding** international agreement dedicated exclusively to combating desertification, land degradation, and drought (DLDD).

4.5. Landslide Early Warning Systems (LEWS) in India

Context:

Recent landslides in the Western Ghats, particularly in Wayanad, have renewed focus on establishing effective Landslide Early Warning Systems (LEWS) in India. Researchers from IIT Madras have developed a new warning model for the Himalayan region to improve disaster preparedness.

Explanation:

- A Landslide is the downward movement of rock, soil, or debris under the influence of gravity, triggered by factors such as heavy rainfall, earthquakes, slope instability, deforestation, mining, and human activities.

Space for Notes



- A Landslide Early Warning System (LEWS) combines hazard mapping, rainfall thresholds, geotechnical sensors, weather forecasts, and real-time monitoring to issue advance warnings before slope failure.
- IIT Madras has developed a probabilistic forecasting model for the Himalayan region, using rainfall forecasts and slope-monitoring instruments such as tilt meters, pressure gauges, accelerometers, and moisture sensors.
- The Geological Survey of India (GSI) is the nodal agency for landslide hazard zonation, while the India Meteorological Department (IMD) provides rainfall forecasts essential for LEWS.
- The Himalayas and Western Ghats are India's major landslide-prone regions due to steep slopes, fragile geology, and intense monsoon rainfall.

4.6. Ken - Betwa River Linking Project and Rehabilitation Concerns

Context:

The **Ken–Betwa River Linking Project**, India's first inter-basin river linking project, has triggered protests by tribal families affected by the proposed **Dodhan Dam** in Madhya Pradesh. They are demanding fair compensation, proper rehabilitation and resettlement (R&R), and equitable distribution of benefits.

Explanation:



- The **Ken–Betwa Link Project (KBLP)** is India's **first river interlinking project** under the **National Perspective Plan (NPP)** for river interlinking.
- It aims to transfer surplus water from the **Ken River** to the **Betwa River** to address water scarcity in the **Bundelkhand** region of **Madhya Pradesh and Uttar Pradesh**.
- The project's key component is the **Dodhan Dam** on the **Ken River**, located inside the **Panna Tiger Reserve**.
- Expected benefits include **irrigation**, **drinking water supply**, and **hydropower generation**.
- Key concerns include **submergence of forest areas**, impact on **Panna Tiger Reserve**, **loss of biodiversity**, displacement of **tribal communities**, and issues related to **Rehabilitation and Resettlement (R&R)**.
- The project received **environmental, forest and wildlife clearances** subject to mitigation measures.

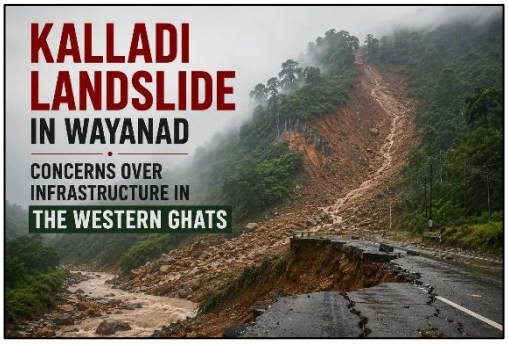
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4.7. Kalladi Landslide in Wayanad and Concerns over Infrastructure in the Western Ghats

Context:

A landslide at **Kalladi in Wayanad, Kerala**, near the **Anakkampoyil – Kalladi - Meppadi tunnel road project**, has raised concerns over infrastructure development in the ecologically fragile **Western Ghats**. Experts attribute the disaster to a combination of intense rainfall, slope modification, tunnelling, and inadequate geological assessment.

Explanation:



- **Wayanad** lies in the **Western Ghats**, a **UNESCO World Heritage Site** and one of the world's **biodiversity hotspots**.
- The **Anakkampoyil–Kalladi–Meppadi Tunnel Road Project** aims to improve connectivity between **Kozhikode and Wayanad**.
- **Landslides** occur when soil or rock moves downslope due to gravity, often triggered by **intense rainfall**, earthquakes, slope cutting, or human activities.
- **Tunnelling, excavation, deforestation, and unscientific dumping of excavated material** can destabilize hill slopes.
- **Climate change** is increasing the frequency of **short-duration, high-intensity rainfall (cloudbursts)** in the Western Ghats, raising landslide risk.
- **Environmental Impact Assessment (EIA)** evaluates the environmental consequences of major projects before approval, while **geological and climate-risk assessments** are crucial in fragile mountain ecosystems.
- The incident highlights the need for **sustainable infrastructure**, strict compliance with **EIA conditions**, and scientific planning in ecologically sensitive regions.

4.8. India Records Highest Annual Addition of Animal Species in 2025

Context:

The Zoological Survey of India (ZSI) reported that India added a record 709 animal species to its national database in 2025. With this, India's recorded faunal diversity has reached 105,953 species and subspecies, about 5.3% of the global total.

Explanation:

- Zoological Survey of India (ZSI) is India's premier organisation for faunal taxonomy, surveys and biodiversity documentation.
- Zoological Survey of India (ZSI) Headquarters: Kolkata, West Bengal
- The report 'Animal Discoveries: New Species, New Records' records species new to science and species reported in India for the first time.
- Of the 709 additions, 483 were new to science and 226 were new records for India.
- Insects dominated the discoveries, especially Hymenoptera, Lepidoptera and Diptera.

- Kerala led the state-wise list, followed by West Bengal, Karnataka and Arunachal Pradesh.
- Major biodiversity zones include the Western Ghats, Eastern Himalayas, forests and coastal ecosystems.
- ZSI also launched Fauna of India Checklist 3.0 and Paleo India Portal for digital biodiversity and fossil documentation.

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4.9. Restoring Struggling Tiger Reserves in India

Context:

As India's tiger population has reached 3,682, the Centre has identified 25 priority tiger reserves for habitat recovery, prey restoration and possible targeted reintroductions. The focus is shifting from merely increasing tiger numbers to balancing tiger conservation across landscapes.

Explanation:

- India's tiger population rose from 1,411 in 2006 to 3,682 in 2022, but growth is uneven.
- Some tiger reserves like Corbett, Bandipur and Kaziranga act as source populations, with high tiger density, good prey base and suitable habitat.
- Several reserves are sink populations, with poor prey, weak connectivity or very low breeding tiger presence.
- Carrying capacity refers to the maximum number of tigers a habitat can sustainably support.
- Overcrowded reserves push tigers into buffer areas, farms and villages, increasing human-wildlife conflict.
- Tiger recovery needs habitat quality, prey abundance, protection and landscape connectivity.
- A connected tiger landscape supports metapopulation, dispersal and genetic exchange.
- Reintroduction means bringing tigers back to areas where they disappeared; it is used only as a last resort after scientific assessment.

4.10. India in 2026 UN SDG Index

Context:

India has achieved its highest-ever rank in the 2026 UN SDG Index, rising to 94th among 167 countries with a score of 68.3. However, the report states that India remains off track to achieve several Sustainable Development Goals by 2030, with Zero Hunger emerging as a major challenge.

Explanation:

- The Sustainable Development Goals are 17 global goals adopted by the United Nations in 2015 under the 2030 Agenda for Sustainable Development.
- The 17 goals cover poverty, hunger, health, education, gender equality, clean water, clean energy, decent work, industry and innovation, reduced inequalities, sustainable cities, responsible consumption, climate action, marine life, terrestrial life, peace and justice, and global partnerships.

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- The UN SDG Index, published by the UN Sustainable Development Solutions Network, measures countries' progress towards achieving these goals.
- India has improved from 99th rank in 2025 to 94th rank in 2026, its best position since the SDGs were adopted.
- Despite progress, India faces major challenges in Zero Hunger, health, gender equality, sustainable cities, life below water, life on land, and peace and justice.
- Only about one-third of India's SDG targets are expected to be achieved by 2030, while some indicators have stagnated or worsened.
- Hunger remains a key concern due to child stunting, child wasting, undernourishment and rising obesity.

4.11. Needs a Second Home for Asiatic Lions

Context:

Recently, India's Asiatic lion population was estimated at 891 in the 16th Lion Population Estimation, 2025, a 32% increase since 2020. Despite this success, almost the entire wild population remains concentrated in Gujarat's Gir landscape, leaving the species vulnerable to disease, wildfire, drought or any single large disaster.



Explanation:

Why a Second Population Is Needed?

- Since all lions live in one connected region, a disease outbreak, wildfire, drought or prey decline could affect many at once.
- The 2018 Canine Distemper Virus (CDV) outbreak, which killed several lions, exposed this risk.
- The population also has low genetic diversity, having grown from a very small surviving group.

Metapopulation Approach:

- A metapopulation means separate populations of one species living in different habitats.
- A distant second population would act as insurance against a major crisis in Gir.
- Managing both populations together can help preserve genetic diversity over time.

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Kuno National Park:

- Studies identified Kuno National Park, Madhya Pradesh, as suitable, and it was prepared through village relocation and improved habitat and prey.
- The Supreme Court ordered translocation to Kuno in 2013, but no lions have moved yet due to Gujarat's resistance and weak inter-State coordination.
- Kuno now also hosts the cheetah reintroduction programme, so its prey, space and management capacity need fresh review.

Barda and Project Lion:

- Project Lion (2020) focuses on landscape-level conservation, habitat restoration and disease control.
- Barda Wildlife Sanctuary in Gujarat is being developed as another site for natural dispersal of lions. However, Barda is close to Gir and may not protect the species from a region-wide disease or disaster.

Critical Concerns:

- Translocation can cause stress, injury or failure to adapt, and lions may stray outside protected areas and attack livestock.
- A small founder group risks inbreeding and unstable social structure.
- Careful quarantine, phased release, radio-collaring, compensation and long-term monitoring are needed.

Conclusion:

India has succeeded in raising lion numbers, but growth alone does not guarantee survival. A carefully planned, distant second population is essential to convert this conservation success into lasting ecological security.

Mains Practice Question:

Q. Concentration of an endangered species in a single geographical area increases its vulnerability to extinction. Explain. Discuss the significance of establishing a second free-ranging population of Asiatic lions. **(15 Marks, 250 Words)**

4.12. Government Releases Revised CAFE III Fuel Efficiency Norms for Passenger Vehicles

Context:

The Central Government has released the **third draft of Corporate Average Fuel Efficiency (CAFE) Phase III norms** for stakeholder consultation.

Explanation:



- **Corporate Average Fuel Efficiency (CAFE)** norms prescribe the **maximum average CO_2 emissions/fuel consumption** allowed for a manufacturer's passenger vehicle fleet.
- Introduced under the **Energy Conservation Act, 2001**, and implemented by the **Bureau of Energy Efficiency (BEE)** under Ministry of Power.
- **CAFE I (2017–2022):** First fleet-average CO_2 standards for passenger cars.

Space for Notes

- **CAFE II (2022–2027):** Stricter emission targets and broader vehicle coverage.
- **CAFE III (2027–2032):** Recognises **Carbon Neutrality Factors (CNFs)** for ethanol, CBG and biofuels, tightens emission limits, and introduces multi-year compliance blocks. Effective from **April 2027**
- Objective: Improve fuel efficiency, reduce transport emissions, and support India's **Net Zero 2070** goal.

4.13. IUCN Red List Update: Deep-Sea Molluscs Face Extinction Threat

Context:

The latest IUCN Red List of Threatened Species highlights that over 62% of endemic hydrothermal vent molluscs are threatened with extinction due to deep-sea mining. The update also reports changes in the conservation status of species such as the desert rain frog and numbat, reflecting both biodiversity loss and successful conservation efforts.

Explanation:



- The IUCN Red List of Threatened Species is the global standard for assessing the conservation status and extinction risk of species.
- The Red List categories include Least Concern (LC), Near Threatened (NT), Vulnerable (VU), Endangered (EN), Critically Endangered (CR), Extinct in the Wild (EW), and Extinct (EX).
- Molluscs are invertebrates under Phylum Mollusca, including snails, clams, mussels, octopus, squid, and chitons, and are vital for marine ecosystems and food security.
- A Numbat (*Myrmecobius fasciatus*) is a small, insect-eating marsupial that is endemic to Australia
- Hydrothermal vents are mineral-rich deep-sea ecosystems that support unique endemic species adapted to extreme conditions.
- Deep-sea mining generates sediment plumes and habitat destruction, threatening vent biodiversity despite governance by the International Seabed Authority (ISA) under the United Nations Convention on the Law of the Sea (UNCLOS).
- Marine Protected Areas (MPAs) and invasive species management have demonstrated positive conservation outcomes, as seen in the recovery of the numbat.

4.14. Basel Convention and Emerging Global Waste Streams

Context:

At the Basel Convention's OEWG-15 meeting in Geneva, countries advanced technical work on e-waste, textile waste and hazardous waste. However, disagreements continued over whether plastic waste should be further addressed under the Basel Convention or left to global plastics treaty negotiations.

Explanation:

- The Basel Convention, 1989 controls the transboundary movement of hazardous wastes and their environmentally sound management.
- It aims to prevent developed countries from dumping hazardous waste in developing countries.

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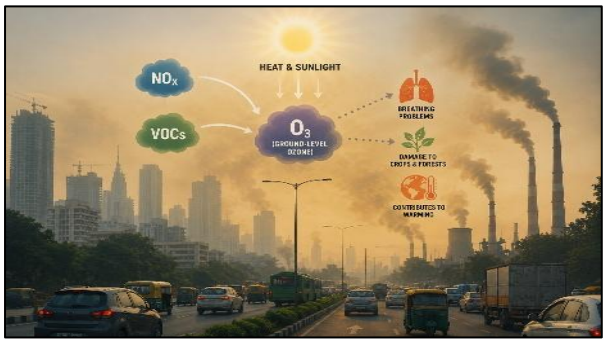
- Its key mechanism is Prior Informed Consent (PIC), under which waste can be exported only after the importing country gives consent.
- The Convention covers hazardous wastes, e-waste, biomedical waste, used oils, chemical wastes and certain plastic wastes.
- E-waste includes discarded electrical and electronic equipment containing metals, plastics and toxic substances.
- Textile waste is emerging as a concern because unusable second-hand clothes are often exported to developing countries.
- Plastic waste remains contentious due to overlap with ongoing negotiations for a Global Plastics Treaty.
- Hong Kong Convention deals with safe and environmentally sound ship recycling

4.15. Ground-Level Ozone Pollution in Indian Cities

Context:

A new CSE analysis of 2021–2026 data shows that ground-level ozone pollution is spreading across Indian cities. Delhi-NCR has emerged as the largest regional hotspot, while cities such as Chandigarh, Jaipur, Ahmedabad, Mumbai, Chennai, Bengaluru and Patna are also severely affected.

Explanation:



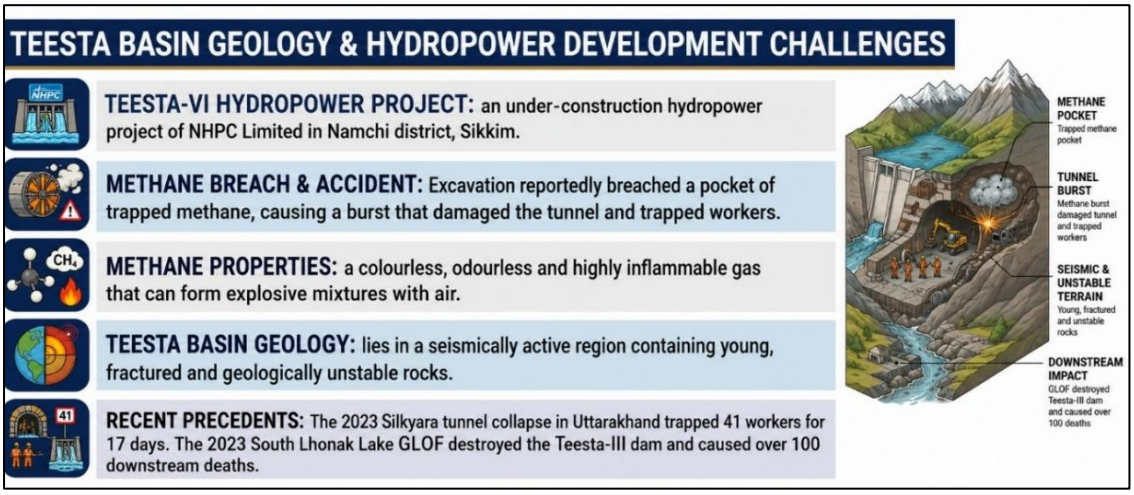
- Ground-level ozone (O_3) is a harmful secondary pollutant formed near the Earth's surface.
- It is not emitted directly; it forms when nitrogen oxides (NOx) and volatile organic compounds (VOCs) react in the presence of heat and sunlight.
- Major sources of NOx and VOCs include vehicles, industries, power plants, fuel burning, solvents and urban emissions.
- Unlike stratospheric ozone, which protects Earth from ultraviolet radiation, ground-level ozone is harmful to health.
- It can cause breathing difficulty, asthma aggravation, lung inflammation and reduced lung function.
- It also damages crops, forests and agricultural productivity.
- India's National Ambient Air Quality Standards (NAAQS) prescribe 100 µg/m³ as the safe limit for ozone over an 8-hour average.
- Ozone pollution peaks during summer, but recent trends show longer exposure and night-time persistence.
- It is also a short-lived climate pollutant, contributing to warming.

4.16. Infrastructure Safety and Ecological Fragility in the Himalayas

Space for Notes

Context:

The Himalayas are India's ecological and hydrological lifeline, but their young and unstable geology makes infrastructure construction exceptionally hazardous. A suspected methane-related tunnel accident at the **Teesta Stage-VI Hydroelectric Project in Sikkim** has renewed questions about worker safety, environmental appraisal and regulatory accountability.



Explanation:

Why Himalayan Tunnelling Is Dangerous?

- Tunnels may encounter unstable rock, fault zones, groundwater and compressed gas pockets.
- Earthquakes, landslides and intense rainfall can destabilise excavated areas and obstruct rescue operations.
- Geological uncertainty cannot be eliminated, but detailed surveys and predictive risk modelling can reduce exposure.

