CHAHAL ACADEMY

Monthly Magazine

MARCH 2026

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For Integrated Preparation of CSE Prelims + Mains + Interview

Special Feature

Monthly MCQs

MARCH

from

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JOURNALISM OF COURAGE

**MCQs on Prelims Latest Pattern*

- Modified UDAN
- Operation SANKALP
- Indo-Myanmar Border
- Dark Oxygen Strategy
- World Happines Report 2026
- One Nation, One Election (ONOE)
- Wildlife Conservation Governance
- India and Canada Strategic Diplomacy
- Savitribai Phule
- Preah Vihear Temple
- TB Elimination Strategy
- Great Indian Bustard (GIB)
- Transgender Rights in India
- Strategic Petroleum Reserves (SPR)
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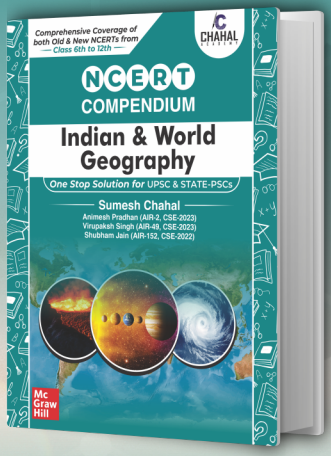

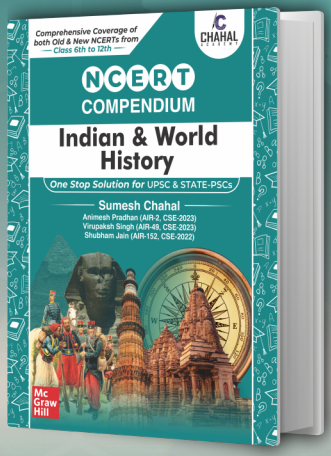

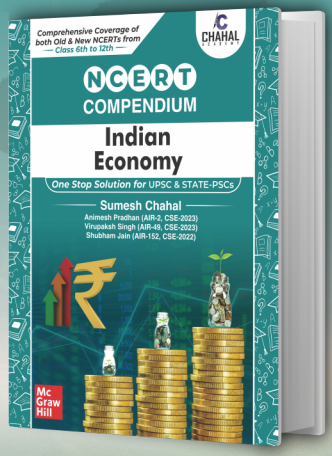

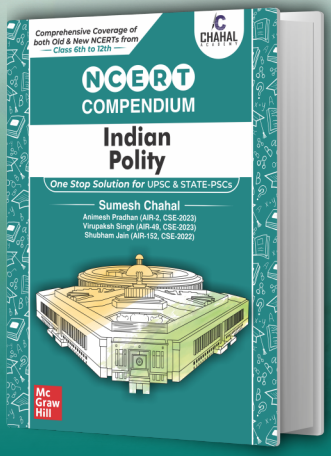

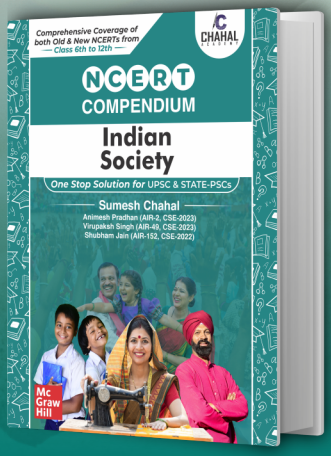

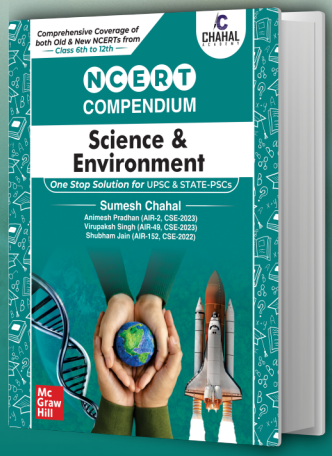

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POLITY AND GOVERNANCE

ONE NATION, ONE ELECTION (ONOE)

Why in News: Indonesia's experience of simultaneous elections (2019 & 2024) causing administrative strain and deaths has reignited debate on **One Nation, One Election (ONOE)** in India.

Key Details

- ONOE proposes **simultaneous elections for Lok Sabha and all State Assemblies**.
- It aims to reduce **frequent election cycles and governance disruptions**.
- India followed simultaneous elections until **1967**, after which the cycle broke.
- The idea is being reconsidered to enhance **efficiency, cost-effectiveness, and stability**.

Historical Background & Evolution

- **Initial Synchronisation (1951–1967):** India conducted simultaneous elections for Lok Sabha and State Assemblies in **1951–52, 1957, 1962, and 1967**, ensuring a unified electoral cycle.
- **Breakdown of Cycle:** The cycle was disrupted due to **premature dissolution of Assemblies and Lok Sabha** in late 1960s–70s, mainly because of political instability.
- **Rise of Coalition Era:** Frequent government collapses during the **coalition phase (1989–1999)** further deepened the asynchronisation of elections.
- **Recent Revival:** Bodies like the **Law Commission (2018)** and discussions by policy think tanks have revived ONOE as a structural reform.

Constitutional & Legal Framework

- **Relevant Constitutional Provisions:** Articles **83 & 85 (Parliament)** and **172 & 174 (State Legislatures)** govern tenure and dissolution, forming the core legal basis.
- **Need for Amendments:** ONOE would require **constitutional amendments** and possibly ratification by states under **Article 368**, affecting federal structure.
- **Role of Article 356:** President's Rule complicates synchronisation, as premature dissolution disrupts the election cycle.
- **Election Commission's Role:** The Election Commission of India would need enhanced **logistical and administrative capacity** to conduct nationwide polls simultaneously.

Objectives of ONOE

- **Cost Reduction:** India spends thousands of crores on elections; for example, **2019 general elections cost over ₹60,000 crore (including party expenditure)**.
- **Governance Efficiency:** Frequent elections impose the **Model Code of Conduct (MCC)**, delaying policy decisions and developmental work.
- **Administrative Stability:** Continuous election mode diverts bureaucracy and security forces from core governance tasks.
- **Enhanced Voter Participation:** A single election cycle may reduce **voter fatigue** and increase turnout through focused awareness campaigns.

Advantages of Simultaneous Elections

- **Economic Efficiency:** Combined elections reduce repeated costs of **security deployment, polling staff, and logistics**.
- **Policy Continuity:** Governments can focus on **long-term reforms** instead of short-term populist measures driven by frequent elections.
- **Optimised Security Deployment:** Central Armed Police Forces can be used more efficiently rather than being mobilised repeatedly across states.
- **Political Stability:** Fixed electoral cycles may reduce political opportunism and **frequent government collapses**.

Challenges & Concerns

- **Federalism Issues:** States may lose flexibility in determining election timing, raising concerns about **erosion of federal autonomy**.
- **Dominance of National Issues:** Simultaneous elections may overshadow regional issues, affecting **representation of local interests**.
- **Logistical Complexity:** Conducting elections for **900+ million voters** simultaneously requires massive infrastructure, EVMs, and manpower.
- **Constitutional Rigidity:** Synchronisation may require **extension or curtailment of legislative tenures**, raising democratic concerns.

Global Perspective & Lessons

- **Indonesia's Experience:** Simultaneous elections in **2019 led to over 800 poll worker deaths** due to administrative overload, highlighting logistical risks.
- **South Africa Model:** National and provincial elections are held together, showing feasibility in a **federal-like structure**.
- **Sweden's System:** Fixed election cycles ensure predictability and stability, offering lessons in **institutional design**.
- **Key Lesson:** While simultaneous elections improve efficiency, **administrative preparedness and worker safety** are critical.

Implementation Mechanisms

- **Transitional Arrangements:** Synchronisation may require **one-time extension or reduction of Assembly terms** to align cycles.

- **Constructive Vote of No Confidence:** Governments can only be removed if an alternative is ready, preventing premature dissolution.
- **Two-Phase Election Model:** Elections can be held in **two batches within a 5-year cycle**, balancing feasibility and synchronisation.
- **Legal & Political Consensus:** Broad agreement among political parties and states is essential for successful implementation.

Way Forward

- **Build Political Consensus:** ONOE requires cooperation between the Union and States to uphold **cooperative federalism**.
- **Strengthen Institutional Capacity:** Enhance resources of the Election Commission, including **EVM availability and manpower training**.
- **Safeguard Federal Structure:** Ensure mechanisms that protect **regional autonomy and local issues representation**.
- **Phased Implementation:** Start with synchronising **some states** before full nationwide adoption to test feasibility.

Conclusion

One Nation, One Election offers a pathway to **efficient governance, reduced costs, and electoral stability**, but it must be implemented cautiously. Balancing **efficiency with federalism and democratic representation** is essential to ensure that electoral reforms strengthen, rather than weaken, India's constitutional framework.

EXPECTED QUESTIONS FOR UPSC CSE

Prelims MCQ

Que. Implementation of One Nation, One Election would likely require amendments to which part of the Constitution?

(a) Fundamental Rights
(b) Provisions related to tenure of Parliament and State Legislatures
(c) Directive Principles of State Policy
(d) Citizenship provisions

Answer: (b)

Descriptive Question

Que. Discuss the advantages and challenges of implementing One Nation, One Election in India. How can it impact federalism and governance? (150 Words, 10 Marks)

RIGHT TO DIE WITH DIGNITY

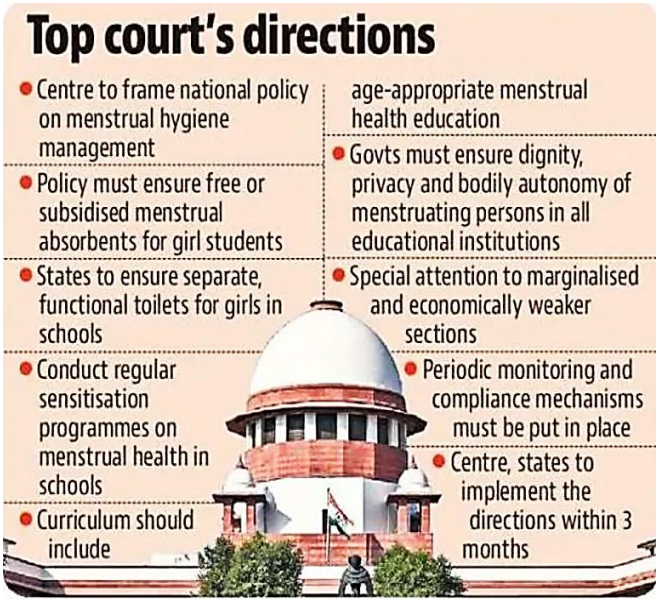
Why in News: The Supreme Court of India recently permitted withdrawal of life support for Harish Rana, reaffirming the **Right to Die with Dignity under Article 21**.

Key Details

- The case involved a patient in **Persistent Vegetative State (PVS)** for over 12 years, raising critical ethical and legal questions.
- The Court held that **prolonging life artificially may violate dignity**, especially in irreversible conditions.
- Concerns persist regarding **misuse, lack of legislation, and medical uncertainty**.
- The judgment emphasised the importance of **Living Wills** and patient autonomy.

Ethical and Legal Complexity of Life and Death

- **Sanctity of Life vs Right to Dignity:** Indian society traditionally values preservation of life; however, modern jurisprudence recognises that **life without dignity may undermine constitutional values**.
- **Moral Dilemmas in Euthanasia:** Decisions on ending life involve ethical questions of autonomy, compassion, and suffering, making them **highly sensitive and contested** across cultures.
- **Global Legal Evolution:** Countries like the Netherlands and Belgium permit euthanasia under strict conditions, while India follows a **cautious, case-based judicial approach**.
- **Role of Article 21:** Article 21 has been expansively interpreted to include **right to live with dignity**, now extending to **death with dignity in specific circumstances**.



Landmark Judgment in Harish Rana Case

- **Recognition of Medical Reality:** The Court acknowledged that PVS patients lack awareness and recovery chances are negligible, making continued treatment **medically futile**.
- **Withdrawal of Life Support:** Permission was granted to withdraw artificial nutrition and hydration, marking a **progressive step in end-of-life jurisprudence**.
- **Dignity over Prolongation:** The judgment observed that mechanical prolongation of life may lead to **prolonged suffering and loss of human dignity**.
- **Judicial Safeguards:** The decision reaffirmed that such actions must follow **strict procedural checks**, including medical boards and consent protocols.

Evolution of Euthanasia Jurisprudence in India

- **Gian Kaur vs State of Punjab:** The Court held that the **Right to Life does not include the right to die**, but opened debate on dignified death.
- **Aruna Shanbaug Case:** Introduced the concept of **passive euthanasia** and allowed withdrawal of life support under strict conditions.

- **2018 Constitution Bench Judgment:** Recognised **Right to Die with Dignity as a fundamental right** and validated **Living Wills**.
- **Recent Developments:** The Harish Rana case builds on this evolution, reinforcing **judicial consistency and humanitarian interpretation**.

Ethical Concerns and Risks

- **Possibility of Misuse:** Families may misuse provisions for financial or inheritance motives, necessitating **robust legal safeguards**.
- **Pressure on Vulnerable Groups:** Elderly and terminally ill patients may feel **social or emotional pressure** to withdraw treatment.
- **Medical Uncertainty:** Diagnosing irreversible conditions like PVS is complex, and errors may lead to **premature decisions**.
- **Cultural and Religious Sensitivities:** Many belief systems oppose euthanasia, creating **societal resistance and ethical conflict**.

Role of Living Wills and Patient Autonomy

- **Concept of Living Will:** A legal document allowing individuals to specify medical preferences in case of incapacity, ensuring **respect for autonomy**.
- **Reducing Family Burden:** Living wills help families avoid emotional dilemmas by clearly stating the patient's wishes.
- **Legal Recognition:** The Supreme Court has recognised living wills, but awareness and implementation remain **limited in India**.
- **Global Practice:** Countries like the USA widely use advance directives, showing the importance of **institutionalising patient choice**.

Medical Ethics and Technological Challenges

- **Advancement in Life Support Systems:** Modern medicine can artificially sustain life for long periods, raising questions about **quality vs quantity of life**.
- **Doctor's Ethical Responsibility:** Physicians must balance **Hippocratic duty (to save life)** with compassion and patient dignity.
- **Need for Medical Guidelines:** Clear protocols are required to guide doctors in **end-of-life decision-making**.
- **Palliative Care Importance:** Strengthening palliative care can reduce suffering and dependence on extreme medical interventions.

Way Forward

- **Comprehensive Legislation:** India needs a clear law on euthanasia to provide **uniform guidelines and legal certainty**.
- **Strengthening Safeguards:** Multi-layered checks including judicial oversight, medical boards, and consent mechanisms must be ensured.
- **Promoting Living Wills:** Awareness campaigns and simplified procedures can encourage individuals to exercise **advance directives**.
- **Enhancing Palliative Care** Expanding access to palliative and hospice care will ensure **dignified end-of-life support**.
- **Ethical Training for Medical Professionals:** Integrating medical ethics into training will help doctors make **balanced and humane decisions**.

Conclusion

The judgment strengthens the constitutional vision of **dignity, autonomy, and compassion** under Article 21. By recognising the right to withdraw life-sustaining treatment and promoting living wills, the Court balances medical advancement with humane values. However, the absence of comprehensive legislation highlights the urgent need for a robust legal framework to prevent misuse while safeguarding patient dignity.

EXPECTED QUESTIONS FOR UPSC CSE

Prelims MCQ

Que. The Right to Die with Dignity in India is derived from:
(a) Article 14
(b) Article 19
(c) Article 21
(d) DPSPs

Answer: (c)

Descriptive Question

Que. "The recognition of the Right to Die with Dignity reflects an evolving understanding of Article 21 in India." Discuss the ethical, legal and medical dimensions of euthanasia in India. (250 words, 15 marks)

REMOVAL OF THE CHIEF ELECTION COMMISSIONER

Why in News: Opposition parties are reportedly considering a **removal motion against the Chief Election Commissioner (CEC)**, raising concerns over electoral independence and constitutional safeguards.

Key Details

A proposal is being discussed to initiate removal proceedings against the CEC, which is unprecedented in India's history.

- The issue highlights concerns regarding institutional independence and electoral neutrality.
- It is linked to recent changes in the appointment process through the 2023 law.
- The debate raises questions about checks and balances in a parliamentary democracy.

Constitutional Status of Election Commission (Article 324)

- **Constitutional Authority:** Article 324 vests the ECI with superintendence, direction, and control of elections, making it the cornerstone of India's electoral democracy.
- **Independent Institution:** The ECI is designed as an autonomous constitutional body, insulated from executive interference to ensure free and fair elections.
- **Composition:** It consists of the Chief Election Commissioner (CEC) and other Election Commissioners, appointed by the President.
- **Scale of Operations:** The ECI conducts elections for nearly 970 million registered voters (2024–25 data), making it the largest democratic exercise globally.
- **Core Functions:** It enforces the Model Code of Conduct (MCC), manages electoral rolls, monitors elections, and resolves disputes.

Removal Process of the Chief Election Commissioner

- **Constitutional Protection (Article 324(5)):** The CEC can be removed only in the **same manner as a Supreme Court judge**, ensuring security of tenure and independence.
- **Grounds of Removal:** Removal is allowed only on **proved misbehaviour or incapacity**, preventing arbitrary dismissal.
- **Initiation of Motion:** Requires signatures of **100 Lok Sabha or 50 Rajya Sabha members**, ensuring seriousness of intent.
- **Inquiry Mechanism:** A **three-member committee** (SC judge, HC CJ, jurist) investigates allegations, ensuring due process.
- **Special Majority Requirement:** Both Houses must pass the motion with **two-thirds majority + total membership majority**, making removal extremely difficult.

Constitutional Vision of Electoral Independence

- **Ambedkar's Perspective:** B.R. Ambedkar emphasised that electoral machinery must remain **independent of executive control** to preserve democratic legitimacy.
- **Free and Fair Elections:** The Supreme Court has repeatedly held elections as part of the **basic structure of the Constitution**.
- **Anup Baranwal Case (2023):** The Court mandated a **selection committee including PM, LoP, and CJI**, highlighting the need for balanced appointments.
- **Institutional Autonomy:** Independence ensures credibility, neutrality & citizen trust in electoral outcomes.
- **Comparative Importance:** Similar protections exist for **judiciary and CAG**, reflecting the importance of independent constitutional bodies.

Legislative Changes in Appointment Process (2023 Act)

- **New Law Enacted:** Parliament passed the **Chief Election Commissioner and Other Election Commissioners Act, 2023**.
- **Changed Selection Committee:** The **Chief Justice of India was replaced by a Union Cabinet Minister**, giving the executive majority.
- **Concerns Raised:** Critics argue this may increase **executive dominance**, affecting perceived impartiality.
- **Separation of Powers Debate:** Raises concerns about weakening **checks and balances** between institutions.
- **Impact on Credibility:** Even the perception of bias can reduce **public trust in elections**, which is critical for democracy.

Institutional Legacy and Achievements of ECI

- **First General Elections (1951–52):** Conducted under **Sukumar Sen**, involving ~170 million voters, despite widespread illiteracy.
- **Voter Awareness Initiatives:** Programs like **SVEEP** improved participation and electoral literacy.
- **Technological Advancements:** Introduction of **EVMs, VVPATs, and digital electoral rolls** enhanced transparency.
- **Global Recognition:** The ECI is regarded as one of the **most credible election management bodies**, assisting other democracies.
- **Expanding Inclusivity:** Efforts include **PWD-friendly polling stations, gender inclusion, and remote voting pilots**.

Parliamentary Oversight vs Institutional Independence

- **Role of Parliament:** Parliament ensures accountability through **debates, committees, and removal provisions**.
- **Checks and Balances:** Removal provisions act as safeguards against **misuse of constitutional authority**.
- **Unprecedented Nature:** No removal motion has ever been initiated against a CEC in **75+ years**, making the current debate significant.
- **Risk of Politicisation:** Frequent or politically motivated attempts may undermine **institutional neutrality**.
- **Democratic Maturity:** The issue reflects the evolving balance between **accountability and autonomy** in Indian democracy.

Electoral Integrity and Democratic Governance

- **Free Elections as Foundation:** Electoral integrity ensures **peaceful transfer of power and political stability**.
- **Public Trust:** Credibility of the ECI directly influences **citizen confidence in democracy**.
- **Challenges Today:** Issues like **money power, misinformation, and political polarisation** test institutional strength.
- **Global Context:** Independent election bodies are essential for **democratic resilience worldwide**.
- **Need for Reform:** Transparent appointments and institutional safeguards are key to maintaining legitimacy.

Conclusion

The Election Commission is central to India's democratic framework. While parliamentary oversight ensures accountability, safeguarding **institutional independence, neutrality, and credibility** is equally essential. Strengthening transparent appointment mechanisms, maintaining constitutional morality, and ensuring bipartisan respect for institutions will preserve electoral integrity in the world's largest democracy.

EXPECTED QUESTIONS FOR UPSC CSE

Prelims MCQ

Que. Which Article of the Constitution deals with the Election Commission of India?
(a) Article 320
(b) Article 324
(c) Article 326
(d) Article 329

Answer: (b)

Descriptive Question

Que. Discuss the constitutional safeguards ensuring the independence of the Election Commission of India. Examine recent debates regarding its appointment and removal process. (250 words, 15 marks)

CORPORATE LAWS (AMENDMENT) BILL 2026

Why in News: The **Corporate Laws (Amendment) Bill, 2026** was introduced in Lok Sabha to amend the Companies Act, 2013 and LLP Act, 2008 to enhance ease of doing business and decriminalise minor corporate offences.

Key Details

- The Bill seeks to **decriminalise several procedural offences** by replacing criminal penalties with civil penalties.
- It proposes **changes in CSR thresholds**, compliance simplification, and expansion of the definition of small companies.
- It enables **digital corporate governance**, including hybrid AGMs and electronic filings.
- The Bill has been referred to a **Joint Parliamentary Committee (JPC)** for detailed scrutiny.

Decriminalisation of Corporate Offences

- **Shift from Criminal to Civil Liability:** The Bill converts several procedural offences into **civil penalties**, reducing imprisonment provisions. This aligns with earlier reforms (2019, 2020 amendments) aimed at improving investor confidence.
- **Reduction in Litigation Burden:** Corporate India faces delays due to legal proceedings. Decriminalisation will **ease judicial burden** and improve India's ranking in the Ease of Doing Business indicators.
- **Global Best Practices:** Advanced economies like the UK and Singapore rely on **monetary penalties for minor compliance failures**, focusing criminal liability only on serious fraud or misconduct.
- **Concerns on Deterrence:** Critics argue that removal of criminal provisions may **weaken compliance culture**, especially in cases of repeated violations.

Corporate Social Responsibility (CSR) Reforms

- **Increased Threshold for Applicability:** The Bill raises CSR applicability threshold from **₹5 crore to ₹10 crore net profit**, potentially reducing the number of companies under CSR obligations.
- **Retention of 2% Spending Norm:** Companies meeting criteria must still spend **2% of average net profits (last 3 years)**, ensuring continuity of social contributions.
- **Flexibility in Fund Utilisation:** Extension of time for transferring unspent CSR funds from **30 days to 90 days** improves operational flexibility.
- **Concerns of Dilution:** India is the **first country to mandate CSR (Companies Act, 2013)**; raising thresholds may reduce CSR funds for social sectors like education, health, and rural development.

Ease of Doing Business & Compliance Simplification

- **Digital Governance Measures:** The Bill allows **electronic service of documents and hybrid AGMs**, reflecting post-pandemic digital transformation in corporate governance.
- **Self-Declaration Mechanism:** Replacement of affidavits with **self-declarations** reduces bureaucratic delays and compliance costs for businesses.
- **Relaxation for Small Companies:** Exemptions from auditor appointment and reduced filing fees aim to support **MSMEs and startups**, which form over **90% of India's business ecosystem**.
- **Periodic Physical Meetings:** Mandatory physical AGM once every **three years** ensures balance between digital convenience and shareholder engagement.

Redefinition of Small Companies

- **Expanded Threshold Limits:** Paid-up capital limit increased to **₹20 crore** and turnover to **₹200 crore**, significantly expanding the category.
- **Encouragement to MSMEs:** India has over **6.3 crore MSMEs (Ministry of MSME data)**; relaxed compliance will aid formalisation and growth.
- **Reduced Regulatory Burden:** Smaller companies benefit from **simplified reporting, reduced penalties, and fewer governance requirements**.
- **Risk of Regulatory Arbitrage:** Larger firms may restructure to fall under "small company" classification to **avoid stricter regulations**.

Corporate Governance & Institutional Strengthening

- **Expanded Role of NFRA:** The National Financial Reporting Authority gets powers to **issue advisories, conduct investigations, and enforce compliance**.
- **Designation of IBBI as Valuation Authority:** Ensures standardisation in valuation practices, critical for **mergers, insolvency, and investment decisions**.
- **Alignment with Global Standards:** Strengthened oversight enhances credibility in global markets, improving India's position in **FDI inflows (over $70 billion annually in recent years)**.
- **Concerns of Executive Overreach:** Increased powers to regulators and government may lead to **reduced autonomy and excessive centralisation**.

Capital Market and Structural Reforms

- **Flexible Buyback Provisions:** Companies can undertake buybacks beyond **25% limit for prescribed classes**, improving capital restructuring options.
- **Employee Compensation Schemes:** Inclusion of **RSUs and Stock Appreciation Rights (SARs)** aligns India with global corporate compensation practices.
- **Ease in Mergers & Amalgamations:** Approval thresholds reduced from **90% to 75%**, facilitating faster corporate restructuring.
- **Impact on Investment Climate:** Simplified restructuring enhances India's attractiveness for **foreign investors and venture capital**.

LLP and Trust Conversion Framework

- **Conversion of Trusts into LLPs:** Enables trusts registered under **SEBI or IFSC Authority** to convert into LLPs, enhancing flexibility.

- **Boost to Financial Sector Innovation:** Facilitates restructuring of investment entities like **AIFs and financial trusts**, promoting capital market efficiency.
- **Advantages of LLP Structure:** Combines **limited liability with operational flexibility**, making it suitable for professional services and startups.
- **Regulatory Oversight Challenges:** Ensuring compliance during conversion is essential to avoid misuse for **tax evasion or regulatory arbitrage**.

Constitutional and Governance Concerns

- **Delegated Legislation Issue:** Critics argue excessive powers given to executive authorities may violate principles laid down in **Hamdard Dawakhana case (1960)**.
- **Parliamentary Oversight:** Referral to a **31-member JPC** indicates the need for detailed legislative scrutiny.
- **Balance between Reform and Accountability:** While easing business, safeguards must ensure **transparency, investor protection, and corporate ethics**.
- **Democratic Governance:** Corporate laws must align with broader constitutional values of **accountability and rule of law**.

Conclusion

The Corporate Laws (Amendment) Bill, 2026 is a significant step towards **modernising India's corporate regulatory framework** by promoting ease of doing business, digital governance, and global alignment. However, its success depends on maintaining a **delicate balance between deregulation and accountability**. Strengthening institutional oversight, ensuring effective parliamentary scrutiny, and safeguarding CSR commitments will be crucial to achieving inclusive and sustainable economic growth.

EXPECTED QUESTIONS FOR UPSC CSE

Prelims MCQ

Que. With reference to the Corporate Laws (Amendment) Bill, 2026, consider the following statements:

1. It increases CSR applicability threshold from ₹5 crore to ₹10 crore net profit.
2. It completely removes CSR spending requirements.
3. It allows hybrid AGMs with at least one physical meeting in three years.

Which of the above is/are correct?

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

Answer: (c)

Descriptive Question

Que. The Corporate Laws (Amendment) Bill, 2026 aims to balance ease of doing business with corporate accountability. Critically examine. (150 Words, 10 Marks)

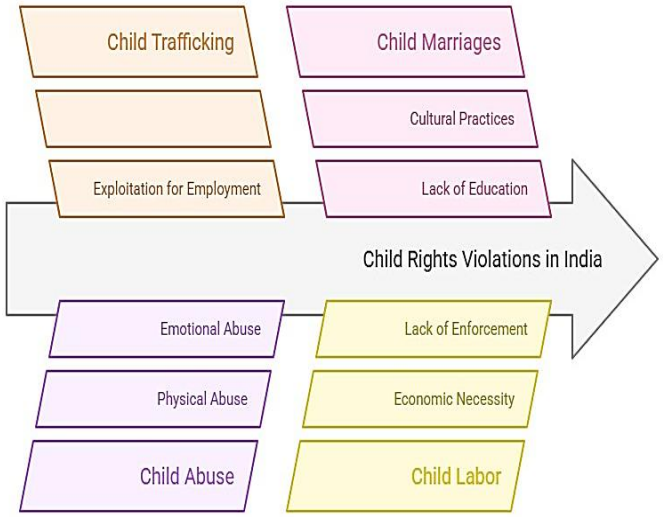
DIGITAL SAFETY AND CHILD RIGHTS

Why in News: Karnataka and Andhra Pradesh have proposed restricting social media access for minors, triggering debates on **digital safety, constitutional rights, and regulatory jurisdiction in India**.

Key Details

- Some Indian states propose **age-based restrictions or bans** on social media to address addiction and online harm.
- Evidence suggests **blanket bans are ineffective**, as children often bypass restrictions using alternative accounts.
- Digital platforms also provide **learning opportunities, emotional support, and social engagement**.
- Experts advocate **digital literacy, parental supervision, and graded regulation** instead of outright bans.