Essential Safety Measures:

- Projects require continuous gas detection, forced ventilation, explosion-proof machinery and automatic warning systems.
- Workers must receive protective equipment, evacuation training and regular emergency drills.
- Multiple escape routes, rescue chambers and real-time communication systems should remain functional throughout construction.

Environmental and Climate Concerns:

- Hydropower construction can destabilise slopes and alter river flow, sediment transport and aquatic ecology.
- Climate change is increasing glacier retreat, extreme precipitation and the danger of **Glacial Lake Outburst Floods**.
- Numerous projects within one basin may create cumulative impacts that individual project-level assessments fail to capture.

Governance and Accountability:

- Rescue and medical assistance must remain the immediate priority.
- An independent inquiry should examine whether geological and methane risks were assessed before excavation.

Space for Notes

- Compliance with environmental-clearance and occupational-safety conditions must be independently audited.
- Basin-level carrying-capacity studies, transparent monitoring and enforceable accountability are necessary.

Conclusion:

Hydropower is valuable for energy security, but renewable energy cannot be sustainable if it endangers workers or Himalayan ecosystems. Infrastructure planning must follow the **precautionary principle**, scientific assessment and strict regulatory oversight.

Mains Practice Question:

Q. What are Landslide Early Warning Systems? Discuss their utility and limitations in reducing landslide disasters in India. **(10 Marks, 150 words)**

4.17. Iron and Steel Sector Brought Under India's Carbon Credit Trading Scheme (CCTS)

Context:

India has notified draft emission-intensity targets for **255 iron and steel units** under the **Carbon Credit Trading Scheme (CCTS)**, making steel the largest sector covered under the compliance carbon market from **FY 2026–27**.

Explanation:



- **Carbon Credit Trading Scheme (CCTS)** is India's **compliance carbon market**, notified under the **Energy Conservation (Amendment) Act, 2022**, and implemented by the **Bureau of Energy Efficiency (BEE)**
- It follows an **Emission Intensity** approach, measuring **CO_2 emissions per unit of production**, unlike absolute emission caps.
- Units performing better than targets earn **Carbon Credit Certificates (CCCs)**, while non-compliant units must purchase credits.
- Steel contributes **10–12% of India's CO_2 emissions** and is the **second-largest steel producer** globally.
- Major steelmaking routes include **BF-BOF (Blast Furnace–Basic Oxygen Furnace)**, **DRI-IF (Direct Reduced Iron–Induction Furnace)** and **EAF (Electric Arc Furnace)**; EAF is relatively less carbon-intensive.
- The move aims to reduce emissions per tonne of steel while supporting India's decarbonisation commitments.

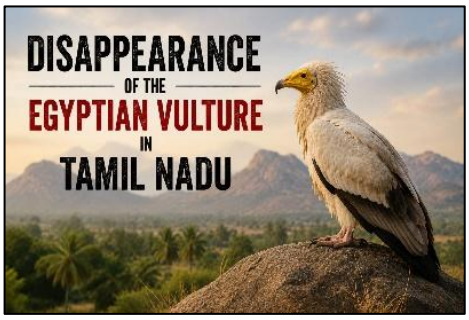
4.18. Disappearance of the Egyptian Vulture in Tamil Nadu

Context:

The Egyptian Vulture (*Neophron percnopterus*) has become locally extinct in The Nilgiris and no longer breeds in Tamil Nadu. Conservationists have called for coordinated conservation measures, including establishing an Egyptian Vulture Conservation Breeding Programme to revive the declining resident population in south India.

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Explanation:



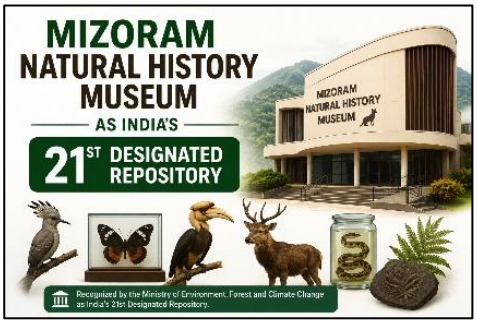
- Egyptian Vulture (*Neophron percnopterus*) is the **smallest Old-World vulture** and is listed as **Endangered** on the **IUCN Red List**.
- India hosts the resident subspecies **Neophron percnopterus ginginianus**, while migratory populations arrive from **Africa** and the **Middle East** during winter.
- It inhabits **rocky cliffs, villages, temple towns, grazing lands and open scrub habitats**, nesting mainly on cliffs.
- As a **scavenger**, it provides vital **ecosystem services** by disposing of animal carcasses and reducing disease transmission.
- Major threats include **habitat loss, poisoning, electrocution, collision with power lines**, decline in food availability, and **veterinary drugs such as diclofenac**, which have devastated vulture populations.
- Conservation measures include **captive breeding, habitat protection, safe carcass zones (Vulture Restaurants)**, and strict enforcement of the **diclofenac ban**.

4.19. Mizoram Natural History Museum as India's 21st Designated Repository

Context:

The Ministry of Environment, Forest and Climate Change has notified the Natural History Museum, Mizoram University, as India's **21st Designated Repository** under the **Biological Diversity Act, 2002**. It will preserve authenticated biological specimens from the Indo-Burma Biodiversity Hotspot.

Explanation:



- **Biological Diversity Act, 2002** regulates access to India's biological resources and protects associated traditional knowledge.
- **Section 39** allows the Central Government to notify institutions as **Designated Repositories**.
- These repositories preserve **voucher specimens** and **type specimens** of plants, animals and microorganisms.
- **Voucher specimens** help verify species identity; **type specimens** act as the scientific reference for newly discovered species.
- Mizoram lies in the **Indo-Burma Biodiversity Hotspot**, rich in endemic flora and fauna.
- NHM will document taxa such as **pteridophytes, macrofungi, reptiles, amphibians, fishes, moths, beetles and butterflies**.
- It supports **ex-situ conservation**, genetic diversity protection and the **Kunming–Montreal Global Biodiversity Framework**.

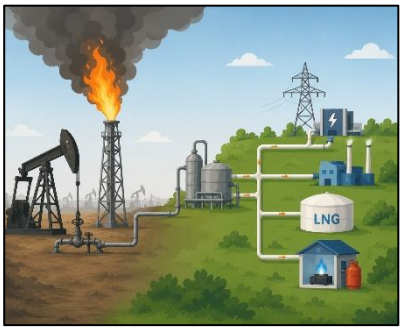
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4.20. Global Gas Flaring Increased for the Third Consecutive Year: World Bank Report

Context:

According to the World Bank's 2026 Global Gas Flaring Tracker Report, global gas flaring rose to 167 billion cubic metres (bcm) in 2025, with nine countries accounting for 83% of total flaring. The report highlights that reducing routine flaring can improve energy security, lower emissions and reduce economic losses.

Explanation:

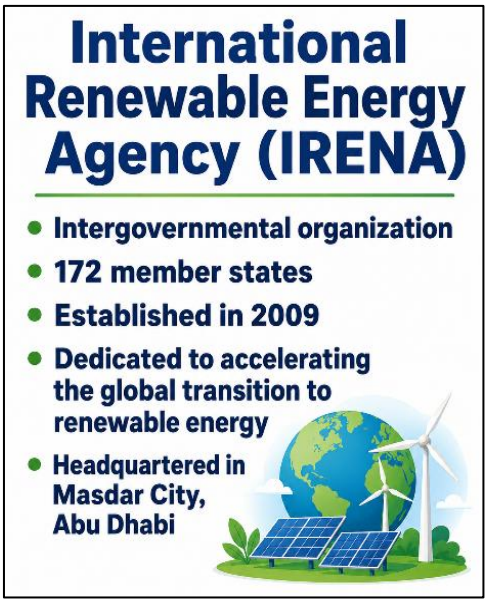


- Gas flaring is the burning of associated natural gas produced during oil extraction when it is not captured or utilised.
- Flaring releases carbon dioxide (CO_2) and methane (CH_4), contributing to climate change and wasting valuable energy resources.
- The Global Flaring and Methane Reduction Partnership (GFMR) is a World Bank-led initiative to reduce routine flaring and methane emissions.
- Routine gas flaring can be eliminated through gas capture, processing, pipelines and utilisation technologies.
- Captured gas can be used for electricity generation, Liquefied Natural Gas (LNG) production, industrial use and clean cooking fuel.
- Reducing flaring supports energy security, improves resource efficiency, lowers greenhouse gas emissions and advances SDG 7 (Affordable and Clean Energy) and SDG 13 (Climate Action).

4.21. Renewables and Fossil Fuel Cost Savings

Context:

According to IRENA, renewable energy projects commissioned in 2025 helped save about $480 billion in global fossil fuel costs. The report highlights that solar and wind power are becoming cheaper than new fossil-fuel-based electricity generation.



Explanation:

- Falling costs of solar panels, wind turbines, technology improvements and economies of scale have made renewables competitive.
- Renewables reduce dependence on imported coal, oil and natural gas, improving energy security.
- Since solar and wind have no fuel cost, they protect economies from gas price spikes and geopolitical shocks.

MCQs

Space for Notes

1. With reference to the environmental implications of electric mobility, consider the following statements:

1. Electric vehicles eliminate particulate pollution arising from tyres, brakes and resuspension of road dust.
2. The life-cycle emission advantage of an electric vehicle is influenced by the source of electricity used for charging.
3. Electrifying vehicles that travel long distances every day may produce greater emission reductions per vehicle than electrifying infrequently used private cars.

Which of the statements given above are correct?

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

2. Consider the following pairs:

Feedstock	Fuel produced
1. Sugarcane molasses	First-generation ethanol
2. Lignocellulosic crop residues	Second-generation ethanol
3. Used cooking oil	Biodiesel
4. Algal oil	Compressed biogas

How many of the pairs given above are correctly matched?

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

3. With reference to the recycling of critical minerals, consider the following statements:

1. It can reduce import dependence by recovering minerals already present in products circulating within the economy.
2. It can immediately meet the entire mineral requirement of a rapidly expanding clean-energy sector.
3. Mine tailings may become a secondary mineral resource, depending on their composition and the economics of recovery.

Which of the statements given above are correct?

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

4. With reference to desertification, consider the following statements:

1. It refers exclusively to the outward expansion of existing deserts.
2. Under the United Nations Convention to Combat Desertification, it refers to land degradation in arid, semi-arid and dry sub-humid areas.
3. It can result from both climatic variations and human activities.

Space for Notes

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

5. Consider the following pairs:

Instrument	Measurement relevant to landslide warning
1. Piezometer	Pore-water pressure
2. Inclinometer	Subsurface slope movement
3. Rain gauge	Rainfall intensity and duration
4. Seismograph	Soil-moisture content

How many of the pairs given above are correctly matched?
(a) Only one
(b) Only two
(c) Only three
(d) All four

6. Consider the following statements:
Statement-I: Establishing a second free-ranging population can improve the long-term security of a threatened species presently concentrated in a single landscape.
Statement-II: Geographically separated populations are less likely to be simultaneously affected by the same local disease outbreak or catastrophic event.
Which one of the following is correct in respect of the above statements?
(a) Both Statement-I and Statement-II are correct, and Statement-II explains Statement-I
(b) Both Statement-I and Statement-II are correct, but Statement-II does not explain Statement-I
(c) Statement-I is correct, but Statement-II is incorrect
(d) Statement-I is incorrect, but Statement-II is correct

7. Consider the following pairs:

Term	Meaning
1. Holotype	Single specimen designated as the name-bearing type of a species
2. New record	Species previously unknown to science
3. Designated repository	Institution maintaining authenticated biological material for reference
4. Endemic species	Species naturally restricted to a particular geographical area

How many of the pairs given above are correctly matched?
(a) Only one
(b) Only two
(c) Only three
(d) All four

8. With reference to the Basel Convention, consider the following statements:

1. The Prior Informed Consent procedure is a system of controlling covered waste movements, rather than an unconditional prohibition on them.
2. Transboundary movements of both hazardous and non-hazardous electronic waste are now subject to this procedure.
3. Describing a shipment as being intended for recycling does not, by itself, exempt it from the Convention's controls.

Which of the statements given above are correct?

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

9. Which of the following are potential advantages of producing second-generation ethanol from agricultural residues?

1. Reduction in the burning of crop residues
2. Lower direct pressure on food crops
3. Productive utilisation of agricultural waste
4. Complete elimination of energy and water requirements during ethanol production

Select the correct answer using the code given below:

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

Space for Notes

Answers

1.	Answer: B	**3.**	Answer: C	**5.**	Answer: C	**7.**	Answer: C
2.	Answer: C	**4.**	Answer: D	**6.**	Answer: A	**8.**	Answer: D

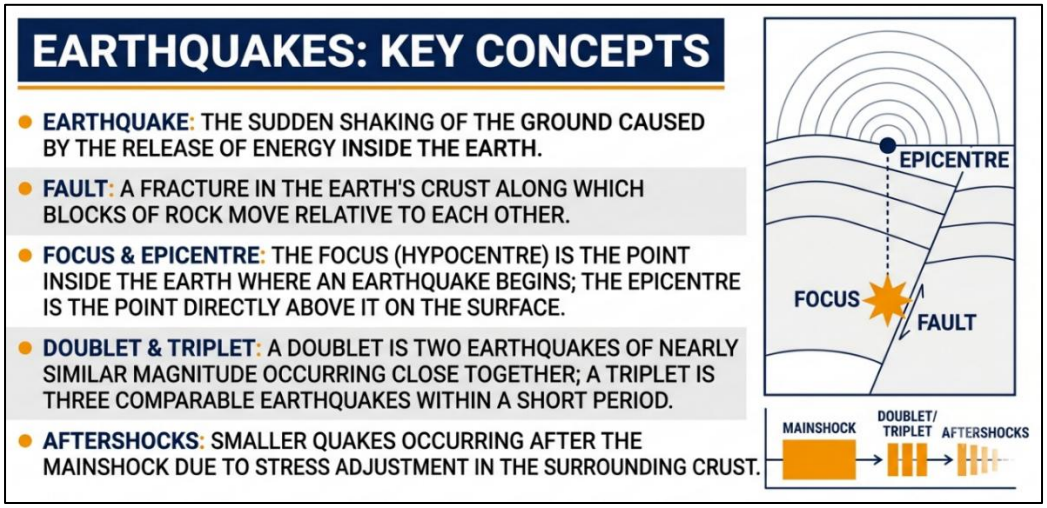
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5. Geography

5.1. Venezuela Earthquakes and the Rare Seismic Doublet

Context:

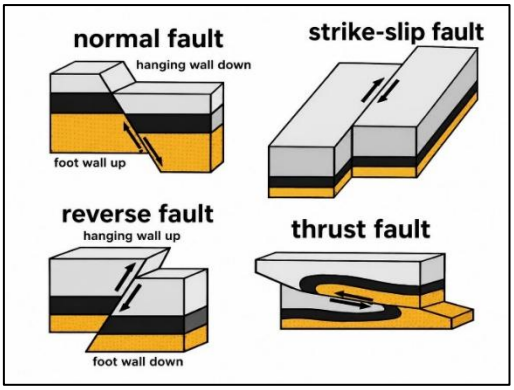
Recently, two powerful earthquakes of magnitude **7.2 and 7.5** struck west of **Caracas, the capital of Venezuela**, within just 39 seconds. The stronger quake occurred at a shallow depth of about 10 km and caused severe destruction. The sequence was described as a rare **seismic doublet**.



Explanation:

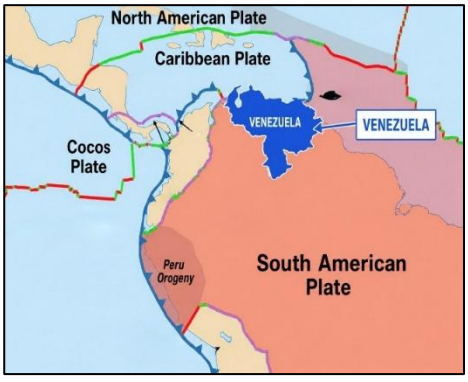
Why Venezuela Is Earthquake-Prone?

- Venezuela lies near the boundary between the **Caribbean Plate and the South American Plate.**
- These plates mainly slide horizontally past each other along a **strike-slip fault.**
- Northern Venezuela therefore has high seismicity and experiences frequent earthquakes.



What Happened:

- The magnitude **7.2** earthquake was classified as a **foreshock**, which is a smaller quake occurring before a larger one.
- Just 39 seconds later, the magnitude **7.5 mainshock**, or the largest event in the sequence, occurred.
- Since both quakes were close in magnitude, location and time, they formed a **seismic doublet.**



Why the Damage Was Severe?

- The shallow depth allowed strong seismic waves to reach the surface.
- The first quake weakened buildings before the second major shock arrived.
- The doublet prolonged ground shaking and increased building collapse.
- Closely timed major shocks also made rescue operations more difficult and dangerous.

Space for Notes

Conclusion:

The disaster resulted from Venezuela's plate-boundary location, shallow strike-slip faulting and a rare seismic doublet. Strong building codes, monitoring and disaster preparedness are essential in earthquake-prone regions.

5.2. Seafloor Rifting Event Observed in the Indian Ocean

Context:

Scientists have, for the first time, directly observed an active **seafloor rifting event** in the Indian Ocean using underwater sensors. The event recorded magma movement, seafloor spreading, and a large underwater volcanic eruption, providing new insights into **plate tectonics** and the formation of oceanic crust.

Explanation:



- **Rifting** is the process in which the **Earth's lithospheric plates diverge**, allowing **magma** from the mantle to rise and create new **oceanic crust**.
- It commonly occurs along **Divergent Plate Boundaries**, especially at **Mid-Ocean Ridges**, leading to **seafloor spreading**.
- As tectonic plates separate, magma solidifies into **basaltic rock**, continuously expanding the ocean floor.
- The **Indian Ocean** hosts active spreading centres such as the **Central Indian Ridge, Carlsberg Ridge, and Southwest Indian Ridge**.
- Rifting is associated with **submarine volcanism, hydrothermal vents**, earthquakes, and the **Wilson Cycle** of ocean basin evolution.
- Direct observation of seafloor rifting improves understanding of **plate tectonics, earthquake and volcanic processes, marine geology**, and the evolution of Earth's crust.

5.3. Critical Minerals Recycling for India's Mineral Security

Context:

NITI Aayog has highlighted that recycling e-waste, battery waste and mine tailings can provide India a faster route to critical minerals security. This is important as domestic mining and exploration may take years to become commercially productive.

Explanation:



- Critical minerals are minerals essential for economic growth, clean energy, defence and advanced technologies, but have supply risks.
- India has identified 31 critical minerals, including lithium, cobalt, nickel, graphite, rare earth elements, copper and gallium.
- These minerals are vital for EV batteries, solar panels, wind turbines, semiconductors, electronics and strategic sectors.

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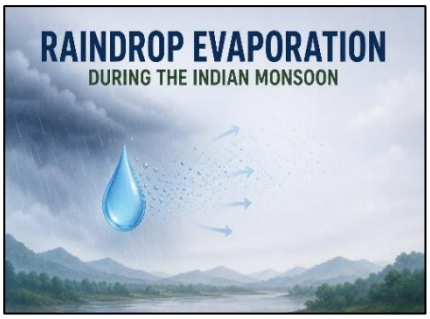
- India currently depends heavily on imports for many critical minerals, creating supply-chain vulnerability.
- Urban mining means recovering valuable metals and minerals from waste such as e-waste and discarded batteries.
- Mine tailings are leftover materials after mineral extraction; they may contain recoverable critical minerals.
- Fly ash, steel slag, overburden dumps and industrial waste can also act as secondary sources.
- Recycling supports circular economy, reduces import dependence, lowers environmental damage and improves resource efficiency.

5.4. Raindrop Evaporation during the Indian Monsoon

Context:

A study by the Indian Institute of Tropical Meteorology (IITM), Pune has found that nearly 25% of monsoon rainfall evaporates before reaching the ground over parts of India. The findings will improve weather forecasting, monsoon prediction, and climate models by better representing rainfall processes.

Explanation:



- **Raindrop evaporation** is the process by which falling raindrops evaporate before reaching the Earth's surface, especially in **dry and warm sub-cloud layers**.
- During the **Southwest Monsoon (June–September)**, evaporation rates vary with **temperature, humidity, wind, and raindrop size**.
- Evaporation causes **evaporative cooling**, creating **cold pools** and **downdrafts**, which influence **cloud formation, convection, and rainfall intensity**.
- The study used **stable water isotopes (heavy oxygen and hydrogen isotopes)** to estimate rain mass lost through evaporation.
- Accurate estimation of raindrop evaporation helps improve Numerical Weather Prediction (NWP), climate models, monsoon dynamics, hydrological cycle studies, and water resource planning.
- The findings are significant for enhancing disaster preparedness, agricultural advisories, and understanding the impacts of climate change on India's rainfall patterns.

MCQs

1. Consider the following statements:

Statement-I: Oceanic crust found near a mid-ocean ridge is generally younger than oceanic crust located farther from the ridge.

Statement-II: At mid-ocean ridges, magma rises through divergent plate boundaries and solidifies to form new oceanic crust.

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

(a) Both Statement-I and Statement-II are correct, and Statement-II explains Statement-I

(b) Both Statement-I and Statement-II are correct, but Statement-II does not explain Statement-I

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

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

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Answer

1. Answer: A

Space for Notes

6. Science and Technology

6.1. Vikram-1: India's Private Orbital Launch Milestone

Context:

Vikram-1 was recently in the news after becoming India's first privately developed launch vehicle, **built by Hyderabad-based Skyroot Aerospace**, to place payloads in orbit. The successful mission, **named "Aagaman," marks** a major expansion of private-sector participation in India's space programme.



Explanation:

Rocket Configuration and Technology:

- **Vikram-1 is a four-stage launch vehicle** comprising three solid-fuel stages and a liquid-powered orbital adjustment module.
- Its lightweight airframe **uses carbon-fibre composite material**, providing high strength while reducing the rocket's overall mass.
- **Vikram-1 Feature:** Uses an all-carbon-composite airframe, enabling economical small-satellite launches.
- **Challenge:** Manufacturing is complex due to hidden defects and directional (anisotropic) strength of fibres.
- Its propulsion systems **incorporate 3D-printed components,** which reduce the number of parts, manufacturing time, cost and possible points of failure.
- The modular design permits flexible launches for small satellites into different orbital configurations.

Significance of the Mission:

- The mission successfully validated **propulsion, avionics, navigation, guidance, stage separation and orbital-insertion systems** under operational conditions.
- It demonstrates the growing technological capability of Indian space start-ups and can complement **ISRO's PSLV and SSLV launch services.**
- A domestic private-launch ecosystem could promote innovation, skilled employment, supply-chain development and greater access to space.

Commercial Challenges:

- A successful maiden launch does not automatically establish commercial viability, customers require repeated demonstrations of reliability and competitive pricing.
- Skyroot must secure regular **domestic and international launch** contracts to sustain its proposed manufacturing capacity.

Space for Notes

- Competition from established rockets, **especially low-cost rideshare missions**, may constrain demand.
- Insurance costs, regulatory requirements, supply-chain limitations and the relatively small payload mass of the global small-satellite market remain important barriers.
- India's domestic commercial space market remains limited. Launch companies may therefore need to diversify into satellite manufacturing, communications, data analytics and other downstream services.
- Long-term competitiveness will require lower costs, rapid manufacturing, greater launch cadence, possible reusability and consistent mission reliability.

Conclusion:

Vikram-1 marks India's transition from private-sector participation to genuine private orbital capability. However, its lasting significance will be determined by whether technological success can be converted into affordable, dependable and frequently available commercial launch services.

Mains Practice Question:

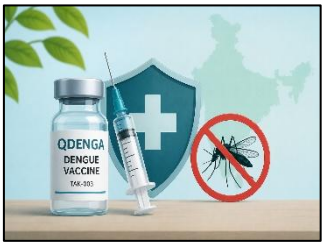
Q. What factors have contributed to the growth of private participation in India's space sector? Discuss the challenges in converting technological capability into a commercially viable launch ecosystem. **(15 Marks, 250 words)**

6.2. India Approves Its First Dengue Vaccine (QDENGA/TAK-003)

Context:

The Drug Controller General of India (DCGI) has granted market authorization to Takeda Biopharmaceuticals India's QDENGA (TAK-003), making it the first dengue vaccine approved in India. The vaccine is approved for individuals aged 4–60 years and is administered as a two-dose schedule with a three-month interval.

Explanation:



- Dengue is a mosquito-borne viral disease caused by the **Dengue virus** (DENV-1, DENV-2, DENV-3, DENV-4) and transmitted mainly by **Aedes aegypti** mosquitoes.
- **QDENGA (TAK-003)** is a **live-attenuated tetravalent vaccine**, designed to provide protection against **all four dengue serotypes.**
- Unlike earlier vaccines, pre-vaccination screening is not required, and it can be administered irrespective of prior dengue infection.
- Dengue can progress to severe dengue (dengue haemorrhagic fever/dengue shock syndrome) due to antibody-dependent enhancement (ADE) during secondary infection with a different serotype.
- Prevention relies on **integrated vector management.**

6.3. Mission Drishti: World's First OptoSAR Satellite Loses Contact

Context:

Bengaluru-based space start-up **GalaxEye** has lost contact with **Mission Drishti**, described as the world's first **OptoSAR satellite**. The anomaly occurred after a **geomagnetic solar storm**, and recovery chances are presently low.

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Explanation:

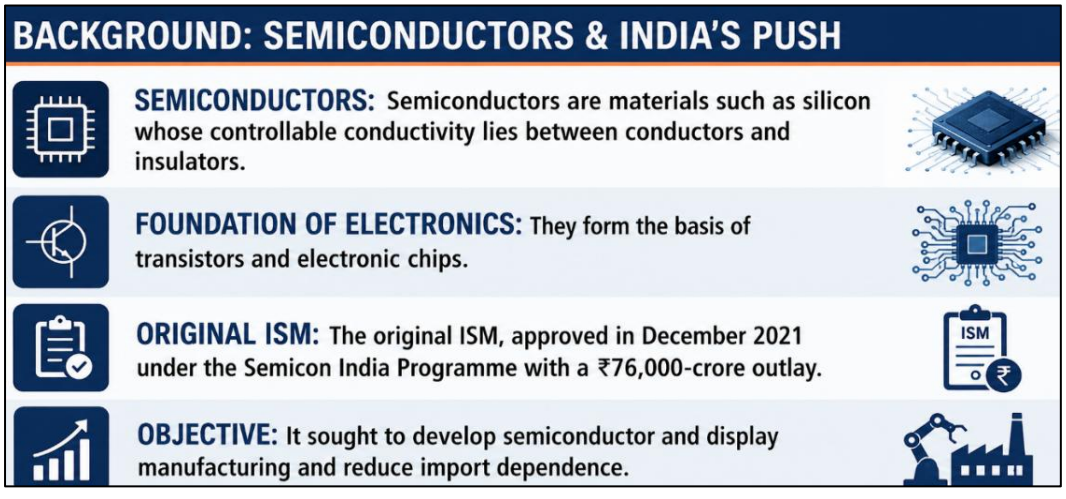


- **Mission Drishti** is India's largest privately developed **Earth observation satellite**.
- It was launched in May aboard **SpaceX Falcon 9** from **Vandenberg, California**.
- It combines **electro-optical sensors** and **Synthetic Aperture Radar (SAR)** on one satellite platform.
- **Electro-optical imaging** captures images using visible and infrared light, like a powerful space camera.
- **SAR** uses radar waves, so it can observe Earth even during night, clouds, smoke or bad weather.
- This combination is called **OptoSAR**, useful for agriculture, disaster management, defence, border monitoring and infrastructure mapping.
- The satellite faced problems during the final stage of **LEOP**, meaning Launch and Early Orbit Phase.
- A **geomagnetic solar storm** can disturb satellite electronics, communication systems and orbital stability.
- The incident shows that private space missions need strong space-weather protection and backup systems.

6.4. India Semiconductor Mission 2.0: Building an Innovation-Led Chip Ecosystem

Introduction:

The Union Cabinet has approved the second phase of the India Semiconductor Mission (ISM 2.0). The revised framework shifts emphasis beyond factories towards design, research, equipment, materials, intellectual property and resilient supply chains.



Mission Scope and Revised Incentives:

- ISM 2.0 covers chip design, fabrication, software, intellectual property, testing, packaging, equipment, materials and supply chains.
- The revised framework provides a 40% subsidy for silicon fabrication plants, 35% for advanced packaging and 25% for conventional packaging.

- A 75% subsidy for semiconductor design expenditure supports research, fabless design companies and start-ups.
- The Centre is unlikely to subsidise land acquisition or technology transfer, which means acquiring manufacturing knowledge from established global firms. Valuation difficulties prompted the exclusion of transfer costs.
- States must facilitate land and supporting infrastructure, while central assistance targets design, manufacturing, domestic value addition and technological self-reliance.
- Incentives should also develop domestic raw materials, specialty chemicals, industrial gases and production equipment.

Two-Level Technology Strategy:

- Mature nodes measure 28 nanometres or above, while leading-edge nodes fall below 7 nanometres. Smaller measurements indicate higher transistor density and technological advancement.
- India plans immediate production of mature chips aligned with current capabilities. These chips constitute about 70% of demand and serve smartphones, power grids and medical equipment.
- India also seeks to develop 7-nanometre and 2-nanometre chips within five years. This objective remains aspirational.
- Semiconductor leadership can arise from chip design and software even without domestic production of the most advanced nodes.

Constraints:

- Pandemic-era shortages and continuing technological rivalry expose the fragility of global semiconductor value chains.
- Brief power interruptions can destroy production. Logistics, environmental approvals and regulations must therefore remain predictable.
- India has engineers in global design companies but requires more specialised manufacturing technicians.

Implementation Priorities:

- Design clusters in Bengaluru, Hyderabad, Pune and Noida should connect innovation with manufacturing.
- Universities, research laboratories, start-ups and industry require stronger institutional cooperation.
- Market competition, sustained public support, reliable infrastructure and specialised skills must develop the complete value chain.

Conclusion:

Semiconductor leadership requires more than factories and financial incentives. India must convert design talent into manufacturing capacity while strengthening research, materials, equipment and intellectual property. A complete ecosystem can improve resilience, strategic autonomy and economic value.

Mains Practice Question:

Q. Semiconductor self-reliance cannot be achieved by establishing fabrication plants alone. Examine the importance of design, materials, equipment, skills and advanced packaging in developing a resilient semiconductor ecosystem in India.

(15 Marks, 250 words)

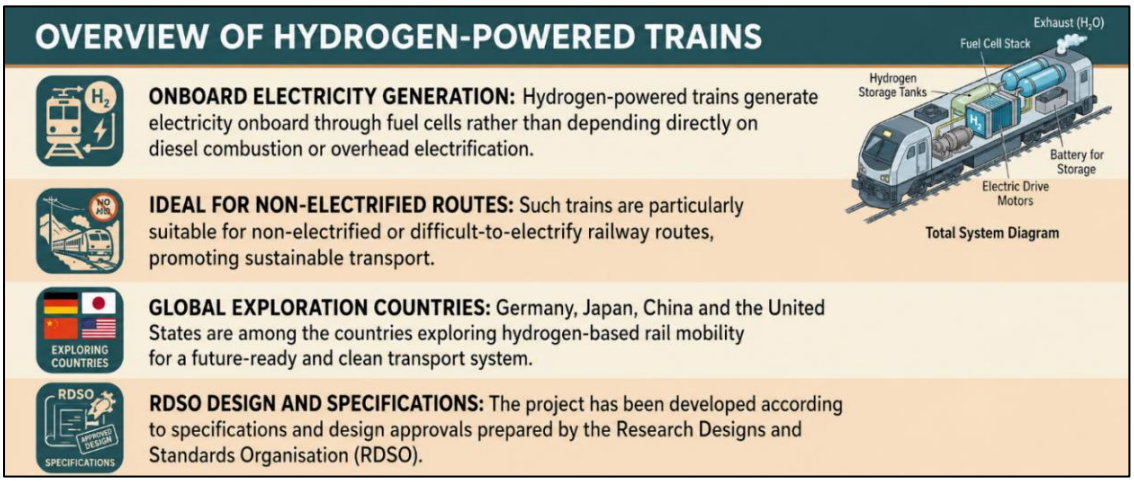
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6.5. India's First Hydrogen-Powered Train

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Context:

India's first indigenously designed hydrogen fuel-cell train is scheduled to begin operations on **the Jind - Sonipat section of Northern Railway** on July 17, 2026. The pilot project aims to demonstrate low-emission rail transport while building domestic capabilities in hydrogen propulsion, refuelling and safety systems.



Explanation:

- It supports the **National Green Hydrogen Mission**, *Atmanirbhar Bharat* and Indian Railways' objective of achieving net-zero carbon emissions.
- As a pilot initiative, it will generate operational knowledge for the future expansion of hydrogen-powered mobility.

Key Features:

- The train is a **10-car trainset** comprising two Hydrogen Driving Power Cars and eight trailer coaches.
- It uses a **1,200-kW hydrogen fuel-cell propulsion system** and can carry approximately 2,600 passengers.
- It has an approved operational speed of 75 kmph and a design speed of 110 kmph.

How Does It Work?

- Its principal energy source is a **Proton Exchange Membrane Fuel Cell (PEMFC)**.
- Inside the fuel cell, hydrogen reacts electrochemically with atmospheric oxygen across a proton-conducting membrane to generate electricity.
- Electricity powers the traction motors, while water vapour and heat are the principal onboard by-products.
- **Lithium iron phosphate batteries** store supplementary energy, support acceleration and regulate fluctuations in power demand.
- Hydrogen has a gravimetric energy content of around **120 MJ/kg**, compared with approximately 43 MJ/kg for diesel. However, it requires specialised high-pressure storage because of its low volumetric energy density.

Hydrogen Infrastructure:

- India's largest railway hydrogen storage and refuelling facility has been established at Jind, Haryana, with a capacity of nearly 3,000 kg.

Space for Notes

- The PESO-licensed facility contains hydrogen compressors, dispensing equipment, critical spares and a standby compressor.
- It follows **NFPA-2 and ISO 19880** standards and has undergone independent safety assessment by TUV SUD.

Operational Safety:

- Hydrogen and flame detectors continuously monitor production, storage and dispensing facilities.
- Continuous ventilation prevents gas accumulation, while automatic systems can stop the hydrogen supply upon detecting heat, flame or smoke.
- Real-time displays communicate system health to the loco pilot, and an emergency mode enables the train to be moved to safety.
- Trained personnel, technical staff, regular audits, prescribed maintenance and round-the-clock monitoring strengthen operational preparedness.

Significance and Concerns:

- The project promotes indigenous technological capability and can reduce local air pollution and dependence on imported fossil fuels.
- It can support green-hydrogen demand and provide clean transport on routes where full electrification is uneconomical.
- Nevertheless, green hydrogen remains expensive, requires considerable renewable electricity and presents storage and transportation challenges.
- Its lifecycle emissions depend on the production method; hydrogen derived from fossil fuels cannot provide fully clean mobility.
- The pilot must therefore evaluate cost, efficiency, durability, infrastructure requirements and safety before large-scale deployment.

Conclusion:

The hydrogen train is not merely a new trainset but a demonstration of an entire clean-mobility ecosystem. Its success can enable wider adoption, provided India expands affordable green-hydrogen production, maintains rigorous safety standards and deploys the technology on routes where it offers clear advantages over electrification.

Mains Practice Question:

Q. What are the advantages of hydrogen fuel-cell trains? Examine the technological, economic and environmental factors that should determine their deployment in India.
(10 Marks, 150 words)

6.6. IIT Bombay Develops Efficient Method for Sustainable Drug Discovery

Context:

Researchers at IIT Bombay have developed a new chemical method to efficiently convert simple straight-chain carbon compounds into complex ring-shaped molecules. The breakthrough could make drug discovery faster, cheaper, and more sustainable by simplifying the synthesis of medicinal compounds.

Explanation:

- **Synthetic chemistry** involves designing and synthesizing molecules for pharmaceuticals, agrochemicals, and advanced materials.
- **Lactones are cyclic esters** widely found in natural products and pharmaceuticals, exhibiting antibiotic, anticancer, antifungal, and anti-inflammatory properties.