Analyzing Child Rights Issues in India



Growing Digital Exposure among Children

- **Rapid Internet Penetration:** India has over **850 million internet users (TRAI/industry estimates)**, with increasing access among children; nearly **69% of children (10–15 years)** use digital devices regularly.
- **Pandemic-driven Digital Integration:** The COVID-19 pandemic accelerated online learning, making children **dependent on digital platforms for education and communication**, normalising early exposure.
- **Digital Natives Phenomenon:** Today's children are "digital natives," growing up with technology; nearly **50% can manage privacy settings**, showing advanced digital familiarity.
- **Affordable Technology Ecosystem:** Low-cost smartphones and cheap data (India among the **lowest data costs globally)** have democratised access but also increased unsupervised usage.

Limitations of Blanket Social Media Bans

- **Ease of Circumvention:** Studies show **71% of children access platforms via family accounts**, highlighting the impracticality of enforcing age restrictions.
- **Global Evidence of Failure:** Australia's eSafety Commissioner (2025) found **80% of children (8–12)** were using social media despite age limits, indicating regulatory gaps.
- **Shift to Riskier Platforms:** Blanket bans may push children toward **encrypted or unregulated platforms**, where monitoring and safety mechanisms are weaker.

- **Implementation Challenges in India:** Due to the **borderless nature of the internet**, state-level bans are difficult to enforce without coordination with the Union Government.

Online Risks Associated with Social Media

- **Cyberbullying and Harassment:** Children face trolling, abuse, and peer pressure online, which can lead to **low self-esteem, anxiety, and depression**.
- **Exposure to Harmful Content:** Algorithm-driven feeds often expose minors to **violent, sexual, or misleading content**, raising ethical concerns about platform design.
- **Mental Health Impacts:** Research links excessive screen time with **sleep disruption, attention issues, and increased stress levels** among adolescents.
- **Addictive Platform Design:** Features like **infinite scrolling, notifications, and short-form videos** are engineered to maximise engagement, contributing to digital addiction.

Opportunities Provided by Digital Platforms

- **Access to Education and Skills:** Platforms like YouTube and online communities provide **free educational resources**, especially benefiting students in rural areas.
- **Emotional Support and Community Building:** Around **55% of children report positive online interactions**, showing the role of digital spaces in emotional well-being.
- **Inclusion of Marginalised Groups:** Studies highlight that **LGBTQ+ youth** and other marginalised groups find safe spaces online for identity expression and support.
- **Creative and Civic Engagement:** Social Media enables **content creation, innovation, and civic participation**, fostering entrepreneurship and awareness among youth.

Constitutional and Federal Issues

- **Union vs State Jurisdiction:** Under the **Seventh Schedule (Union List – Entry 31)**, internet and telecommunications fall under Union jurisdiction, limiting states' authority.
- **Fundamental Rights Concerns:** Social media access relates to **Article 19(1)(a) (freedom of speech and expression)** and **Right to Information**.
- **Reasonable Restrictions Doctrine:** Any restriction must satisfy **Article 19(2)** conditions and pass the test of **proportionality**, as laid down by the Supreme Court.
- **Digital Gender Divide Risk:** Blanket bans may disproportionately restrict access for girls, reinforcing **patriarchal control and widening inequality**.

Policy and Regulatory Framework

- **Information Technology Act, 2000:** Provides the legal framework for regulating digital platforms and addressing cybercrime in India.
- **IT Rules, 2021:** Mandate **content moderation, grievance redressal, and due diligence** for intermediaries.
- **Economic Survey 2025–26 Recommendations:** Suggested **age-based restrictions, content filters, and limits on targeted advertisements** for minors.
- **Global Trends:** Countries like Australia, France, and Indonesia are adopting **age-verification systems and graded restrictions**, not blanket bans.

India's Proposed Graded Regulatory Approach

- **Age-based Tier System:** Proposed categories:
  - ✓ **8–12 years:** Strict parental control
  - ✓ **12–16 years:** Moderate access
  - ✓ **16–18 years:** Regulated independence
- **Time and Usage Restrictions:** Measures like **daily screen limits and restricted login hours** are being considered.
- **Platform Accountability:** Social media companies may be required to design **child-safe algorithms and stronger privacy protections**.
- **Balanced Policy Vision:** The approach aims to ensure **child safety without restricting digital access**, aligning with global best practices.

Conclusion

A blanket ban on social media is neither practical nor effective and may inadvertently push children toward unsafe digital spaces. India must adopt a **balanced, multi-stakeholder approach** combining **digital literacy, parental guidance, age-based regulation, and platform accountability**. Strengthening awareness in schools and empowering families can create a **safe, inclusive, and responsible digital ecosystem**, ensuring that children remain protected yet empowered participants in the digital age.

EXPECTED QUESTIONS FOR UPSC CSE

Prelims MCQ

Que. Which of the following are potential risks associated with excessive social media use among children?

1. Cyberbullying
2. Sleep disruption
3. Improved attention span
4. Exposure to harmful content

Select the correct answer:

(a) 1 and 2 only

(b) 1, 2 and 4 only

(c) 2 and 3 only

(d) 1, 2, 3 and 4

Answer: (b)

Descriptive Question

Que. "A blanket ban on social media for minors may be counterproductive." Discuss in the context of digital safety, constitutional rights, and governance challenges in India. (150 Words, 10 Marks)

JUDICIAL REFORMS AND PENDENCY

Why in News: India's rising judicial pendency and underutilisation of plea bargaining have renewed the demand for a **national mission on negotiated justice**.

Key Details

- Over **5 crore cases are pending** in Indian courts, with **80% in district courts**.

- Plea bargaining, introduced in **2005 (CrPC Amendment)**, is used in **less than 1% cases**.
- Countries like the **United States (90%+ cases)** rely heavily on negotiated settlements.
- Experts suggest a **"Sahmati Samadhan Nyaya Mission"** to promote faster dispute resolution.

Judicial Pendency Crisis in India

- **Magnitude of Backlog:** India has over **5 crore pending cases**, including ~4.7 crore in subordinate courts, showing systemic overload at the grassroots level.
- **Structural Nature of Problem:** Pendency is not merely administrative but structural, involving **judge shortages, procedural delays, and rising litigation**.
- **Impact on Citizens:** Delays result in **denial of timely justice**, prolonged detention of undertrials, and emotional and financial stress for litigants.
- **Pandemic Effect:** COVID-19 worsened the backlog, despite reforms like **e-Courts Mission Mode Project** and virtual hearings.

Plea Bargaining: Concept and Legal Framework

- **Definition and Objective:** Plea bargaining allows the accused to **plead guilty in exchange for a lighter sentence or reduced charges**, ensuring faster case disposal.
- **Legal Basis in India:** Introduced via **Criminal Law (Amendment) Act, 2005**, incorporated in **Chapter XXI-A of CrPC**.
- **Scope and Limitations:** Applicable mainly to **offences with punishment up to 7 years**, excluding serious crimes like those affecting national security.
- **Underlying Philosophy:** Inspired by the idea that **certainty and speed of justice** are more effective than severity of punishment.

Global Best Practices

- **United States Model:** Over **90% of criminal cases** are resolved through plea bargaining, significantly reducing trial burden.
- **United Kingdom & Europe:** Countries like the UK, Germany, and France use **negotiated settlements for minor offences**, ensuring faster justice.
- **China's Controlled System:** China uses **high early-stage disposal mechanisms**, maintaining low pendency through administrative efficiency.
- **Key Lesson for India:** Effective plea systems require **institutional trust, transparency, and incentives**, not just legal provisions.

Reasons for Low Adoption in India

- **Lack of Awareness:** Many litigants and lawyers perceive plea bargaining as **unfair or equivalent to admission of guilt**, reducing its usage.
- **Institutional Hesitation:** Judges and prosecutors often avoid plea deals due to **fear of misuse, lack of guidelines, and procedural ambiguity**.
- **Absence of Incentives:** Legal professionals lack financial or professional incentives to settle cases early through negotiation.
- **Trust Deficit:** Concerns of **coercion, extortion, or unequal bargaining power** discourage acceptance of negotiated justice.

Impact of Judicial Delays

- **On Individuals:** Undertrials may spend years in jail without conviction, violating **Article 21 (Right to Life and Personal Liberty)**.
- **On Victims:** Long trials lead to **secondary victimisation**, delaying closure and justice.
- **On Economy:** Slow dispute resolution weakens **contract enforcement**, reduces ease of doing business, and deters investment.
- **On Governance:** Persistent delays create a **crisis of legitimacy**, reducing public trust in the judiciary and rule of law.

Need for a National Mission for Negotiated Justice

- **Institutional Mechanism:** A dedicated mission like **"Sahmati Samadhan Nyaya Mission"** can promote structured plea bargaining and settlements.
- **Capacity Building:** Training prosecutors and judges in negotiation techniques will ensure **fair and efficient case resolution**.
- **Incentive Reforms:** Aligning fee structures and performance metrics can encourage lawyers to **opt for early settlements**.
- **Judicial Encouragement:** Courts can identify suitable cases and promote **pre-trial negotiation frameworks**.
- **Safeguards and Transparency:** Strong oversight is required to prevent **coercion and ensure voluntary, informed consent**.

Conclusion

India's judicial crisis demands a shift from **adversarial litigation to collaborative resolution mechanisms**. Plea bargaining, if implemented with safeguards, can enhance efficiency, reduce pendency, and restore public trust. A national mission for negotiated justice can transform the system into one that delivers **timely, certain, and accessible justice**, aligning with constitutional ideals.

EXPECTED QUESTIONS FOR UPSC CSE

Prelims MCQ

Que. Plea bargaining in India was introduced through:
(a) Indian Penal Code
(b) Criminal Law (Amendment) Act, 2005
(c) Civil Procedure Code
(d) Legal Services Authorities Act

Answer: (b)

Descriptive Question

Que. Judicial pendency in India is a structural issue. Examine how plea bargaining can help address this challenge. (150 Words, 10 Marks)

DEMOCRACY AND DISSENT

Why in News: The recent protest by the Indian Youth Congress (IYC) at the India AI Summit and the subsequent political backlash have reignited debates on dissent, nationalism, and India's global image.

Key Details

- IYC's protest during an international summit triggered debate on **limits of dissent in democracy**.
- Political responses labelled the protest as **"anti-national"**, raising concerns over misuse of the term.
- Dissent is a **core democratic right** ensuring accountability and participation.
- Tension persists between **strong leadership narratives and constitutional pluralism**.

Protest and Political Controversy

- **Nature of Protest:** The IYC staged a shirtless protest at the India AI Summit, targeting the **India–U.S. trade agreement**, drawing attention due to the presence of global stakeholders.
- **Political Backlash:** Leaders from the ruling establishment labelled the act as **"anti-national"**, reflecting a growing trend of equating dissent with disloyalty.
- **Law and Order Response:** Police invoked charges such as **rioting and promoting enmity**, highlighting concerns over the use of legal provisions against political protest.
- **Global Image Debate:** Critics argued such protests may affect India's international perception, while others viewed them as a sign of **vibrant democratic engagement**.

Dissent as a Democratic Safety Valve

- **Constitutional Protection:** Article 19(1)(a) of the Constitution guarantees **freedom of speech and expression**, making dissent a fundamental democratic right.
- **Role in Governance:** Dissent acts as a **feedback mechanism**, enabling citizens to question policies and hold the government accountable.
- **Global Democratic Practice:** Democracies like the US and UK regularly witness protests during global events, indicating that dissent is **not incompatible with global reputation**.
- **Judicial Recognition:** The Supreme Court has emphasised that **"dissent is the safety valve of democracy"**, warning that its suppression can lead to instability.

Strong Leadership vs Democratic Space

- **Centralisation of Authority:** Strong leadership models often prioritise **decisive governance**, sometimes at the cost of accommodating dissenting voices.
- **Blurring of State and Government:** Increasing tendency to equate criticism of the government with criticism of the nation undermines **democratic accountability**.
- **Historical Context:** During the Emergency (India 1975–77), slogans like "India is Indira" blurred distinctions between leader and nation.
- **Impact on Opposition:** Labelling dissent as anti-national weakens the **role of opposition**, which is essential for checks and balances in a democracy.

Federalism, Media and Nationalism Debate

- **Federal Constitutional Design:** India follows a **quasi-federal system**, balancing central authority with regional autonomy, encouraging diverse viewpoints.
- **Media Narratives:** Sections of media amplify **"one nation, one identity"** narratives, sometimes oversimplifying complex democratic debates.
- **Recent Protest Examples:** Movements like the **farmers' protests (2020–21)** and **CAA protests** were often portrayed as anti-national by some stakeholders.
- **Policy vs Nation Distinction:** Criticism of government policy is a democratic exercise and must not be conflated with **disloyalty to the nation**.

Democracy as a Living Constitutional Ethos

- **Pluralism as Strength:** India's democracy is rooted in **diversity, debate, and inclusiveness**, which strengthens rather than weakens the nation.
- **Civic Participation:** Protests, civil society engagement, and public discourse are essential for a **participatory democracy**.
- **Balancing Rights and Responsibility:** While dissent is protected, it must remain within **constitutional limits** such as public order and sovereignty.
- **Global Perception:** A nation that tolerates dissent is often seen as **more democratic and resilient**, enhancing rather than harming its global image.

Way Forward

- **Reinforce Constitutional Morality:** Promote awareness of rights and duties to ensure **responsible exercise of dissent**.
- **Clear Distinction:** Maintain a strict separation between **criticism of government and criticism of the nation** in political discourse.
- **Strengthen Institutions:** Ensure independent functioning of judiciary, media, and civil society to safeguard democratic space.
- **Encourage Dialogue:** Governments should engage constructively with dissent rather than suppress it, fostering **deliberative democracy**.
- **Responsible Media Role:** Media must avoid sensationalism and promote **balanced, fact-based discussions** on protests and nationalism.

Conclusion

A mature democracy must protect the space for dissent while safeguarding national unity. Criticism of government policies is not equivalent to disloyalty to the nation. India's constitutional framework thrives on pluralism, debate, and checks and balances. The true strength of the republic lies not in suppressing dissent but in engaging with it constructively, ensuring a resilient and inclusive democracy.

EXPECTED QUESTIONS FOR UPSC CSE

Prelims MCQ

Que. Which of the following best describes the role of dissent in a democracy?

(a) Weakens governance

(b) Acts as a safety valve

(c) Promotes instability

(d) Undermines sovereignty

Answer: (b)

Descriptive Question

Que. "Dissent is a safety valve of democracy, yet it is increasingly labelled as anti-national in contemporary politics." Critically examine in the context of recent protests in India. (250 words, 15 marks)

TRANSGENDER RIGHTS IN INDIA

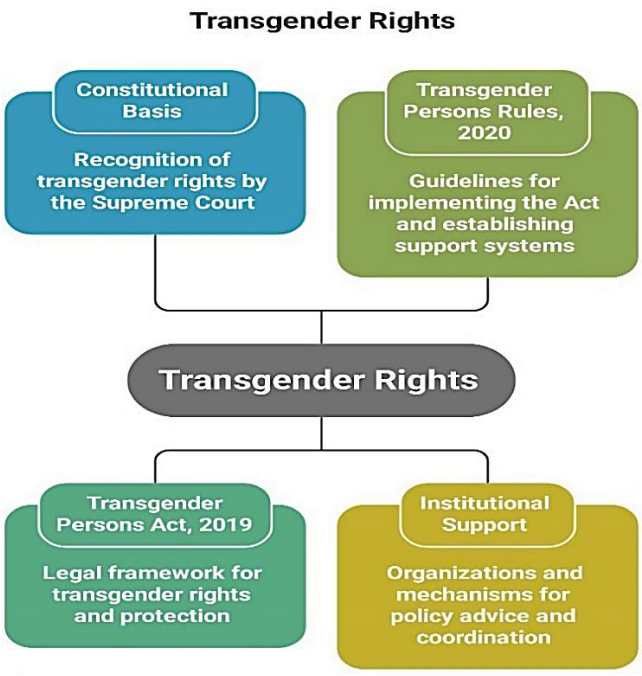
Why in News: The **Transgender Persons (Protection of Rights) Amendment Bill, 2026** has sparked controversy for potentially diluting judicially recognised rights and limiting inclusivity.

Key Details

- The Bill proposes a **restricted definition** of transgender persons, focusing on specific socio-cultural identities.
- It introduces **medical board verification**, limiting the right to self-identification.
- Concerns relate to **privacy, dignity, and autonomy**, as recognised by the Supreme Court.
- It may **dilute protections** under the 2019 Act and contradict progressive judicial precedents.

Constitutional Foundation of Gender Identity Rights

- **Article 21 – Right to Dignity and Identity:** The Supreme Court has interpreted Article 21 to include **personal autonomy, dignity, and identity**, making gender identity an intrinsic part of life and liberty.
- **Articles 14 & 15 – Equality and Non-Discrimination:** Equality before law and prohibition of discrimination extend to **gender identity and sexual orientation**, ensuring equal protection to transgender persons.



- **Article 19 – Freedom of Expression:** Gender expression through dress, behaviour, and identity falls under **freedom of speech and expression**, reinforcing personal choice.
- **Transformative Constitutionalism:** Indian constitutional jurisprudence seeks to **transform society** by recognising marginalized identities and promoting substantive equality.

Judicial Recognition of Transgender Rights

- **NALSA vs Union of India:** Recognised transgender persons as the **third gender** and upheld the **right to self-identification without medical intervention**.
- **Right to Self-Identification Principle:** The Court emphasised that gender identity is based on **psychological self-perception**, not biological determinism.
- **K.S. Puttaswamy vs Union of India:** Established **privacy as a fundamental right**, including **bodily autonomy and informational privacy**.
- **Navtej Singh Johar vs Union of India:** Reinforced **dignity, equality, and non-discrimination** for LGBTQ+ persons, strengthening the rights framework.

Key Features of the Amendment Bill, 2026

- **Restricted Definition:** The Bill recognises only specific communities such as **hijra, kinner, aravani**, excluding many gender-diverse identities.
- **Medical Board Certification:** Mandatory verification by district medical boards undermines the **self-identification principle** recognised by the judiciary.
- **Biological and Cultural Criteria:** Attempts to define gender through **biological markers and socio-cultural categories**, ignoring psychological identity.
- **Data Sharing Requirements:** Medical institutions must share details of gender-affirming procedures, raising concerns over **privacy and data protection**.

Issues and Criticisms

- **Violation of Self-Identification:** The Bill contradicts the **NALSA judgment**, which clearly upheld gender identity as a matter of personal choice.
- **Exclusion of Diverse Identities:** Trans men, non-binary, and genderqueer individuals may be excluded, undermining the **inclusive intent of the 2019 Act**.
- **Privacy Concerns:** Mandatory sharing of sensitive medical data violates the **right to privacy** recognised by the Supreme Court.
- **Administrative Challenges:** Medical verification may lead to **bureaucratic delays, harassment, and exclusion**, discouraging identity assertion.
- **Risk of Rights Rollback:** Instead of expanding protections, the Bill may reverse **progressive constitutional and judicial developments**.

Democratic Process and Governance Concerns

- **Hasty Legislative Process:** The Bill was reportedly passed with **limited debate**, raising concerns about parliamentary scrutiny and accountability.
- **Lack of Stakeholder Consultation:** LGBTQIA+ communities were not adequately consulted, violating principles of **participatory governance**.

- **Transparency Deficit:** Absence of detailed deliberation weakens **legitimacy and acceptance** of the law.
- **Public Trust Issues:** Ignoring affected communities may reduce trust in democratic institutions and policymaking.

International Perspective and Global Trends

- **Global Backlash:** Several countries are witnessing **restrictions on transgender rights**, particularly in healthcare and legal recognition.
- **Human Rights Standards:** International norms emphasise **self-identification and non-discrimination**, aligning with earlier Indian judicial principles.
- **India's Leadership Potential:** With progressive judgments like NALSA, India can emerge as a **global leader in inclusive constitutional democracy**.

Republic and Inclusive Citizenship

- **Dignity as Core Value:** A republic ensures **equal dignity and rights for all citizens**, including marginalized communities.
- **Role of the State:** The state must act as a **protector of rights**, not as a gatekeeper restricting identity recognition.
- **Public Awareness and Acceptance:** Legal rights must be supported by **social awareness and inclusion** for effective implementation.
- **Living Constitution:** The Constitution evolves through interpretation and practice, requiring **expansion of rights, not contraction**.

Way Forward

- **Align with Judicial Principles:** The law must uphold **self-identification and dignity**, as recognised in landmark Supreme Court judgments.
- **Inclusive Definition:** Expand the definition of transgender persons to include **non-binary and gender-diverse identities**.
- **Strengthen Data Privacy:** Ensure strict safeguards against misuse of **sensitive medical and identity data**.
- **Participatory Law-Making:** Engage stakeholders, especially transgender communities, in **policy formulation and implementation**.
- **Focus on Welfare Measures:** Improve access to **healthcare, education, employment, and social security**, rather than restrictive regulation.

Conclusion

While the objective of strengthening transgender welfare is commendable, it must align with **constitutional morality and judicial precedents**. The 2026 Amendment risks limiting inclusivity and rolling back rights. India must uphold its commitment to **dignity, equality, and autonomy**, ensuring that the republic remains **inclusive and rights-expanding**.

EXPECTED QUESTIONS FOR UPSC CSE

Prelims MCQ

Que. With reference to transgender rights in India, consider the following:

1. The NALSA judgment recognised the right to self-identify gender.
2. The right to privacy includes bodily autonomy and identity.
3. The Constitution explicitly mentions transgender rights.

Which of the statements are correct?

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

Answer: (a)

Descriptive Question

Que. Critically examine the Transgender Persons (Protection of Rights) Amendment Bill, 2026 in light of constitutional values and judicial precedents. (250 Words, 15 Marks)

HOUSE DECORUM

Why in News: The controversy arose because **Opposition parties accused the Speaker of bias and restricting debate**, while the government defended parliamentary productivity, exposing **deep political polarisation and weakening trust in legislative institutions**.

Key Details

- **Lok Sabha rejected resolution** seeking removal of **Speaker Om Birla**.
- Debate highlighted **growing government–Opposition confrontation** in Parliament.
- Opposition alleged **restrictions on debate and muted microphones**.
- Government cited **statistics showing adequate Opposition participation**.
- Issue reflects **declining parliamentary consensus and rising partisanship**.

Lok Sabha Rejects Removal Resolution

- The **Lok Sabha rejected a resolution under Article 94(c)** seeking the removal of **Speaker Om Birla** through a **voice vote on March 11**.
- The debate preceding the vote was **highly confrontational**, exposing tensions between the **government and the Opposition**.
- The resolution stemmed from concerns about the **Speaker's neutrality and conduct in the House**.
- The Opposition was particularly provoked by the Speaker's claim of **confidential information regarding possible protest by Congress women MPs against the Prime Minister**.
- The episode highlighted **deep political divisions within Parliament**.

Role of Parliament in Representative Democracy

- **Parliament forms the foundation of representative democracy**, ensuring government accountability.
- Regular parliamentary functioning allows **scrutiny of executive actions**.
- It serves as a **structured forum for debate between the government and Opposition**.

- Parliamentary procedures are meant to operate **methodically and impartially**.
- However, **increasing partisanship has weakened these democratic functions**.

Impact of Single-Party Dominance

- **Single-party dominance** has gradually eroded many **formal and informal legislative norms**.
- Parliamentary debates increasingly reflect **political confrontation rather than deliberation**.
- Legislative institutions are sometimes used as **platforms for partisan politics**.
- The authority of presiding officers has also become **politically contested**.
- This trend is visible in both the **Lok Sabha and the Rajya Sabha**.

Concerns Raised by the Opposition

- Opposition MPs claim they are **frequently denied opportunities to raise important issues**.
- **Rahul Gandhi** was reportedly prevented from quoting **former Army Chief M.M. Naravane's unpublished memoir** on the **2020 India–China standoff**.
- **Opposition microphones are often switched off during debates**, according to their allegations.
- During the **Motion of Thanks debate**, Rahul Gandhi was **interrupted multiple times**.
- The Opposition also alleged restrictions on discussing issues such as the **Gautam Adani investigation and international trade matters**.

Government's Defence of Parliamentary Functioning

- The government cited data showing **significant participation by Opposition members**.
- Opposition MPs reportedly received **56% of Zero Hour speaking time**.
- They also asked **more supplementary questions (364)** compared to **NDA MPs (321)** during the Speaker's tenure.
- **Home Minister Amit Shah** highlighted the **high productivity of the House** under the current Speaker.
- He also noted that debates were conducted in **14 regional languages**, reflecting parliamentary inclusivity.

Conclusion

The controversy over the Speaker's removal resolution reflects **deep political polarisation within Parliament**. While the government emphasises productivity and procedural fairness, the Opposition raises concerns about **shrinking democratic space for debate**. Restoring Parliament's credibility requires **neutral presiding officers, respectful dialogue, and adherence to parliamentary norms**, ensuring that the legislature remains an effective forum for accountability and democratic deliberation.

EXPECTED QUESTION FOR UPSC CSE

Descriptive Question

Que. "The functioning of Parliament reflects the health of a democracy." In light of recent controversies regarding the role of the Lok Sabha Speaker and government–Opposition relations, critically examine the challenges to parliamentary functioning in India and suggest measures to restore its effectiveness. (250 Words, 15 Marks)

INTERNATIONAL RELATIONS

WEST ASIA CONFLICT & ENERGY SECURITY

Why in News: Recent **US–Israel strikes on Iran and Iranian retaliation across Gulf countries** have expanded the conflict in West Asia, raising concerns over regional stability and global energy security.

Key Details

- The US and Israel conducted strikes on Iran, followed by Iranian attacks on **US-linked bases and energy infrastructure** in the Gulf.
- Countries affected include **Bahrain, Qatar, UAE, Saudi Arabia, Kuwait and Israel**.
- Strategic assets like **oil refineries, LNG terminals, and the US Fifth Fleet base in Bahrain** have been impacted.
- The conflict threatens critical chokepoints such as the **Strait of Hormuz**, affecting global energy supply chains.

Geopolitical Significance of West Asia

- **Strategic Location & Connectivity:** West Asia lies at the crossroads of **Europe, Asia, and Africa**, making it central to global trade routes like the **Suez Canal and Strait of Hormuz**, through which nearly **30% of global oil trade** passes.
- **US Military Presence:** The US maintains bases in **Bahrain, Qatar, UAE, and Kuwait**, with the **Fifth Fleet in Bahrain** overseeing about **2.5 million sq. miles** of maritime area, ensuring energy flow security.
- **Israel–Iran Rivalry:** The conflict is both **ideological and strategic**, involving proxy groups like Hezbollah (Lebanon) and Houthis (Yemen), now escalating into **direct military confrontation**.
- **Regional Power Politics:** Gulf countries balance relations between **US, Iran, China, and Russia**, making them vulnerable to spillover effects of conflicts.

Energy Security & Global Economic Impact

- **Targeting Energy Infrastructure:** Attacks on facilities such as **Saudi Aramco refineries and LNG plants** indicate a shift towards **economic warfare targeting energy lifelines**.
- **Strait of Hormuz Vulnerability:** Around **20% of global oil supply** passes through this chokepoint; any disruption can cause **sharp spikes in crude oil prices**.
- **Global Price Shock:** Oil prices have surged beyond **$100 per barrel**, similar to peaks during the **Russia–Ukraine war (2022)**, triggering inflation globally.
- **Shipping & Insurance Costs:** Increased geopolitical risk raises **marine insurance premiums**, escalating global trade and commodity prices.

International Law & Use of Force

- **Article 51 – Self Defence:** Countries justify retaliatory strikes under **Article 51 of the UN Charter**, allowing self-defence against armed attacks.
- **Violation of Sovereignty:** Attacks on bases within Gulf states raise concerns over **territorial integrity and non-intervention principles**.
- **Collective Security Risks:** Escalation could involve alliances like **NATO**, especially if allied territories are targeted.
- **Role of United Nations:** Emergency meetings of the **UN Security Council** aim to prevent escalation, though effectiveness is often limited by veto politics.

Expanding Theatre of Conflict

- **Iran's Pressure Strategy:** Iran targets US-linked assets to push Gulf nations to **influence US policy and seek de-escalation**.
- **Economic Leverage:** Strikes on oil and LNG infrastructure aim to create **global economic pressure**, impacting energy-importing nations.
- **Deterrence Signalling:** Expansion of attacks signals Iran's capability to **destabilise the entire region**, beyond bilateral conflict with Israel.
- **Risk of Regionalisation:** Involvement of multiple Gulf countries increases the risk of a **full-scale regional war**.

Iran's Political System & Leadership Dynamics

- **Theocratic-Republic Model:** Since the **1979 Islamic Revolution**, Iran combines elected institutions with clerical supremacy under the **Supreme Leader**.

- **Role of Supreme Leader:** Controls the military, judiciary, and foreign policy, making the position central to **regime stability and continuity**.
- **Succession Mechanism:** The **Assembly of Experts (88 members)** appoints the leader, ensuring institutional continuity even during crises.
- **Centralisation of Power:** Over time, authority has been consolidated, limiting pluralism but strengthening **ideological control.**

Military Dimension: IRGC & Proxy Networks

- **Parallel Military Structure:** The **Islamic Revolutionary Guard Corps (IRGC)** operates alongside the regular army with influence in politics and economy.
- **Axis of Resistance:** Iran supports proxy groups across **Lebanon, Syria, Iraq, and Yemen** to counter US–Israel influence.
- **Internal Security Role:** IRGC and Basij forces ensure regime stability by managing internal dissent and protests.
- **Transition Risks:** Leadership shocks may lead to **military consolidation or internal factionalism**, affecting regional stability.