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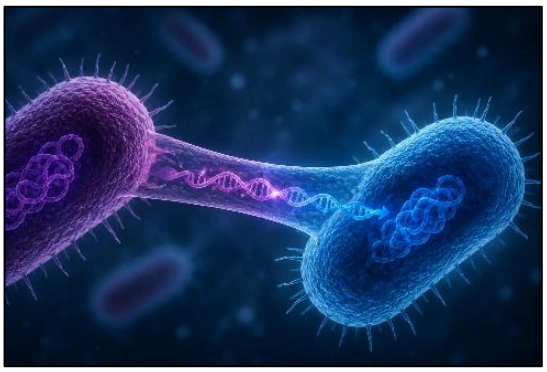
- Conventional lactone synthesis often requires multiple reaction steps, increasing cost, time, and chemical waste.
- IIT Bombay's **catalytic selective conversion** efficiently transforms simple acyclic (straight-chain) compounds into lactones, improving yield and reducing reaction steps.
- The method aligns with **Green Chemistry principles** by enhancing atom economy, reducing waste, and lowering energy consumption.
- The breakthrough has applications in drug discovery, medicinal chemistry, and the synthesis of **bioactive molecules**.

6.7. Scientists Directly Observe Genetic Material Moving Between Microbial Species

Context:

Researchers at the Max Planck Institute visually tracked a circular intron RNA moving from the predatory bacterium *Vampirococcus archaeovorus* into its archaeal prey, *Methanothrix soehngenii*. It provides rare direct evidence of cross-domain horizontal transfer without a viral carrier.

Explanation:



- **Horizontal gene transfer (HGT)** is the movement of genetic material between organisms other than through parent - offspring inheritance.
- It differs from **vertical gene transfer**, which occurs from parents to descendants.
- HGT commonly occurs through **transformation** (uptake of free DNA), **transduction** (virus-mediated transfer) and **conjugation** (direct cell-to-cell transfer).
- "**Jumping genes**" are mobile genetic elements capable of changing their position within a genome or moving between organisms.
- The predator's **23S ribosomal RNA gene** contains a self-splicing **Group I intron** - a sequence removed during RNA processing.
- After excision, the intron forms stable **circular RNA**, which resists degradation because it lacks exposed ends.
- Scientists used fluorescent nucleic-acid probes and microscopy to detect this RNA in the predator and dead prey cells.
- This provides direct visual evidence of RNA crossing from Bacteria to Archaea without a viral carrier.
- HGT can spread antibiotic resistance, virulence and metabolic traits, thereby accelerating microbial evolution.

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6.8. WHO Report 2026: Growing Global Inequalities in Access to Cancer Care

Context:

The **World Health Organization (WHO)** and the **International Agency for Research on Cancer (IARC)** have released the **Global Status Report on Cancer 2026**, highlighting widening inequalities in cancer prevention, diagnosis, treatment, and supportive care. The report warns that global cancer cases could rise to nearly **35 million annually by 2050** if urgent action is not taken.

Explanation:



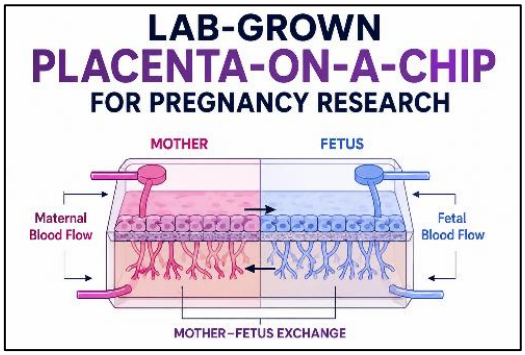
- **Cancer** is the **uncontrolled growth of abnormal cells**, and it is the **second leading cause of death globally** after cardiovascular diseases.
- The **World Health Organization (WHO)** is the UN's specialized agency for global public health, while the **International Agency for Research on Cancer (IARC)** is WHO's specialized cancer research agency.
- The **Global Status Report on Cancer 2026** assesses trends in **cancer incidence, mortality, prevention, diagnosis, treatment, and palliative care**.
- **Universal Health Coverage (UHC)** aims to ensure access to quality health services without financial hardship, yet fewer than one-third of countries include comprehensive cancer care in UHC packages.
- **Cancer burden** varies across regions, **Asia** records the highest number of cases due to its large population, whereas **low-income countries** experience disproportionately higher mortality because of delayed diagnosis and limited healthcare infrastructure.

6.9. Lab-Grown Placenta-on-a-Chip for Pregnancy Research

Context:

Researchers from **ICMR–National Institute for Research on Women's Health (ICMR-NIRRWH), Mumbai** and **IIT Bombay** have developed a **placenta-on-a-chip** model that closely mimics the human placenta. The innovation will help scientists study how drugs, nutrients, hormones and harmful substances pass from the mother to the foetus, enabling safer pregnancy research.

Background:



- **Placenta** is a temporary organ that develops during pregnancy and connects the foetus to the mother's uterus through the **umbilical cord**.
- It facilitates the exchange of **oxygen, nutrients, hormones and antibodies** while removing **carbon dioxide and metabolic wastes** from the foetus.
- The placenta also acts as a **selective biological barrier**, preventing many microbes and toxins from reaching the foetus, although some drugs and pathogens can cross it.

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- **Placenta-on-a-chip** is an **organ-on-a-chip** technology that recreates the placental interface using **human placental cells**, **endothelial cells** and a **porous membrane** to simulate maternal–foetal exchange.
- The model can study the transfer of **drugs, nutrients, pollutants and infectious agents**, reducing dependence on **animal models**, which often fail to accurately replicate human pregnancy.
- It can improve research on pregnancy-related disorders such as **pre-eclampsia**, **gestational diabetes**, and **foetal growth restriction**, and support the development of safer medicines for pregnant women.

6.10. NASA's Robotic Rescue Mission for Swift Space Telescope

Context:

NASA launched a robotic rescue mission to prevent the ageing Neil Gehrels Swift Observatory from falling towards Earth. The mission aims to tow the telescope into a stable orbit using a specialised spacecraft.

Explanation:



- Neil Gehrels Swift Observatory was launched by NASA in 2004 to study gamma-ray bursts (GRBs).
- Gamma-ray bursts are extremely energetic explosions linked to the death of massive stars or compact object mergers.
- Swift operates in Low Earth Orbit (LEO), around 600 km altitude.
- Satellites in LEO experience gradual orbital decay due to atmospheric drag.
- Without sufficient propulsion, ageing satellites may lose altitude and eventually burn up in Earth's atmosphere.
- The rescue mission uses a robotic spacecraft designed to approach, latch on and tow Swift into a safer orbit.
- Such missions are part of on-orbit servicing, which includes satellite repair, refuelling, repositioning and debris management.
- It also reflects the growing importance of space sustainability and extending the life of costly scientific missions.

6.11. Nuclear Heat-Based Hydrogen Production using Cu–Cl Thermochemical Cycle

Context:

The Department of Atomic Energy has inaugurated the world's first hydrogen production facility using the Copper–Chlorine thermochemical cycle and nuclear heat from the Fast Breeder Test Reactor at Kalpakkam. It marks a major step in linking advanced nuclear energy with clean hydrogen production.

Explanation:

- Hydrogen is a clean energy carrier that can support decarbonisation in industry, transport and energy storage.

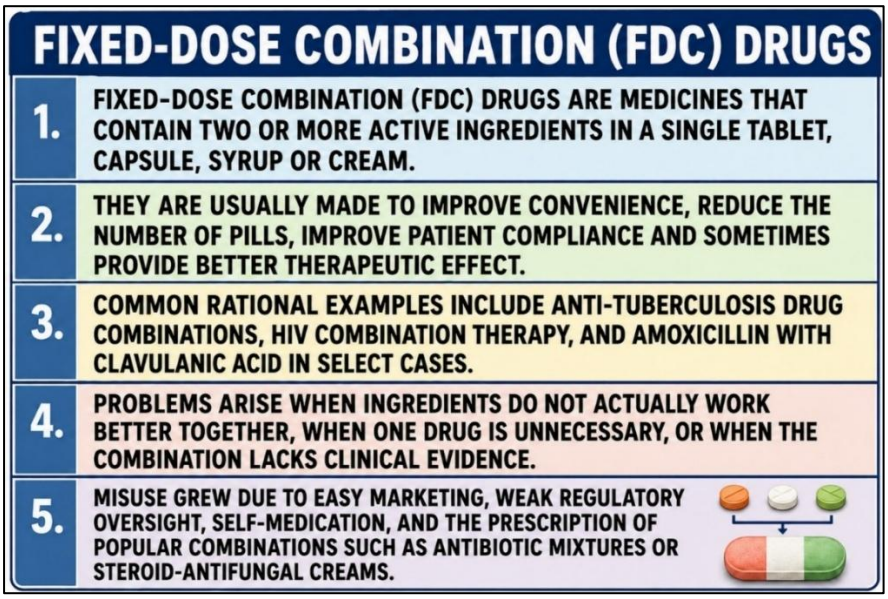
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- Conventional hydrogen production often depends on fossil fuels, while green/clean hydrogen aims to reduce carbon emissions.
- The Copper–Chlorine (Cu–Cl) thermochemical cycle uses heat-driven chemical reactions to split water and produce hydrogen.
- It is considered promising because it works at relatively lower temperatures compared to some other thermochemical cycles.
- Nuclear process heat can provide reliable, carbon-free heat for hydrogen production.
- The facility uses heat from the Fast Breeder Test Reactor (FBTR) at IGCAR, Kalpakkam.
- Fast breeder reactors produce more fissile material than they consume and are central to India's three-stage nuclear programme.
- BARC developed the indigenous Cu–Cl hydrogen technology, while IGCAR leads fast breeder reactor research.

6.12. Drugs Misuse and Regulation of Fixed-Dose Combination Medicines

Context:

Recently, the government banned several **fixed-dose combination (FDC) drugs**, including certain antibiotic mixtures and dermatological creams, because they lacked adequate scientific justification. Irrational combinations may expose patients to unnecessary medicines, adverse effects and rising **antimicrobial resistance (AMR)**.



Explanation:

Regulation of FDCs:

Scientific justification:

- Every combination should demonstrate safety, effectiveness and a clear advantage over its individual ingredients. Approval must be based on clinical evidence and risk-benefit assessment rather than commercial popularity.

Global regulation:

- The **United States** generally requires a new drug application supported by clinical evidence.
- The **European Union** permits FDCs only when each ingredient has a justified therapeutic role.
- The **World Health Organization (WHO)** cautions against irrational antibiotic combinations because they encourage AMR.

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Regulation in India:

- Earlier, many FDCs were approved by State authorities without sufficient central review.
- Later reforms introduced greater central scrutiny, and expert committees reviewed thousands of combinations.
- Products without adequate therapeutic justification were subsequently banned.

What Should Be Done?

Regulators:

- Ensure uniform central approval, periodic market review and removal of unsafe combinations.

Doctors and pharmacists:

- Prescribe and dispense FDCs only when evidence shows a clear medical benefit.
- Avoid unnecessary antibiotics and explain the purpose of each ingredient.

Patients:

- Avoid self-medication, leftover antibiotics and unprescribed combination creams.
- Understand that more ingredients do not necessarily mean better treatment.

Conclusion:

FDCs can simplify treatment when scientifically justified. However, irrational combinations increase adverse effects, treatment failure and antimicrobial resistance; therefore, their approval and use must remain evidence-based.

Mains Practice Question:

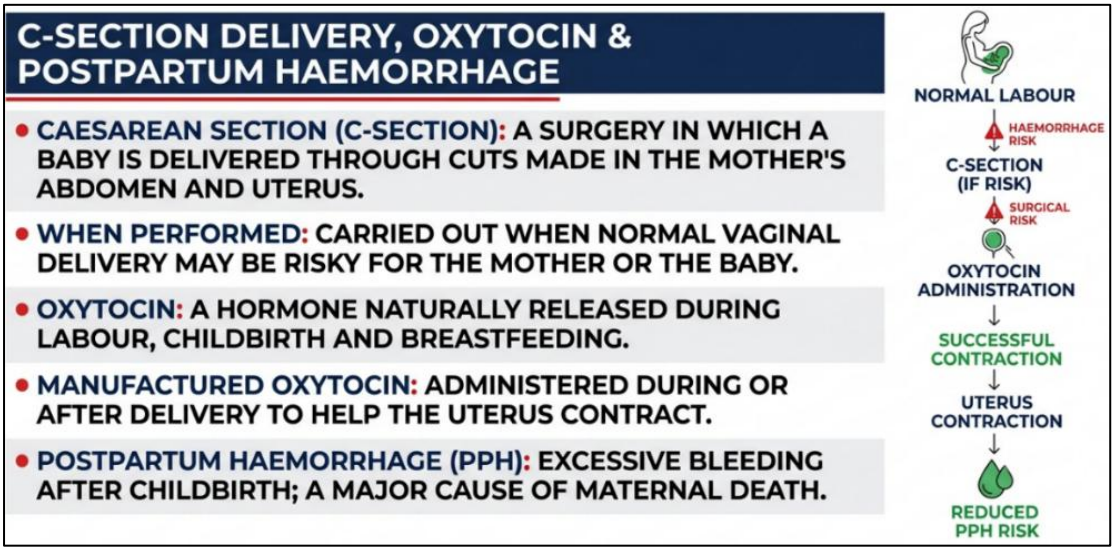
Q. Irrational fixed-dose combinations constitute both a drug-regulation problem and a public-health challenge. Discuss, with particular reference to antimicrobial resistance.

(10 Marks, 150 words)

6.13. Oxytocin, C-Sections and Maternal Safety

Context:

Recently, suspected fake or substandard oxytocin used during C-sections in Rajasthan was linked to excessive bleeding and maternal deaths. The **World Health Organization (WHO)** has sought information from India, highlighting concerns over drug quality in childbirth care.



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Explanation:

Role During Childbirth:

- After delivery, blood vessels at the place where the placenta was attached remain open.
- Oxytocin contracts the uterus and compresses these vessels, thereby reducing blood loss.
- It also helps in the delivery of the placenta and supports breast-milk release.

Importance in C-Sections:

- Natural oxytocin release may be weaker during a C-section, especially under spinal or epidural anaesthesia.
- Doctors therefore administer oxytocin to ensure that the uterus contracts properly.
- Failure of the uterus to contract, called **uterine atony**, can cause severe and life-threatening bleeding.

Other C-Section Risks:

- Possible complications include wound or uterine infection, greater blood loss and reactions to anaesthesia.
- Severe cases may require blood transfusion, intensive care or emergency surgery.

Risk from Poor-Quality Oxytocin:

- Fake or substandard oxytocin may contain insufficient or no active ingredient.
- Improper storage can also reduce its effectiveness.
- If the medicine fails, heavy bleeding may continue despite treatment.

Way Forward:

- Every batch should undergo strict quality testing before use.
- **Quick Response (QR) codes** and barcodes should be used to track the manufacturer, batch and supply chain.
- The **Central Drugs Standard Control Organisation (CDSCO)** and State regulators must conduct regular inspections and rapid recalls.
- Hospitals should ensure proper storage, blood availability and trained emergency teams.
- Maternal deaths should be audited to identify medical and regulatory failures.

Conclusion:

Oxytocin is a life-saving medicine during childbirth, especially in C-sections. Its success depends on correct use and assured quality. Strong drug regulation is essential to protect mothers.

Mains Practice Question:

Q. Maternal mortality caused by substandard medicines represents both a public-health failure and a regulatory failure. Discuss with reference to drug procurement, storage, surveillance and accountability in India. **(15 marks, 250 words)**

6.14. DRDO Conducts Maiden Flight Test of Project Kusha Long-Range Air-Defence Missile

Context:

DRDO successfully conducted the first flight test of the Project Kusha Long-Range Surface-to-Air Missile (LR-SAM) from Dr. APJ Abdul Kalam Island, Odisha.

Space for Notes

Explanation:



- **Project Kusha** is an indigenous, long-range **surface-to-air missile system** developed by DRDO for the Indian Air Force
- The indigenous system is intended to intercept high-altitude aerial threats at ranges of up to 400 km, reducing dependence on imported systems such as the S-400.
- It is designed to counter fighter aircraft, cruise missiles, drones and other high-altitude aerial threats.
- It includes missiles, radars and a networked **command-and-control system**, providing layered air defence.
- It will complement the **Integrated Air Defence Weapon System**, comprising QRSAM, VSHORADS and directed-energy weapons.
- The system supports **Atmanirbhar Bharat**, strategic autonomy and reduced dependence on imported S-400 systems.

6.15. ICMR-INDIAB Study Highlights High Burden of Dyslipidemia in Indian Adults

Context:

An ICMR-INDIAB national study has found that nearly 9 in 10 Indian adults have at least one lipid abnormality, with low High-Density Lipoprotein (HDL) being the most common.

Explanation:



- **Dyslipidemia** is an abnormal level of blood lipids, including high LDL, low HDL, high triglycerides or high total cholesterol, increasing the risk of atherosclerosis and cardiovascular diseases (CVDs).
- **HDL** (High-Density Lipoprotein) is "good cholesterol" that removes excess cholesterol from arteries, while **LDL** (Low-Density Lipoprotein) is "bad cholesterol" that promotes plaque formation.
- Major risk factors include sedentary lifestyle, unhealthy diet, obesity, diabetes, hypertension, insulin resistance, tobacco use and genetic predisposition.
- Dyslipidemia is a major **modifiable risk factor** for coronary artery disease, stroke and peripheral arterial disease, making early screening, regular physical activity and a balanced diet essential.

6.16. Embodied AI: Advancing the Next Generation of Intelligent Robots

Context:

Recent advances by companies such as Boston Dynamics and Google DeepMind have accelerated the development of Embodied AI.

Explanation:

- **Embodied AI** integrates Artificial Intelligence with a physical body, enabling robots to perceive, learn, reason and act through interaction with the real world using sensors, actuators and feedback.