Global Economic Impact – 3Fs Framework

- **Fuel Shock:** Oil price spikes above **$100/barrel** increase import bills for countries like India, worsening trade deficits.
- **Food Inflation:** Past conflicts raised the **FAO Food Price Index to ~160 (2022)**; current stability (~125) may be threatened if conflict persists.
- **Fertiliser Crisis:** West Asia supplies key inputs like **ammonia and sulphur**, disruption of which can impact agriculture globally.
- **Interlinkages:** Higher fuel costs raise transport and fertiliser costs, creating **inflationary spirals**.

Impact on India

- **Energy Dependence:** India imports over **80–85% of crude oil**, with a major share coming from West Asia, making it highly vulnerable.
- **Diaspora Concerns:** Around **8–9 million Indians** live in the Gulf, contributing nearly **38% of India's remittances (~$118 billion)**.
- **Balance of Payments Risk:** Rising oil prices and falling remittances can widen the **Current Account Deficit (CAD)**.
- **Strategic Autonomy:** India maintains relations with **Israel, Iran, and Gulf countries**, requiring careful diplomatic balancing.

Industrial & Supply Chain Vulnerability

- **Critical Imports:** India depends on West Asia for limestone (~68%), sulphur (~65%), gypsum (~62%), and DRI (~59%).
- **Infrastructure Impact:** Disruption in these imports may increase costs in **cement, steel, and construction sectors**.
- **Diamond Industry Risk:** Over **40% of rough diamonds** come from the region, affecting India's export-oriented gem sector.
- **Manufacturing Competitiveness:** Rising input costs can impact initiatives like **Make in India**.

Strategic Chokepoints & Maritime Security

- **Strait of Hormuz:** A narrow passage between Iran and Oman, handling nearly **one-fifth of global oil trade**.
- **Global Trade Disruption:** Any blockade can disrupt energy supply chains and increase freight costs worldwide.
- **India's Dependence:** A large share of India's oil and LNG imports transit through this route.
- **Maritime Security Importance:** Ensuring safe sea lanes is critical for **India's economic and strategic interests**.

Conclusion

The West Asia conflict highlights the deep interlinkages between **geopolitics, energy security, and global economic stability**. For India, ensuring **energy diversification, strengthening strategic reserves, promoting renewables, and proactive diplomacy** are essential. A balanced foreign policy based on **strategic autonomy and multilateral engagement** will be crucial in navigating such crises. Long-term stability in West Asia is indispensable for global peace and India's growth trajectory.

EXPECTED QUESTIONS FOR UPSC CSE

Prelims MCQ

Que. Which of the following factors are referred to as "3Fs" in global economic shocks?
(a) Finance, Fiscal, Forex
(b) Fuel, Food, Fertilisers
(c) Farming, Fisheries, Forestry
(d) Funds, Flows, FDI

Answer: (b)

Descriptive Question

Que. Discuss the strategic importance of West Asia in global geopolitics and examine the implications of escalating Iran–US–Israel tensions for India. (150 words, 10 marks)

INDIA'S PEACEMAKING DIPLOMACY

Why in News: During the **state visit of Finland's President Alexander Stubb to India (March 2026)**, India and Finland upgraded their ties to a **strategic partnership on digitalisation and sustainability**, while emphasising India's potential role as a global peacemaker.

Key Details

- India and Finland agreed to upgrade bilateral relations to a **strategic partnership focused on digitalisation, sustainability, and emerging technologies**.
- Finland's President highlighted that the **United States appears to be acting outside traditional international law frameworks** in certain global conflicts.
- The Finnish President recognised **India as one of the few countries capable of engaging with all major global actors**, giving it peacemaking potential.
- Discussions occurred on the sidelines of the **Raisina Dialogue**, India's flagship geopolitical conference.

India–Finland Strategic Partnership

- **Upgradation of Bilateral Relations:** India and Finland decided to elevate their cooperation to a **strategic partnership**, particularly focusing on digital transformation and sustainability-driven economic cooperation.
- **Technology Cooperation:** Finnish technology firms such as **Nokia** have a significant presence in India's telecom sector, with a large share of India's **5G infrastructure supported by Finnish technology**.
- **Digitalisation and Innovation:** Cooperation is expected in emerging sectors like **artificial intelligence, quantum computing, cybersecurity, and digital networks**, areas where both countries have complementary strengths.
- **Sustainability and Green Technology:** Finland, known for its leadership in **clean technologies and circular economy models**, can support India's transition toward sustainable development and climate resilience.
- **Linkage with EU–India Relations:** As a member of the **European Union**, Finland's engagement also strengthens the broader **India–EU strategic and economic partnership**, including negotiations for a Free Trade Agreement.

India's Role in a Changing Global Order

- **Multipolar World Dynamics:** The global order is increasingly shifting from a **unipolar system dominated by the United States to a multipolar framework** involving emerging powers such as India, China, and the European Union.
- **India's Rising Global Influence:** India is currently one of the **fastest-growing major economies (around 6–7% growth)** and has lifted **over 250 million people out of poverty in the past decade**, strengthening its international credibility.
- **Bridge Between Global North and South:** India maintains close relations with **both Western democracies and developing nations**, allowing it to function as a diplomatic bridge in global governance.
- **Leadership in Multilateral Forums:** India's leadership in forums such as **G20, BRICS, and the Global South Summit** reflects its growing influence in shaping international policy debates.

India as a Potential Global Peacemaker

- **Balanced Foreign Policy:** India follows a policy of **strategic autonomy**, enabling it to maintain relations with diverse actors such as the US, Russia, Europe, and developing countries simultaneously.
- **Dialogue with All Parties:** Unlike many countries aligned strictly within geopolitical blocs, India maintains **open diplomatic channels with conflicting parties**, including in crises like the **Russia–Ukraine conflict**.
- **Historical Role in Peacebuilding:** India has contributed extensively to **United Nations peacekeeping missions**, making it one of the largest troop contributors historically.
- **Credibility Among Developing Nations:** India's developmental experience and commitment to **South–South cooperation** enhances its legitimacy as a neutral mediator in international disputes.

International Law and Global Governance Challenges

- **Concerns over Unilateral Actions:** Finland's President highlighted concerns that certain powers, including the **United States**, sometimes act outside established international legal frameworks in geopolitical conflicts.
- **Erosion of Multilateral Norms:** Increasing unilateralism and geopolitical rivalry are weakening institutions such as the **United Nations and international law mechanisms**.
- **Importance of Rules-Based Order:** A stable international system depends on adherence to **international law, diplomacy, and multilateral cooperation**.
- **India's Position:** India consistently emphasises the importance of **respect for sovereignty, territorial integrity, and peaceful resolution of disputes**, aligning with principles of the UN Charter.

Emerging Areas of India–Europe Cooperation

- **Technology Partnerships:** Collaboration in **5G networks, artificial intelligence, and quantum technologies** can strengthen India's digital ecosystem.
- **Economic and Trade Integration:** The proposed **India–EU Free Trade Agreement (FTA)** could significantly increase trade, investment, and supply chain resilience.
- **Green Transition:** Cooperation in **renewable energy, sustainable infrastructure, and climate technologies** can support global climate commitments.
- **Education and Innovation:** Partnerships between universities, research institutions, and startups can promote innovation in fields such as biotechnology and advanced engineering.

Conclusion

India's expanding diplomatic engagement and technological cooperation with countries such as Finland reflect its growing role in the global order. As geopolitical tensions rise and international norms face challenges, India's ability to maintain dialogue with diverse actors positions it uniquely as a potential peacemaker. Strengthening partnerships with Europe in technology, sustainability, and trade will further enhance India's strategic influence and contribute to a stable, rules-based international system.

EXPECTED QUESTIONS FOR UPSC CSE

Prelims MCQ

Que. The Raisina Dialogue is primarily associated with:

(a) Global trade negotiations

(b) International geopolitical and strategic discussions

(c) Climate negotiations

(d) Military alliances

Answer: (b)

Descriptive Question

Que. India's strategic autonomy enables it to act as a bridge between competing geopolitical blocs. Discuss in the context of emerging global conflicts. (150 Words, 10 Marks)

INDIA AND CANADA STRATEGIC DIPLOMACY

Why in News: Recently, India and Canada issued a **Joint Leaders' Statement** marking a strategic reset in bilateral relations after recent diplomatic tensions.

Key Details

- Canadian Prime Minister **Mark Carney** visited India (Feb 27–Mar 2, 2026), first such visit since 2018.
- Both countries agreed to strengthen ties through **CEPA, Strategic Energy Partnership, and security cooperation**.
- A **10-year uranium supply deal (~$1.9–2.6 billion)** was signed to support India's nuclear energy goals.
- The partnership is guided by **"Vasudhaiva Kutumbakam"**, focusing on sustainability, inclusivity, and global cooperation.

Strategic Reset in Bilateral Relations

- **Diplomatic Normalisation:** Relations, strained after the 2023 Nijjar issue, have improved with the return of diplomats and revival of institutional dialogues, indicating a shift towards pragmatic engagement.
- **Leadership Change as Catalyst:** Transition from earlier tensions to cooperation under new leadership reflects how political changes influence foreign policy dynamics and bilateral trust-building.
- **Middle Power Cooperation:** Both India and Canada are emerging as **"middle powers"**, aiming to balance global power rivalries through multilateralism and strategic autonomy.
- **Shared Democratic Values:** The partnership is rooted in democracy, rule of law, and sovereignty, forming a stable ideological foundation for long-term cooperation.

Economic Cooperation & Trade Architecture

- **CEPA Negotiations:** The proposed **Comprehensive Economic Partnership Agreement (CEPA)** aims to increase bilateral trade to **$50–70 billion by 2030**, compared to **~$8–9 billion currently**.
- **Trade Diversification:** Both countries seek to reduce dependence on traditional partners like the US and China by expanding trade in pharmaceuticals, agriculture, and technology.
- **Investment Linkages:** Around **600+ Canadian companies operate in India**, while Indian firms have a strong presence in Canada, showing deep economic integration.
- **Institutional Mechanisms:** Revival of CEO Forum and Finance Dialogue reflects the shift towards **structured economic diplomacy** and private sector-led growth.

Strategic Energy & Nuclear Cooperation

- **Uranium Supply Agreement:** A **10-year uranium deal (~10,000 tonnes)** strengthens India's nuclear energy programme and supports its target of **100 GW nuclear capacity by 2047**.
- **Energy Security & Diversification:** Canada's role as a supplier of LNG, crude oil, and potash helps India diversify energy imports and reduce vulnerability to geopolitical disruptions.
- **Clean Energy Transition:** Cooperation in hydrogen, biofuels, and renewables aligns with India's climate commitments and global net-zero goals.
- **Critical Minerals Partnership:** Collaboration ensures access to **lithium, cobalt, and rare earths essential** for EVs and advanced manufacturing, reducing reliance on single-country supply chains.

Technology, Innovation & Digital Cooperation

- **Emerging Technologies:** Focus on AI, quantum computing, semiconductors, and cybersecurity reflects the importance of **trusted digital ecosystems** in modern geopolitics.
- **Trilateral Partnerships:** Initiatives like **Australia–Canada–India Technology Partnership (ACITI)** strengthen collaboration in high-tech sectors and innovation ecosystems.
- **Digital Public Infrastructure (DPI):** India's expertise in scalable digital systems (UPI, Aadhaar) complements Canada's advanced research capabilities.
- **Space Cooperation:** Collaboration between ISRO and Canadian Space Agency in robotics, quantum communication, and space exploration enhances strategic capabilities.

Indo-Pacific & Security Cooperation

- **Indo-Pacific Strategy:** Both countries support a **free, open, and inclusive Indo-Pacific**, ensuring maritime security and regional stability.
- **Counterterrorism & Security:** Cooperation on terrorism, cybercrime, and organized crime reflects shared security concerns and the need for intelligence coordination.
- **Defence Dialogue:** Institutionalisation of defence cooperation, joint exercises, and maritime security partnerships marks a shift towards deeper strategic alignment.
- **Multilateral Engagement:** Collaboration in G20, G7 outreach, and potential engagement in **IORA** highlights growing geopolitical convergence.

People-to-People & Diaspora Linkages

- **Indian Diaspora:** Canada hosts around **1.8 million Indo-Canadians** and **400,000 Indian students**, making diaspora a key pillar of relations.
- **Education & Talent Mobility:** Programs like MITACS and joint degrees enhance skill development, research collaboration, and innovation ecosystems.
- **Cultural Diplomacy:** MoUs on cultural cooperation promote heritage exchange, creative industries, and soft power engagement.
- **Sub-national Diplomacy:** Engagement with Canadian provinces like Saskatchewan strengthens cooperation in agriculture, minerals, and education.

Areas of Friction & Challenges

1. Sovereignty & Extremism Issues

- **Separatist Movements:**
  - ✓ Presence of extremist groups in Canada remains a major concern for India.
- **Freedom of Expression vs Security:**
  - ✓ India prioritises **territorial integrity**, while Canada emphasises **free speech laws**.
- **Domestic Political Constraints:**
  - ✓ India views Canada's internal political alliances (e.g., Liberal–NDP) as limiting strong action.
- **Foreign Interference Concerns:**
  - ✓ Mutual allegations of **interference in domestic affairs** have created tensions.
- **Khalistan movement Issue:**
  - ✓ Core friction due to differing views on **extremism vs political expression**.

2. Security & Transnational Crime

- **Criminal Networks:**
  - ✓ Links emerging between **drug cartels, human trafficking, and extremist elements**.
- **New Threats:**
  - ✓ Rise in **fentanyl-related trafficking** and **cyber financial fraud** affecting both countries.

3. Diplomatic Trust Deficit

- **Public Accusations:**
  - ✓ Shift from quiet diplomacy to **public confrontation** has reduced trust.
- **Intelligence Sharing Issues:**
  - ✓ Slower cooperation impacts broader global frameworks like Five Eyes.

4. Trade & Economic Barriers

- **Stalled Agreement:**
  - ✓ Comprehensive Economic Partnership Agreement negotiations remain pending.
- **Tariff Issues:**
  - ✓ India imposes **high tariffs** on select Canadian products (e.g., dairy, wine).
- **Regulatory Barriers:**
  - ✓ Canada's strict **Sanitary and Phytosanitary (SPS) standards** restrict Indian exports.

5. People-to-People Relations ("Living Bridge")

- **Decline in Students:**
  - ✓ Drop in Indian students due to **high living costs and housing issues** in Canada.
- **Visa Restrictions:**
  - ✓ Caps on international students have reduced Canada's attractiveness.

Conclusion

The India–Canada partnership is undergoing a **pragmatic strategic reset**, driven by economic interests, energy security, and geopolitical shifts. Sustained dialogue, institutional trust-building, and deeper economic interdependence will be essential to overcome legacy issues. A stable partnership between these democracies will contribute significantly to **Indo-Pacific stability, global resilience, and inclusive growth**.

EXPECTED QUESTION FOR UPSC CSE

Prelims MCQ

Que. Consider the following regarding India–Canada relations:

1. Canada is a major supplier of uranium to India.
2. CEPA aims to reduce trade barriers between India and Canada.
3. Canada is a member of the International Solar Alliance.

Which of the statements is/are correct?

(a) 1 and 2 only

(b) 2 and 3 only

(c) 1 and 3 only

(d) 1, 2 and 3

Answer: (a)

Descriptive Question

Que. "India–Canada relations reflect a shift from diplomatic strain to strategic pragmatism." Examine the factors driving this transformation. (150 Words, 10 Marks)

GULF COOPERATION COUNCIL (GCC)

Why in News: The **Gulf Cooperation Council** is in news due to discussions on a **possible India–GCC Free Trade Agreement**, growing **energy cooperation**, and expanding **strategic and economic ties** between **India** and GCC countries.

Key Details

- **Gulf Cooperation Council** is a **regional political and economic organization** established in **1981**.
- It has **six members**: **Saudi Arabia**, **United Arab Emirates**, **Qatar**, **Kuwait**, **Oman**, and **Bahrain**.
- **Headquarters** is located in **Riyadh**, **Saudi Arabia**.
- Focuses on **economic integration, regional security, and political coordination** among member states.
- The bloc is crucial in **global energy markets** due to its **large oil and natural gas reserves**.

Overview

- The **Gulf Cooperation Council (GCC)** is a **regional political, economic and security organization** of Arab states located in the **Persian Gulf region**.

- It aims to promote **regional integration, stability, and cooperation** among member states.
- **Establishment**
  - ✓ **Established** on **25 May 1981** in **Abu Dhabi**, **United Arab Emirates**.
  - ✓ Formed during a period of **regional instability**, particularly **after** the **Iran–Iraq War** and the **Iranian Revolution**.
- **Member Countries**
  - ✓ **Saudi Arabia**
  - ✓ **United Arab Emirates**
  - ✓ **Qatar**
  - ✓ **Kuwait**
  - ✓ **Oman**
  - ✓ **Bahrain**
- **Headquarters**
  - ✓ Located in **Riyadh**, **Saudi Arabia**.

Objectives

- Achieve coordination, integration &interconnection among member states.
- Promote **economic cooperation and unified economic policies**.
- Strengthen **defense and security collaboration**.
- Encourage **scientific, technological, and cultural cooperation**.
- Enhance **political consultation and foreign policy coordination**.

Organizational Structure

- **Supreme Council**
  - ✓ Highest decision-making authority.
  - ✓ Composed of **heads of state of member countries**.
  - ✓ Presidency rotates annually among members.
- **Ministerial Council**
  - ✓ Includes **foreign ministers or other ministers** of member states.
  - ✓ Responsible for policy formulation and coordination**.**
- **Secretariat-General**
  - ✓ Administrative body responsible for **implementing GCC decisions**.
  - ✓ Headed by the **Secretary-General**.

Economic Cooperation

- Creation of **GCC Free Trade Area (1983)**.
- Establishment of a **Customs Union in 2003** with a **common external tariff**.
- Launch of the **GCC Common Market (2008)** allowing **equal economic rights for citizens of member states**.
- Proposals for **monetary union and a common GCC currency** (not yet implemented).
- Cooperation in **energy, infrastructure, transportation, and digital economy**.

Security and Defense Cooperation

- Formation of the **Peninsula Shield Force**, a **joint military force** for collective defense.
- Cooperation in **counterterrorism, intelligence sharing, and maritime security**.
- Coordination on **regional conflicts and stability in the Gulf region**.

Energy Importance

- GCC countries collectively possess **around one-third of global oil reserves**.
- They are major members of **Organization of the Petroleum Exporting Countries**.
- Significant role in **global energy supply and oil price stability**.

Relations with Other Countries

- Maintains **strategic partnerships** with major powers such as **United States**, **China**, and **India**.
- Conducts **GCC–India, GCC–EU, and GCC–China dialogues** on trade and security.

Importance for India

- GCC is **India's major trading partner**.
- Large **Indian diaspora** works in GCC countries.
- Important source of **crude oil and remittances** for India.
- Cooperation in **energy security, maritime security, and investment**.

Challenges

- **Political differences among member states** (e.g., **Qatar diplomatic crisis**).
- Dependence on **oil-based economies**.
- Need for **economic diversification & deeper integration**.

Conclusion

The **Gulf Cooperation Council** remains a key regional bloc promoting **economic integration, political coordination, and collective security** in the Gulf region. With vast **energy resources** and growing global partnerships, it plays a crucial role in regional stability and international energy markets. Strengthening cooperation with partners like **India** further enhances its strategic and economic significance.

EXPECTED QUESTION FOR UPSC CSE

Descriptive Question

Que. Discuss the role and significance of the Gulf Cooperation Council in promoting regional cooperation and economic integration in the Gulf region. Also examine its importance for India. (10 marks, 150 words)

REGIONAL STABILITY IN THE INDIAN OCEAN

Why in News: Recently, the sinking of the Iranian frigate **IRIS Dena near Sri Lanka** has intensified geopolitical tensions and raised concerns over maritime security in the Indian Ocean region.

Key Details

- An Iranian warship **IRIS Dena** was reportedly torpedoed near **Galle, Sri Lanka**, amid the ongoing US–Iran conflict.
- The incident marks a **significant expansion of the conflict theatre** from the Persian Gulf to the wider Indian Ocean.
- It threatens the stability of **major global shipping routes** and energy trade passing through the region.
- The event poses diplomatic and strategic challenges for **India's maritime security and regional diplomacy**.

Strategic Importance of the Indian Ocean Region (IOR)

- **Global Trade and Energy Corridor:** The Indian Ocean carries nearly **80% of global seaborne oil trade** and about **one-third of global bulk cargo**, making it one of the most vital maritime spaces.
- **Critical Sea Lines of Communication (SLOCs):** Key chokepoints such as the **Strait of Hormuz, Malacca Strait, Bab-el-Mandeb, and the Mozambique Channel** are crucial for global commerce and energy supplies.
- **India's Central Geographic Position:** India's location gives it strategic oversight over major shipping routes, enabling it to act as a **net security provider in the region**.
- **Strategic Competition in the IOR:** The region increasingly witnesses naval presence from major powers including **the United States, China, France, and regional navies**, making it a theatre of geopolitical rivalry.

Expansion of Conflict Beyond the Persian Gulf

- **Shift in Theatre of War:** The attack near Sri Lanka indicates that the conflict is **no longer limited to the Middle East**, expanding into the broader Indo-Pacific maritime space.
- **Demonstration of Naval Reach:** The use of advanced submarine warfare technologies such as **torpedo strikes from nuclear attack submarines** highlights the growing technological dimension of naval warfare.
- **Risk of Maritime Escalation:** Extending conflict into international waters can escalate tensions and create **new flashpoints affecting multiple regional states**.
- **Implications for Neutral Waters:** Traditionally safe international waters are increasingly becoming contested zones due to **strategic competition and power projection**.

Impact on Global Shipping and Energy Security

- **Disruption of Shipping Routes:** Maritime conflict near major shipping lanes can disrupt global trade flows, particularly for **energy imports to Asia and Europe**.
- **Increase in War-Risk Insurance Premiums:** Reports indicate that **war-risk insurance premiums for shipping routes have surged significantly**, increasing transportation costs.
- **Rerouting of Global Trade:** Shipping companies may divert vessels through **longer routes such as the Cape of Good Hope**, increasing freight costs and delivery times.
- **Impact on Developing Economies:** Higher freight costs translate into **increased prices of fuel, food, and commodities**, disproportionately affecting developing nations.

Maritime Security and India's Strategic Concerns

- **Threat to Regional Stability:** The Indian Ocean has traditionally been considered a **relatively stable maritime region**, and such incidents undermine decades of diplomatic efforts.
- **India's SAGAR Vision:** India's doctrine of **Security and Growth for All in the Region (SAGAR)** aims to ensure peaceful and cooperative maritime governance.
- **Indian Ocean as a Strategic Theatre:** Increasing militarisation by external powers may transform the region into a **major arena of global power competition**.
- **Diplomatic Balancing:** India maintains diplomatic relations with **both the United States and Iran**, requiring careful diplomatic engagement to avoid escalation.

International Law and Maritime Norms

- **Principle of Freedom of Navigation:** Under international law and the **United Nations Convention on the Law of the Sea (UNCLOS)**, international waters are meant to ensure safe passage for ships.
- **Challenge to Sovereignty Norms:** The incident reflects the erosion of traditional principles of **state sovereignty and non-interference** established since the **1648 Treaty of Westphalia**.
- **Precedents in Naval Warfare:** Historical incidents such as the **sinking of the Argentine cruiser General Belgrano during the 1982 Falklands War** illustrate how naval warfare can generate diplomatic controversies.
- **Growing Militarisation of Maritime Spaces:** The increasing use of advanced naval platforms such as **nuclear submarines and long-range weapons** raises concerns about escalation risks.

Role of Diplomacy in Preventing Escalation

- **India as a Regional Stabiliser:** India's diplomatic engagement and naval presence position it as a **key stabilising power in the Indian Ocean**.
- **Multilateral Maritime Cooperation:** Platforms such as **Indian Ocean Rim Association (IORA)** and **Indian Ocean Naval Symposium (IONS)** promote regional dialogue and cooperation.
- **Conflict De-escalation Efforts:** Diplomatic initiatives aimed at **confidence-building and conflict management** are crucial to avoid escalation.
- **Maintaining Strategic Autonomy:** India's foreign policy emphasises **strategic autonomy and balanced engagement with major powers**.

Conclusion

The sinking of the Iranian frigate near Sri Lanka highlights the growing militarisation of the Indian Ocean and the risks posed by expanding geopolitical conflicts. India must strengthen maritime surveillance, deepen regional cooperation, and pursue proactive diplomacy to maintain peace and stability in the Indian Ocean region. Preserving open and secure sea lanes is essential not only for regional security but also for the stability of global trade and energy flows.

EXPECTED QUESTIONS FOR UPSC CSE

Prelims MCQ

Que. Which of the following is associated with India's maritime security vision in the Indian Ocean region?

(a) Act East Policy
(b) SAGAR Doctrine
(c) Neighbourhood First Policy
(d) Indo-Pacific Economic Framework

Answer: (b)

Descriptive Question

Que. Discuss the strategic significance of the Indian Ocean region for global trade and India's maritime security. (250 Words, 15 Marks)

NORTH ATLANTIC TREATY ORGANISATION

Why in News: NATO (North Atlantic Treaty Organisation) Is in news due to its **expanded role in European security after the Russia–Ukraine conflict and the inclusion of Sweden as its newest member**.

Key Details

- NATO is a **military alliance formed in 1949** to ensure collective security among North American and European nations.
- It operates on the principle of **collective defense (Article 5)**—attack on one is attack on all.
- **Headquarters:** Brussels, Belgium.
- NATO now has **32 members**, including **Finland (2023) and Sweden (2024)**.

Formation & Cold War Context

- **Post-World War II Security Need:** NATO was formed on **4 April 1949 in Washington, D.C.** to counter the expansion of the Soviet Union and ensure Western security.
- **Cold War Military Bloc:** It acted as a counterweight to the **Warsaw Pact (1955)**, representing ideological and military rivalry between capitalism and communism.
- **Founding Members:** Initial 12 members included USA, UK, France, Canada, Italy, and others, forming a **transatlantic security framework**.
- **Shift After Cold War:** After the USSR collapse (1991), NATO redefined its role from **collective defense to crisis management and cooperative security**.

Core Principle – Collective Defense (Article 5)

- **Legal Commitment:** Article 5 states that an armed attack against one member is considered an attack against all, forming the backbone of NATO.
- **Invocation Example:** Article 5 was invoked only once, after the **9/11 terrorist attacks (2001)** in the United States.
- **Deterrence Mechanism:** It acts as a strong deterrent against aggression, especially from adversaries like Russia.
- **Shared Responsibility:** Members contribute through defense spending, with a benchmark of **2% of GDP (NATO guideline)**.

Organizational Structure & Decision-Making

- **North Atlantic Council (NAC):** The highest decision-making body where all members have equal say; decisions are taken by **consensus**.
- **Secretary-General:** Acts as the chief spokesperson and coordinator, ensuring political and military alignment among members.
- **Military Committee:** Provides strategic military advice and supervises NATO's integrated command structure.
- **Integrated Command:** NATO has a unified military command, enhancing **joint operations and interoperability** among forces.

Military Capabilities & Operations

- **Joint Military Exercises:** NATO conducts large-scale exercises like **Defender Europe**, improving readiness and coordination.

- **Major Operations:**
  - ✓ **Kosovo (1999):** Air campaign to prevent humanitarian crisis
  - ✓ **Afghanistan (ISAF, 2001–2021):** Counterterrorism and stabilization
  - ✓ **Libya (2011):** Enforcement of UN-mandated no-fly zone
- **Technological Edge:** Focus on **cybersecurity, artificial intelligence, and space defense** reflects evolving warfare trends.
- **Nuclear Deterrence:** NATO relies partly on the **nuclear capabilities of the USA, UK, and France** for strategic deterrence.

Expansion & Recent Developments

- **Post-Cold War Expansion:** NATO expanded eastward, including countries from Eastern Europe, increasing its membership to 32.
- **Recent Additions:**
  - ✓ Finland (2023)
  - ✓ Sweden (2024)
    - These expansions were triggered by **security concerns after Russia's actions in Ukraine**.
- **Russia–Ukraine Conflict (2022–Present):** NATO has strengthened troop deployment in Eastern Europe and provided military aid to Ukraine (non-member).
- **Emerging Domains:** NATO is increasingly focusing on **cyber threats, hybrid warfare, and space security**.

Significance in Global Security

- **Most Powerful Military Alliance:** NATO members collectively account for **over 50% of global military expenditure**, led by the USA.
- **Euro-Atlantic Stability:** It ensures stability in Europe by deterring aggression and maintaining balance of power.
- **Crisis Management Role:** Engages in peacekeeping, disaster response, and counterterrorism operations globally.
- **Geopolitical Relevance:** NATO plays a crucial role amid rising tensions involving **Russia and China**, shaping global strategic order.

Challenges & Criticism

- **Russia's Opposition:** NATO expansion is seen by Russia as a threat, contributing to geopolitical tensions like the Ukraine war.
- **Burden Sharing Issues:** Many members fail to meet the **2% GDP defense spending target**, leading to internal disagreements.
- **Relevance Debate:** Critics argue NATO's role should evolve beyond traditional military alliances to address new-age threats.
- **Global South Perspective:** Some countries view NATO interventions (e.g., Libya) as examples of **Western dominance**.

Conclusion

NATO continues to remain a cornerstone of **collective security in the Euro-Atlantic region**, adapting to evolving threats such as cyber warfare and geopolitical rivalries. Its expansion and renewed focus after the Russia–Ukraine conflict highlight its enduring relevance. However, for long-term stability, NATO must balance deterrence with diplomacy, ensure equitable burden-sharing, and engage constructively with global stakeholders.

EXPECTED QUESTIONS FOR UPSC CSE

Prelims MCQ

Que. Which of the following countries recently joined NATO?

1. Finland
2. Sweden
3. Ukraine

Which of the above statements are correct?

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

Answer: (a)

Descriptive Question

Que. Discuss the role of NATO in shaping the post-Cold War global security architecture. How has its relevance evolved in recent years? (150 Words, 10 Marks)

SECTION 301 INVESTIGATION AND INDIA–US TRADE TENSIONS

Why in News: The United States Trade Representative has initiated **Section 301 investigations** against India to examine trade practices related to manufacturing capacity and supply chain standards.

Key Details

- The United States has launched Section 301(b) investigations against India and other economies. These investigations aim to assess whether foreign trade practices harm U.S. commerce and domestic industries.
- The first investigation focuses on excess manufacturing capacity and overproduction. It examines whether such capacity leads to unfair export advantages in global markets.
- The second investigation covers around 60 countries, including India, on forced labour compliance. It evaluates whether supply chains meet international labour and ethical standards.
- The move comes amid evolving U.S. tariff policies and judicial rulings on trade powers. This adds uncertainty to global trade and ongoing India–US negotiations.

Section 301 of the US Trade Act

- **Legal Provision:** Section 301 of the Trade Act of 1974 allows the U.S. to investigate unfair trade practices. It empowers authorities to take action against countries violating trade norms.
- **Implementing Authority:** Investigations are conducted by the USTR. The office evaluates evidence and recommends appropriate trade measures.
- **Retaliatory Measures:** If violations are found, the U.S. can impose tariffs or restrictions. These measures are intended to protect domestic industries from unfair competition.
- **Global Significance:** Section 301 has been widely used in trade disputes, including against China. It is often seen as a unilateral tool influencing global trade dynamics.

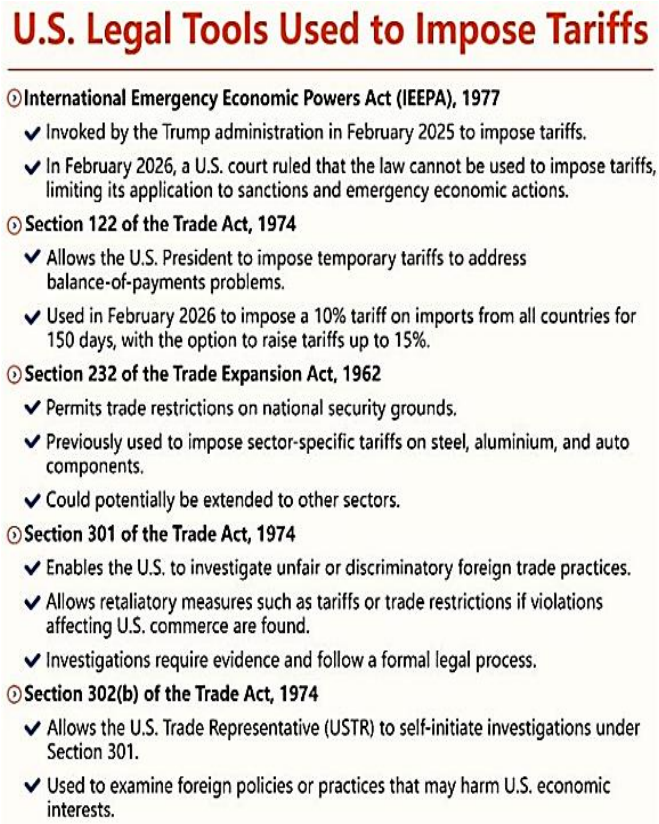
US Concerns Over India's Manufacturing Capacity

- **Trade Surplus Issue:** The U.S. estimates India's trade surplus at around $58 billion in 2025. However, Indian data suggests a lower figure, highlighting differences in trade calculations.

- **Identified Sectors:** Key sectors include solar modules, steel, textiles, petrochemicals, and automobiles. These industries are considered sensitive due to their export competitiveness.
- **Excess Capacity Argument:** The U.S. argues that India's production exceeds domestic demand. This surplus capacity may lead to aggressive exports affecting global prices.
- **Example – Solar Sector:** India's solar module production is significantly higher than domestic needs. This indicates an export-oriented manufacturing strategy.

Implications for India

- **Tariff Risks:** Indian exports may face higher tariffs if the investigation finds unfair practices. This can reduce competitiveness in the U.S. market.
- **Trade Negotiation Impact:** Ongoing India–US trade talks may be affected. Uncertainty in tariff policy can delay or complicate agreements.
- **Export Structure Debate:** Experts argue that India's exports are demand-driven and diversified. This challenges the U.S. claim of capacity-driven distortion.
- **Need for Monitoring:** The investigation outcome will influence India's trade strategy. Close monitoring is required to safeguard export interests.



India–US Trade Relations

- **Strong Bilateral Trade:** India and the United States share one of the largest trade relationships globally. Bilateral trade reached over $130 billion in 2024–25.
- **Major Trading Partner:** The U.S. remains India's largest trading partner. This highlights the importance of stable trade relations.
- **Recurring Disputes:** Issues like tariffs, market access, and subsidies often create friction. These disputes are common in large trade partnerships.
- **Strategic Importance:** Trade ties are linked with broader geopolitical cooperation. Economic relations influence diplomatic and strategic engagement.

Recent US Tariff Developments

- **High Tariffs Imposed:** The U.S. earlier imposed tariffs up to 50% on Indian goods. These were later reduced temporarily to lower levels.
- **Judicial Intervention:** The Supreme Court of the United States restricted the use of emergency powers for tariffs. This limited executive authority in trade decisions.
- **Temporary Tariff Measures:** A 10% tariff was imposed under Section 122 for 150 days. This reflects a short-term approach to trade regulation.
- **Policy Uncertainty:** Frequent changes create unpredictability in global trade. Businesses face challenges in long-term planning.

Global Trade and Strategic Competition

- **Protectionism Trend:** Countries are increasingly using tariffs and investigations to protect industries. This marks a shift from free trade to strategic trade policies.
- **Supply Chain Concerns:** Issues like forced labour and ethical sourcing are gaining importance. Trade policies are now linked with human rights considerations.
- **Impact on Developing Nations:** Emerging economies like India face greater scrutiny. They must balance growth with compliance to global standards.
- **Need for Multilateralism:** Strengthening institutions like WTO is essential. It ensures fair and rule-based international trade.

Way Forward

- **Diplomatic Engagement:** India should engage with the U.S. to resolve concerns through dialogue. This will help avoid escalation into trade conflicts.
- **Export Diversification:** Expanding markets beyond the U.S. can reduce dependency. It strengthens resilience against external shocks.
- **Compliance Improvement:** Enhancing labour and supply chain standards is necessary. This will improve credibility in global trade.
- **Domestic Strengthening:** Boosting competitiveness and innovation can counter external pressures. A strong domestic base supports sustainable export growth.

Conclusion

The Section 301 investigation reflects growing concerns over trade imbalances and industrial policies. While it poses risks for Indian exports, proactive diplomacy and policy adjustments can mitigate its impact and strengthen India's position in global trade.

ECONOMY AND AGRICULTURE

DECLINE OF GLOBALISATION

Why in News: Rising **protectionism, tariff wars, supply-chain realignments, and geoeconomic rivalries** are signalling the decline of cooperative globalisation and the emergence of competitive economic nationalism.

Key Details

- The traditional belief that **international trade promotes peace and cooperation** is being challenged by rising geopolitical tensions.
- Countries increasingly view **economic interdependence as a vulnerability rather than a stabilising factor**.
- Global trade is witnessing **tariffs, export controls, technology restrictions, and supply-chain restructuring**.
- The shift reflects a transition from **globalisation to geoeconomic competition and strategic trade policies**.

Concept of "Gentle Trade"

- **Philosophical Origin:** The concept of doux commerce was proposed by the Enlightenment thinker Montesquieu. It suggested that commerce encourages peaceful behaviour by promoting mutual dependence and reducing incentives for war.
- **Trade as a Civilising Force:** During the era of globalisation, trade was viewed as a mechanism that would **soften political tensions and create shared economic interests** among nations.
- **Institutional Framework:** Global institutions such as the World Trade Organization promoted the idea that rules-based trade could stabilise international relations.
- **Economic Interdependence Theory:** Liberal economic theory argued that countries trading extensively would avoid conflicts because war would disrupt mutually beneficial economic exchanges.

Rise of Globalisation (1990s–2010s)

- **Expansion of Global Trade:** After the end of the Cold War, global trade expanded rapidly. The establishment of the World Trade Organization in 1995 institutionalised a multilateral trading system.
- **Integration of Major Economies:** Countries such as China integrated deeply into global supply chains, particularly after joining the WTO in 2001, becoming a manufacturing hub.
- **Efficiency-Driven Supply Chains:** Corporations pursued **offshoring and global production networks**, prioritising cost efficiency and comparative advantage.
- **Trade and Economic Growth:** International trade contributed significantly to global GDP growth and poverty reduction, especially in developing economies.

Emergence of Geoeconomic Competition

- **Trade Wars and Tariffs:** Recent years have witnessed tariff disputes such as the **trade conflict between the United States and China**, signalling a shift from cooperation to economic rivalry.
- **Weaponisation of Trade:** Countries increasingly use trade policies such as **export controls, sanctions, and technology restrictions** to achieve geopolitical objectives.
- **Technology Rivalry:** Strategic sectors such as **semiconductors, artificial intelligence, and telecommunications** have become central to global power competition.
- **Strategic Resource Control:** Nations are competing for control over **critical minerals, rare earth elements, and energy resources**, which are vital for modern industries.

Supply Chain Vulnerabilities

- **Lessons from the Pandemic:** The COVID-19 pandemic exposed weaknesses in global supply chains, causing disruptions in manufacturing, logistics, and medical supplies.
- **Geopolitical Shocks:** Events such as the Russia–Ukraine War highlighted the risks of dependence on foreign energy and commodities.
- **Shift to Strategic Trade Policies:** Countries are increasingly adopting **industrial policies and domestic manufacturing incentives** to reduce dependence on foreign suppliers.
- **Economic Security Concerns:** Trade policy is now closely linked with **national security considerations**, particularly in sectors like energy, defence, and digital infrastructure.

Fragmentation of Global Trade

- **Friend-shoring and Near-shoring:** Nations are relocating supply chains to **politically trusted partners or geographically closer countries** to reduce risk.
- **Decline of Multilateralism:** The influence of global trade institutions is weakening as countries prefer **regional and bilateral trade agreements**.
- **Rise of Protectionism:** Policies such as **"Buy National" campaigns and tariff barriers** are being used to protect domestic industries.
- **Emergence of Trade Blocs:** Global trade is increasingly organised around **regional alliances and strategic partnerships**, reducing the universality of the global market.

Implications for India

- **Strategic Trade Partnerships:** India is diversifying its trade relations through agreements with partners such as the European Union and other regional blocs.
- **Supply Chain Integration:** India aims to position itself as an alternative manufacturing hub through initiatives like **Production Linked Incentive (PLI) schemes**.
- **Balancing Protection and Integration:** While protecting domestic industries, India must maintain integration with global trade networks to sustain economic growth.
- **Role in Emerging Global Order:** As a major developing economy, India has the opportunity to shape **a more balanced and inclusive global trade architecture**.

Conclusion

The transition from cooperative globalisation to competitive geoeconomics reflects deep structural changes in international politics. While economic security concerns are legitimate, excessive protectionism could undermine global growth and cooperation. The challenge for the international community is to **rebuild trust in the global trading system while ensuring resilience and strategic autonomy**. A balanced approach combining **multilateral cooperation, diversified supply chains, and responsible economic policies** is essential to prevent the global economy from descending into a destructive "law of the jungle".

EXPECTED QUESTIONS FOR UPSC CSE

Prelims MCQ

Que. The concept of "doux commerce" is associated with which thinker?

(a) Adam Smith
(b) Montesquieu
(c) David Ricardo
(d) John Locke

Answer: (b)

Descriptive Question

Que. "Economic interdependence once promoted global cooperation, but today it is increasingly viewed as a strategic vulnerability." Discuss in the context of emerging geoeconomic competition. (150 Words, 10 Marks)

CRITICAL MINERALS & SUPPLY CHAINS

Why in News: Global semiconductor and technology supply chains are being disrupted due to a **helium shortage triggered by West Asia geopolitical tensions**.

Key Details

- Helium supply has tightened due to the **West Asia conflict affecting major producers like Qatar**.
- It is crucial for **chipmaking processes such as cooling, leak detection, and precision manufacturing**.
- Supply is **highly geographically concentrated**, making it vulnerable to disruptions.
- The shortage may impact industries like **electronics, automobiles, healthcare (MRI), and space technology**.

Helium as a Critical Industrial Resource

- **Unique Physical Properties:** Helium is chemically inert, non-toxic, and has the **lowest boiling point (-269°C)**, making it ideal for extreme cooling applications in advanced technologies.
- **Applications in Semiconductor Industry:** It is used in **chip fabrication processes**, including cooling wafers, maintaining clean environments, and detecting microscopic leaks in equipment.
- **Strategic Importance Beyond Electronics:** Helium is essential in **MRI machines (cooling superconducting magnets)**, **space rockets**, fiber optics, and scientific research.
- **Non-renewable and Limited Resource:** Helium is obtained as a **by-product of natural gas extraction**, making its supply finite and dependent on fossil fuel production.

Global Supply Concentration and Vulnerability

- **Geographical Concentration:** Countries like **Qatar, the USA, and Algeria** dominate global helium production, with Qatar contributing nearly **one-third of global supply**.
- **Supply Chain Fragility:** High concentration leads to **geopolitical vulnerability**, where conflicts or disruptions in one region can affect global availability.
- **Transport and Storage Challenges:** Helium requires **special cryogenic storage and transport infrastructure**, increasing logistical complexity and cost.
- **Past Supply Disruptions:** Previous shortages (e.g., **2017 Qatar blockade**) also disrupted global helium supply, indicating recurring systemic risks.

Impact on Semiconductor and Tech Industry

- **Chip Manufacturing Disruptions:** Semiconductor fabrication is highly sensitive; helium shortages can lead to **production slowdowns or shutdowns**, affecting global chip supply.
- **Ripple Effect on Industries:** Sectors such as **automobiles, consumer electronics, smartphones, and AI hardware** depend on semiconductors and may face supply constraints.
- **Cost Escalation:** Rising helium prices increase **production costs**, which may be passed on to consumers, contributing to inflationary pressures.
- **Global Supply Chain Bottlenecks:** Combined with other disruptions (pandemic, geopolitics), helium shortage worsens **existing supply chain vulnerabilities**.

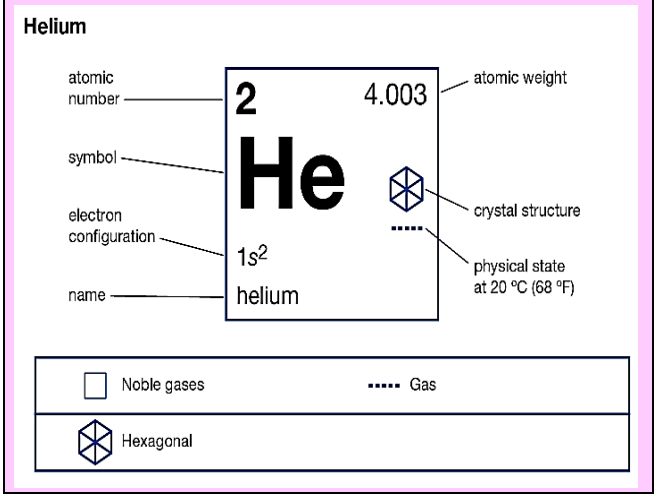
Geopolitics and Resource Security

- **West Asia Conflict Impact:** Tensions in West Asia have disrupted production and logistics, highlighting the **link between geopolitics and critical resources**.

- **Resource Nationalism:** Countries may prioritise **domestic needs over exports**, affecting global availability of helium.
- **Strategic Competition:** Advanced economies are competing to secure **critical minerals and industrial gases**, similar to rare earth elements.
- **Diversification Efforts:** Companies are exploring alternative suppliers like the **United States**, indicating a shift towards supply diversification.

About Helium

- Helium (**He**) is a chemical element, **inert gas of Group 18** (**noble** gases) of the periodic table.
- It is the **second lightest element** after hydrogen.
- It is a **colourless**, **odourless**, and **tasteless** gas that becomes **liquid at −268.9 °C** (−452 °F).
- The **boiling** and **freezing** points of helium are **lower than those of any other known substance**.
- Helium is the **only element that cannot be solidified by sufficient cooling at normal atmospheric pressure** and it is necessary to apply pressure of 25 atmospheres at a temperature of 1 K (−272 °C, or −458 °F) to convert it to its solid form.
- **Production**
  - ✓ Helium gas (98.2 per cent pure) is **isolated from natural gas by liquefying the other components** at low temperatures and under high pressures.
  - ✓ Adsorption of other gases on cooled, activated charcoal yields 99.995 per cent pure helium.



Implications for India

- **Dependence on Imports:** India imports most of its helium requirements, making it vulnerable to **global supply disruptions**.
- **Impact on Electronics Manufacturing:** With initiatives like **Make in India** and semiconductor missions, helium shortage could affect India's **electronics and chip ambitions**.
- **Healthcare Sector Risks:** MRI and medical infrastructure depend on helium, and shortages may affect **diagnostic services**.
- **Strategic Opportunity:** India can explore **domestic reserves, recycling technologies, and strategic storage** to reduce dependence.

Helium and Critical Minerals Framework

- **Critical Minerals Concept:** Helium, though not always listed, fits the criteria of **critical resources due to high economic importance and supply risk**.
- **Link with Semiconductor Policy:** India's **Semiconductor Mission** highlights the need for secure supply of inputs like gases and materials.
- **Global Initiatives:** Countries are forming alliances for **resilient supply chains**, such as the Quad and Indo-Pacific frameworks.
- **Sustainability Concerns:** Over-extraction and wastage of helium raise concerns about **long-term availability and resource management**.

Conclusion

The helium shortage highlights the urgent need for **resilient and diversified supply chains** in critical sectors like semiconductors. Countries, including India, must invest in **strategic reserves, alternative technologies, recycling of helium, and domestic exploration**. Strengthening international cooperation and reducing overdependence on limited suppliers will be crucial for ensuring **technological and economic security** in an increasingly geopolitically uncertain world.

EXPECTED QUESTIONS FOR UPSC CSE

Prelims MCQ

Que. Consider the following statements about Helium:

1. It is a renewable resource obtained independently of natural gas.
2. It is used in cooling superconducting magnets in MRI machines.
3. It is chemically inert.

Which of the above statements is/are correct?

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

Answer: (b)

Descriptive Question

Que. "Critical resource shortages can disrupt global supply chains and economic stability." Examine in the context of helium shortage and semiconductor industry. (250 Words, 15 Marks)

CURRENCY DEPRECIATION & OIL SHOCK

Why in News: The **Indian rupee depreciated to record lows (~₹93/$)** amid rising crude oil prices, West Asia tensions, and foreign capital outflows, highlighting external sector vulnerabilities.

Key Details

- Rupee touched around **₹93.77 per US dollar in March 2026**, marking sharp depreciation.
- Crude oil prices surged to **~$117/barrel**, far above RBI's $70 assumption.
- Foreign portfolio outflows and global uncertainty intensified currency pressure.
- RBI intervened, with forex reserves declining to **~$709.8 billion**.

Exchange Rate & Rupee Depreciation

- **Exchange Rate Mechanism:** Exchange rate refers to the value of one currency in terms of another. A movement from ₹90 to ₹93 per dollar indicates **rupee depreciation**, making imports costlier and affecting macroeconomic stability.
- **Managed Floating System in India:** India follows a **managed float regime**, where market forces determine exchange rate, but the RBI intervenes to curb excessive volatility and maintain orderly market conditions.
- **Depreciation vs Devaluation:** Depreciation is **market-driven**, influenced by demand-supply of currency, unlike devaluation which is a deliberate government action. Current rupee fall reflects **external shocks**, not policy change.
- **Historical Trend & Volatility:** The rupee has gradually weakened due to **inflation differentials and trade deficits**, with sharp falls during crises like the **2013 Taper Tantrum and COVID-19 pandemic**.

Role of Crude Oil Prices

- **High Import Dependence:** India imports nearly **85% of its crude oil**, making it highly sensitive to global price fluctuations and exposing the economy to external shocks.
- **Impact on Current Account Deficit (CAD):** Rising oil prices increase the **import bill**, widening CAD. Every **$1 increase in oil raises import costs by ~$2 billion annually**, pressuring the rupee.
- **Recent Oil Price Surge:** Oil prices surged to **~$117/barrel in 2026**, far exceeding RBI's baseline, worsening trade imbalance and increasing demand for dollars.
- **Inflationary Transmission:** Higher crude prices increase costs of **transport, fertilizers, LPG, and manufacturing**, leading to cost-push inflation and reducing consumer purchasing power.

Geopolitical Factors & Energy Shock

- **West Asia Conflict Impact:** Tensions involving Iran and Israel disrupted energy infrastructure, tightening global oil supply and triggering price volatility.
- **Strategic Importance of Strait of Hormuz:** Nearly **20% of global oil trade passes through this chokepoint**, making disruptions a major risk for global energy markets and India's imports.
- **Safe Haven Demand for Dollar:** Geopolitical uncertainty increases demand for **US dollar as a safe asset**, leading to depreciation of emerging market currencies like the rupee.
- **Historical Precedence:** Events like the **Gulf War and Russia-Ukraine conflict** similarly caused oil shocks and currency volatility, affecting India's external sector.

Capital Flows & External Sector Dynamics

- **Foreign Portfolio Investment (FPI) Outflows:** Withdrawal of foreign capital reduces demand for rupee, causing depreciation. Recent outflows from equity and debt markets intensified pressure.
- **Global Dollar Strength:** Higher US interest rates attract global capital, strengthening the dollar and weakening currencies of developing economies.
- **Twin Deficit Problem:** Simultaneous rise in **Current Account Deficit (CAD)** and capital outflows creates a "double deficit", destabilizing currency markets.
- **Market Volatility & Risk Aversion:** Global uncertainty increases risk aversion, leading to sudden capital flight and sharp exchange rate fluctuations.

RBI Intervention & Forex Management

- **Role of RBI:** RBI stabilizes currency by **selling dollars from forex reserves**, reducing excessive volatility and ensuring liquidity in forex markets.
- **Decline in Forex Reserves:** India's reserves fell to around **$709.8 billion**, with a decline of nearly **$18–19 billion in March 2026**, reflecting active intervention.
- **Policy Approach:** RBI initially adopted a **hands-off approach** but later intervened aggressively to prevent disorderly depreciation.
- **Limits of Intervention:** Continuous intervention can deplete reserves, hence RBI balances between **exchange rate stability and reserve adequacy**.

Financial Market Volatility

- **Stock Market Decline:** Indices like **Nifty and Sensex fell ~1.2–1.3%**, reflecting investor caution amid global uncertainty.
- **India VIX Surge:** Volatility index rose by **~25% to 17.13**, indicating heightened market fear and uncertainty.
- **Sectoral Impact:** Aviation, paints, tyres, and oil marketing companies were negatively impacted due to rising input costs.
- **Safe Haven Assets:** Gold and silver prices surged **5–9%**, as investors shifted to safer assets during global instability.

Economic Implications of Rupee Depreciation

- **Imported Inflation:** Depreciation raises prices of imported goods like fuel, fertilizers, and electronics, contributing to inflationary pressures.
- **Trade Competitiveness:** While exports become cheaper, India's export basket has **low elasticity**, limiting gains from depreciation.
- **Fiscal Impact:** Higher subsidy burden on fuel and fertilizers may widen the **fiscal deficit**, affecting public finances.
- **Growth Concerns:** Persistent depreciation can reduce investor confidence, increase borrowing costs, and slow economic growth.

Conclusion

India's rupee depreciation reflects structural vulnerabilities to **oil shocks, geopolitical risks, and global capital flows**. Strengthening **energy security (renewables, SPR expansion)**, boosting **export competitiveness**, maintaining

adequate forex reserves, and ensuring **prudent macroeconomic management** are essential. A calibrated RBI approach, combined with structural reforms, can enhance **external sector resilience and long-term currency stability**.

EXPECTED QUESTIONS FOR UPSC CSE

Prelims MCQ

Que. Which of the following factors can lead to depreciation of the Indian rupee?

1. Rise in crude oil prices
2. Increase in foreign portfolio investment
3. Widening current account deficit

Which of the above is/are correct?

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

Answer: (a)

Descriptive Question

Que. Examine the role of capital flows and RBI intervention in managing currency depreciation in India. (150 Words, 10 Marks)

GRIM FUTURE

Why in News: India's core sector slowdown, declining GDP drivers, and rising energy vulnerabilities amid **West Asia tensions and** high oil prices have led to growth downgrades, raising concerns over economic resilience.

Key Details

- **Core sector slowdown**: Feb 2026 growth at **3-month low**, nearly half of January.
- **Energy sector stress**: Crude oil contracting **6/24 months**, natural gas **20 consecutive months**.
- **High import dependence**: Over-reliance on **West Asia energy supplies** amid rising geopolitical tensions.
- **Demand weakness**: Rising inventories indicate **low consumption despite production**.
- **GDP concerns**: Fall in contributions of **consumption, investment, trade**; growth outlook cut to ~6.5%.

Weakening Core Sector Performance

- The economy was already showing **signs of stress even before the West Asia conflict**.
- **February 2026 Index of Eight Core Industries** showed:
  - ✓ Growth fell to a **3-month low**
  - ✓ Nearly **half of January's growth rate**
- This slowdown is **not due to base effect** (Feb 2025 growth was only 3.4%).
- **Sector-wise concerns**:
  - ✓ **Crude oil**: contracting for **6 consecutive months** (20 out of last 24 months)
  - ✓ **Natural gas**: contracting for **20 straight months**

Energy Dependence and Policy Gaps

- India remains **highly dependent on energy imports**, especially from **West Asia**.
- Rising geopolitical tensions (U.S.–Iran) were **predictable since mid-last year**.
- Domestic production declined partly because **imports were cheaper**.
- However, policy response lacked foresight:
  - ✓ Domestic oil & gas production **should have been increased earlier**
  - ✓ Could have helped **build reserves and reduce import dependence temporarily**
- A **timely production push** might have reduced the current **supply crunch**.
- The **2016 Ujjwala Yojana** should have triggered a **long-term LPG security strategy**.
- Lesson: **Lack of proactive planning despite visible risks**.

Broader Economic Slowdown Signals

- New GDP data suggests the economy is **smaller than earlier estimated**.
- Key growth drivers have **weakened (2022–23 to 2025–26):**
  - ✓ Private consumption ↓
  - ✓ Investment (capital formation) ↓
  - ✓ Exports ↓
  - ✓ Imports ↓
- **Change in stocks has doubled** → indicates:
  - ✓ Production is happening
  - ✓ But **demand is weak (unsold inventory rising)**
- If demand remains low, **production will eventually slow down further**.

Impact on Growth Outlook and Reality Check

- Current crisis is worsening the situation:
  - ✓ Fuel supply constraints
  - ✓ Oil prices **above $100/barrel**
  - ✓ High global uncertainty
- Economists and rating agencies are **downgrading growth to ~6.5%**.
- India's so-called **strong macroeconomic fundamentals** may be **overestimated**.
- Need for a **more realistic and cautious assessment of economic resilience**.

Conclusion

India's recent economic trends highlight structural weaknesses in energy security, **demand generation, and growth sustainability.** The slowdown in core industries alongside weak consumption signals deeper fragility. While external shocks have aggravated the situation, inadequate policy foresight has also played a role. **Strengthening domestic capacity**, reducing import dependence, and boosting demand will be essential for ensuring stable and resilient long-term growth.

EXPECTED QUESTION FOR UPSC CSE

Descriptive Question

Que. "Recent economic indicators suggest underlying weaknesses in India's growth story." Discuss in the context of core sector performance, energy dependence, and demand conditions. (150 words, 10 marks)

FISCAL HEALTH INDEX 2026

Why in News: NITI Aayog released the **second edition of the Fiscal Health Index (FHI) 2026** to assess the fiscal performance and sustainability of Indian states.

Key Details

- Fiscal Health Index 2026 evaluates **28 states (18 major + 10 NE & Himalayan states)** using a data-driven framework.
- It is based on **five pillars: expenditure quality, revenue mobilisation, fiscal prudence, debt index, and debt sustainability**.
- States like **Odisha, Goa, and Jharkhand** emerged as top performers (Achievers category).
- The report highlights **rising fiscal pressures, debt concerns, and need for reforms in state finances**.