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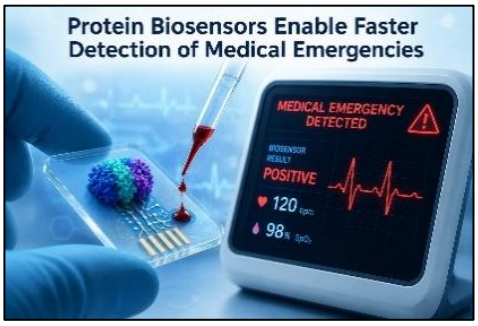
- Unlike **Generative AI** (text, image and video models), Embodied AI must handle gravity, balance, locomotion, object manipulation and real-time decision-making.
- Major challenges include the **simulation-to-reality (Sim-to-Real) gap**, scarcity of real-world training data, hardware limitations and safe human-robot interaction.
- Emerging technologies include **Neuromorphic AI, Spiking Neural Networks (SNNs)** and **Evolutionary Algorithms**, improving energy-efficient learning, adaptive behaviour and autonomous robotics.
- The technology aims to bridge the gap between simulation-based learning and autonomous operation in dynamic environments.

6.17. Protein Biosensors Enable Faster Detection of Medical Emergencies

Context:

Researchers are developing protein biosensors that can rapidly detect multiple disease-related biomarkers, including proteins associated with sepsis. These devices could shorten diagnostic delays and support timely, point-of-care treatment.

Explanation:



- A **biosensor** combines a biological recognition element with a **transducer** that converts biological activity into a measurable signal.
- Proteins serve as **biomarkers** because their levels change during infections, cancer, heart attacks and inflammation.
- The first functional biosensor was the enzyme-based **glucose sensor** developed in 1962.
- Modern sensors increasingly use **aptamers** - synthetic DNA or RNA strands that bind selectively to target proteins.
- Aptamers are cheaper, stable and easier to manufacture than antibodies.
- Nanomaterials improve sensitivity and enable **multiplex detection**.
- Applications include sepsis diagnosis, wearables, cancer screening and food safety.

6.18. NASA Astronaut Anil Menon Begins Eight-Month ISS Mission

Context:

NASA astronaut Anil Menon has reached the International Space Station aboard Russia's Soyuz MS-29 spacecraft for his first spaceflight. He will conduct scientific research and technology demonstrations during the eight-month mission.

Explanation:

- Menon launched with **Roscosmos** cosmonauts Pyotr Dubrov and Anna Kikina from **Baikonur Cosmodrome**, Kazakhstan.
- **Soyuz MS-29** is a Russian crewed spacecraft that transports astronauts to the ISS.
- It docked with the station's **Prichal module**.
- Menon, a physician of Indian-Ukrainian heritage, represents **NASA**, not ISRO.

Space for Notes



- The crew will serve under **ISS Expeditions 74 and 75** and return in April 2027.
- The ISS is a multinational research laboratory operating in **low-Earth orbit**.
- Experiments will examine **microgravity's effects** on human physiology and test technologies for long-duration space exploration.
- The mission reflects continuing **NASA - Roscosmos cooperation**.

6.19. DRDO Successfully Tests Pinaka Long-Range Guided Rocket

Context:

The **Defence Research and Development Organisation (DRDO)** successfully flight-tested the **Pinaka Long-Range Guided Rocket (LRGR)** from the **Integrated Test Range (ITR), Chandipur, Odisha**. The test validated its **60 km user-defined minimum strike range** and demonstrated high-precision targeting from the existing Pinaka launcher.

Explanation:



- **Pinaka** is an **indigenously developed Multi-Barrel Rocket Launcher (MBRL)** system designed for **area saturation** and precision strikes.
- It has been developed by **DRDO**, led by the **Armament Research and Development Establishment (ARDE)**, with contributions from **HEMRL, DRDL**, and **Research Centre Imarat (RCI)**.
- The **Long-Range Guided Rocket (LRGR)** uses **guidance and navigation systems** for improved accuracy compared to unguided rockets.
- A single **Pinaka launcher** can fire different variants of rockets with varying ranges, enhancing **operational flexibility**.
- Pinaka is intended to replace imported rocket artillery systems and strengthen **Aatmanirbhar Bharat** in defence.
- **Integrated Test Range (ITR), Chandipur (Odisha)** is a key DRDO facility for testing **missiles, rockets, and defence systems**.

6.20. Strain-Tunable Metals for Programmable Nanophotonic Devices

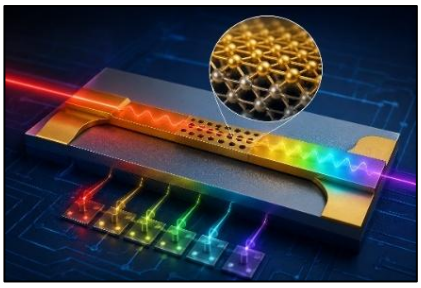
Context:

Researchers from the **Jawaharlal Nehru Centre for Advanced Scientific Research (JNCASR), Bengaluru** have shown that the optical properties of metals can be changed by applying **mechanical strain**. This discovery may help build **programmable nanophotonic devices**, optical sensors and chip-compatible photonic circuits.

Explanation:

- Metals interact with light through their free electrons.
- In some metals, light can be trapped and concentrated at extremely small scales; this is called **plasmon resonance**.

Space for Notes



- Earlier, scientists believed that a metal's optical properties were mostly fixed after choosing its material composition.
- **Simple idea:** Metals usually interact with light in a fixed way, but JNCASR scientists showed that if an ultrathin metal film like titanium nitride is slightly stretched or strained, its electrons behave differently. So, the metal can be "tuned" to reflect, absorb or trap light differently.
- **Simple example:** Just as tightening a guitar string changes its sound, applying strain to a metal changes how it responds to light. This can help make tiny light-based devices for sensors, cancer diagnosis, optical chips and programmable nanophotonic devices.

6.21. Mahendragiri: Project 17A Indigenous Stealth Frigate

Context:

The Indian Navy is set to commission **Mahendragiri (F38)**, the sixth **Project 17A indigenous stealth frigate**, at Visakhapatnam on 11 July 2026. The warship highlights India's progress in indigenous naval design, stealth technology and defence manufacturing.

Explanation:



- Project 17A is India's programme to build advanced indigenous stealth guided-missile frigates as successors to the Shivalik-class frigates.
- A frigate is a medium sized naval warship used for escort, patrol, anti -submarine warfare, anti-air warfare and maritime security operations.
- Stealth features reduce a ship's radar signature, making it harder for enemy sensors to detect and track.
- Mahendragiri was designed by the Indian Navy's Warship Design Bureau (WDB) and built by Mazagon Dock Shipbuilders Limited (MDL), Mumbai.
- It has over 75% indigenous content, supporting Aatmanirbhar Bharat, MSMEs and India's defence industrial base.
- It uses CODOG propulsion, meaning Combined Diesel or Gas, allowing efficient cruising and high-speed operations.
- It is equipped for anti-air, anti-surface and anti-submarine warfare, along with HADR, Search and Rescue and Indo-Pacific maritime security roles.

6.22. Netra AEW&C: India's Indigenous Airborne Early Warning and Control System

Context:

India's indigenous Netra Airborne Early Warning and Control (AEW&C) system has received Final Operational Clearance (FOC) after years of development and operational use. The milestone confirms its full operational capability and paves the way for induction of more advanced indigenous AEW&C aircraft.

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Explanation:



- Airborne Early Warning and Control (AEW&C) is a flying radar station that detects, tracks, identifies and monitors enemy aircraft, drones, cruise missiles and other airborne threats over long distances while simultaneously directing friendly air operations.
- Unlike ground-based radars, AEW&C aircraft fly at high altitude, enabling them to detect low-flying aircraft beyond the radar horizon created by the Earth's curvature.
- AEW&C acts as a force multiplier, providing early warning, surveillance, command and control, battle management and supporting network-centric warfare.
- Major AEW&C/AWACS systems include the E-3 Sentry (USA/NATO), Saab Erieye/GlobalEye (Sweden), KJ-2000/KJ-500 (China), A-50 Mainstay (Russia) and E-2 Hawkeye (USA Navy).
- Netra AEW&C has been developed by the Centre for Airborne Systems (CABS) under the Defence Research and Development Organisation (DRDO) and is mounted on the Brazilian Embraer EMB-145I aircraft platform.
- India is among a select group of countries possessing indigenous AEW&C capability and is developing larger Netra Mk-1A systems to further strengthen long-range aerial surveillance.

6.23. Discovery of the Oldest Known Quasars in the Early Universe

Context:

Astronomers using the Euclid Space Telescope have discovered the oldest known quasars, dating back to the first 700 million years after the Big Bang. The findings provide new insights into the early growth of supermassive black holes and the formation of galaxies, while also posing fresh questions about how such massive objects formed so quickly.

Explanation:

- A quasar is the incredibly bright core of a distant galaxy, powered by a giant black hole. As the black hole feeds on swirling gas and dust, it creates a superheated ring of matter that shines up to a thousand times brighter than an entire galaxy.
- A quasar isn't the black hole itself, but the massive light show surrounding it.
- As gas and dust spiral into the black hole through an accretion disk, enormous amounts of gravitational energy are converted into light, making quasars among the brightest objects in the Universe.
- Supermassive black holes are typically millions to billions of times the mass of the Sun and are believed to exist at the centres of most galaxies.
- The Big Bang marks the origin of the Universe about 13.8 billion years ago; studying distant quasars helps
- scientists understand the early evolution of galaxies and black holes.
- The Euclid Space Telescope, launched by the European Space Agency (ESA) in 2023, maps the large-scale structure of the Universe to study dark matter, dark energy, and the evolution of galaxies.

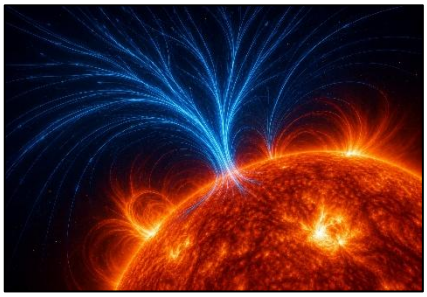
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6.24. Magnetic Tree Hypothesis Validated Through Sun's Upper Atmosphere Study

Context:

Researchers from ARIES, in collaboration with Indian institutions and NASA, have discovered that the Sun's meridional plasma flow extends into the upper chromosphere, providing the first observational evidence supporting the magnetic tree hypothesis. The finding improves understanding of the solar dynamo and space weather, which can affect satellites, communication, navigation, and power grids on Earth.

Explanation:



- The Sun consists of the Photosphere (visible surface), Chromosphere, Transition Region, and Corona; its atmosphere is composed of hot ionized gas called plasma.
- **Meridional flow** is a slow poleward movement of plasma that transports magnetic fields across the Sun and helps regulate the 11-year solar cycle.
- The Solar Cycle is the periodic rise and fall of the Sun's magnetic activity approximately every 11 years, influencing sunspots, solar flares, and other energetic events.
- The **Solar Dynamo** generates the Sun's magnetic field through plasma motion and differential rotation, driving solar flares, Coronal Mass Ejections (CMEs), and space weather.
- The **Magnetic Tree Hypothesis** proposes that magnetic structures in the Sun's upper atmosphere remain connected to deeper solar layers, like branches connected to the trunk and roots of a tree.
- The study used the **Nobeyama Radioheliograph (Japan),** demonstrating how radio astronomy can probe the Sun's internal dynamics and validate the magnetic tree hypothesis.

6.25. Cyclospora Outbreak in the United States

Context:

The United States is witnessing a multi-state outbreak of Cyclospora infections, with contaminated leafy greens and fresh produce suspected as the primary source.

Explanation:

- Cyclospora cayetanensis is a protozoan parasite that causes **Cyclosporiasis**, a food- and water-borne intestinal disease.
- Infection occurs through ingestion of **sporulated oocysts** contaminating fresh fruits, vegetables, herbs, or water; person-to-person transmission does not occur because oocysts require days to weeks outside the body to become infective.
- Symptoms include prolonged watery diarrhoea, abdominal cramps, bloating, nausea, fatigue, and weight loss; incubation period is usually about one week.

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- Diagnosis is by stool examination using specialized molecular or fluorescence-based techniques; treatment is commonly **Trimethoprim-Sulfamethoxazole (TMP-SMX)**.
- The outbreak has highlighted the parasite's resistance to routine disinfection, diagnostic challenges, and the need for stronger food safety measures across the supply chain

6.26. Role of Leucine in Mitochondrial Energy Production

Context:

Recent research highlights that **leucine**, an essential amino acid, helps protect mitochondria and supports cellular energy production. It may prevent premature degradation of mitochondrial outer membrane proteins, thereby helping cells maintain energy balance.

Explanation:



- **Amino acids** are the building blocks of **proteins**, which perform vital functions in cells and organs.
- **Leucine** is an **essential amino acid**, meaning the human body cannot produce it and must obtain it from food.
- It belongs to **Branched Chain Amino Acids (BCAAs)**, along with **isoleucine** and **valine**.
- **Mitochondria** are called the **powerhouse of the cell** because they produce **ATP**, the cell's energy currency.
- Organs with high energy demand, such as the **heart, muscles, brain and nervous system**, depend heavily on mitochondria.
- Leucine helps maintain the **outer mitochondrial membrane** and protects mitochondrial proteins from premature degradation.
- A study using **Caenorhabditis elegans** showed leucine interacts with **SEL1L protein**, linked to removal of damaged proteins.
- This may help in understanding **metabolic disorders, ageing and age-related diseases.**

6.27. Space Oncology

Context:

Space oncology is an emerging field that studies how microgravity and space radiation influence cancer cells, with the aim of improving cancer research, drug discovery and treatment. Recent advances in space-based experiments are opening new possibilities for biomedical innovation.

Explanation:

- Space oncology studies the effects of microgravity and cosmic radiation on cancer biology to improve diagnosis and therapy.
- Microgravity is a condition of near-weightlessness experienced in orbit, where gravitational forces are greatly reduced.
- In microgravity, cancer cells form 3D spheroids, which closely resemble human tumours and help in realistic drug testing.
- Space-based research can reveal changes in gene expression, cell signalling, protein synthesis, cell proliferation and metastasis.

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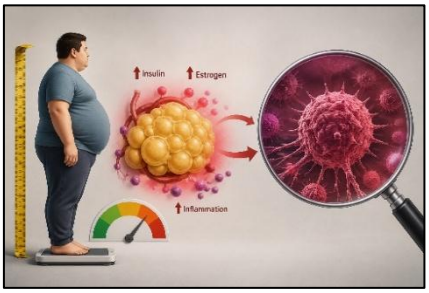
- Microgravity also affects protein crystallisation and nanoparticle behaviour, aiding the development of more effective medicines.
- The International Space Station (ISS) serves as a major laboratory for biomedical and cancer research in space.
- Space experiments may accelerate drug discovery, personalised medicine, biomarker identification and precision oncology, while reducing dependence on animal testing.
- The Indian Space Research Organisation (ISRO) is increasingly supporting space-based life sciences and biomedical research through its expanding space programme.

6.28. Higher BMI and Cancer Risk

Context:

A new international study published in Nature Metabolism found that higher Body Mass Index (BMI) is linked to increased risk of 19 types of cancer. The findings are important as obesity is rising globally and is considered a major modifiable risk factor.

Explanation:



- Body Mass Index (BMI) is a simple measure of body fat based on a person's weight and height.
- It is calculated as weight in kilograms divided by height in metres squared (kg/m²).
- Obesity refers to excessive body fat accumulation that can harm health.
- Excess body fat may increase cancer risk by disturbing insulin levels, oestrogen levels, metabolism and immune functions.
- It can also cause chronic inflammation, which may support abnormal cell growth.
- The study linked higher BMI with cancers such as endometrial cancer, oesophageal adenocarcinoma, colorectal cancer, gallbladder cancer, leukaemia, non-Hodgkin lymphoma, bladder cancer and glioma.
- Obesity-related cancer risks may vary by sex, geography, ethnicity and cancer type.

MCQs

1. Consider the following pairs:

Nuclear material or technology	Description
1. Natural uranium	Can be used as fuel in pressurised heavy-water reactors
2. Enriched uranium	Commonly used in light-water reactors
3. Thorium-232	Fissile material capable of sustaining a chain reaction without conversion
4. Fast breeder reactor	Operates without the use of any fertile material

How many of the pairs given above are correctly matched?

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

2. Consider the following statements:
Statement-I: Establishing semiconductor fabrication plants alone may not ensure resilience of a country's semiconductor supply chain.
Statement-II: Semiconductor production also depends upon chip design, fabrication equipment, specialty chemicals, industrial gases, packaging and testing facilities.
Which one of the following is correct in respect of the above statements?
(a) Both Statement-I and Statement-II are correct, and Statement-II explains Statement-I
(b) Both Statement-I and Statement-II are correct, but Statement-II does not explain Statement-I
(c) Statement-I is correct, but Statement-II is incorrect
(d) Statement-I is incorrect, but Statement-II is correct

3. With reference to hydrogen fuel-cell transport, consider the following statements:
1. A hydrogen fuel cell generates electricity through an electrochemical reaction rather than combustion.
2. Water and heat are the principal onboard by-products when pure hydrogen is used.
3. Hydrogen's high gravimetric energy density eliminates the need for specialised storage systems.
4. Batteries may be used along with fuel cells to meet fluctuations in traction-power demand.

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

4. An outbreak of an intestinal disease is traced to contaminated fresh produce. Direct person-to-person transmission is considered unlikely because the parasite is not immediately infective when excreted. Which one of the following organisms is most consistent with this description?
(a) Plasmodium falciparum
(b) Cyclospora cayetanensis
(c) Dengue virus
(d) Salmonella Typhi

5. Consider the following statements:
Statement-I: An airborne radar can generally detect a low-flying aircraft at a greater distance than a comparable ground-based radar.
Statement-II: Placing the radar at a higher altitude extends its line of sight beyond the radar horizon of a ground-based system.
Which one of the following is correct in respect of the above statements?
(a) Both Statement-I and Statement-II are correct, and Statement-II explains Statement-I
(b) Both Statement-I and Statement-II are correct, but Statement-II does not explain Statement-I
(c) Statement-I is correct, but Statement-II is incorrect
(d) Statement-I is incorrect, but Statement-II is correct

Space for Notes

Answers

1. Answer: B
2. Answer: A
3. Answer: C
4. Answer: B
5. Answer: A

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Space for Notes

7. Internal Security

7.1. MeitY Releases Digital Threat Report 2025–26 for India's BFSI Sector

Context:

The Ministry of Electronics and Information Technology (MeitY), in collaboration with CERT-In, CSIRT-Fin, and SISA, has released the second edition of the Digital Threat Report 2025–26 for India's Banking, Financial Services, Insurance (BFSI), and payments ecosystem.