Fiscal Health Index: Concept & Objectives

- **Comprehensive Fiscal Assessment:** The Fiscal Health Index is a structured framework developed by NITI Aayog to evaluate fiscal performance of states beyond traditional deficit indicators. It enables comparison of fiscal strength and vulnerabilities.
- **Data-Driven Governance Tool:** The index uses **verified fiscal data (including CAG inputs)** to promote transparency and evidence-based policymaking. It supports informed decision-making at both Union and state levels.
- **Benchmarking & Reform Orientation:** By ranking states into **Achievers, Front Runners, Performers, and Aspirational**, it encourages competitive federalism and motivates states to adopt best practices.
- **Alignment with Fiscal Responsibility:** The index complements the objectives of the Fiscal Responsibility and Budget Management Act by promoting fiscal discipline, debt sustainability, and deficit control.

Key Pillars of Fiscal Health Index

- **Quality of Expenditure:** Focuses on productive spending such as infrastructure and social sectors rather than committed liabilities. Higher capital expenditure (around **4–5% of GSDP in top states**) indicates better growth potential.
- **Revenue Mobilisation:** Measures state capacity to generate own revenues like GST, excise, and stamp duty. Strong states maintain **over 60% own-tax share**, ensuring fiscal autonomy.
- **Fiscal Prudence:** Evaluates deficit management and adherence to fiscal targets (around **3% of GSDP deficit norm**). Persistent breaches signal fiscal stress.
- **Debt Index:** Assesses the size of outstanding liabilities relative to GSDP. High debt levels (around **35–45% in weaker states**) increase fiscal vulnerability.
- **Debt Sustainability:** Examines long-term repayment capacity by analysing interest burden and revenue trends. States spending **15–20% of revenue on interest payments** face reduced fiscal flexibility.

Key Findings of Fiscal Health Index 2026

- **Top Performing States:** Odisha ranked first due to stable revenues and controlled deficits, followed by Goa and Jharkhand. These states maintain **low debt (<25% of GSDP)** and strong fiscal discipline.
- **States under Fiscal Stress:** Punjab, Kerala, West Bengal, and Andhra Pradesh fall in the aspirational category due to **high deficits, rising debt, and weak revenue growth**.
- **Regional Disparities:** Among NE and Himalayan states, **Arunachal Pradesh and Uttarakhand** performed well, while others face structural challenges such as difficult terrain and low revenue base.
- **Shifting Fiscal Trends:** States are increasingly focusing on **capital expenditure and social sector spending**, but rising subsidies and committed expenditures continue to constrain fiscal space.

Fiscal Parameters for the Sub-Indices for 18 Major states

MAJOR SUB- INDICES	MINOR SUB- INDICES
1. Quality of Expenditure	1.1 Total Developmental Expenditure/Total Expenditure
	1.2 Total Capital Outlay/ GSDP*
2. Revenue Mobilisation	2.1 State Own Revenue/ GSDP*
	2.2 State Own Revenue/ Total Expenditure
3. Fiscal Prudence	3.1 Gross Fiscal Deficit/ GSDP*
	3.2 Revenue Deficit/ GSDP*
4. Debt Index	4.1 Interest Payments/Revenue Receipts
	4.2 Outstanding Liabilities/ GSDP*
5. Debt Sustainability	5.1 Growth Rate of GSDP* - Growth Rate of Interest Payments

** GSDP at current prices for the year 2023-24*

Importance of State Finances in India

- **Macroeconomic Stability:** States account for nearly **one-third of India's total public debt**, making their fiscal health crucial for overall economic stability. India's total public debt is around **80–82% of GDP**.
- **Role in Public Service Delivery:** State governments undertake major spending in **health, education, infrastructure, and welfare**, directly impacting human development outcomes.
- **Driver of Inclusive Growth:** Strong state finances enable higher capital investment, reducing regional disparities and supporting the vision of **Viksit Bharat @2047**.
- **Fiscal Federalism in Practice:** Healthy fiscal relations between Centre and states strengthen cooperative

federalism, ensuring balanced economic development across regions.

Key Challenges in State Finances

- **High Committed Expenditure:** Salaries, pensions, and interest payments consume **50–60% of revenue receipts**, leaving limited funds for development.
- **Weak Revenue Base:** Many states depend heavily on central transfers, with own revenue contributing less than one-third in some cases (e.g., Bihar).
- **Rising Fiscal Deficits:** Several states exceed the **FRBM deficit limit of 3–4% of GSDP**, indicating fiscal indiscipline and growing borrowing.
- **Increasing Debt Burden:** Debt-to-GSDP ratio of states has risen from **~17% (2013-14) to ~23% (2022-23)**, reflecting increasing financial stress.
- **Off-Budget Borrowings:** Hidden liabilities reduce transparency and pose risks to long-term fiscal sustainability.

Global Context & Relevance

- **Rising Global Public Debt:** Global public debt crossed **USD 100 trillion (2024)**, increasing pressure on fiscal sustainability worldwide.
- **Sub-National Finance Importance:** Many countries face fiscal stress at regional levels, making India's focus on state finances globally relevant.
- **Learning from Global Practices:** Countries emphasise **medium-term fiscal frameworks, transparency, and fiscal rules**, which India is gradually adopting.

Way Forward

- **Enhancing Revenue Mobilisation:** States must broaden tax bases, improve GST compliance, and strengthen digital tax systems to increase own revenues.
- **Rationalising Expenditure:** Reducing subsidies and controlling committed expenditure can restore fiscal flexibility and prioritise development spending.
- **Improving Capital Expenditure Quality:** Focus on infrastructure and asset creation will boost long-term growth and employment generation.
- **Strengthening Fiscal Discipline:** Adherence to FRBM targets and adoption of **medium-term fiscal frameworks** can stabilise deficits and debt.
- **Ensuring Transparency & Accountability:** Monitoring off-budget borrowings and using verified fiscal data will enhance credibility and governance.

Conclusion

The Fiscal Health Index 2026 highlights that **strong and sustainable state finances are the backbone of India's macroeconomic stability and inclusive growth**. By promoting transparency, benchmarking, and reform-oriented governance, the index strengthens fiscal federalism and supports India's long-term development vision.

EXPECTED QUESTIONS FOR UPSC CSE

Prelims MCQ

Que. The Fiscal Health Index evaluates states based on which of the following pillars?

1. Revenue Mobilisation
2. Debt Sustainability
3. Quality of Expenditure
4. Agricultural Productivity

Which of the above is/are correct:

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

Answer: (c)

Descriptive Question

Que. Discuss the significance of the Fiscal Health Index in strengthening fiscal federalism and improving state finances in India. (150 Words, 10 Marks)

ESSENTIAL COMMODITIES ACT (ECA), 1955

Why in News: India invoked the **Essential Commodities Act, 1955** to ensure uninterrupted **LPG supply amid West Asia geopolitical tensions**, highlighting its continued relevance despite market reforms.

Key Details

- The government used ECA provisions to **direct oil refineries to prioritise LPG production** for domestic consumption.
- The Act empowers the Centre to **control supply, prices, and stock limits** of essential goods.
- The **2020 amendment** restricted excessive intervention to encourage **market liberalisation**.
- The issue reflects the **policy dilemma between consumer protection and market efficiency**.

Essential Commodities Act, 1955: Concept & Objective

- **Legal Framework for Market Regulation:** Enacted in 1955, the ECA empowers the government to regulate production, supply, and distribution of essential goods to ensure **availability at fair prices**.
- **Prevention of Hoarding & Black Marketing:** The Act was designed to curb **artificial scarcity and speculative practices**, especially during shortages or crises affecting food and energy security.
- **Coverage of Essential Goods:** Commodities include **food grains, edible oils, petroleum products, fertilizers, and drugs**, which are critical for daily life and national stability.
- **Relevance in Welfare State:** It reflects India's **mixed economy model**, balancing state intervention with market forces to protect vulnerable populations.

Key Provisions & Powers under ECA

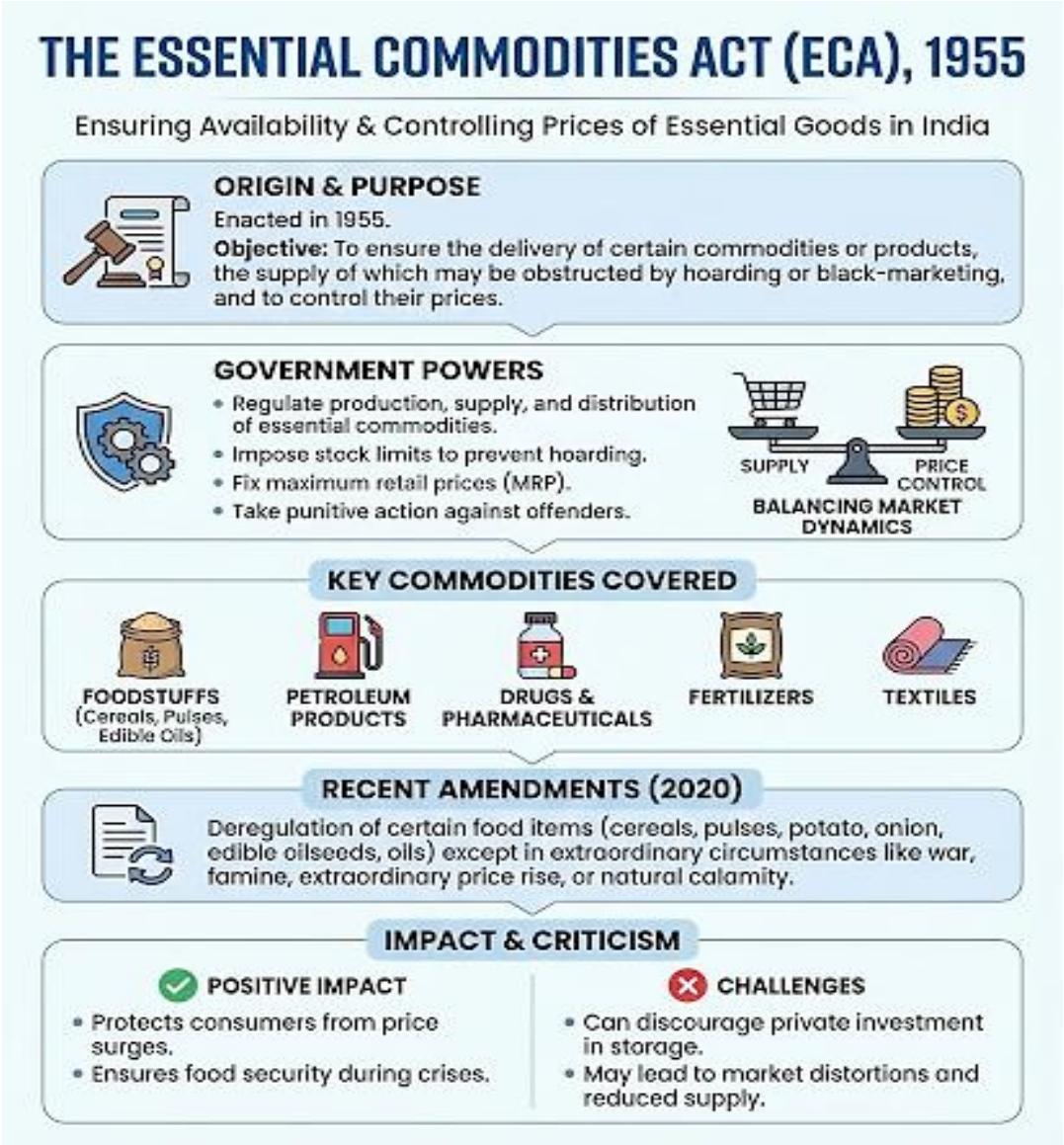
- **Section 3 – Regulatory Powers:** The Central Government can control **production, supply,**

distribution, pricing, and trade of essential commodities during emergencies.

- **Stock Limits & Anti-Hoarding Measures:** Authorities can impose limits on storage by traders to **release excess supply into markets**, reducing price spikes.
- **Price Control Mechanism:** Government can fix or regulate prices to prevent **inflation and exploitation**, especially for essential food items and fuels.
- **Delegation to States (Section 5):** Powers can be delegated to State Governments for **effective ground-level enforcement and inspections**.
- **Penalties & Enforcement:** Violations can lead to **imprisonment (3 months to 7 years), fines, and confiscation**, ensuring strict compliance.

2020 Amendment: Shift Towards Liberalisation

- **Reduction in Government Intervention:** The amendment removed items like **cereals, pulses, onions, and edible oils** from routine control, limiting intervention to extraordinary situations.
- **Trigger-Based Regulation:** Stock limits can be imposed only if prices rise sharply (**50% for non-perishables, 100% for perishables**), ensuring predictability.
- **Encouraging Private Investment:** The reform aimed to boost **investment in storage, cold chains, and Agri-infrastructure**, addressing post-harvest losses.
- **Balancing Reform with Risk:** Critics argue reduced regulation may lead to **hoarding and price volatility**, especially affecting poor consumers.



Contemporary Application: LPG Crisis

- **Energy Security Concern:** Due to **West Asia tensions and oil supply disruptions**, India invoked ECA to ensure uninterrupted LPG supply for households.
- **Directive to Oil Refineries:** Refineries were instructed to **maximize LPG production** and restrict diversion of propane and butane to petrochemicals.
- **Household Welfare Priority:** LPG is used by **millions of Indian households**, making it crucial for daily cooking and energy access.
- **Strategic Use of ECA:** Demonstrates how ECA acts as a **crisis-management tool**, ensuring stability during global uncertainties.

Case Studies of ECA in Action

- **Sugar Export Restrictions (2022):** India capped sugar exports at **10 million tonnes** to maintain domestic availability and price stability.

- **Wheat Stock Limits (2023):** Stock limits were imposed on traders to **control inflation and prevent hoarding** amid rising wheat prices.
- **COVID-19 Pandemic Response:** Masks and sanitizers were declared essential commodities to ensure **availability and affordability**.
- **Energy Sector Intervention (2026):** LPG regulation highlights ECA's role beyond agriculture, extending to **energy security and strategic sectors**.

Impact Analysis: A Double-Edged Sword

(a) Consumer Protection & Food Security

- ✓ **Positive:** Ensures affordability and availability, especially for **poor and vulnerable sections**, stabilising inflation temporarily.
- ✓ **Negative:** According to **Economic Survey 2019-20**, stock limits often fail to control long-term prices and may trigger **panic buying**.

(b) Farmers & Agricultural Markets

- ✓ **Positive:** Helps maintain price stability and protects consumers who are also **small farmers**.
- ✓ **Negative:** Export bans and stock limits reduce demand, leading to **lower farm incomes and price realisation**.

(c) Investment & Market Efficiency

- ✓ **Positive:** Limited intervention under 2020 reforms aims to improve **market confidence and infrastructure growth**.
- ✓ **Negative:** Frequent policy changes create **uncertainty**, discouraging private investment in storage and logistics (noted by policy experts like **N.K. Singh Committee**).

Key Challenges

- **Policy Uncertainty:** Frequent invocation creates unpredictability in markets.
- **Balancing Inflation vs Growth:** Controlling prices may harm producers and long-term supply.
- **Implementation Issues:** Enforcement varies across states, affecting effectiveness.
- **Global Linkages:** External shocks (oil crisis, wars) complicate domestic supply management.

Way Forward

- **Strategic & Limited Use:** ECA should be used only during **extraordinary situations** like war, famine, or severe inflation.
- **Strengthen Market Mechanisms:** Promote platforms like **e-NAM**, improve price discovery, and enhance transparency.
- **Boost Infrastructure:** Invest in **warehousing, cold chains, and logistics** to reduce supply bottlenecks.
- **Adopt Hybrid Approach:** Combine **buffer stocks, open market operations, and targeted interventions** instead of excessive controls.

Conclusion

The Essential Commodities Act, 1955 remains a **critical regulatory tool** for ensuring food and energy security. However, its frequent use in normal conditions may distort markets. A **balanced, predictable, and market-friendly approach** is essential to harmonise consumer welfare with farmer prosperity and economic efficiency.

EXPECTED QUESTIONS FOR UPSC CSE

Prelims MCQ

Que. With reference to the Essential Commodities Act, 1955, consider the following:

1. It allows the government to impose stock limits on commodities.
2. It applies only to agricultural commodities.
3. It empowers both Central and State Governments for enforcement.

Which of the above is/are correct?

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

Answer: (c)

Descriptive Question

Que. "The Essential Commodities Act, 1955 is a double-edged sword balancing consumer protection and market efficiency." Discuss. (150 Words, 10 Marks)

STRATEGIC PETROLEUM RESERVES (SPR)

Why in News: India is accelerating its **Phase-II expansion** and exploring commercial partnerships with global oil majors to enhance its energy buffer against mid-2020s geopolitical volatility.

Key Details

- **Current Capacity:** India possesses a total functional capacity of **5.33 Million Metric Tonnes (MMT)**, enough to meet approximately **9.5 days** of the nation's crude requirements.
- **Implementing Agency:** Managed by **Indian Strategic Petroleum Reserves Limited (ISPRL)**, a Special Purpose Vehicle (SPV) under the **Ministry of Petroleum and Natural Gas**.
- **Storage Technology:** Oil is stored in massive **underground unlined rock caverns**. This method is cost-effective, space-saving, and highly secure against external threats like sabotage or aerial attacks.
- **Locations:**
  - ✓ **Phase-I (Operational):** Visakhapatnam (AP), Mangaluru (Karnataka), and Padur (Karnataka).

- ✓ **Phase-II (Approved):** Planned expansion at **Chandikhol (Odisha)** and **Padur (Karnataka)** to add another **6.5 MMT**.

Other Features

- **Commercial-Strategic Hybrid Model:** To reduce the fiscal burden, the government is moving toward a **PPP (Public-Private Partnership)** model. This allows foreign companies (like UAE's ADNOC) to store oil in Indian caverns, with India retaining the "first right of refusal" during emergencies.
- **Two-Tier Stockpiling:** SPRs are separate from the **commercial stocks** held by Oil Marketing Companies (OMCs). While SPRs cover ~9.5 days, OMCs typically hold another ~64 days of supply, bringing India's total cover closer to **74 days**.
- **The 90-Day Benchmark:** As an **Associate Member** of the International Energy Agency (IEA), India aspires to reach the global benchmark of **90 days** of net import cover to ensure total energy sovereignty.
- **Market Stabilization Tool:** Beyond war-time security, these reserves can be used as a diplomatic and economic tool to stabilize **Current Account Deficit (CAD)** by releasing stocks when global crude prices spike abnormally.

Strategic Map: SPR Locations

Location	State	Phase	Capacity
Visakhapatnam	Andhra Pradesh	Phase-I	1.33 MMT
Mangaluru	Karnataka	Phase-I	1.50 MMT
Padur	Karnataka	Phase-I	2.50 MMT
Chandikhol	Odisha	Phase-II	4.00 MMT
Padur (Expansion)	Karnataka	Phase-II	2.50 MMT

ENVIRONMENT AND GEOGRAPHY

WATER-CENTRED CLIMATE RESILIENCE

Why in News: At COP-30 (Belém, 2025), global focus shifted to **water-centred climate adaptation**, recognising water systems as the most visible channel of climate impacts.

Key Details

- COP-30 emphasised **implementation and measurable climate adaptation outcomes**.
- Integration of **Water, Sanitation and Hygiene (WASH)** into global climate accountability frameworks.
- Introduction of **59 Belém Adaptation Indicators** for monitoring resilience.
- Focus on **early warning systems, hydrometeorological services, and vulnerability assessments**.

COP-30 as the "COP of Implementation"

- **Shift from Commitments to Action:** COP-30 marked a transition from long-term climate pledges to **time-bound, measurable implementation**, aligning with the goals of the Paris Agreement.
- **Accountability Frameworks Introduced:** The adoption of **Belém Adaptation Indicators** ensures countries track adaptation progress through **quantifiable metrics**, moving beyond vague resilience goals.
- **Centrality of Water in Adaptation:** Water was repositioned from a sectoral issue to a **core survival resource**, linking climate resilience with food, health, and livelihoods.
- **Integration of WASH in Climate Policy:** For the first time, WASH indicators became part of global climate frameworks, strengthening the **water–health–climate nexus**.

Climate Change Experienced Through Water Systems

- **Floods and Urban Vulnerability:** Increasing frequency of floods in cities like Mumbai and Chennai highlights **urban planning gaps and drainage inefficiencies** under climate stress.
- **Droughts and Agrarian Crisis:** Nearly **52% of India's agriculture is rain-fed**, making it highly vulnerable to erratic monsoons and prolonged dry spells.
- **Glacial Melt and River Systems:** Himalayan glaciers, often called the **"Third Pole"**, are retreating, threatening perennial rivers like the Ganga and Brahmaputra.
- **Salinisation and Coastal Threats:** Coastal states such as Gujarat and Tamil Nadu face **saline intrusion**, affecting drinking water and agricultural productivity.
- **Water–Climate–Agriculture Link:** Agriculture contributes around **40% of global methane emissions**, necessitating water-efficient practices like micro-irrigation and crop diversification.

Belém Adaptation Indicators & Global Climate Governance

- **Structured Monitoring Framework:** The **59 indicators** under the UAE Framework for Global Climate Resilience provide a **global dashboard** for adaptation performance.
- **Focus on Water Security:** Indicators emphasise **universal access to safe drinking water, flood resilience, and drought preparedness**, aligning with SDG-6.
- **Disaster Preparedness Targets:** Countries are expected to establish **multi-hazard early warning systems by 2027**, consistent with the United Nations Office for Disaster Risk Reduction goals.
- **Hydrometeorological Services:** Strengthening weather forecasting and data systems improves **real-time response and risk mitigation**.
- **From Infrastructure to System Resilience:** The focus shifts to ensuring **continuity of services during climate shocks**, not just asset creation.

India's Institutional Framework for Water Governance

- **Integrated Water Management:** The creation of the Ministry of Jal Shakti unified water-related functions, improving policy coordination.
- **Water Vision 2047:** Aligns with sustainability goals, focusing on **equity, efficiency, and long-term resilience** in water use.
- **Groundwater Management (NAQUIM):** The National Aquifer Mapping and Management Programme (NAQUIM) promotes **scientific aquifer-based planning**.
- **River Rejuvenation Efforts:** The National Mission for Clean Ganga integrates ecology, biodiversity, and pollution control.
- **Flagship Schemes:** Programmes like **Jal Jeevan Mission** and **Atal Bhujal Yojana** enhance **drinking water access and groundwater sustainability**.

Key Challenges in India's Water–Climate Nexus

- **Severe Water Stress:** As per NITI Aayog (Composite Water Management Index), **over 600 million Indians face high to extreme water stress**.
- **Climate-Induced Disasters:** Around **75% of natural disasters in India are water-related**, including floods, cyclones, and droughts.
- **Fragmented Governance:** Water is a **State subject**, leading to coordination challenges across states and central agencies.
- **Adaptation Finance Gap:** Despite global commitments of **$1.3 trillion annually by 2035**, funding for water resilience remains inadequate.
- **Data and Digital Gaps:** Lack of integrated platforms limits the use of hydrological data for **real-time planning and decision-making**.

Role of Technology and Digital Public Infrastructure

- **AI and Climate Data Integration:** Artificial Intelligence can improve **crop advisories, flood forecasting, and insurance systems**.
- **Digital Public Infrastructure (DPI):** India's platforms like Aadhaar and GIS systems can support **targeted water governance and benefit delivery**.
- **Real-Time Monitoring Systems:** IoT-based sensors and satellite data enhance **water quality monitoring and disaster preparedness**.
- **Unified Dashboards:** Integrating schemes into a single platform ensures **policy convergence and efficient resource allocation**.

Water as the Core of Climate Resilience

- **Interlinkages with SDGs:** Water connects **SDG-2 (Zero Hunger), SDG-3 (Health), SDG-6 (Clean Water), and SDG-13 (Climate Action)**.
- **Nature-Based Solutions:** Wetlands, mangroves, and river ecosystems act as **natural buffers against floods and climate variability**.
- **Community Participation:** Local water management through **Panchayats and user groups** ensures sustainability and inclusiveness.
- **Resilience as System Functionality:** True resilience lies in **continuous service delivery during shocks**, not merely infrastructure expansion.

Conclusion

COP-30 signals a paradigm shift from climate promises to **measurable adaptation**, placing water at the centre of resilience. For India, aligning **water governance, finance, and digital systems** with global indicators is essential. Strengthening early warning systems, promoting water-use efficiency, and integrating technology can position India as a **global leader in climate adaptation**, particularly for the Global South.

EXPECTED QUESTIONS FOR UPSC CSE

Prelims MCQ

Que. Which of the following best describes WASH?

(a) Water, Agriculture, Sanitation, Health
(b) Water, Sanitation, and Hygiene
(c) Water and Soil Health
(d) Waste and Sanitation Handling

Answer: (b)

Descriptive Question

Que. Examine the significance of water-centred climate adaptation frameworks like the Belém Indicators for India's climate resilience. (150 Words, 10 Marks)

A SEISMIC DECISION

Why in news: The Centre rolled back the Bureau of **Indian Standards (BIS)** earthquake zoning revision after concerns over methodology, higher construction costs, and development impacts, highlighting tensions between scientific risk assessment and economic feasibility.

Key Details

- **BIS proposed new seismic zoning** using the **Probabilistic Seismic Hazard Assessment (PSHA)** model.
- The framework introduced **Zone VI**, covering **Kashmir, Himalayan regions, Kutch, and the north-east**.
- **Stricter seismic standards** could increase **construction costs by 20–33%**.
- Concerns that higher costs may **slow infrastructure development and expand informal housing**.
- **Multiple ministries and regulators** opposed the revision due to **implementation and financial challenges**.

Rollback of India's Earthquake Zoning Revision

- **The Centre rolled back** the revision to India's earthquake zoning proposed by the **Bureau of Indian Standards (BIS)** after experts raised concerns about the **methodology used**.
- Some **engineers argued** that the revised zoning was **not aligned with site-specific seismic evaluations**.
- However, the rollback was **mainly driven by concerns over massive costs and implementation challenges**.
- The decision has **major implications for urban planning, disaster preparedness, and climate resilience** in India.
- As India undergoes **rapid urban infrastructure expansion**, getting the **earthquake zoning framework right is crucial** to make cities and infrastructure safer.

Importance of the Earthquake Zoning Framework

- The **zoning exercise provides an opportunity** to strengthen **disaster resilience** across cities and infrastructure.
- It can help **earthquake-proof key assets** such as **cityscapes, power infrastructure, dams, highways, homes, and offices**.
- With India's **rapid urbanisation**, integrating **disaster preparedness into infrastructure planning** is essential.
- A **robust zoning framework** can reduce long-term damage from earthquakes and **protect lives and investments**.
- Therefore, designing an **accurate and practical zoning system** has become more important than ever.

Scientific Debate on Earthquake Risk Assessment

- The core issue is the **scientific estimation of potential earthquakes and their intensity**.
- This estimation must be balanced with the **capacity of buildings and infrastructure to withstand seismic shocks**.
- Most advanced economies now use **Probabilistic Seismic Hazard Assessment (PSHA)**.
- **PSHA uses probability-based simulations of ground motion** to estimate earthquake risks more dynamically.
- India has traditionally relied on a **simpler fixed seismic zoning model**, which is less sophisticated.

BIS Proposal and the New Zone VI

- The **BIS attempted to adopt the PSHA-based approach**, aligning India with **global seismic risk assessment practices**.
- However, the **revisions notified in November 2025** were later **withdrawn on March 3**.

- The proposal introduced a **new highest-risk category called Zone VI**.
- This zone included **most of Kashmir, parts of the Himalayan region, Kutch in Gujarat, and the north-east**.
- The move was seen as **scientifically progressive but operationally controversial**.

Concerns About Economic and Developmental Impact

- **Urban planners fear** stricter zoning could **slow infrastructure development** in already **economically fragile regions**.
- It may also **push more housing into the informal sector**, which already accounts for **nearly 80% of homes in India**.
- **Construction costs could rise significantly** with stricter seismic standards.
- A **one-zone increase may raise building costs by about 20%**, while **two zones could increase costs by nearly one-third**.
- For **large infrastructure projects** like **metro rail, dams, and power stations**, the costs could be even higher.

Institutional Pushback Against the Revision

- Opposition to the revised zoning came from **both the private sector and government bodies**.
- Key institutions raising concerns included:
  - ✓ **Ministry of Housing and Urban Affairs**
  - ✓ **Ministry of Home Affairs**
  - ✓ **Central Water Commission**
  - ✓ **National Dam Safety Authority**
- These stakeholders highlighted **the financial and operational burden** of implementing stricter standards.
- The pushback ultimately contributed to the **Centre's decision to withdraw the revision**.

Climate and Sustainability Dimension

- The **construction sector in India is a major source of carbon emissions**.
- Stricter earthquake-resilient construction could **increase material use**, potentially affecting **climate mitigation goals**.
- Therefore, the earthquake zoning revision must consider **both disaster resilience and environmental sustainability**.
- A balanced approach is required to **avoid increasing emissions while strengthening infrastructure safety**.
- Integrating **climate considerations with seismic safety** is becoming increasingly important.