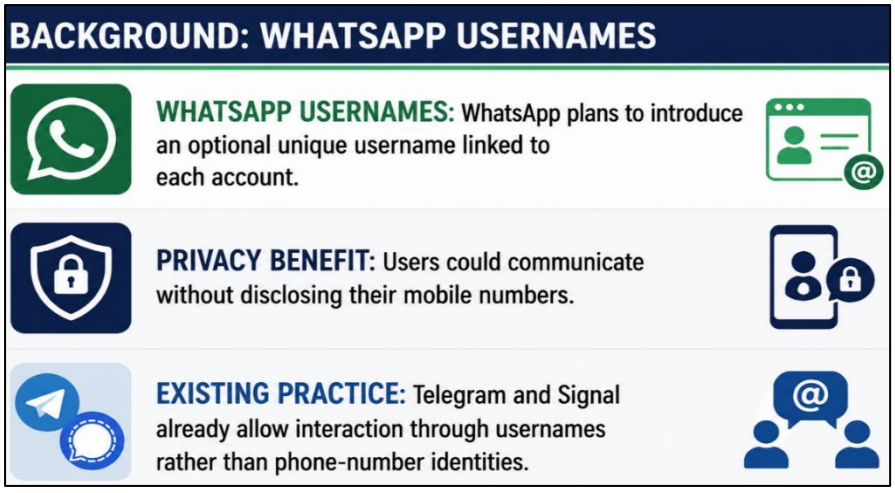
Explanation:

- The BFSI (Banking, Financial Services and Insurance) sector is part **of India's Critical Information Infrastructure (CII)** and is increasingly vulnerable to cyber threats due to rapid digitalisation.
- The report **identifies AI asymmetry,** where attackers exploit Artificial Intelligence (AI) faster than defenders, enabling large-scale phishing, credential theft, deepfakes, social engineering, cloud exploitation, and supply-chain attacks.
- **It introduces the 4-Layer Gap Archetype Framework**, which analyses cyber breaches as a sequence of systemic failures rather than isolated incidents.
- **CERT-In**, designated under **the Information Technology (Amendment) Act, 2008,** is India's national agency for responding to cyber security incidents.
- **CSIRT-Fin** is the sectoral **Computer Security Incident Response Team** for the financial sector, coordinating cyber incident prevention and response across banking, insurance, securities, and pension entities.
- The report recommends continuous risk assessment, threat intelligence sharing, Digital Forensics and Incident Response (DFIR), Zero Trust Architecture, AI-enabled defence, and stronger cyber resilience to secure India's digital financial ecosystem.

7.2. WhatsApp Usernames: Balancing Informational Privacy and Cybersecurity

Introduction:

WhatsApp's proposed username feature has created a debate over informational privacy and cybersecurity. The feature can conceal phone numbers, but the Union Government fears that fake digital identities could facilitate fraud, impersonation and online scams.



Space for Notes

Privacy Benefits:

- Usernames can prevent strangers, businesses and group participants from accessing a user's mobile number.
- The feature creates an additional digital identity while leaving participation optional.
- It strengthens informational privacy, which concerns an individual's control over personal data.
- In *Justice K.S. Puttaswamy v. Union of India* (2017), the Supreme Court recognised privacy as part of the right to life and personal liberty under Article 21.

Cybersecurity Risks:

- The Union Government has requested a detailed explanation from WhatsApp about the feature's safeguards.
- Impersonation occurs when fraudsters create identities resembling individuals, companies or government agencies to deceive users.
- Spoofing disguises the identity of a person, device or communication to appear legitimate and gain trust.
- Fake digital identities can support phishing, identity theft, social engineering, digital-arrest scams, financial fraud and other cybercrime.

Legal and Regulatory Balance:

- WhatsApp states that the feature remains optional and includes safeguards.
- Privacy protects individual liberty but does not exclude regulation for public order, cybersecurity and national security.
- The State may restrict privacy only through a valid law that pursues a legitimate aim and applies proportionate measures.
- Regulation must therefore protect users' phone numbers while addressing impersonation, spoofing and fraud.

Conclusion:

WhatsApp usernames can improve privacy by limiting unnecessary disclosure of mobile numbers. They can also create opportunities for deceptive identities and cybercrime. A lawful and proportionate framework must preserve user choice while ensuring effective safeguards against fraud.

Mains Practice Question:

Q. How can username-based communication strengthen informational privacy? Identify the cybersecurity risks that may arise from concealing phone-number identities.

(10 marks, 150 words)

7.3. Kudankulam Data Leak

Context:

Recently, around **14.3 gigabytes of data** linked to the Kudankulam Nuclear Power Plant reportedly appeared on "World Leaks". Although reactor operations were unaffected, the incident raised concerns about cybersecurity and transparency.



BALANCE OF PLANT (BoP): the supporting systems such as electrical, ventilation and water facilities that operate outside the core reactor system.

NPCIL (Nuclear Power Corporation of India Limited): a Mumbai-based public sector undertaking wholly owned by the Government of India, responsible for nuclear power generation and administered under the Department of Atomic Energy.

Space for Notes

Explanation:

What Reportedly Happened?

- Hackers allegedly accessed Reliance Infrastructure systems (an Engineering contractor) for Units 3 and 4.
- Yotta Data Services hosted the data, detected suspicious activity and isolated the server on May 29.
- Files appeared online from June 11, while NPCIL clarified the matter on July 15.
- They reportedly contained layouts, supplier details and equipment reviews, but remain unauthenticated.

Was Reactor Safety Affected?

- NPCIL stated that the breach concerned supporting facilities, not reactor operations or nuclear safety systems.
- Yotta found no ransomware execution, encryption or spread into other customers' systems.
- Available information shows no interference with reactor control, radiation safety or electricity generation.

Why Is It Serious?

- **Security intelligence:** Layouts and supplier lists may help attackers study the facility and prepare attacks.
- **Supply-chain weakness:** Attackers may bypass a nuclear network through a weaker contractor - like entering a fortress through its service gate.
- **Unclear accountability:** Multiple organisations share duties, making responsibility and coordination difficult.
- **Delayed disclosure:** Slow communication creates rumours and reduces trust. A 2019 malware incident also affected only Kudankulam's administrative network.

Way Forward:

- **Indian Computer Emergency Response Team (CERT-In)** and NPCIL should authenticate the leaked files and trace how the intrusion happened.
- Nuclear contractors need binding cybersecurity standards, regular audits and mandatory fast breach reporting.
- Reactor, administrative and contractor networks must stay strictly segregated, with periodic third-party testing.
- Sensitive project data should sit on government-audited servers, and disclosures should come faster and be verified.

Conclusion:

The incident may not be a nuclear safety breach, but it remains a serious warning. Nuclear infrastructure is only as secure as its weakest contractor, server or employee. Strong cyber-hygiene, supply-chain monitoring and timely transparency are essential.

Mains Practice Question:

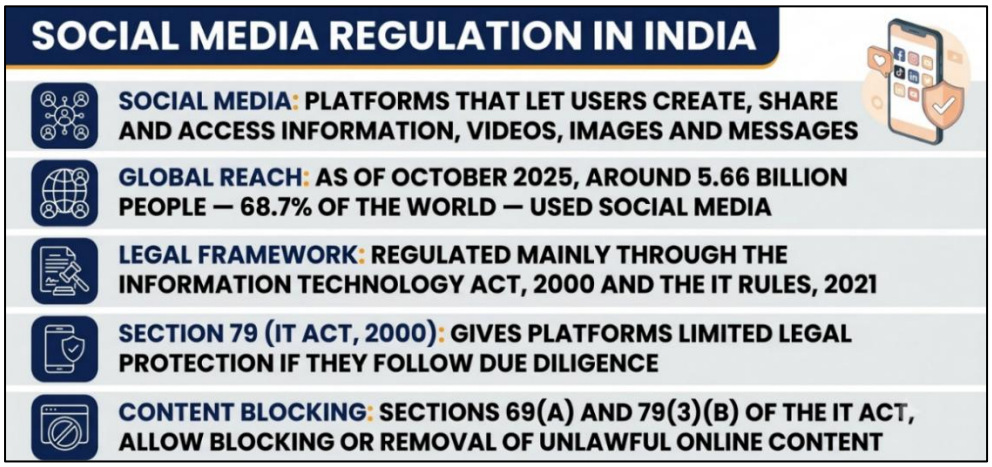
Q. Examine the institutional and accountability challenges involved in protecting nuclear infrastructure when government entities, engineering contractors and cloud-service providers handle different parts of the system. **(15 marks, 250 words)**

Space for Notes

7.4. Social Media: Balancing Freedom, Safety, and Accountability

Context:

Recently, the government issued notices to Meta and Telegram over harmful and illegal online content. Meta was asked to disable Instagram advertisements allegedly linked to **Child Sexual Exploitative and Abuse Material (CSEAM)** within seven days. Telegram was asked to act against piracy and respond within 15 days.



Explanation:

- **CSEAM:** Material sexually exploiting children; Instagram ads allegedly linked users to such content sold via Telegram.
- **Piracy:** Unauthorised distribution of copyrighted material; Telegram's lax file limits enabled film/book piracy and the NEET paper leak.
- **Disinformation:** Deliberate spread of false information; post-Pahalgam attack (2025), fabricated claims about military leadership went viral.
- **Deepfakes:** AI-generated synthetic audio/video mimicking real people; the 2023 Rashmika Mandanna deepfake sparked national debate.
- **Encryption barriers:** End-to-end encryption blocking message traceability; WhatsApp has legally contested the IT Rules' traceability mandate.
- **Terrorism:** Use of platforms for radicalisation and propaganda; The Resistance Front amplified messaging online after Pahalgam.
- **Organised crime:** Use of platforms for illicit trade; Telegram channels have hosted drug sales and investment frauds.
- **Echo chambers:** Algorithmic feeds showing only belief-aligned content; this reinforces polarisation and deepens misinformation's reach.
- **Privacy violations:** Unauthorised collection/use of personal data; the Cambridge Analytica scandal (2018) exposed political profiling via Facebook data.
- **Cyberbullying:** Online harassment, especially of minors; McAfee reports 85% of Indian children have faced cyberbullying.
- **Mental health impact:** Excessive use linked to psychological harm; the World Happiness Report links heavy use to declining adolescent well-being.

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Government Measures:

- **IT Act, 2000:** Provides the legal foundation for intermediary liability (Section 79) and content blocking (Section 69A).
- **IT (Intermediary Guidelines and Digital Media Ethics Code) Rules, 2021:** Mandates grievance officers, compliance officers, message traceability, and monthly compliance reporting.
- **Digital Personal Data Protection (DPDP) Act, 2023:** Regulates collection, processing, and consent for personal data, addressing privacy violations by platforms.
- **Telecommunications Act, 2023:** Provides government powers to intercept messages and suspend services on security grounds, replacing colonial-era telegraph laws.
- **State-level proposals:** Karnataka and Andhra Pradesh's age-restriction measures mirror Australia's 2025 model.

Way Forward:

- Build proactive, technology-driven monitoring rather than relying on external investigations.
- Enact a transparency law covering disclosures, fact-checking, and de-platforming standards.
- Regulate algorithmic amplification and echo chambers, not just individual content.
- Strengthen international cooperation for enforcement against foreign-headquartered platforms.

Conclusion:

Social media's misuse now spans child safety, terrorism, crime, and public trust. Balanced regulation that secures citizens without stifling legitimate expression is India's central digital governance challenge.

Mains Practice Question:

Q. Social-media regulation involves reconciling freedom of expression with child safety, public order and individual privacy. Explain the constitutional dimensions of this challenge. **(10 marks, 150 words)**

7.5. Operation 'Hard Ball': International Crackdown on Transnational Crime Networks

Context:

A coordinated international law enforcement operation, **Operation Hard Ball**, has dismantled several transnational criminal networks involved in organised crime. The operation has renewed India - Canada cooperation against organised crime and terrorism following recent diplomatic tensions.

Explanation:

- **Transnational Organised Crime (TOC)** refers to criminal activities conducted across national borders by organised groups for financial or material gain.
- **Operation Hard Ball** involved coordinated action by law enforcement agencies from multiple countries against international criminal syndicates.
- Such syndicates engage in **drug trafficking, human trafficking, extortion, money laundering, cybercrime, illegal arms trade and terrorism financing.**

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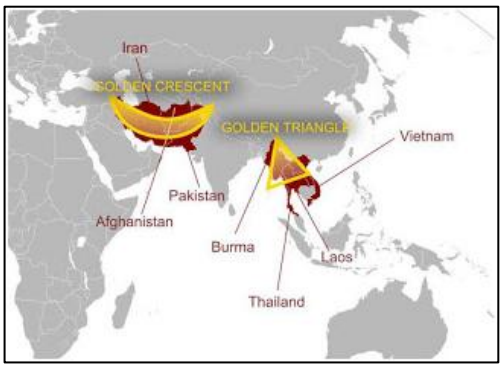
- The **United Nations Convention against Transnational Organized Crime (UNTOC), 2000 (Palermo Convention)** is the principal international treaty to combat organised crime.
- India is a **State Party to UNTOC** and cooperates through **Interpol**, bilateral Mutual Legal Assistance Treaties (MLATs) and intelligence sharing.
- Effective international cooperation strengthens extradition, financial investigations, asset recovery and prosecution of criminals operating across borders.

7.6. Myanmar Opium Flow and India's Eastern Border Security

Context:

The Narcotics Control Bureau has reported that Myanmar has emerged as an alternative global source of opium after the Taliban's drug ban in Afghanistan. India's eastern borders, especially the Manipur corridor, have become vulnerable to heroin and methamphetamine trafficking.

Explanation:



- Opium is obtained from the poppy plant and is used to produce narcotic drugs such as heroin.
- The Golden Triangle refers to the drug-producing region around Myanmar, Laos and Thailand.
- The Golden Crescent refers to Afghanistan, Pakistan and Iran, historically linked with opium production.
- Myanmar shares a long and porous border with India's Manipur, Mizoram, Nagaland and Arunachal Pradesh.
- The Free Movement Regime (FMR) earlier allowed limited cross-border movement among border communities, but it also raised security concerns.
- National Highway 102 through Manipur is significant for connectivity but can be misused for trafficking routes.
- Drug trafficking is linked to organised crime, insurgency financing, border management challenges and internal security threats.

7.7. FIU-IND Recognised at the Best Egmont Case Award (BECA) 2026

Context:

The Financial Intelligence Unit–India (FIU-IND) was adjudged the Runner-up at the Best Egmont Case Award (BECA) 2026 during the Egmont Group Plenary in Baku, Azerbaijan. The recognition was for uncovering a large-scale cyber fraud and money laundering network involving ₹868 crore through extensive domestic and international financial intelligence cooperation.

Explanation:



- Financial Intelligence Unit–India (FIU-IND) is the national agency under the Department of Revenue, Ministry of Finance, responsible for receiving, analysing, and disseminating information relating to suspicious financial transactions to combat money laundering and terrorist financing.
- The Egmont Group is a global network of Financial Intelligence Units (FIUs) that facilitates secure exchange of financial intelligence through the Egmont Secure Web (ESW) and currently has over 180 member jurisdictions.
- Money laundering is the process of disguising the proceeds of crime as legitimate assets and is regulated in India under the Prevention of Money Laundering Act (PMLA), 2002.
- Mule bank accounts are accounts used by criminals to transfer or conceal illicit funds, while cryptocurrency transactions increasingly feature in cross-border financial crimes.
- The Directorate of Enforcement (ED) investigates offences under PMLA, 2002, while the Indian Cyber Crime Coordination Centre (I4C) coordinates efforts against cybercrime.
- The case highlights the importance of Anti-Money Laundering and Counter Financing of Terrorism (AML/CFT) frameworks and international cooperation in tackling transnational financial crimes.

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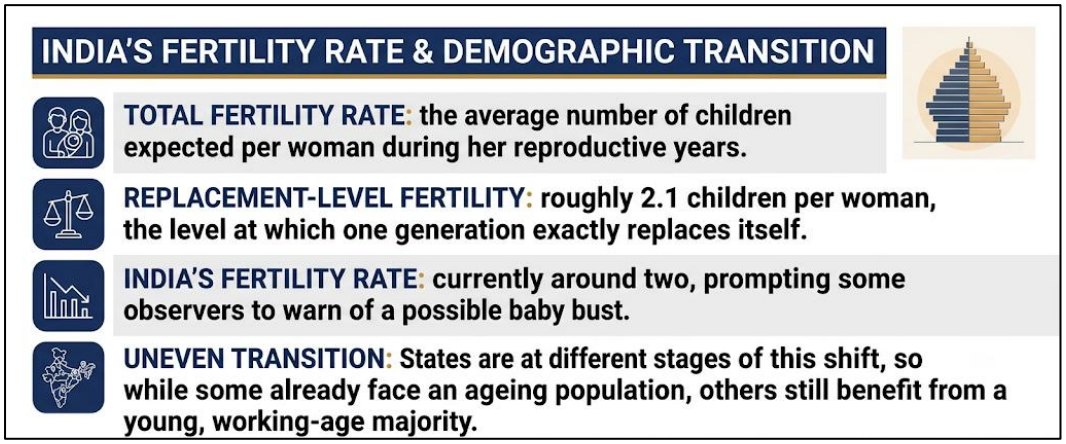
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8. Society

8.1. Young Indians, Family Aspirations and Falling Fertility

Context:

Recently, the United Nations Population Fund released its Demographic Futures Survey, covering 1.08 lakh young adults across 73 countries. It shows that young Indians want families but face economic, social and environmental barriers.