Need for a Holistic and Implementable Framework

- Revising earthquake zoning is **necessary for improving disaster preparedness** in India.
- However, it requires **extensive consultation with ministries, regulators, engineers, and industry stakeholders**.
- Policies must address **affordability, implementation challenges, and climate commitments** simultaneously.
- A **well-designed and practical framework** can ensure safer infrastructure without hindering development.
- Ultimately, a **holistic and implementable seismic policy** is essential for strengthening India's **disaster resilience and sustainable growth**.

Conclusion

Revising India's earthquake zoning **framework is essential to improve** disaster preparedness as urbanisation accelerates. However, seismic safety must be balanced with **economic feasibility**, housing affordability, and climate commitments. A transparent, science-based approach with wider consultations among engineers, **ministries, and industry stakeholders** is necessary. Only a holistic and implementable framework can strengthen infrastructure resilience while ensuring sustainable and inclusive development.

EXPECTED QUESTION FOR UPSC CSE

Descriptive Question

Q. Discuss the implications for disaster resilience, urban development, and climate commitments in India. (250 words, 15 marks)

"BLACK RAIN" IN TEHRAN

Why in News: Recent airstrikes on oil facilities in Tehran during the ongoing West Asia conflict triggered **toxic "black rain" caused by atmospheric pollution mixing with rainfall**.

Key Details

- Israeli airstrikes reportedly targeted **oil storage depots and refinery infrastructure in Tehran and Alborz province** on March 7.
- Massive fires released **hydrocarbons, sulfur oxides, and nitrogen compounds** into the atmosphere.
- Rainfall passing through polluted air absorbed these chemicals and fell as **oily, soot-laden "black rain."**
- The **World Health Organization (WHO)** warned of severe respiratory and environmental risks for the population.

Black Rain: Scientific Mechanism

- **Atmospheric Pollution Interaction:** Black rain forms when rain droplets interact with **suspended particulate matter, soot, and chemical pollutants** in the atmosphere. These pollutants dissolve or attach to water droplets, leading to contaminated precipitation.
- **Release of Toxic Pollutants:** Explosions at oil facilities release large amounts of **hydrocarbon vapours, sulfur oxides (SOx), nitrogen oxides (NOx), and particulate matter**. These compounds combine with atmospheric moisture to form polluted rain.
- **Similar Environmental Phenomena:** A comparable event occurred after the **1945 Hiroshima bombing**, where radioactive particles mixed with rainfall, producing "black rain." Industrial disasters and large fires can also trigger similar precipitation.
- **Chemical Composition:** Petroleum products contain **thousands of hydrocarbons including benzene and polycyclic aromatic hydrocarbons (PAHs)**, many of which are toxic and carcinogenic.

Air Pollution and Urban Geography of Tehran

- **Topographical Constraints:** Tehran is surrounded by **mountain ranges such as the Alborz Mountains**, which restrict air circulation and trap pollutants within the city.
- **Temperature Inversion Effect:** During certain weather conditions, **cooler air becomes trapped beneath warmer air**, preventing the upward movement of pollutants and intensifying smog accumulation.
- **Existing Air Quality Crisis:** Tehran already experiences high pollution levels due to **vehicle emissions, industrial activity, and fossil fuel use**, making it highly vulnerable to atmospheric contamination.
- **Urban Density Impact:** With a population of around **9 million people in the city and over 15 million in the metropolitan region**, pollutant concentration and health exposure risks are significantly amplified.

Environmental Consequences of Military Conflicts

- **War-Induced Environmental Damage:** Modern warfare often damages **oil infrastructure, chemical plants, and industrial zones**, leading to widespread air, soil, and water contamination.
- **Historical Examples:** The **1991 Gulf War oil fires in Kuwait** released millions of barrels of oil into the atmosphere, causing severe regional air pollution and acid rain.
- **Damage to Ecosystems:** Pollutants from oil fires and explosions can contaminate **vegetation, water bodies, and agricultural lands**, affecting biodiversity and food security.
- **Conflict and Environmental Monitoring:** Reports by environmental monitoring groups indicate **over 200 conflict-related incidents with environmental risks** during the ongoing West Asia conflict.

Health Risks from Toxic Black Rain

- **Respiratory Illness:** Exposure to pollutants like sulfur dioxide and nitrogen oxides can cause **breathing difficulty, asthma attacks, and lung inflammation**, particularly among vulnerable populations.
- **Skin and Eye Irritation:** Acidic compounds present in polluted rainwater may cause **chemical burns, rashes, and eye irritation** upon direct contact.
- **Long-Term Toxic Effects:** Hydrocarbon compounds such as **benzene are carcinogenic**, increasing the risk of cancer and chronic diseases after prolonged exposure.
- **Public Health Advisory:** Authorities advised residents to **stay indoors, avoid direct contact with rainwater, and use protective masks** to minimise health risks.

Environmental Persistence and "Forever Chemicals"

- **Per- and Polyfluoroalkyl Substances (PFAS):** Flame retardants & industrial chemicals released during fires may include **PFAS**, commonly called "forever chemicals" due to their resistance to degradation.
- **Groundwater Contamination:** These chemicals can seep into **soil and groundwater**, persisting for decades and affecting drinking water supplies.
- **Food Chain Bioaccumulation:** Toxic compounds deposited on vegetation may enter the **food chain through livestock and crops**, posing long-term ecological and health risks.
- **Infrastructure Corrosion:** Acidic precipitation can accelerate **corrosion of buildings, metal structures, and transport infrastructure**, especially in polluted urban environments.

Environmental Security and Global Governance

- **Environmental Dimension of Warfare:** Increasingly, conflicts are evaluated not only by humanitarian impacts but also by **environmental damage and ecological destruction**.
- **International Environmental Norms:** International humanitarian law and environmental agreements aim to **minimise environmental harm during armed conflicts**.
- **Role of International Organisations:** Agencies such as **WHO and environmental monitoring groups** provide early warnings and technical guidance to mitigate environmental disasters.
- **Climate and Conflict Linkage:** Environmental degradation during wars exacerbates **climate vulnerability, public health crises, and humanitarian emergencies**.

Conclusion

The black rain episode in Tehran highlights the often-overlooked **environmental consequences of modern warfare**. Beyond immediate military impacts, conflicts can trigger large-scale pollution, ecological damage, and long-term health risks for civilians. Strengthening international norms on environmental protection during conflicts, improving urban pollution management, and enhancing environmental monitoring systems are essential to mitigate such disasters. Sustainable peace and environmental security must be viewed as interconnected pillars of global stability.

EXPECTED QUESTIONS FOR UPSC CSE

Prelims MCQ

Q. Which of the following pollutants commonly contribute to acid rain?

1. Sulfur dioxide
2. Nitrogen oxides
3. Methane

Select the correct answer using the code below:

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

Answer: (a)

Descriptive Question

Que. Modern conflicts increasingly have environmental consequences. Discuss the environmental and public health impacts of warfare with suitable examples. (250 Marks, 15 Marks)

FOREST RIGHTS ACT, 2006

Why in News: Recently, concerns have arisen over marginalization of Shompen, coercion of Nicobarese communities, settler-backed decisions, and violations of Forest Rights Act provisions, undermining consent, representation, and protection of tribal lands.

Key Details

- The **Forest Rights Act, 2006** was enacted to recognize and legally secure the rights of **Scheduled Tribes and other traditional forest dwellers**, correcting the historical injustice caused by colonial and post-colonial forest laws.
- The Act provides **individual and community rights**, including ownership of minor forest produce, rights over cultivated forest land (up to 4 hectares), and community rights to protect and manage forest resources.
- It gives a **central role to the Gram Sabha**, which is responsible for initiating, verifying, and recommending claims, making it a key institution in decentralized forest governance.
- The Act recognizes **eligibility based on residence and dependence**, where STs are automatically eligible, while Other Traditional Forest Dwellers must prove residence for at least 75 years.
- Despite its progressive nature, the implementation of the Act faces challenges such as **delays, wrongful rejection of claims, lack of awareness, and conflicts with conservation policies**, limiting its full impact.

Introduction

- The **Forest Rights Act, 2006** (also called **Scheduled Tribes and Other Traditional Forest Dwellers Act**) recognizes the **rights of forest-dwelling communities**.
- It aims to correct the **historical injustice** faced by tribal and forest-dependent people.

Objectives of the Act

- Recognize **land and resource rights** of forest dwellers.
- Ensure **livelihood and food security**.
- Promote **forest conservation through community participation**.
- Empower **Gram Sabhas** in forest governance.

Who are Eligible?

- **Scheduled Tribes (STs)** living in forest areas.
- **Other Traditional Forest Dwellers (OTFDs)** residing for at least **3 generations (75 years)**.
- Must depend on forests for **livelihood**.

Types of Rights Recognized

- **Individual Rights**
  - ✓ Right to **cultivate forest land** (up to 4 hectares).
  - ✓ Land must be under **occupation before 13 Dec 2005**.
- **Community Rights**
  - ✓ Rights over **minor forest produce** (like bamboo, honey, tendu leaves).
  - ✓ Access to **grazing grounds and water bodies**.
  - ✓ Traditional **seasonal resource access**.
- **Community Forest Resource (CFR) Rights**
  - ✓ Right to **protect, regenerate and manage forests**.
  - ✓ Empowers Gram Sabha as **forest manager**.
- **Rights of Special Groups**
  - ✓ Habitat rights for **Particularly Vulnerable Tribal Groups (PVTGs)**.
  - ✓ Rights for **nomadic and pastoral communities**.

Role of Gram Sabha

- Acts as the **primary authority**.
- Initiates the **process of determining rights**.
- Verifies and recommends **claims**.
- Ensures **protection and conservation** of forests.

Procedure for Recognition of Rights

- Claim filed at **Gram Sabha level**.
- Verified by **Forest Rights Committee (FRC)**.
- Approved by **Sub-Divisional & District** Level Committees.
- Final decision rests with **District Level Committee (DLC)**.

Importance of the Act

- Strengthens **tribal empowerment**.
- Supports **sustainable forest management**.
- Reduces **conflicts between forest officials and locals**.
- Promotes **inclusive development**.

Challenges in Implementation

- **Delay in recognition of claims**.
- High rate of **claim rejections**.
- Lack of **awareness among beneficiaries**.
- Conflicts with **forest conservation laws**.
- Poor implementation of **Community Forest Rights (CFR)**.

Way Forward

- Improve **awareness and capacity building**.
- Ensure **transparent claim verification**.
- Strengthen **Gram Sabha institutions**.
- Better coordination between **Forest Department and communities**.
- Focus on **effective implementation of CFR rights**.

Conclusion

The situation underscores serious concerns regarding the protection of tribal rights, environmental governance, **and legal compliance**. Ensuring free, prior, and informed consent of **indigenous communities** is essential. Strict adherence to the Forest Rights Act, along with inclusive and **transparent decision-making,** is necessary to balance development with justice, sustainability, and the constitutional rights of vulnerable populations.

EXPECTED QUESTIONS FOR UPSC CSE

Descriptive Question

Que. Which of the following rights is **not** recognized under e Forest Rights Act (FRA), 2006:

(a) Right to minor forest produce
(b) Right to grazing
(c) Right to own mineral resources
(d) Right to habitation

Answer: (c)

WILDLIFE CONSERVATION GOVERNANCE

Why in News: India's **Project Cheetah** at Kuno National Park has shown recovery success through advanced veterinary interventions, highlighting progress in wildlife conservation.

Key Details

- India reintroduced cheetahs under **Project Cheetah (2022)** after extinction in 1952.
- Multiple cheetahs at Kuno were treated for **fractures, infections, and amputations**.
- Veterinary teams successfully managed complex cases like **bone fractures and osteomyelitis**.
- The programme is now considered **stable and evolving**, with native-born cheetahs surviving.

Project Cheetah: Reintroduction Initiative

- **India's First Intercontinental Translocation:** Project Cheetah involves translocation of cheetahs from Namibia and South Africa, marking the **world's first large carnivore intercontinental relocation**.
- **Historical Context of Extinction:** Cheetahs were declared extinct in India in **1952** due to hunting, habitat loss, and ecological imbalance, making reintroduction a restoration effort.
- **Ecological Objective:** The project aims to restore **grassland ecosystems** and improve biodiversity by reintroducing an apex predator that regulates prey populations.
- **Location Significance:** Kuno National Park in Madhya Pradesh was selected due to its **adequate prey base, habitat suitability, and low human interference**.

Veterinary Science and Wildlife Management

- **Advanced Clinical Interventions:** Cases like Mukhi's humerus fracture and Nirva's bone infection required **X-rays, immobilisation, surgery, and antibiotics**, showing integration of modern veterinary science.
- **Handling High-Speed Injury Risks:** Cheetahs are prone to injuries due to speeds up to **100 km/h**, leading to fractures and soft tissue damage during hunts or territorial fights.
- **Amputation and Rehabilitation:** Complex procedures such as tail amputation and digit removal highlight the **capacity for surgical intervention and post-operative care in wildlife conservation**.
- **Institutional Capacity Building:** Indian forest and veterinary staff have developed **expertise in wildlife rehabilitation**, reducing dependence on foreign specialists.

Conservation Biology and Ecosystem Restoration

- **Role of Apex Predators:** Cheetahs help maintain ecological balance by controlling herbivore populations, thus preventing **overgrazing and habitat degradation**.
- **Grassland Ecosystems Focus:** India's grasslands are often neglected compared to forests, but projects like this bring attention to their role in **biodiversity conservation**.
- **Genetic Diversity Challenges:** Imported cheetahs raise concerns about **genetic adaptation, survival rates, and long-term sustainability** in Indian conditions.
- **Human-Wildlife Interface:** Ensuring minimal conflict with local communities is essential, requiring **buffer zones, compensation mechanisms, and awareness programs**.

Policy Framework and Institutional Mechanisms

- **Legal Backing:** Wildlife conservation in India is governed by the **Wildlife (Protection) Act, 1972**, which provides legal protection to endangered species.
- **National Biodiversity Goals:** The project aligns with India's commitments under the **Convention on Biological Diversity (CBD)** and biodiversity conservation targets.
- **Role of Government Agencies:** The Ministry of Environment, Forest and Climate Change and state forest departments coordinate implementation and monitoring.
- **Use of Technology:** GPS collars, surveillance systems, and digital radiography tools are used for **tracking and health monitoring of animals**.

Challenges and Criticism

- **High Mortality Concerns:** Initial deaths of some cheetahs raised questions about **habitat suitability and adaptation stress**.
- **Climate and Habitat Differences:** Indian conditions differ from African savannas, posing challenges in **temperature tolerance and prey behaviour adaptation**.
- **Long-Term Sustainability:** Maintaining a viable breeding population requires **continuous monitoring, genetic management, and habitat expansion**.
- **Resource Allocation Debate:** Critics argue about prioritising cheetahs over other endangered native species like **Great Indian Bustard or Asiatic Lion**.

Success Indicators and Emerging Outcomes

- **Birth of Native Cubs:** The birth and survival of cubs like Mukhi's offspring indicate **successful adaptation and reproduction**.
- **Improved Veterinary Response:** Timely medical interventions have resulted in **100% recovery in documented injury cases**.
- **Capacity Enhancement:** Indian wildlife management systems are becoming **self-reliant and technically advanced**.
- **Global Recognition:** The project positions India as a leader in **innovative conservation strategies and species reintroduction**.

Conclusion

Project Cheetah reflects a **holistic conservation model combining ecology, science, and governance**. Strengthening habitat management, ensuring genetic diversity, enhancing community participation, and adopting adaptive strategies are crucial for long-term success. The initiative demonstrates that conservation is a **continuous, evolving process requiring scientific innovation and institutional commitment**.

EXPECTED QUESTION FOR UPSC CSE

Prelims MCQ

Que. Project Cheetah aims to:

(a) Conserve Asiatic lions

(b) Reintroduce cheetahs in India

(c) Protect wetlands

(d) Increase forest cover

Answer: (b)

PROJECT HANUMAN

Why in News: The Government of Andhra Pradesh launched **Project HANUMAN on World Wildlife Day 2026** to address the rising human–wildlife conflict (HWC) through technology and community participation.

Key Details

- Project HANUMAN is a **state-level initiative** aimed at reducing human–wildlife conflict and ensuring coexistence.
- It integrates **AI-based monitoring, rapid response teams, and community participation ('Vajra' groups)**.
- Includes **wildlife rescue centres, Kumki elephants, and digital app-based coordination**.
- Compensation for wildlife conflict victims has been **enhanced (₹10 lakh for death)**.

Human–Wildlife Conflict (HWC)

- **Definition and Nature:** Human–Wildlife Conflict refers to **negative interactions between humans and wild animals**, leading to loss of life, crops, livestock, and biodiversity. It affects both **human security and ecological balance**.
- **Rising Trend in India:** As per State of India's Environment 2025, **human fatalities due to elephant attacks increased by ~36% (2020–24)**, indicating growing ecological stress.
- **Major Conflict Zones:** States like **Odisha, West Bengal, Jharkhand, Assam, and Karnataka** report high conflict, especially involving elephants, tigers, and leopards.
- **Impact Dimensions:** Includes **economic loss (crop damage), social distress, and retaliatory killing of wildlife**, thereby threatening conservation efforts.

Key Drivers of Human–Wildlife Conflict

- **Habitat Fragmentation:** Infrastructure expansion (roads, railways, urbanisation) disrupts wildlife corridors, forcing animals into **human-dominated landscapes**.
- **Agricultural Attractiveness:** Crops like **sugarcane, paddy, and maize** attract herbivores, increasing incidents of crop raiding and conflict near forest fringes.
- **Conservation Success Paradox:** Rising populations of **tigers (~3,167 in 2022)** and elephants (~30,000) without proportional habitat expansion intensify conflicts.
- **Climate Change Impact:** Droughts, floods, and erratic rainfall reduce natural food and water availability, pushing wildlife towards human settlements.

Project HANUMAN: Overview & Objectives

- **Full Form & Vision:** HANUMAN stands for **Healing and Nurturing Units for Monitoring, Aid and Nursing of Wildlife**, focusing on coexistence and conflict mitigation.
- **Core Objective:** To ensure **human safety while conserving wildlife**, aligning with India's commitments under **Wildlife Protection Act, 1972**.
- **Integrated Approach:** Combines **technology, community participation, institutional coordination, and financial support mechanisms**.
- **Geographical Focus:** Implemented across **Andhra Pradesh**, especially in forest-border districts like **Chittoor and Tirupati**.

Technological Interventions

- **AI-Based Monitoring Systems:** Artificial Intelligence is used to track wildlife movement near forest boundaries, enabling **early warning systems** for villagers.
- **HANUMAN Digital App:** A real-time platform for **reporting incidents, tracking animals, and coordinating rescue teams**, improving administrative efficiency.
- **Data-Driven Governance:** Integration of technology ensures **predictive analysis and faster decision-making**, reducing response time in emergencies.

Rapid Response & Rescue Mechanism

- **Deployment Infrastructure:** Around **100 vehicles (93 response units + 7 ambulances)** have been deployed for immediate action during wildlife emergencies.
- **Multi-disciplinary Teams:** Each team includes **forest officials, veterinarians, and trained personnel**, ensuring scientific handling of wildlife.
- **Wildlife Rescue Centres:** Four centres at **Visakhapatnam, Rajamahendravaram, Tirupati, and Birlut** provide long-term treatment and rehabilitation.
- **Significance:** Reduces mortality of both humans and animals, strengthening **humane conservation practices**.

Community Participation: 'Vajra' Model

- **Village-Level Institutions:** 'Vajra' (Wildlife Rakshak) teams are trained local volunteers acting as **first responders** in wildlife incidents.
- **Decentralised Governance:** Promotes **bottom-up conservation**, aligning with principles of participatory governance and Panchayati Raj.
- **Handling Minor Conflicts:** These teams manage snake rescues and small wildlife intrusions, reducing pressure on forest departments.
- **Social Acceptance:** Enhances trust between communities and government, ensuring **long-term sustainability of conservation efforts**.

Elephant Management & Kumki Elephants

- **Use of Kumki Elephants:** Trained elephants (from Karnataka) are used to **guide and control wild elephant herds**, especially in high-conflict zones.
- **Scientific Wildlife Management:** Kumki elephants help in **non-lethal mitigation**, preventing damage and ensuring animal safety.

- **Target Areas:** Districts like **Chittoor** face frequent elephant movement, making this intervention crucial.
- **Best Practice Example:** Similar models have been successfully used in **Tamil Nadu and Karnataka**.

Compensation & Welfare Measures

- **Enhanced Ex-Gratia:** Compensation for death increased from **₹5 lakh to ₹10 lakh**, ensuring financial security for affected families.
- **Injury & Livestock Compensation:** ₹2 lakh for injuries and **market-value compensation for cattle loss** reduces economic distress.
- **Timely Disbursement:** Faster compensation improves trust in governance and reduces retaliatory actions against wildlife.
- **Inclusive Approach:** Balances **livelihood protection with conservation goals**, addressing socio-economic dimensions.

Significance of Project HANUMAN

- **Human Security:** Protects lives, livelihoods, and property in forest-border areas, addressing a major rural concern.
- **Wildlife Conservation:** Ensures rescue, rehabilitation, and protection of animals, supporting biodiversity conservation.
- **Policy Innovation:** Demonstrates integration of **technology + community + governance**, a model for other states.
- **Sustainable Development Goals (SDGs):** Contributes to **SDG 15 (Life on Land)** and **SDG 11 (Sustainable Communities)**.

Conclusion

Project HANUMAN represents a **holistic and innovative model** to address human–wildlife conflict in India. Scaling such initiatives nationwide, strengthening wildlife corridors, integrating climate resilience, and enhancing community awareness are essential for achieving **sustainable coexistence between humans and wildlife**. The future of conservation lies in **technology-enabled, community-driven governance frameworks**.

EXPECTED QUESTIONS FOR UPSC CSE

Prelims MCQ

Que. Project HANUMAN is related to:
(a) Forest fire management
(b) Human–wildlife conflict mitigation
(c) River conservation
(d) Climate finance

Answer: (b)

Descriptive Question

Que. Human–wildlife conflict is emerging as a major environmental and socio-economic challenge in India. Discuss with reference to recent initiatives like Project HANUMAN. (250 Words, 15 Marks)

INTERNATIONAL DAY OF ZERO WASTE 2026

Why in News: The **International Day of Zero Waste (30 March 2026)** focused on **food waste and circular economy practices** to address climate change and sustainability.

Key Details

- Established by the **United Nations General Assembly in 2022**, observed annually on 30 March.
- 2026 theme highlights **food waste as a major environmental and economic challenge**.
- Around **1.05 billion tonnes of food** is wasted globally every year.
- Promoted by **UNEP and UN-Habitat**, focusing on sustainable consumption patterns.

Zero Waste Concept & Circular Economy

- **Linear vs Circular Economy:** Traditional "take–make–dispose" models are unsustainable, whereas the **circular economy focuses on reuse, recycling, and resource efficiency**.
- **Zero Waste Principle:** It aims to **minimise waste generation at source**, promoting sustainable production and consumption patterns aligned with **SDG 12 (Responsible Consumption)**.
- **Policy Relevance:** The concept is integrated into global frameworks like the **Paris Agreement and SDGs**, making it important for climate governance.
- **Economic Efficiency:** Circular systems reduce raw material dependency and create **green jobs**, contributing to sustainable economic growth.

Scale of Global Food Waste

- **Magnitude of Waste:** According to the **UNEP Food Waste Index Report 2024**, about **1.05 billion tonnes (19%) of food** is wasted annually.
- **Sectoral Contribution:** Households contribute **60%**, food services **28%**, and retail **12%**, indicating that behavioural change is crucial.
- **Hunger Paradox:** Around **783 million people face hunger globally**, highlighting inequality in food distribution systems.
- **Developing Countries Impact:** Food waste levels are similar across income groups, disproving the myth that waste is only a developed-world problem.

Food Waste as a Climate Emergency

- **GHG Emissions:** Food waste contributes **8–10% of global greenhouse gas emissions**, making it a major climate driver.
- **Methane Emissions:** Decomposing food releases **methane (CH_4)**, which is **25–28 times more potent than CO_2** over 100 years.
- **Resource Depletion:** Nearly **28–30% of agricultural land** is used for food that is never consumed, leading to biodiversity loss.

- **Economic Cost:** Global losses due to food waste are estimated at **$1 trillion annually**, impacting both economies and sustainability.

India's Food Waste Paradox

- **Hunger vs Waste:** India ranks **102nd in Global Hunger Index 2025**, yet wastes **78 million tonnes of food annually**, showing systemic inefficiency.
- **Per Capita Waste:** Indian households waste around **55 kg per person per year**, highlighting behavioural and infrastructural gaps.
- **Nutritional Concerns:** High levels of **child stunting (32.9%) and wasting (18.7%)** coexist with food wastage, indicating distribution challenges.
- **Economic Impact:** India loses approximately **₹92,000 crore annually**, affecting farmers' income and economic efficiency.

Post-Harvest Losses & Supply Chain Gaps

- **Magnitude of Losses:** India loses around **74 million tonnes (22%) of food grains** annually due to post-harvest inefficiencies.
- **Sector-wise Losses:** Livestock (~22%), fruits (15–19%), vegetables (11–18%) suffer high losses due to poor storage and transport.
- **"Missing Middle" Problem:** Lack of **cold chain infrastructure and refrigerated transport** leads to spoilage before reaching markets.
- **Rural Infrastructure Gap:** Weak **Gramin Agricultural Markets (GrAMs)** and storage facilities hinder efficient supply chains.

Government Initiatives & Policy Framework

- **Mission LiFE (Lifestyle for Environment):** Promotes sustainable habits like **reducing food waste, composting, and mindful consumption**, turning sustainability into a mass movement.
- **FSSAI's "Save Food, Share Food":** Under **Eat Right India**, surplus food is redistributed via the **Indian Food Sharing Alliance (IFSA)**.
- **Legal Framework: Food Safety and Standards (Recovery & Distribution of Surplus Food) Regulations, 2019** institutionalise safe food donation.
- **GOBARDHAN Scheme** Encourages conversion of organic waste into **biogas and compost**, linking waste management with energy security.

Circular Economy Innovations in India

- **Startup Ecosystem:** Indian startups are leveraging technology for waste management, enhancing efficiency and sustainability.
- **Bio-conversion Technologies:** Use of **Black Soldier Fly larvae** converts organic waste into animal feed and fertiliser, reducing waste volume.
- **Upcycling Practices:** Temple waste and organic materials are converted into **value-added products**, promoting resource efficiency.
- **Waste Segregation Technologies:** Automation and AI-based systems improve recycling efficiency and reduce landfill burden.

Global Best Practices

- **France – Loi Garot (2016):** Mandates supermarkets to **donate unsold food**, increasing food redistribution by up to **50%**.
- **South Korea – RFID System:** "Pay-as-you-throw" model charges households based on waste generated, encouraging behavioural change.
- **EU Circular Economy Policies:** Strong regulatory frameworks promote **waste reduction, recycling, and sustainable consumption**.
- **Relevance for India:** These models provide **policy lessons for improving accountability and infrastructure**.

Conclusion

India must adopt a **holistic approach combining behavioural change, infrastructure development, and policy enforcement**. Strengthening cold chains, promoting circular economy practices, and enhancing public awareness are essential. Achieving **SDG 12.3 (halving food waste by 2030)** can significantly reduce emissions and improve food security. The transition from a **linear to circular economy** is not just an environmental necessity but an economic opportunity.

EXPECTED QUESTION FOR UPSC CSE

Prelims MCQ

Que. The International Day of Zero Waste is associated with:
(a) Biodiversity conservation
(b) Sustainable consumption and waste management
(c) Marine pollution
(d) Renewable energy

Answer: (b)

INDIA'S UPDATED NDC

Why in News: The Union Cabinet has approved India's **updated Nationally Determined Contributions (NDCs)** to be submitted to the UNFCCC, enhancing climate targets for 2035.

Key Details

- India aims for **60% non-fossil fuel installed electric capacity by 2035**, up from the earlier 50% target by 2030.
- Emissions intensity reduction target increased to **47% from 2005 levels**.
- Carbon sink target raised to **3.5–4 billion tonnes CO_2 equivalent**.
- India's CO_2 emissions growth slowed to **0.7% in 2025**, indicating possible structural transition.

Nationally Determined Contributions (NDCs)

- **Definition under Paris Agreement:** NDCs are country-specific climate action plans under the Paris Agreement, outlining mitigation and adaptation strategies. They are updated every 5 years with increasing ambition.
- **Non-binding but Accountable:** While targets are not legally binding, countries must report progress, ensuring

transparency and peer pressure in global climate governance.

- **Evolution from INDCs:** Before 2015, countries submitted **INDCs**, which became NDCs after ratification of the Paris Agreement, marking a shift from intent to commitment.
- **CBDR Principle:** NDCs operate under **Common But Differentiated Responsibilities**, recognising that developing countries like India have lower historical emissions.

Key Features of India's Updated NDC (2026)

- **Higher Non-Fossil Capacity:** Target increased to **60% by 2035**, building on India already achieving **~52% by early 2026**, indicating strong renewable expansion.
- **Stronger Emissions Intensity Reduction:** Increased to **47%**, reflecting improved energy efficiency and transition towards cleaner energy sources.
- **Enhanced Carbon Sink:** Target raised to **3.5–4 billion tonnes CO_2 equivalent**, focusing on afforestation and ecosystem restoration.
- **Alignment with Global Timeline:** India's updated NDC fills the gap among G20 nations, strengthening its position in global climate negotiations.