Explanation:

Fertility Decline and Choice:

- Falling fertility is partly a policy achievement supported by girls' education, maternal healthcare, contraceptive choice and the National Health Mission.
- The share of young women married before 18 fell from 23.3% to 20.1%, indicating greater agency and delayed motherhood.
- Healthy Timing and Spacing of Pregnancies places voluntary choice, rather than numerical targets, at the centre of family planning.

Demographic Dividend is the economic growth potential that occurs when a country's working-age population (ages 15–64) is larger than its dependent population (under 15 and 65+).

Aspirations and Barriers:

- Four in ten women and one-third of men consider two children ideal.
- However, inadequate income, costly housing, insecure jobs and childcare concerns often delay their plans.
- Climate change, conflict, unemployment and economic insecurity further weaken confidence and affect mental health.

Unequal Care Burden:

- Young women perform over five hours of unpaid care daily, while young men contribute about half an hour.
- Only 15% of young women are in paid work, compared with 55% of young men.
- This creates a **double burden for working women**, combining employment with disproportionate domestic responsibilities.

Need for Differentiated Policy:

- Fertility varies widely, from 2.7 in Bihar to 1.0 in Sikkim, because demographic transition proceeds at different speeds.
- Higher-fertility States need education and reproductive healthcare, while low-fertility States require stronger family support.

Space for Notes

Way Forward:

- India needs a **rights-based** approach protecting voluntary decisions about whether, when and how many children people have.
- A **State-specific population policy** should replace uniform targets and address distinct demographic needs.
- Governments and employers should provide dignified jobs, parental leave, flexible work, childcare and mental-health support.

Conclusion:

India's fertility decline reflects progress, but unmet aspirations reveal insecurity and gender inequality. Policy must protect reproductive choice and help young people form families freely.

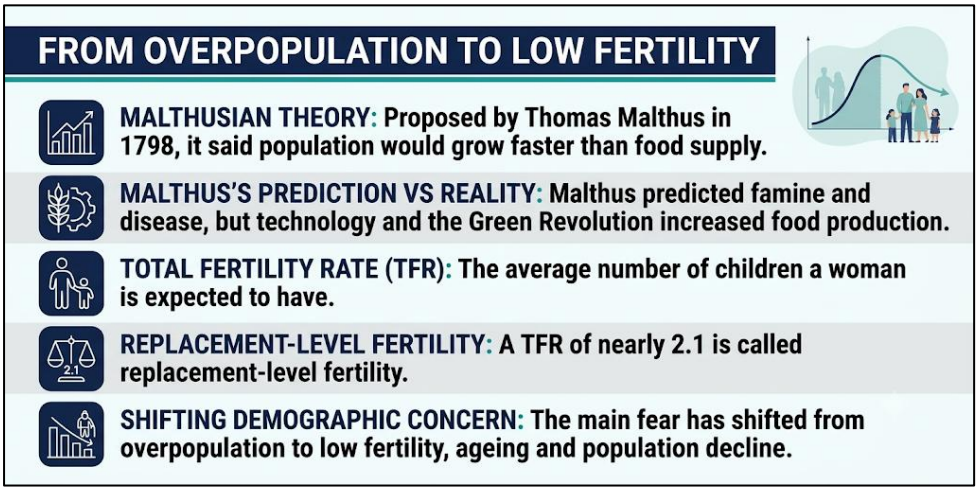
Mains Practice Question:

Q. India's declining fertility rate represents a policy achievement, but it also reflects growing economic insecurity and gender inequality. Discuss. **(10 Marks, 150 Words)**

8.2. India's Population Debate: From Malthusian Fear to Demographic Anxiety

Context:

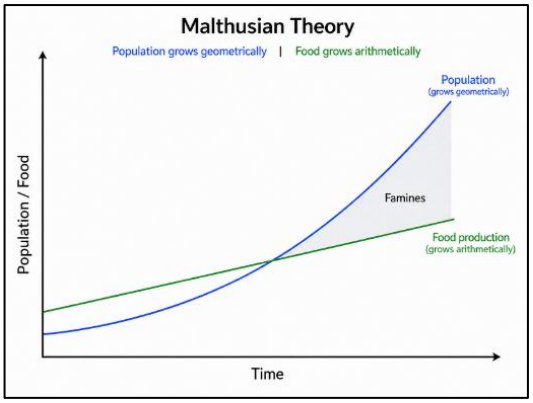
Recently, falling fertility, population ageing and possible depopulation have gained attention in India. These trends are often presented as a demographic crisis. However, they require careful analysis based on data, not fear.



Explanation:

Is India Facing Depopulation?

- India's population is likely to grow for some more decades.
- It may decline gradually later in the century. This is not an immediate population collapse.
- Some projections assume that educated women will continue having fewer children.
- Recent fertility data does not fully support this assumption.



Space for Notes

Ageing, Labour Supply and Demographic Dividend:

- India's elderly population will rise, but the child population will decline too.
- Hence, the working-age population may decline only slightly.
- India can still reap its demographic dividend if the large working-age population gets proper education, skills and jobs.
- AI, automation and higher female labour-force participation can further ease worker shortages.

Regional and Political Concerns:

- Southern states reduced fertility earlier than many northern states.
- This may reduce their political representation after delimitation.
- The concern is genuine because parliamentary seats depend on population.
- However, southern states also make a large economic contribution. Any solution must protect federal fairness.

Religious Population Fears:

- Muslim fertility is slightly higher than Hindu fertility.
- Yet fertility has declined in both communities. The gap is gradually narrowing.
- Claims of an imminent demographic takeover are not supported by evidence.
- Such claims can create unnecessary social tension.

Way Forward:

- The **National Population Policy, 2000** should guide voluntary family planning, reproductive healthcare and informed choice.
- India must invest in health, education, skills and jobs to fully use its **demographic dividend**.
- The **United Nations Population Fund (UNFPA)** recommends protecting reproductive rights and avoiding coercive population measures.
- Future delimitation should be based on federal consultation. States that controlled population growth should not be unfairly penalised.

Conclusion:

Malthusian predictions failed because they underestimated technology and human adaptation. Similar errors may occur when population decline is treated as an unavoidable disaster. India should use its demographic dividend while addressing ageing and regional imbalance through evidence-based and cooperative policies.

Mains Practice Question:

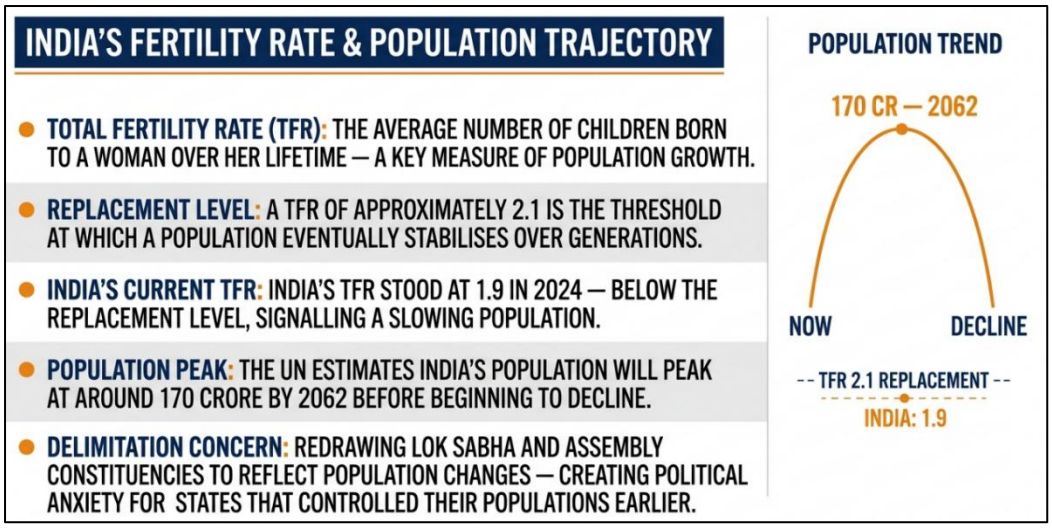
Q. India's population discourse has shifted from the fear of overpopulation to anxiety over low fertility, ageing and depopulation. Critically examine whether these concerns constitute an immediate demographic crisis. **(15 Marks, 250 Words)**

8.3. Falling Fertility, Delimitation and Tax Sharing

Context:

Recent Sample Registration System (SRS) and National Family Health Survey (NFHS - 6) data have reignited debate over India's falling fertility and growing demographic divergence among states. Some low-fertility states, fearing reduced political representation and a smaller tax share, are considering incentives for larger families - an approach that is neither necessary nor sound.

Space for Notes



Explanation:

India's Population Situation:

- India's population will keep growing for several decades because it still has a large young population.
- The sex ratio at birth remains low at **918 girls per 1,000 boys**, against a normal level of about 955, showing continued son preference.

Differences Among States:

- Bihar and Uttar Pradesh have TFRs of **2.9 and 2.6**, compared with the national average of 1.9.
- Lower female education and limited contraception use are major reasons for higher fertility.
- Girls' education, women's empowerment and better family-planning services can reduce fertility in these States.

Should Low-Fertility States Encourage More Births?

- Andhra Pradesh has proposed cash support, nutrition assistance, free education and longer maternity leave for third and fourth children.
- Research shows that one-time financial incentives rarely produce lasting changes in family size.
- Fertility decisions depend more on jobs, housing, childcare, healthcare and work-life balance.
- Since India is still far from population decline, low-fertility States need not promote larger families.

Delimitation and Political Representation:

- Low-fertility States fear losing parliamentary seats after future delimitation.
- States that successfully reduced population growth should not lose political influence.
- The issue should be solved through fair constitutional arrangements, not by encouraging more births.

Tax Devolution:

- Similar concerns arise in sharing central taxes among States.
- The **15th Finance Commission** considered both population and demographic performance while deciding State shares.
- A similar approach can make delimitation and tax sharing fairer than pro-natalist policies.

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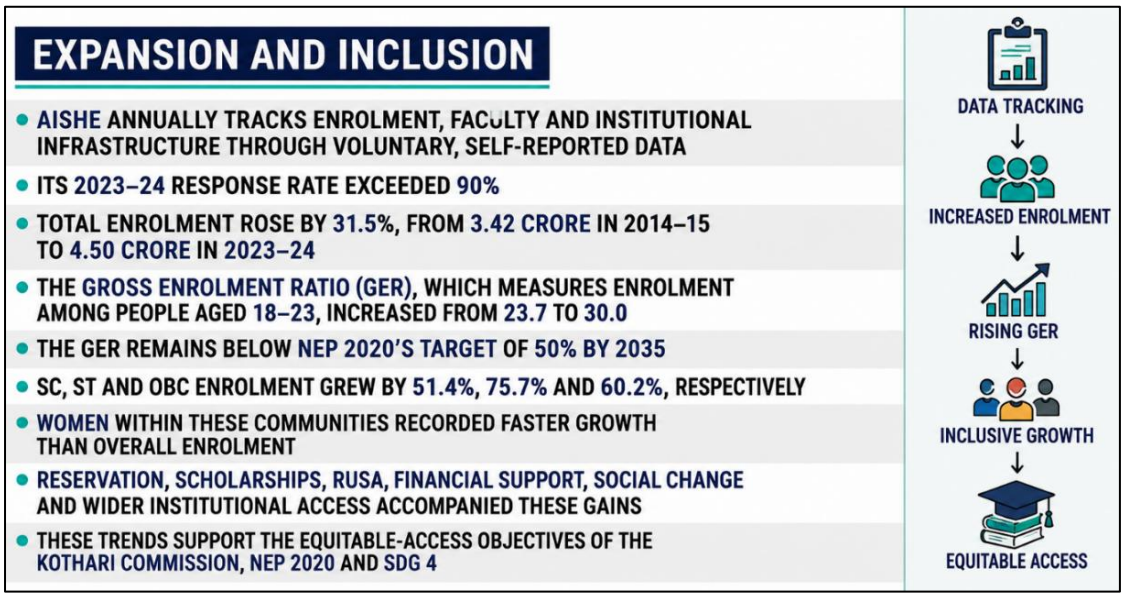
Conclusion:

More children are not the answer to delimitation or tax-sharing concerns. India should reduce regional demographic gaps and reward development, not population size. Reliable Census data will be important for future reforms.

8.4. AISHE 2023–24: Higher Education Transformation and India's Gender Gap

Introduction:

The Ministry of Education's AISHE 2022–23 and 2023–24 reports document expanding access, gender parity and social inclusion in higher education. The findings measure progress under NEP 2020 but, alongside PLFS 2025, reveal a weak transition from women's education to employment.



Gender Gains and Course Segregation:

- Female enrolment increased by 42.2%, from 1.57 crore to 2.24 crore.
- Female GER reached 31.2%, compared with 28.9% for men.
- The Gender Parity Index, the ratio of female to male GER, reached 1.08 and remained above parity for seven consecutive years.
- Women constituted 44% of STEM enrolment and 44.9% of faculty.
- Women remained concentrated in general and life sciences.
- Their under-representation in engineering, technology and software restricts access to artificial intelligence, advanced manufacturing and digital services.

The Employment Gap:

- PLFS measures employment, unemployment, wages and labour participation.
- In 2025, male labour-force participation reached 79.1%, against 40% for women.
- Women had lower wages, weaker placements and less access to salaried work and leadership.
- Self-employment figures also included unpaid family workers.
- Unsafe transport and workplaces, household duties, inadequate childcare and inflexible work interrupted careers.

Space for Notes

Reform Priorities:

- Public education expenditure remains about 4.1% of GDP, below the 6% recommended by the Kothari Commission and NEP 2020.
- India must expand infrastructure, scholarships, institutional and faculty capacity, data verification, multidisciplinary education, research and industry collaboration.
- Institutions must ensure equal access to technical programmes, internships, placements and counselling.
- Safe transport, childcare, flexible work and women leaders can strengthen retention and advancement.

Conclusion:

India has expanded higher education and improved gender and social inclusion. Educational parity has not secured equal, well-paid and degree-matched work. Reform must connect equitable access with quality education, employment and leadership.

Mains Practice Question:

Q. India has achieved gender parity in higher education, but not in employment. Examine the factors responsible for the weak transition of educated women into secure, well-paid and degree-matched work. **(10 Marks, 150 words)**

8.5. Gender Wealth Inequality: A Neglected Policy Challenge

Context:

The **World Inequality Report 2026** and the UN report ***Counting What Counts*** highlight persistent gender disparities in labour income and unpaid work. However, inadequate attention to women's ownership of land, housing and financial assets leaves a major dimension of economic inequality statistically invisible.

Background:

- Income represents current earnings, whereas wealth includes accumulated assets such as land, housing, savings, pensions and business ownership.
- Women's asset ownership improves household bargaining power and reduces vulnerability to poverty, abandonment and domestic violence.
- Productive assets enhance access to credit, agricultural inputs, markets and entrepreneurial opportunities.
- Asset ownership by mothers produces better health, nutrition and educational outcomes for children.
- Despite their contribution to agriculture, Indian women own land in only about 12–16% of rural landholding households.

Explanation:

Limitations of Employment Indicators:

- The PLFS 2023–24 shows that nearly 86% of women workers and 91% of rural women workers are informally employed.
- Around 77% of rural working women are engaged in agriculture, while approximately 73% are classified as self-employed.
- However, many "self-employed" women are unpaid workers on family farms or in household enterprises and possess little control over income or assets.
- Hourly earnings are unsuitable for many farmers, vendors and home-based workers whose working hours and income are irregular.

Space for Notes

Structural Causes:

- Unequal inheritance is a major source of gender wealth inequality.
- Lower wages restrict women's capacity to accumulate assets, while inadequate childcare, transport and family support weaken employment opportunities.
- The absence of gender-disaggregated data on land, wealth and pensions conceals the true extent of inequality.

Policy Priorities:

- Governments must collect individual-level, gender-disaggregated wealth data.
- Equal inheritance rights, joint property titles, affordable credit and childcare support require effective implementation.

Conclusion:

Reducing overall wealth inequality requires directly addressing unequal ownership within households. Women must be recognised not merely as workers but as independent owners and controllers of productive wealth.

8.6. Marriage, Consent and Learned Helplessness

Context:

Recently, cases of dowry-related violence and crimes within intimate relationships have renewed debate on consent and personal choice in marriage. They also raise a deeper concern about how family pressure shapes major life decisions. The issue is not only whom young people marry, but whether they feel free to choose at all.



Explanation:

Compromise and Compliance:

- Compromise means both people express their views and adjust willingly.
- Compliance means agreeing because refusal feels unsafe, useless or disrespectful.
- Society often praises silent obedience as adjustment.
- However, adjustment without freedom is not genuine consent.

How Helplessness Develops?

- Many young people face strict control over education, careers, friendships and relationships.
- Their refusal may be ignored or treated as disobedience.
- Repeated dismissal can teach them that speaking up has no value.
- Marriage then appears as a deadline or family duty. It stops being a personal decision.

Space for Notes

External Locus of Control:

- Some young adults feel that parents, fate, caste or family honour control their future.
- They may fear losing emotional or financial support. They may also worry about social shame.
- This weakens personal agency and confidence.
- It can make boundary-setting difficult in later relationships.

Role of Families and Matchmaking:

- Family involvement can provide guidance and social support.
- Many arranged marriages are happy and fully consensual.
- The problem begins when choice is replaced by pressure.
- Matrimonial systems may focus too much on caste, income, age, appearance and horoscope.
- Compatibility and emotional safety may receive less attention.

Social Consequences:

- People with weak agency may find it harder to recognise abuse.
- They may also struggle to leave unsafe relationships.
- Pressure-based marriages can create resentment, fear and unequal power.
- Women often face greater pressure because family honour is closely linked to their choices.

Way Forward:

- Families should treat disagreement as a sign of maturity.
- Young adults must have a real right to refuse.
- Schools and colleges should teach consent, emotional health and healthy relationships.
- Counselling, legal aid and confidential support must be easily available.
- Marriage decisions should allow time, direct interaction and informed choice.

Conclusion:

The real debate is not love marriage versus arranged marriage. It is genuine consent versus conditioned compliance. Families should guide young adults without controlling their lives. A healthy marriage culture must respect choice, boundaries, dignity and personal agency.