Renewable Energy Transition & Energy Mix

- **Rapid Renewable Expansion:** In 2025, India added **47 GW solar, 6.3 GW wind**, making it one of the fastest-growing renewable markets globally.
- **Decline in Power Sector Emissions:** Emissions fell by **3.8% in 2025**, indicating early signs of decarbonisation in electricity generation.
- **Energy Security Dimension:** Renewable energy reduces dependence on imported fossil fuels, improving **energy independence and economic resilience**.
- **Grid Readiness Challenge:** Around **37 GW renewable capacity remains stranded**, highlighting gaps in transmission and storage infrastructure.

Emissions Intensity vs Absolute Emissions Debate

- **Intensity-Based Approach:** India focuses on emissions per unit of GDP, allowing total emissions to rise with economic growth.
- **Development Imperative:** As a developing country, India prioritises **poverty reduction, industrialisation, and energy access**, making absolute emission cuts difficult.
- **Global Equity Argument:** India's per capita emissions remain significantly lower than developed nations, supporting its stance in climate negotiations.
- **Policy Implication:** Balancing growth with sustainability remains a key challenge for long-term climate strategy.

Climate Action vs Fossil Fuel Dependence

- **Simultaneous Expansion:** India is expanding renewables while planning **100 GW additional coal capacity**, showing policy contradiction.
- **Industrial Emissions Growth:** Sectors like steel and cement saw emissions rise by **8% and 10% respectively in 2025**, offsetting gains in power sector.
- **Petrochemical Investments:** Planned investments of **$1 trillion by 2040** indicate continued reliance on fossil fuel-based industries.
- **Structural Challenge:** Transitioning to a low-carbon economy requires systemic change beyond energy generation.

Carbon Sink & Forest Cover Concerns

- **Definition of Carbon Sink:** Forests and vegetation absorb CO_2, helping offset emissions and contributing to climate mitigation.
- **India's Current Status:** Forest and tree cover stands at **~24%**, below the long-term target of 33%.
- **Quality vs Quantity Issue:** Plantation-based afforestation may not provide the same ecological benefits as natural forests.
- **Sustainability Concern:** Achieving the carbon sink target requires **long-term ecological planning and biodiversity conservation**.

Global Climate Context & India's Position

- **Global Emissions Gap:** Reports indicate current NDCs cover less than **14% of the required emission reductions** to meet the 1.5°C target.
- **COP28 Commitments:** Global consensus includes **tripling renewables and doubling energy efficiency by 2030**, aligning with India's goals.
- **Strategic Diplomacy:** India uses its climate commitments to demand **climate finance and technology transfer** from developed countries.
- **Geopolitical Advantage:** Stronger NDC enhances India's role in **clean energy geopolitics and global leadership**.

Institutional & Policy Mechanism

- **International Framework:** NDCs are submitted under the UNFCCC, which conducts annual COP meetings.
- **Domestic Coordination:** Implementation involves multiple ministries including power, environment, coal, and industry.
- **Central Electricity Authority Role:** Projects **~70% non-fossil capacity by 2035–36**, indicating long-term planning.
- **Policy Integration Need:** Climate goals must align with industrial, energy, and land-use policies for effective implementation.

Challenges / Criticisms

- **Voluntary Nature of NDCs:** Lack of legal binding reduces enforceability and depends on political will.
- **Grid Infrastructure Gaps:** Renewable expansion is constrained by weak transmission and storage capacity.
- **Fossil Fuel Continuity:** Continued coal and industrial expansion undermines climate commitments.
- **One-Year Data Limitation:** The 2025 emissions slowdown may not indicate a sustained long-term trend.

Way Forward

- **System-Level Energy Transition:** Focus on grid modernisation, battery storage, and flexible power systems rather than just capacity addition.
- **Decarbonising Industry:** Develop targeted policies for steel, cement, and heavy industries using green hydrogen and clean technologies.
- **Rationalising Fossil Expansion:** Align coal and petrochemical investments with long-term climate goals.
- **Improving Carbon Sink Quality:** Promote natural forests, biodiversity conservation, and community-led afforestation.
- **Strengthening Climate Diplomacy:** Leverage NDC commitments to secure global finance, technology transfer, and climate justice.

Conclusion

India's updated NDC reflects **enhanced ambition and growing renewable momentum**, positioning the country as a responsible global climate actor. However, **structural contradictions between clean energy expansion and fossil fuel dependence** persist. The success of India's climate strategy will depend not on targets alone, but on **effective implementation, policy coherence, and systemic transformation**.

EXPECTED QUESTIONS FOR UPSC CSE

Prelims MCQ

Que. Nationally Determined Contributions (NDCs) are:

(a) Legally binding emission targets
(b) Voluntary climate action plans under the Paris Agreement
(c) Financial contributions to UNFCCC
(d) Targets set only for developed countries

Answer: (b)

Descriptive Question

Que. India's updated NDC reflects higher climate ambition but also reveals structural contradictions. Critically examine. (150 Words, 10 Marks)

REDISCOVERY OF EXTINCT MARSUPIALS

Why in News: Researchers have rediscovered two marsupial species the Ring-tailed Glider and Pygmy Long-fingered Possum in the forests of New Guinea, which were earlier believed extinct for nearly 6,000 years.

Key Details

- Scientists rediscovered two rare marsupials in remote forests of New Guinea after being known only from fossil records. This discovery highlights the importance of unexplored ecosystems in biodiversity conservation.
- These species are examples of **"Lazarus taxa,"** where organisms reappear after being presumed extinct. Such rediscoveries challenge assumptions about species extinction and ecological resilience.
- The findings underline the ecological richness of tropical rainforests, especially in isolated regions. They also stress the need for continued scientific exploration and conservation efforts.
- Threats such as deforestation and habitat loss continue to endanger these rare species. Conservation strategies must integrate local community participation for effective protection.

Ring-tailed Glider

- **Habitat:** Found in dense tropical rainforests of New Guinea, particularly canopy-rich regions. These forests provide ideal conditions for arboreal movement and food availability.
- **Physical Features:** It has a ring-like gripping tail, gliding membranes, and hairless ears. These adaptations help in tree-to-tree movement and survival in forest canopies.
- **Behaviour:** It is a nocturnal species feeding on leaves and tree sap. It uses claws to extract sap, which later solidifies for consumption.
- **Conservation Concerns:** Logging and land clearing threaten its habitat. However, indigenous community protection has played a key role in its survival.

Pygmy Long-fingered Possum

- **Habitat:** Lives in moist tropical forests with old-growth trees and decaying wood. These environments support insects, which form its primary food source.
- **Physical Features:** It is palm-sized with an elongated finger used for extracting insect larvae. This adaptation is similar to niche feeding seen in some primates like the aye-aye.
- **Behaviour:** Nocturnal in nature with highly sensitive hearing to detect prey inside trees. This helps it locate insects hidden within bark and wood.
- **Conservation Concerns:** Small population size and illegal wildlife trade pose threats. Restricted disclosure of its habitat is necessary to prevent exploitation.

Concept of Lazarus Taxa

- **Definition:** Lazarus taxa refer to species that **reappear after being thought extinct**. They are often known earlier only through fossil records.
- **Scientific Importance:** Such species provide insights into evolutionary survival and adaptability. They challenge gaps in fossil records and extinction assumptions.
- **Examples:** Rediscovered plants, fish, and mammals across the world fall under this category. These cases highlight limitations in biodiversity documentation.

Marsupials: Key Concepts

- **Definition:** Marsupials are **mammals** whose young develop in a pouch after birth. Examples include kangaroos, koalas, and possums.
- **Unique Features:** They give birth to underdeveloped young that continue growth in the pouch. Many species have specialized limbs or claws for climbing and jumping.
- **Habitat:** Found mainly in forests, grasslands, and tropical ecosystems. Vegetation provides food, shelter, and breeding sites.

- **Distribution:** Mostly located in Australia, New Guinea, and nearby islands. India has no living marsupials, though fossil evidence suggests their ancient presence.

Biodiversity Conservation Challenges

- **Habitat Loss:** Deforestation and land-use change threaten tropical ecosystems. This directly impacts species survival and ecological balance.
- **Climate Change:** Alters habitats and food availability for sensitive species. It increases vulnerability of already rare organisms.
- **Limited Data:** Remote regions lack proper biodiversity documentation. This leads to underestimation of species richness.
- **Need for Local Participation:** Indigenous communities play a crucial role in conservation. Their traditional knowledge supports sustainable ecosystem management.

Way Forward

- **Strengthening Conservation Policies:** Protect critical habitats through legal and policy measures. This will ensure long-term survival of rare and rediscovered species.
- **Promoting Scientific Exploration:** Encourage biodiversity surveys in unexplored regions. It helps in identifying unknown or presumed extinct species.
- **Community-Based Conservation:** Involve local communities in protection efforts. This ensures sustainable and inclusive conservation practices.
- **Global Cooperation:** Share knowledge and resources for biodiversity protection. It is essential for preserving global ecological heritage.

Conclusion

The rediscovery of extinct marsupials highlights the resilience of nature and gaps in scientific knowledge. It underscores the importance of conservation, research, and sustainable practices to protect biodiversity for future generations.

Important Key Facts

- Lazarus taxa = Species rediscovered after presumed extinction
- Marsupials = Pouch-bearing mammals
- Hotspot Region = New Guinea tropical forests
- India = No living marsupials (only fossil evidence)
- Threats = Deforestation, climate change, illegal trade

EXPECTED QUESTIONS FOR UPSC CSE

Prelims MCQ

Que. With reference to Lazarus taxa, consider the following statements:

1. It refers to species that were always continuously observed in nature.
2. These species were earlier known only from fossil records.
3. Rediscovery of such species indicates gaps in biodiversity documentation.

How many of the above statements are correct?

(a) Only one

(b) Only two

(c) All three

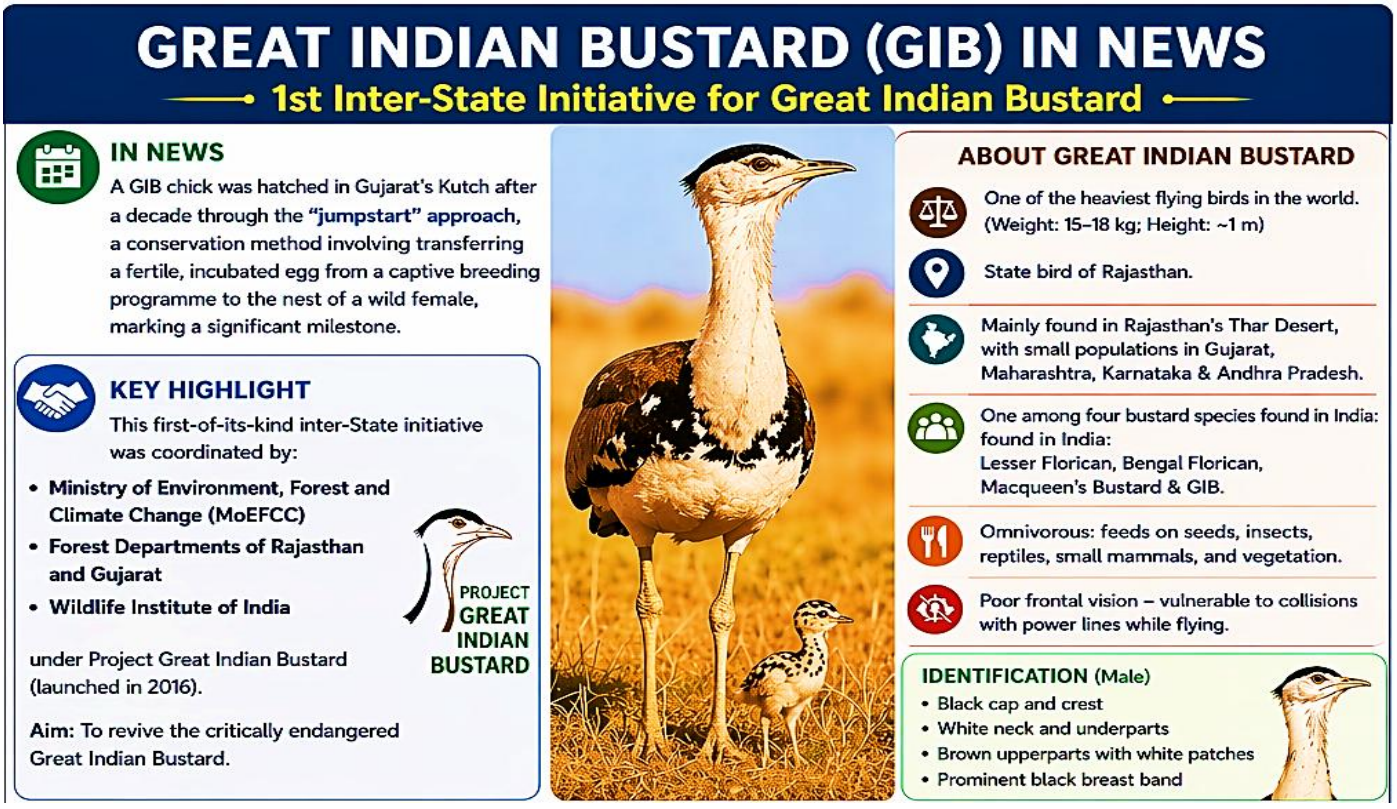
(d) None

Answer: (b)

Descriptive Question

Que. "Rediscovery of species reflects both ecological resilience and gaps in conservation efforts." Discuss in the context of biodiversity conservation. (250 words, 15 marks)

GREAT INDIAN BUSTARD (GIB)



ECOLOGICAL IMPORTANCE

- GIB acts as an **indicator species**; it reflects the health of grassland ecosystems.
- Their decline signals degradation of native grasslands.
- Large umbrella species – conservation benefits many grassland organisms.

PROTECTION STATUS

- IUCN Red List (Critically Endangered)
- CITES (Appendix I)
- Convention on Migratory Species (CMS) (Appendix I)
- Wildlife (Protection) Act, 1972 (Schedule I)

THREATS

- **Habitat loss and fragmentation** due to agriculture expansion, mining, infrastructure development, and urbanisation.
- Collisions with overhead power lines – leading cause of adult mortality.
- Predation by feral dogs, foxes and other carnivores (affects eggs/chicks).
- Human disturbance, grazing pressure, encroachment and invasive species.

CONSERVATION EFFORTS

- Covered under the **Integrated Development of Wildlife Habitats (IDWH)** scheme of MoEFCC for focused conservation.
- **Project Great Indian Bustard (2016–)** aims to:
  - Create breeding enclosures and head-starting of chicks.
  - Reduce human pressure and protect habitats.
  - Mitigate power line threats (undergrounding/bird diverters).
  - Community participation and awareness.
  - Population monitoring and research.

JUMPSTART APPROACH – HOW IT WORKS

1. A fertile, incubated egg is obtained from a captive breeding programme.
2. The egg is transferred to the nest of a wild female.
3. The wild female incubates and raises the chick in its natural habitat.

OUTCOME

Successful hatching of a GIB chick in the wild (Kutch, Gujarat) after a decade.

FOR PRELIMS – QUICK FACTS

- **Scientific Name:** *Ardeotis nigriceps*
- **Family:** Otididae
- **Habitat:** Arid and semi-arid grasslands, scrublands
- **Flight:** Strong flier but usually avoids long flights; prefers walking
- **Breeding Season:** August–September; lays 1 egg on ground in shallow scrape
- **Lifespan:** 20–25 years (estimated in wild)
- **Population:** Fewer than 200 individuals remaining in the wild (approx.)

WHY IMPORTANT FOR UPSC EXAM?

- ✓ Indicator species of grassland ecosystem
- ✓ Conservation linked with environmental governance
- ✓ Inter-state cooperation & Project-based conservation
- ✓ Protection under multiple international conventions
- ✓ Human-wildlife conflict mitigation (power line issue)

REMEMBER • GIB is India's most critically endangered bird and a flagship species for grassland conservation.

STATE BIRD: Rajasthan | IUCN STATUS: Critically Endangered | MAJOR THREAT: Power line collisions | KEY INITIATIVE: Project Great Indian Bustard (2016)

WORLD SPARROW DAY

WORLD SPARROW DAY 2026

"I LOVE SPARROWS" – PROTECT OUR LITTLE NEIGHBOURS

Observed on **20 March** every year to raise awareness about the alarming decline of the **House Sparrow** (*Passer domesticus*) and the need for its conservation.

DATE
20 March 2026

THEME 2026
"I Love Sparrows"
(Focus on public participation and awareness)

HISTORY OF WORLD SPARROW DAY

First celebrated in **2010** by the **Nature Forever Society (India)** in colaboration with international organisations.

The initiative aimed to highlight the **declining population** of sparrows.

It began in India and is now observed in **over 50 countries** worldwide.

Important Fact: In 2012, the House Sparrow was declared the **State Bird of Delhi,** emphasizing its ecological and cultural importance.

SIGNIFICANCE OF WORLD SPARROW DAY

1. **Indicator of Environmental Health**
Sparrows act as **bio-indicators.** Their decline reflects deteriorating urban ecosystems and ecological imbalance.

2. **Role in Pest Control**
They feed on insects and pests, helping maintain **natural ecological balance** and supporting agriculture.

3. **Contribution to Biodiversity**
Sparrows assist in **seed dispersal and pollination,** ensuring plant diversity.

4. **Cultural and Emotional Value**
They are deeply associated with **Indian homes, childhood memories,** and folklore.

Insight: Sparrow decline is linked to urban ecology, biodiversity loss, and sustainable development challenges.

CAUSES BEHIND THE DECLINE OF SPARROWS

1. HABITAT LOSS
Modern architecture lacks **ventilators, ledges,** and **nesting spaces,** making cities unsuitable for sparrows.

2. DECLINE IN FOOD SOURCES
- Excessive **pesticide use** reduces insects.
- Reduced **grain storage** and food waste limit feeding options.

3. POLLUTION
- **Air pollution** affects respiratory health.
- **Noise pollution** disrupts breeding and communication.

4. CLIMATE CHANGE
Alters breeding cycles and availability of food resources.

5. ELECTROMAGNETIC RADIATION (DEBATED)
Some studies suggest mobile tower radiation may affect **navigation and reproduction.**

CONSERVATION EFFORTS IN INDIA

1. 'SAVE THE SPARROW' CAMPAIGN
- Led by environmentalist **Jagat Kinkhabwala.**
- Promotes **nest boxes,** awareness campaigns, and citizen participation.

2. GOVERNMENT & PUBLIC INITIATIVES
- Supported by Prime Minister **Narendra Modi** (2017).
- Example: **MP Brij Lal** installed multiple artificial nests to support sparrow breeding.

3. COMMUNITY PARTICIPATION
- School awareness programs
- Urban biodiversity campaigns
- NGO-led conservation drives
- Citizen science and reporting of sparrow sightings

HOW TO SAVE SPARROWS – PRACTICAL STEPS

Install **nest boxes** in homes and balconies.

Provide **grains and water bowls,** especially in summer.

Avoid **chemical pesticides.**

Plant **native trees and shrubs.**

Promote **eco-friendly urban planning.**

KEY TAKEAWAY: World Sparrow Day is a reminder that small actions lead to big change. Protecting sparrows means protecting our environment and our future.

SCIENCE AND TECHNOLOGY

TB ELIMINATION STRATEGY

Why in News: India has intensified its tuberculosis elimination efforts through a **100-day campaign featuring AI-based screening and nutrition support** after missing the 2025 target.

Key Details

- Government launched a **100-day intensified TB elimination campaign** targeting high-risk populations.
- Use of **AI-enabled handheld X-ray devices** for early detection, including asymptomatic cases.
- Focus on **1.58 lakh high-risk villages/wards and vulnerable groups** such as slum dwellers, prisoners, and patients with comorbidities.
- Introduction of **₹1000 nutrition support within 15 days** to reduce early mortality.

Tuberculosis Burden in India

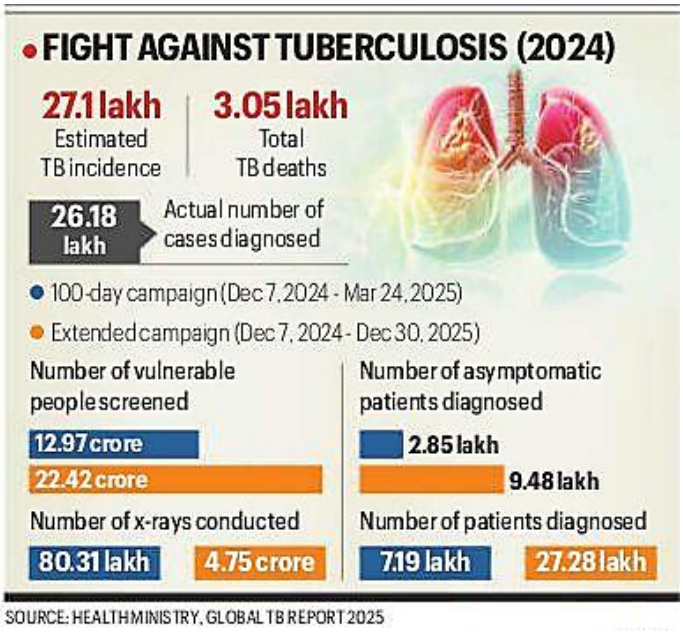
- **High Disease Burden:** India accounts for the **largest share of global TB cases**, with around **27.1 lakh estimated cases (2024)**, making it a major public health concern.
- **Mortality and Detection Gap:** Approximately **3.05 lakh deaths annually** indicate gaps in early diagnosis and treatment adherence despite **26.18 lakh reported cases**.
- **Socio-economic Linkages:** TB is closely associated with **poverty, malnutrition, overcrowding, and poor sanitation**, making it both a medical and developmental issue.
- **Vulnerable Populations:** High-risk groups include **HIV patients, diabetics, smokers, migrant workers, and slum dwellers**, highlighting the need for targeted interventions.

Government Strategy: 100-Day TB Elimination Campaign

- **Targeted Screening Approach:** The campaign focuses on **1.58 lakh high-risk areas**, identified using parameters like TB incidence, malnutrition, and population density.
- **Mass Screening Drive:** Screening of **over 22 crore vulnerable individuals** is planned, aiming to detect hidden and asymptomatic TB cases.
- **Focus on Early Detection:** Early diagnosis is prioritised as most TB deaths occur within the **first two months of infection**.
- **Integration with Existing Programmes:** The campaign builds on the **National TB Elimination Programme (NTEP)**, strengthening last-mile delivery.

Role of Technology: AI in Public Health

- **AI-enabled X-ray Devices:** Around **2,000 handheld AI-powered X-ray machines** are deployed to detect TB within seconds, even before symptoms appear.
- **Detection of Asymptomatic Cases:** AI tools identified nearly **9.48 lakh asymptomatic TB cases**, improving early intervention and reducing transmission.
- **Efficiency and Accessibility:** Portable devices enable screening in **remote areas, slums, and mobile camps**, bridging healthcare access gaps.
- **Digital Health Integration:** Use of **SMS reminders and digital tracking** ensures better treatment adherence and monitoring.



SOURCE: HEALTH MINISTRY, GLOBAL TB REPORT 2025

Nutritional and Social Support Measures

- **Direct Benefit Transfer (DBT):** Provision of **₹1000 nutritional support within 15 days** addresses malnutrition, a key factor in TB mortality.
- **Holistic Patient Care:** Focus on **personalised care**, including follow-ups, counselling, and adherence support.
- **Addressing Malnutrition-TB Nexus:** Malnutrition weakens immunity, increasing TB risk; hence, nutrition support is critical for recovery.
- **Link with Welfare Schemes:** Integration with schemes like **food security and health insurance** enhances treatment outcomes.

Challenges in TB Elimination

- **Missed 2025 Target:** India's goal to eliminate TB by 2025 (ahead of global SDG target 2030) remains unmet due to structural constraints.
- **Underreporting and Stigma:** Social stigma and lack of awareness lead to **delayed diagnosis and hidden cases**.
- **Drug Resistance:** Rising cases of **Multi-Drug Resistant TB (MDR-TB)** complicate treatment and increase costs.
- **Health System Gaps:** Issues like **limited infrastructure, workforce shortages, and uneven healthcare access** hinder progress.

Global and Policy Context

- **SDG Target 3.3:** Aims to end TB epidemic by **2030**, requiring accelerated national efforts.
- **WHO End TB Strategy:** Focuses on **early detection, universal drug access, and social protection measures**.
- **India's Leadership Role:** India's progress is crucial globally, as it contributes significantly to global TB burden.
- **Jan Andolan Approach:** Government promotes TB elimination as a **people's movement**, involving communities and civil society.

Conclusion

India's renewed push through technology, targeted screening, and nutritional support reflects a **multi-dimensional strategy** to combat tuberculosis. However, achieving elimination requires **strengthening primary healthcare, reducing stigma, ensuring treatment adherence, and addressing socio-economic determinants**. A combination of **policy commitment, technological innovation, and community participation** is essential to transform TB elimination into a successful public health mission.

EXPECTED QUESTIONS FOR UPSC CSE

Prelims MCQ

Que. Consider the following regarding Tuberculosis in India:

1. It is caused by a bacterial infection.
2. Malnutrition is a risk factor.
3. AI-based tools are being used for early detection.

Which of the statements is/are correct?

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

Answer: (d)

Descriptive Question

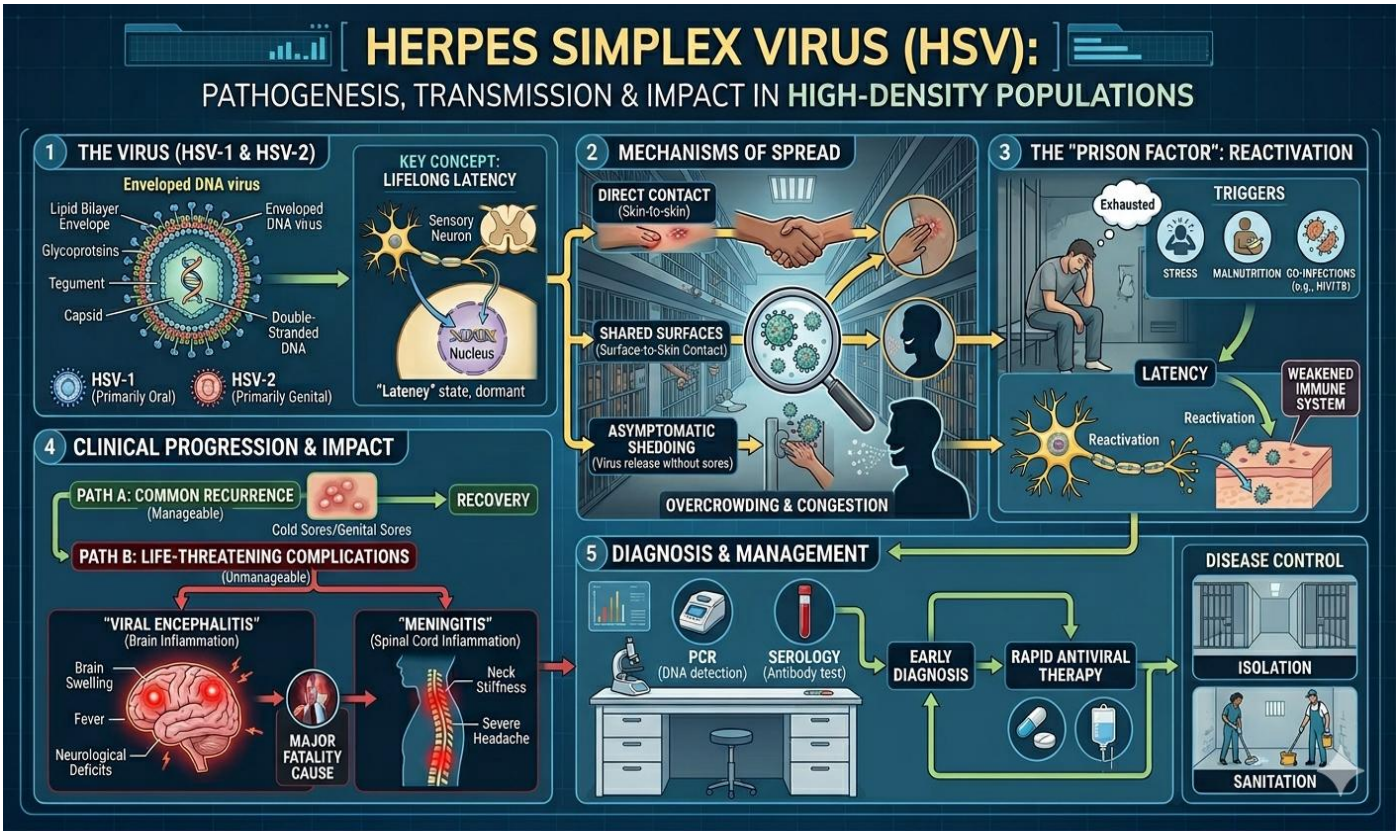
Que. Examine the role of targeted public health interventions in controlling communicable diseases in India with reference to tuberculosis. (150 Words, 10 Marks)

PRISON OUTBREAK

Why in news: India's prison health crisis is in news due to the **HSV outbreak in Jalpaiguri jail causing deaths**, exposing overcrowding, poor healthcare infrastructure, and urgent need for systemic prison and judicial reform

Key Details

- Severe **public health crisis** in prisons due to overcrowding and poor infrastructure
- **HSV outbreak in Jalpaiguri jail** (92 infected, 7 deaths) highlights neglect
- High disease burden: **TB (5x risk), HIV, skin infections, COVID outbreaks**
- Acute shortage of healthcare staff (**43% vacancy, very few psychologists**)
- Overcrowding driven by **large undertrial population and systemic delays**



Public Health Crisis in Prisons

- Indian prisons suffer from **poor infrastructure and delayed medical care**
- Despite legal recognition of the **right to health**, conditions remain inadequate
- Example: **Jalpaiguri Central Correctional Home outbreak (2025–26)**
  - ✓ ~92 inmates infected with **Herpes Simplex Virus (HSV)**
  - ✓ 7 deaths reported

- Overcrowding (e.g., **171% occupancy**) worsens **hygiene and disease control**
- HSV can turn fatal (encephalitis) in **immunocompromised and overcrowded conditions**

Extent of Overcrowding and Disease Burden

- Many prisons operate far beyond capacity:
  - ✓ **West Bengal prisons >160% occupancy**
  - ✓ **Kandi Sub-Jail exceeding 400% historically**
- Health issues linked to congestion:
  - ✓ **Skin diseases** (Kerala prisons, 30% inmates affected)
  - ✓ **Tuberculosis (TB)** risk 5 times higher than general population
- Poor ventilation accelerates spread of diseases like **TB and COVID-19**
- Major outbreaks recorded in **Nagpur and Indore central jails**

Systemic Gaps in Prison Healthcare

- Higher prevalence of **HIV** due to poor screening and unsafe practices
- Lack of **mandatory medical screening** at entry
- Severe shortage of healthcare staff:
  - ✓ **43% vacancy of medical officers**
  - ✓ Inmate-to-doctor ratio **2.6 times higher than recommended**
  - ✓ Only **25 psychologists for 5.7 lakh inmates**
- Weak implementation of **Model Prison Manual standards**

Solutions and Way Forward

- Integrate prisons into the **National Health Mission**
- Ensure **regular screening, trained staff, and outbreak management systems**
- Address overcrowding through:
  - ✓ **Fast-tracking undertrial cases**
  - ✓ Expanding **bail and non-custodial measures**
  - ✓ **Repatriation of foreign inmates**
- Example: **West Bengal (2020)** temporarily released undertrials to ease congestion
- Holistic reform needed combining **healthcare, judicial efficiency, and prison management**

Conclusion

The crisis in India's prisons underscores a serious gap between constitutional rights and ground realities. **Overcrowding, inadequate healthcare**, and staff shortages have turned prisons into disease hotspots. Addressing this requires integrating prisons into **public health systems,** improving medical infrastructure, and reducing inmate populations through judicial reforms. Ensuring dignity and health of prisoners is essential for a humane and just society.