8.7. Kerala's Crude Birth Rate Falls to an All-Time Low

Context:

Kerala's Crude Birth Rate (CBR) declined to 9.64 per 1,000 population in 2024, falling below 10 for the first time, according to the State's Vital Statistics Report. The data reflects an accelerated demographic transition, raising concerns about population ageing and future workforce challenges.

Explanation:

- Crude Birth Rate (CBR) is the number of live births per 1,000 population in a year, while the Crude Death Rate (CDR) is the number of deaths per 1,000 population in a year.
- Demographic Transition is the shift from high birth and death rates to low birth and death rates as a society develops through economic growth, urbanization, education, and improved healthcare.



- Kerala is in the advanced stage of demographic transition, characterized by low fertility, high life expectancy, and an ageing population.
- A sustained decline in fertility increases the old-age dependency ratio, reduces the working-age population, and may affect economic growth, labour supply, and social security systems.
- The Sample Registration System (SRS), under the Registrar General of India (RGI), is the principal source of annual estimates of birth rate, death rate, infant mortality rate (IMR), and Total Fertility Rate (TFR).
- Replacement-level fertility is approximately 2.1 children per woman, below which population eventually begins to decline in the absence of migration.

Space for Notes

9. History & Culture

Space for Notes

9.1. 250 Years of American Independence and the Rise of the United States

Context:

July 4, 2026 marks 250 years since the adoption of the American Declaration of Independence. The anniversary recalls how the American colonies ended British rule and how the United States later transformed its economy and global influence.

Background:



- Native American communities had lived across North America long before Europeans arrived. European colonisation expanded from the late fifteenth century as Spain, France, the Netherlands and Britain established settlements and competed for land and trade.
- Europeans who settled permanently in British-controlled North America, along with their descendants, came to be known as colonists. Their settlements gradually developed local governments, commercial networks and a distinct political identity.
- **The United States emerged from 13 British colonies on the Atlantic coast.** Britain had initially allowed these colonies considerable freedom to manage their own internal affairs.
- The Seven Years' War of 1756–1763 placed Britain under severe financial pressure. The British Parliament then imposed new taxes and strengthened its control over the colonies.
- The central dispute concerned political authority. The colonists rejected taxation without representation, while Britain claimed that Parliament possessed supreme authority throughout the empire.

Explanation:

Growing Conflict with Britain:

- **Britain introduced the Sugar Act of 1764, the Stamp Act of 1765, the Townshend Acts of 1767 and the Tea Act of 1773.** The colonists regarded these measures as attacks on their economic interests, political rights and local authority.
- "**No taxation without representation**" became the main slogan of resistance. Organisations such as the Sons of Liberty and Daughters of Liberty promoted protests, boycotts and opposition to British imports.
- On December 16, 1773, in a famous event known as the **Boston Tea Party**, colonists dumped more than 300 tea chests into Boston Harbour, causing an estimated loss of £10,000 to Britain.
- Britain responded with the Intolerable Acts of 1774. These punitive measures strengthened unity among the colonies and pushed them towards organised resistance.

Space for Notes

Declaration, War and Independence:

- The **First Continental Congress met in 1774** to coordinate colonial resistance. The Second Continental Congress created an army in 1775, appointed George Washington as commander and made a final unsuccessful attempt at reconciliation through the Olive Branch Petition.
- Thomas Jefferson principally drafted the **Declaration of Independence**, which Congress revised and 56 delegates signed on July 4, 1776. The colonies declared independence and fought Britain during the **American Revolutionary War from 1775 to 1783**. France, Spain and the Dutch Republic supported them. British forces surrendered at Yorktown in 1781, and Britain formally recognised the United States through the **Treaty of Paris in 1783**.

Political Ideas and Achievements:

- The Declaration stated that all people possessed natural rights, including life, liberty and the pursuit of happiness.
- It declared that governments received their legitimate authority from the consent of the governed. It also recognised the people's right to change a government that violated their rights.
- The Revolution weakened loyalist elites, ended many mercantilist restrictions and created new commercial opportunities.
- The Constitution established a federal democratic republic, while the Bill of Rights later protected important civil freedoms. The American example spread ideas of constitutional government, federalism and anti-colonial nationalism.

Limits of American Freedom:

- Native American communities lost large areas of land and declined in number as European settlers and the new American state continued to expand.
- Women lacked political rights and could not participate equally in the new republic.
- Enslaved Africans had been brought from Africa and forced to work in the colonies. Their slavery continued after independence and ended formally only in 1865, following the American Civil War.
- Thomas Jefferson himself owned more than 100 enslaved people, although the Declaration proclaimed liberty and equality.

Economic Reinvention:

- Over the years, industrialisation transformed the United States from an agrarian republic into an industrial powerhouse through factories, railways and mechanised production.
- Scientific management and Ford's assembly line later connected mass production with mass consumption.
- Globalisation shifted much manufacturing to lower-cost Asian locations, while American firms retained control over finance, technology, brands and intellectual property.
- Artificial intelligence, semiconductors, cloud computing, biotechnology and robotics now drive another transformation. These technologies raise new concerns about employment, inequality, monopoly and ownership.

Conclusion:

The American Revolution created a republic based on liberty and popular government, but it excluded many communities. The United States later expanded its power through repeated economic and technological reinvention. Its continuing challenge is to balance innovation and global influence with equality and democratic control.

Mains Practice Question:

Q. Examine the political and economic factors that led the thirteen American colonies to revolt against British rule. How did the Revolution influence constitutionalism and anti-colonial movements worldwide? **(15 Marks, 250 Words)**

Space for Notes

9.2. India to Restore Indonesia's UNESCO-listed Prambanan Temple Complex

Context:

Prime Minister Narendra Modi visited the **UNESCO World Heritage Prambanan Temple Complex** in Indonesia along with President Prabowo Subianto. The two leaders inaugurated the **Archaeological Survey of India (ASI)** conservation and restoration project, highlighting the shared civilizational heritage between India and Indonesia.

Explanation:



- **Prambanan Temple Complex** is a **UNESCO World Heritage Site** located near **Yogyakarta, Indonesia**.
- Built in the **9th century** by the **Sanjaya Dynasty**, it is the **largest Hindu temple complex in Indonesia**.
- The temple is dedicated to the **Trimurti - Brahma (Creator), Vishnu (Preserver), and Shiva (Destroyer)**, with **Shiva Temple** being the tallest.
- It reflects the spread of **Indian culture, Hinduism, and temple architecture** in **Southeast Asia**.
- The **Archaeological Survey of India (ASI)** undertakes heritage conservation in India and abroad, including **Borobudur** and now **Prambanan**.
- The project strengthens **India–Indonesia cultural diplomacy** and preservation of **shared civilizational heritage**.

9.3. Ravidassia Community Seeks Separate Religion Code in Census 2027

Context:

The Ravidassia community has renewed its demand for recognition as a separate religion in Census 2027. Community representatives argue that a distinct code would ensure accurate enumeration and protect their religious identity.

Explanation:

- **Ravidassias** are followers of Guru Ravidas, a 15th–16th-century **Bhakti saint** who preached equality and envisioned caste-free **Begampura**.
- Predominantly a Dalit community, they are concentrated in Punjab's **Doaba region**.
- **Dera Sachkhand Ballan** is their principal religious institution.
- Following Sant Ramanand's killing in Vienna in 2009, the Dera declared Ravidassia a separate religion in 2010.
- It adopted **Amritbani Guru Ravidas Ji** as scripture and **Har** as its symbol.
- Census 2011 separately reported six major religions; others were grouped under **Other Religions and Persuasions**.
- Recognition may improve demographic data, welfare planning and cultural visibility.

Space for Notes

9.4. Akal Takht: Sikhism's Highest Temporal Seat

Context:

The Akal Takht has summoned Sikh ministers and legislators in Punjab over their support for an anti-sacrilege law without adequate consultation with major Sikh religious institutions. The development highlights the institution's enduring moral, religious and political influence in Sikh public life.

Explanation:



- Akal Takht means the "Throne of the Timeless One" and is the highest temporal seat of Sikh authority.
- It is located opposite the Harmandir Sahib (Golden Temple) in Amritsar.
- It was established by Guru Hargobind, the sixth Sikh Guru, between 1606 and 1609.
- Guru Hargobind introduced the doctrine of Miri-Piri: *Miri* signifies temporal authority, while *Piri* represents spiritual authority.
- The Akal Takht is one of Sikhism's five Takhts, or authoritative seats.
- Its head is called the Jathedar, who may issue religious edicts called hukamnamas and summon members of the Sikh community.
- A person found guilty of religious misconduct may be declared tankhaiya and assigned tankhah, or religious atonement.
- Punishment may include sewa, public apology, boycott or excommunication.
- Its authority is moral and religious, not enforceable through ordinary courts or police

9.5. UNESCO Warns Pakistan over Reconstruction at Taxila World Heritage Site

Context:

UNESCO has asked Pakistan to reverse reconstruction work at two historical sites in Taxila, warning that the alterations compromise their authenticity and integrity. Failure to comply could lead to the sites being placed on the List of World Heritage in Danger or even delisted from the World Heritage List.

Explanation:



- **UNESCO World Heritage Landmark**: Taxila is an ancient city located in present-day Pakistan that was officially inscribed as a UNESCO World Heritage Site in 1980.
- **Gandhara Civilization Epicenter**: The city flourished extensively as a major centre of the Gandhara Civilization, Buddhist learning, trade, and art between the 6th century BCE and the 5th century CE.
- **Global Academic Hub**: It featured one of the world's earliest universities, drawing legendary historical thinkers like Chanakya and Panini to study and teach advanced sciences.

- **Greco-Buddhist Artistic Fusion**: Its unique geographical position at a crossroads of trade routes blended Greek, Persian, and Indian cultures into a distinct artistic style.
- **International Legal Protection**: Like all registered properties, the site is legally protected under the 1972 Convention Concerning the Protection of the World Cultural and Natural Heritage.
- United Nations Educational, Scientific and Cultural Organization (UNESCO) is a specialized UN agency headquartered in Paris, France, dedicated to building peace and security worldwide by promoting international collaboration in education, arts, sciences, and culture.

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MCQs

1. Consider the following pairs:

Personality	Associated tradition or institution
1. Guru Ravidas	Begampura
2. Guru Hargobind	Miri-Piri
3. Guru Arjan	Establishment of the Akal Takht
4. Guru Gobind Singh	Formation of the Khalsa

How many of the pairs given above are correctly matched?

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

Answer

1. Answer: C

10. MISCELLANEOUS

Space for Notes

10.1. Great Nicobar Project - Is What Can Be Justified Also Just?

Context:

The Rs. 80,000-90,000 crore Great Nicobar Island project proposes major infrastructure at the southern end of the island, including an international transshipment port, an airport, a power plant, an integrated township and tourism facilities. The central concern is whether strategic and economic benefits can justify irreversible harm to indigenous communities and a fragile island ecosystem.

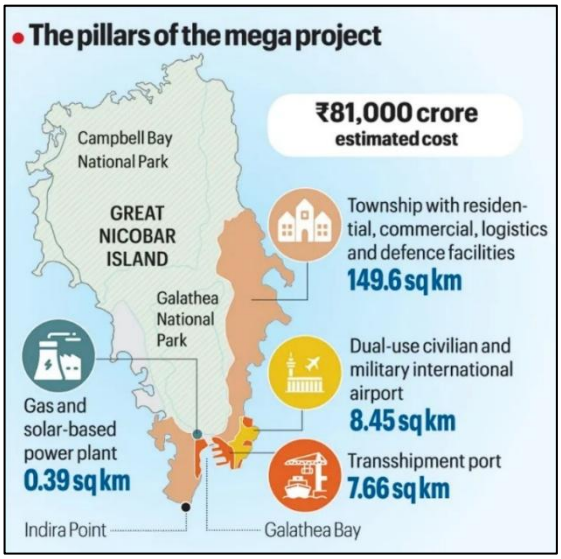
Background: Historical Evolution of "Justification"

- From the 15th century onward, European colonial powers invoked the Doctrine of Discovery to claim territories already inhabited by indigenous communities. Such lands were often treated as terra nullius, or "nobody's land", because colonial authorities refused to recognise indigenous systems of ownership.
- In India, colonial laws such as the **Waste Land Rules** treated forests, grazing areas and shifting-cultivation lands as "unproductive" and transferred them for plantations, mines and railways.
- Modern states no longer openly use colonial language, but land may still be acquired in the name of **public purpose, national security or development**.
- The ethical question is therefore not merely whether a project is legally permissible or economically beneficial, but whether it respects justice, dignity and the survival of vulnerable communities.

Explanation:

MAJOR IMPACTS OF THE PROJECT:

Negative Social and Cultural Impacts:

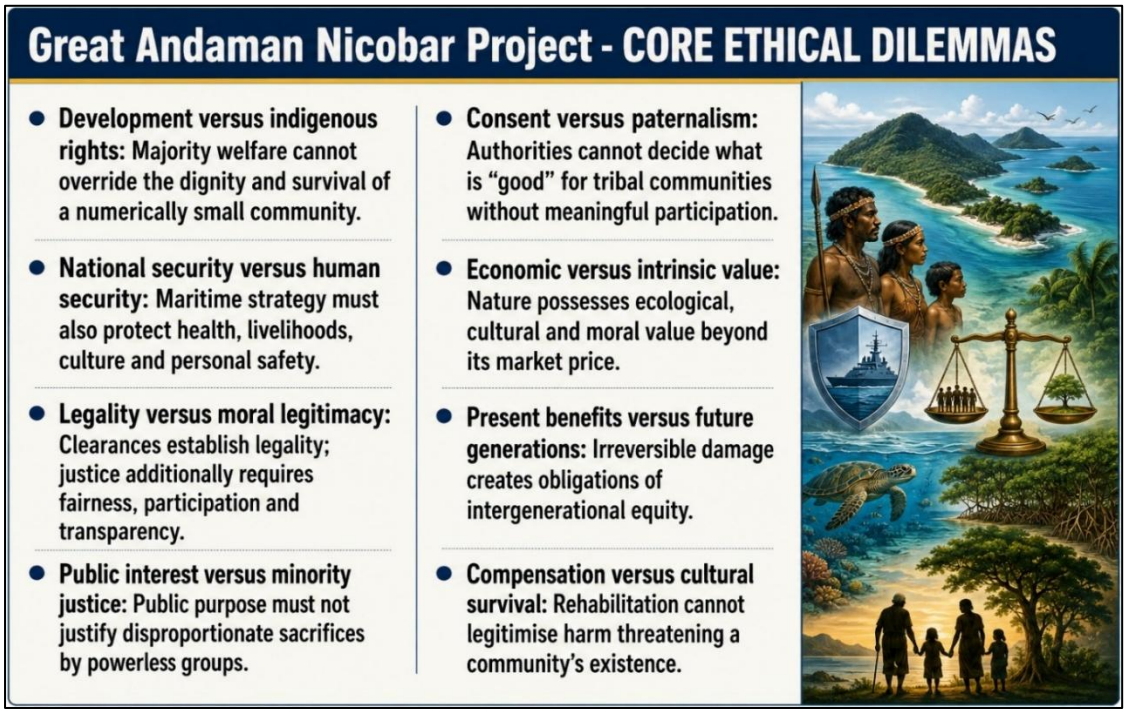


- **Threat to indigenous survival**: The **Shompen**, a Particularly Vulnerable Tribal Group (PVTG) numbering fewer than 300, depend upon forests for food, mobility, medicine, cultural identity and social organisation. Habitat disruption may threaten their existence as a distinct community.
- **Disease and external contact**: Historical experience shows that isolated Andaman communities suffered severe population decline after exposure to unfamiliar diseases, alcoholism, trafficking and exploitation.
- **Loss beyond compensation**: Ancestral land cannot be replaced merely through money or alternative plots because it contains spiritual, cultural and intergenerational significance.
- **Demographic marginalisation**: Large-scale migration of workers and settlers may reduce indigenous communities to a powerless minority within their own homeland.

Space for Notes

Environmental and Developmental Concerns:

- **Irreversible ecological damage:** Forest diversion, coastal construction and settlement expansion may affect endemic species, coral reefs, mangroves and nesting areas of turtles.
- **Disaster vulnerability:** Great Nicobar lies in a seismically active and tsunami-prone region; extensive coastal infrastructure may increase human and ecological risks.
- **Uncertain benefits, certain costs:** Strategic and commercial gains are projected for the future, while forest loss and social disruption are immediate and potentially permanent.
- **Limits of compensatory afforestation:** Newly planted forests elsewhere cannot reproduce the biodiversity and ecological functions of an ancient island rainforest.



Ethical Decision-Making Test:

Before approving such a project, authorities should ask:

1. **Rights test:** Does it violate any non-negotiable human or tribal right?
2. **Justice test:** Are benefits and burdens fairly distributed?
3. **Consent test:** Have affected people participated meaningfully?
4. **Alternatives test:** Is there a less harmful option?
5. **Irreversibility test:** Can the damage be repaired?
6. **Future generations test:** Would the decision remain defensible decades later?
7. **Publicity test:** Can the government transparently justify the decision before the public?

Ethical Resolution of such dilemmas:

- Secure **Free, Prior and Informed Consent** through culturally appropriate and continuous consultation.
- Conduct independent, cumulative environmental, health and social-impact assessments.
- Apply the **precautionary principle** where damage may be serious or irreversible.
- Test proportionality by examining whether the project's scale is necessary and whether less destructive alternatives exist.
- Create inviolate tribal and ecological zones and strictly regulate tourism, migration and external contact.

- Establish independent monitoring, transparent disclosure, grievance redress and legally enforceable stop-work provisions.
- Apply the **Public Trust Doctrine**, under which the State protects forests, coasts and water for present communities and future generations.

Conclusion:

The ethical resolution lies in **responsible and restrained development**, not in treating economic growth as inherently superior to human dignity and ecological survival. Where consequences are irreversible and a community's existence is at stake, the State must follow a higher standard of consent, precaution, justice and constitutional morality. Development becomes legitimate only when it protects both the national interest and the rights of those least able to defend themselves.

Mains Practice Question:

Q. Strategic importance and economic potential cannot, by themselves, settle the debate over development in ecologically fragile and indigenous-inhabited regions. Discuss with reference to the Great Nicobar Island project. **(15 Marks, 250 words)**

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