BIOECONOMY & FOOD SECURITY

Why in News: Biotechnology is emerging as a transformative force in **agriculture, aquaculture, and animal sciences**, strengthening India's bioeconomy and food systems.

Key Details

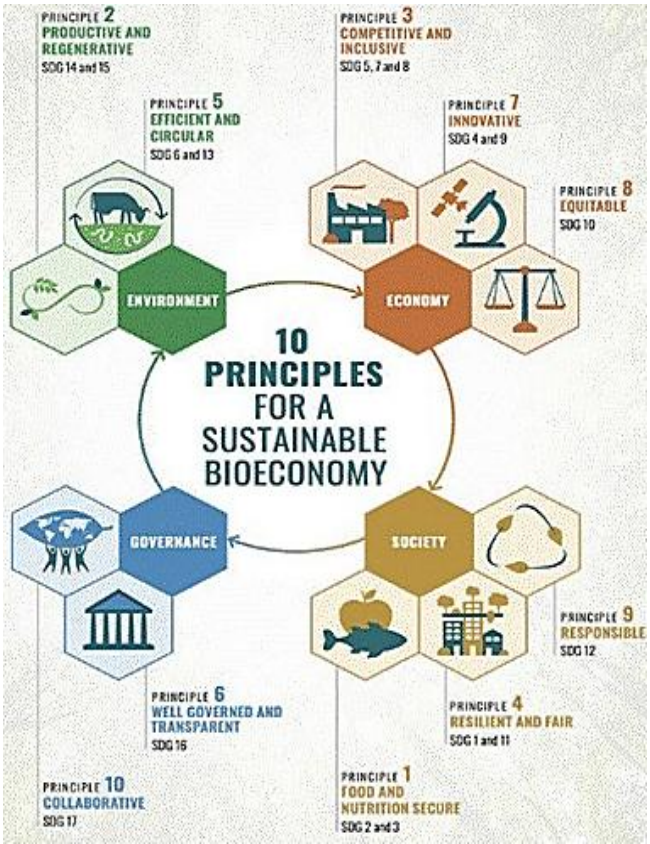
- India's bioeconomy has grown from **$10 billion (2014) to $165.7 billion (2024)**, contributing **4.25% to GDP**.
- The sector is driven by innovations like **gene editing, genomics, and biopharma advancements**.
- Biotechnology is improving **crop productivity, animal nutrition, and aquaculture efficiency**.
- India targets a **$300 billion bioeconomy by 2030**.

Bioeconomy: Concept & Significance

- **Definition and Scope:** The bioeconomy refers to the use of **renewable biological resources** to produce food, energy, and industrial goods, ensuring sustainability and economic growth.
- **Integration with Technology:** Modern bioeconomy integrates **biotechnology with AI, genomics, and circular economy principles**, enhancing efficiency and reducing waste.
- **Environmental Sustainability:** It reduces reliance on fossil fuels and promotes **eco-friendly alternatives**, helping address climate change and biodiversity loss.
- **Global Relevance:** Countries are investing heavily in bioeconomy to ensure **food security, health resilience, and green growth**, making it a key global development driver.

India's Bioeconomy Growth Story

- **Rapid Expansion:** India's bioeconomy has expanded **16 times in a decade**, reaching **$165.7 billion in 2024**, reflecting strong policy and innovation support.

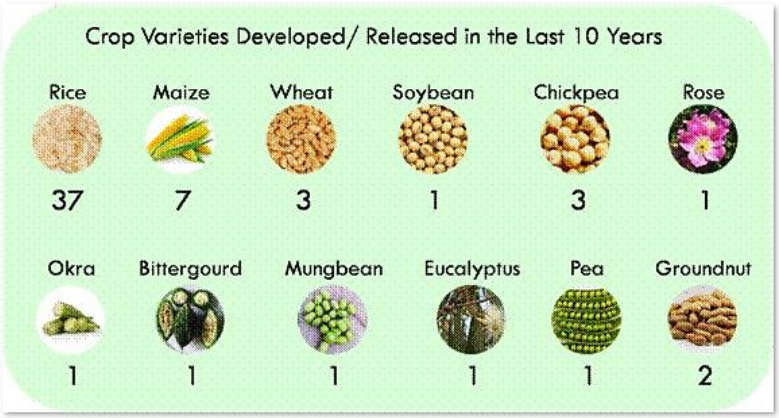


- **Sectoral Composition:** It includes **Biopharmaceuticals (vaccines, therapeutics), Bio-agriculture, Bio-IT, and Bio-services**, ensuring diversified growth.

- **Global Position:** India is among the **Top 12 biotech destinations globally** and **3rd in Asia-Pacific**, supported by skilled manpower and research ecosystem.
- **Future Targets:** The government aims to achieve a **$300 billion bioeconomy by 2030**, with leadership in vaccines, diagnostics, and therapeutics.

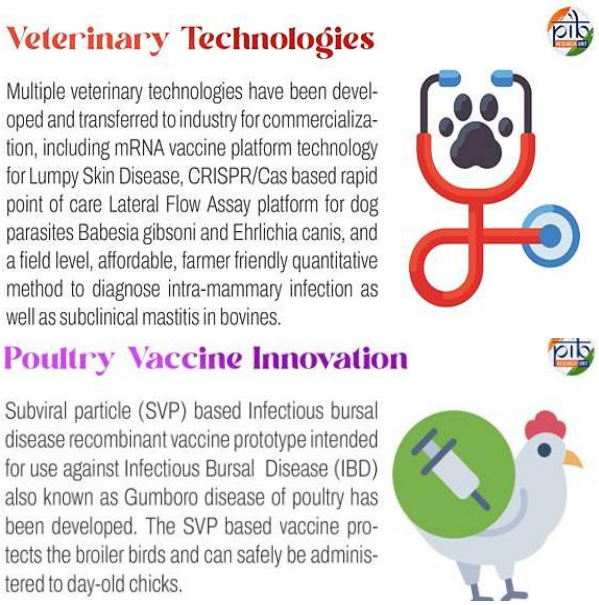
Biotechnology in Agriculture

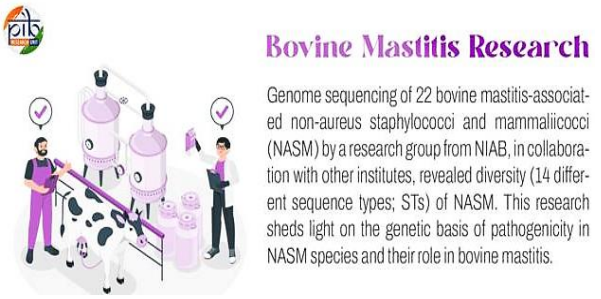
- **Climate-Smart Crops:** Development of drought-tolerant varieties like **"SAATVIK (NC 9)" chickpea** enhances resilience against climate change and ensures stable yields.
- **Genome Editing (CRISPR Technology):** Genome editing is used to improve crops like rice by modifying genes that limit productivity, boosting **yield and disease resistance**.
- **Nutritional Enhancement:** Tools like **NIRS and SNP chips** for crops like amaranth improve nutritional profiling, contributing to tackling **malnutrition and lifestyle diseases**.
- **Biocontrol Methods:** Eco-friendly innovations like fungal nano-formulations reduce dependence on chemical pesticides, promoting **sustainable agriculture**.
- **Farmer Safety Innovations:** Technologies like **Kisan-Kavach** protect farmers from pesticide exposure, addressing occupational health concerns.



Animal Biotechnology

- **Livelihood Importance:** India has the **largest livestock population**, support
- ing livelihoods of **over two-thirds of rural households**, making animal biotechnology crucial.
- **Disease Management:** Biotechnology enables development of vaccines, diagnostics, and genetic improvements to enhance **animal health and productivity**.
- **Improved Nutrition:** Research in feed optimization enhances **milk yield, meat quality, and overall livestock efficiency**, supporting nutritional security.
- **Genetic Advancements:** Use of genomics helps in breeding **high-yield and disease-resistant livestock**, ensuring sustainable rural economy growth.





Aquaculture & Marine Biotechnology

- **Rising Demand for Protein:** Aquaculture meets increasing demand for affordable protein, especially fish, which is vital for **nutritional security**.
- **Innovations in Fish Feed:** Replacement of fish meal with alternative ingredients reduces cost and ensures **sustainability in aquaculture practices**.
- **Disease Prevention:** Technologies like **CIFA-Brood-Vac vaccine** prevent fish mortality, improving productivity and farmer income.
- **Digital Tools:** Software like **Interactive Fish Feed Designer (IFFD)** helps farmers formulate cost-effective and efficient fish feed.

Challenges in India's Biotechnology Sector

- **Fragmented Infrastructure:** Despite having **70+ incubators**, lack of integrated facilities increases costs and reduces efficiency for startups.
- **Regulatory Bottlenecks:** Complex and outdated regulations in **clinical trials, patents, and approvals** delay innovation and market entry.
- **Technological Gaps:** India lags in advanced areas like **AI integration, biologics, and genomics**, affecting global competitiveness.

- **Investment Constraints:** Regulatory uncertainty and long gestation periods deter private investment in high-risk biotech ventures.

Way Forward

- **Strengthening Infrastructure:** Develop integrated biotech hubs with **end-to-end facilities**, including research, testing, and commercialization support.
- **Regulatory Reforms:** Simplify and modernize regulatory frameworks to ensure **faster approvals and innovation-friendly policies**.
- **Public-Private Partnerships (PPP):** Encourage collaboration between government, academia, and industry for **research and commercialization**.
- **Focus on R&D Investment:** Increase funding in **genomics, AI-based biotech, and precision agriculture** to boost global competitiveness.
- **Skill Development:** Promote biotech education and training to create a **skilled workforce for future industries**.

Conclusion

The biotechnology sector is playing a critical role in enhancing **human and animal nutrition, agricultural productivity, and environmental sustainability**. With strong policy support and innovation, India's bioeconomy has the potential to become a **global leader**, ensuring food security, economic growth, and sustainable development.

EXPECTED QUESTIONS FOR UPSC CSE

Prelims MCQ

Que. Which of the following best describes "bioeconomy"?

(a) Use of fossil fuels for industrial growth

(b) Use of renewable biological resources for sustainable production

(c) Import-based agricultural system

(d) Traditional farming practices

Answer: (b)

Descriptive Question

Que. Discuss the role of biotechnology in enhancing food and nutritional security in India. Highlight challenges and suggest reforms. (150 Words, 10 Marks)

GAGANYAAN MISSION

Why in News: India's **Gaganyaan Mission** is progressing towards its first **manned spaceflight before 2026**, placing India among elite human spaceflight nations.

Key Details

- Gaganyaan aims to send a **3-member crew to Low Earth Orbit (400 km) for 3 days** and ensure safe return.
- The mission includes **two unmanned and one manned mission** approved by the Government of India.
- It uses **human-rated LVM3 rocket** and advanced safety systems like **Crew Escape System (CES)**.
- The mission promotes **microgravity research, technological advancement, and global collaboration**.

Human Spaceflight Programme

- **India's First Human Space Mission:** Gaganyaan is India's first attempt to send humans into space, marking a transition from **satellite launches to crewed missions**.
- **Low Earth Orbit (LEO) Mission:** The mission targets an altitude of **~400 km**, similar to the **International Space Station (ISS)** orbit range.
- **Elite Club Membership:** Success will place India alongside **USA, Russia, and China**, the only countries with human spaceflight capability.
- **Institutional Collaboration:** Led by Indian Space Research Organisation, with support from DRDO, IAF, academia, and private industry.

Key Technologies & Systems

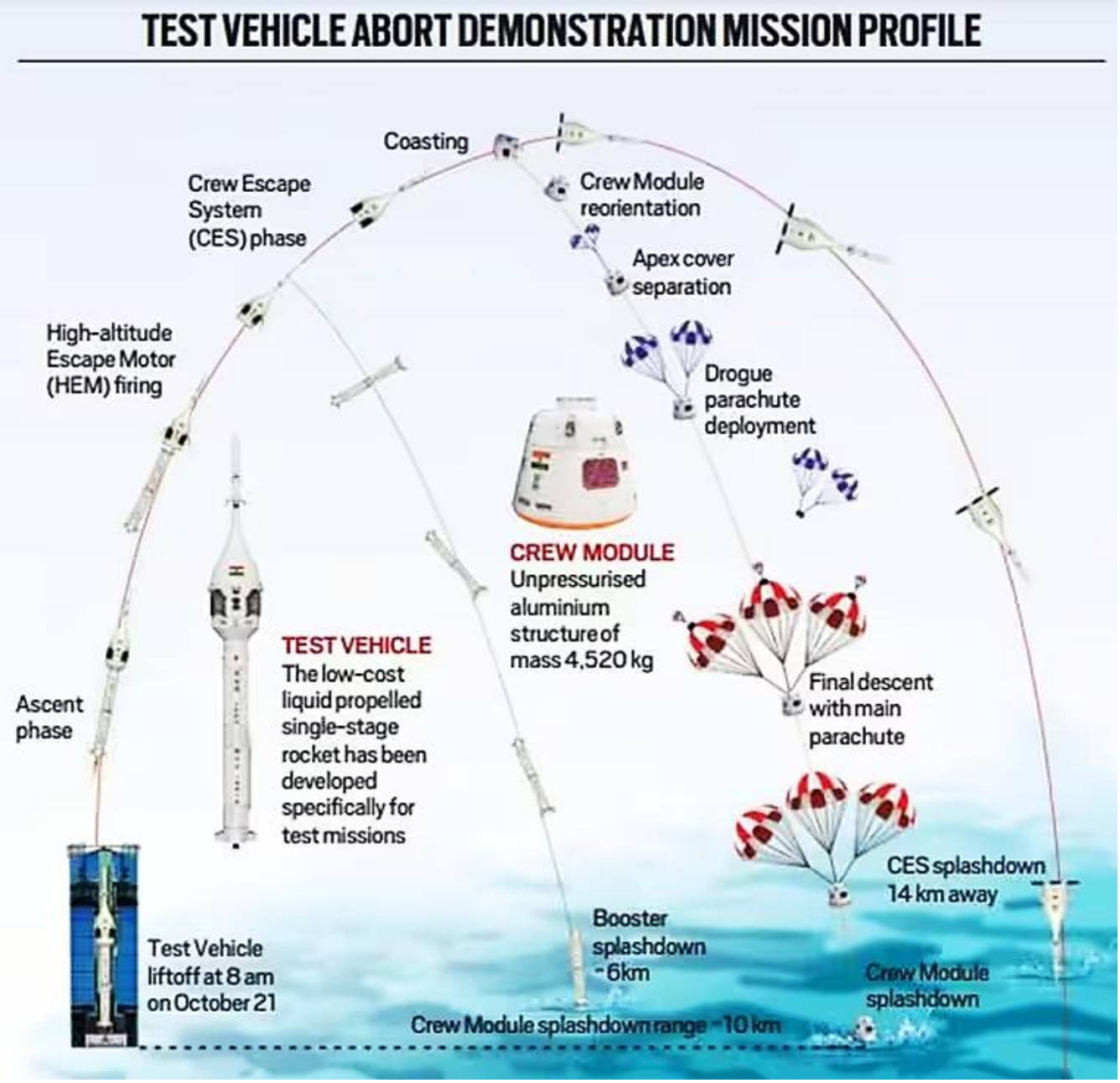
- **Human-Rated LVM3 Rocket:** Modified version of GSLV Mk III, designed with enhanced **reliability, redundancy, and safety margins** for human travel.
- **Orbital Module (Crew + Service):** Includes **Crew Module (habitable)** and **Service Module (support systems)** ensuring life support, propulsion, and control.
- **Thermal Protection System (TPS):** Protects the crew module during **re-entry at temperatures above 1500°C**, ensuring safe landing.
- **Crew Escape System (CES):** Allows astronauts to safely exit the rocket during emergencies, tested via **TV-D1 abort mission (2023)**.

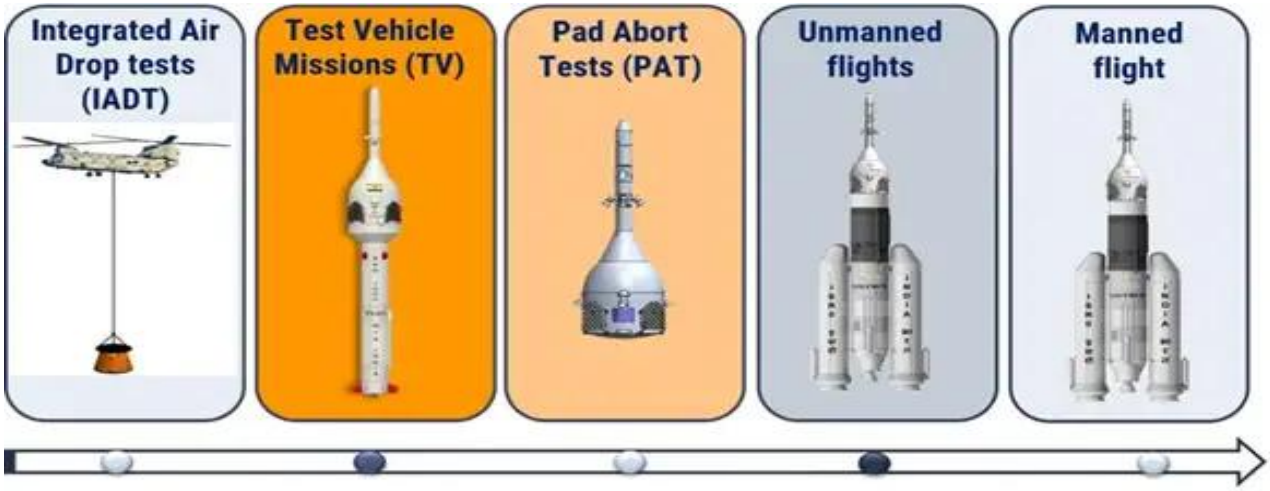
Astronaut Training & Crew Preparedness

- **Training Facility in Bengaluru:** Astronauts undergo **physical, psychological, and simulator training** for mission readiness.
- **Microgravity Familiarisation:** Training includes **parabolic flights** to simulate zero-gravity conditions for operational adaptation.
- **Survival & Recovery Training:** Conducted with Indian Navy for **sea landing recovery operations**, ensuring post-mission safety.
- **International Cooperation:** Initial astronaut training involved collaboration with **Russian space agency (Roscosmos)**.

Microgravity Research & Scientific Potential

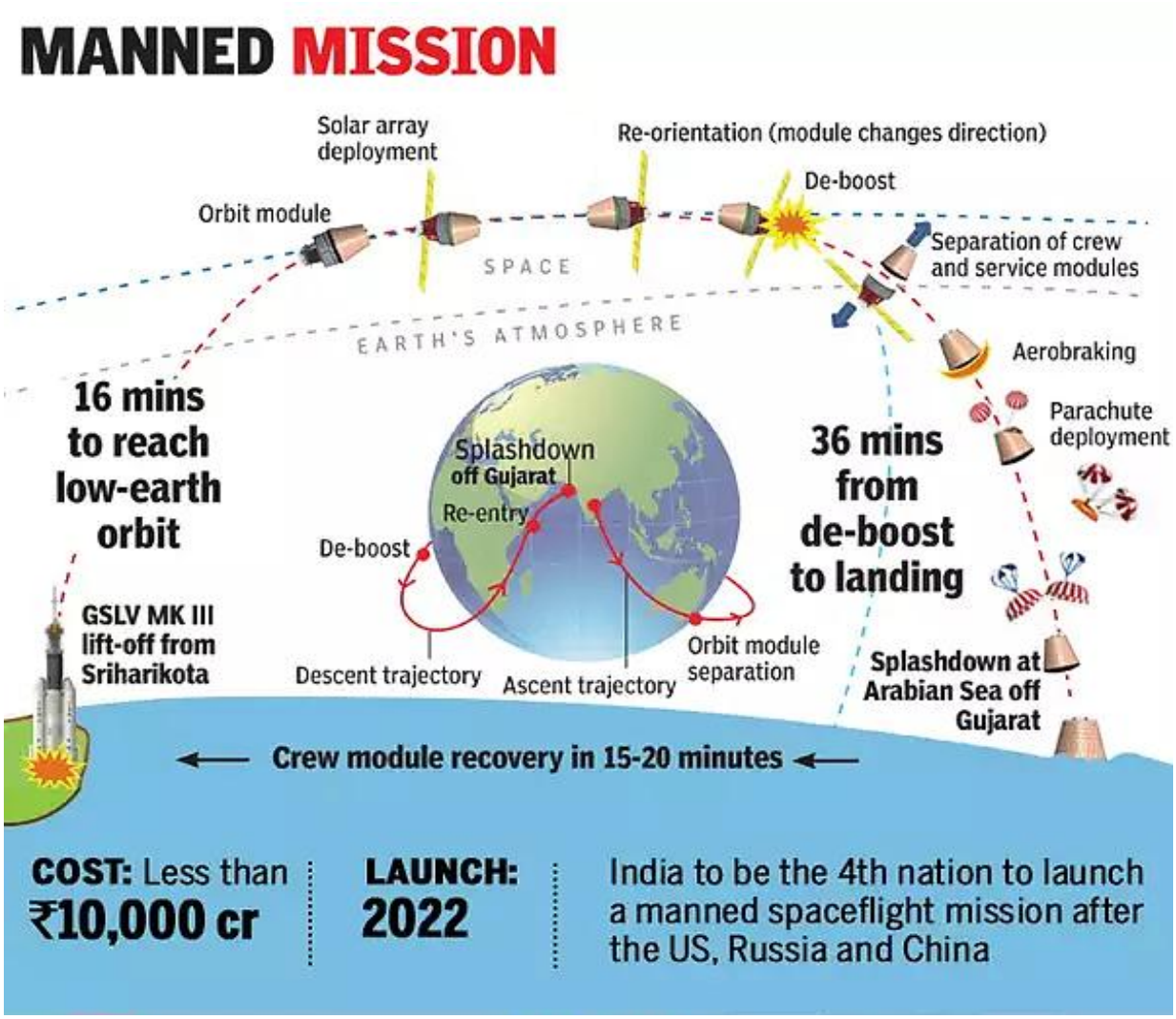
- **Definition & Importance:** Microgravity refers to near-zero gravity conditions enabling **unique scientific experiments** not possible on Earth.
- **Applications in Medicine:** Research can help in **drug development, bone density studies, and cancer research**.
- **Material Science Innovations:** Enables development of **advanced alloys, semiconductors, and nanomaterials**.
- **ISRO's Initiative:** ISRO has invited proposals from academia for **microgravity experiments**, promoting scientific ecosystem growth.





Phases of Gaganyaan Mission

- **Testing Phase:** Includes **Pad Abort Test (PAT), Integrated Air Drop Test (IADT)** to validate safety systems.
- **Unmanned Missions:** Designed to test systems using instruments and humanoid robot **Vyommitra**.
- **Manned Mission:** Final stage involving **3 astronauts for 3 days in orbit**, followed by safe splashdown in sea.
- **Recovery Operations:** Coordinated with Indian Navy for **crew retrieval**, tested via Water Survival Test Facility (WSTF).



Significance of Gaganyaan Mission

- **Technological Advancement:** Boosts indigenous capability in **aerospace engineering, robotics, AI, and materials science**.
- **Strategic & Diplomatic Value:** Enhances India's **global standing and space diplomacy**, enabling partnerships with NASA, ESA, etc.
- **Economic Impact:** Promotes **space startups, private sector participation, and job creation** in high-tech industries.
- **Inspiration for Youth:** Encourages students towards **STEM education and innovation**, similar to ISRO's earlier missions like Chandrayaan-3.

Challenges in Human Spaceflight

- **Crew Safety Risks:** Exposure to **radiation, microgravity health issues, and psychological stress** remains a major concern.
- **Technological Complexity:** Requires advanced systems for **life support, navigation, and emergency handling**.
- **High Cost & Resource Requirement:** Human missions are significantly costlier than unmanned missions.
- **Limited Infrastructure:** India is still developing **advanced simulation and testing facilities** domestically.

India's Space Ecosystem & Global Context

- **Comparison with Global Missions:** Missions like Apollo Program and China's Shenzhou Program set benchmarks.
- **Private Sector Role:** Startups like Skyroot and Agnikul are strengthening India's **space economy ecosystem**.
- **Future Roadmap:** Includes **space station (Bharatiya Antariksh Station) and interplanetary missions**.

Way Forward

- Strengthen **indigenous R&D and testing infrastructure** to reduce external dependency.
- Promote **public-private partnerships** in space technology and innovation.
- Expand **microgravity research collaboration** with global institutions.
- Ensure **robust safety protocols and astronaut health monitoring systems**.
- Develop long-term roadmap for **space station and deep space missions**.

Conclusion

The Gaganyaan Mission represents a **technological, strategic, and scientific milestone** for India. Beyond human spaceflight, it symbolizes India's transition into a **global space power**, fostering innovation, economic growth, and scientific discovery. Its success will redefine India's role in the **new space era**.

EXPECTED QUESTIONS FOR UPSC CSE

Prelims MCQ

Que . Consider the following space missions:

1. Axiom-4
2. SpaDex

3. Gaganyaan

How many of the above encourage microgravity research?

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

Answer: (c)

Descriptive Questions

Que. Discuss the significance of the Gaganyaan Mission in enhancing India's technological and strategic capabilities. (150 Words, 10 Marks)

LIGO-India's First Gravitational Wave Observatory

Why in News: India's **LIGO-India project in Hingoli, Maharashtra** is facing implementation delays despite a target of completion by **2030**.

Key Details

- LIGO-India will be **India's first gravitational wave observatory**, part of a global detection network.
- It will become the **5th node** after LIGO (USA), Virgo (Italy), and KAGRA (Japan).
- The project is led by **Department of Atomic Energy (DAE)** and **Department of Science & Technology (DST)**.
- Delays in land acquisition, infrastructure, and coordination have raised concerns about timelines.

What is LIGO-India

- **Global Scientific Collaboration:** LIGO-India is part of the international gravitational-wave network including detectors in the USA, Italy, and Japan. This collaboration enhances **global scientific cooperation and data sharing**.
- **Strategic Location in India:** The observatory is being constructed in **Hingoli district of Maharashtra**, chosen for its **low seismic noise and minimal human disturbance**, essential for precise measurements.
- **Institutional Framework:** The project is jointly led by **DAE and DST**, with support from institutions like the Inter-University Centre for Astronomy and Astrophysics, strengthening India's academic ecosystem.
- **Timeline and Cost:** Approved in **2023 with an estimated cost of ~₹2,600 crore**, the project aims for completion by **2030**, though delays may affect scientific timelines.

Gravitational Waves: Concept & Science

- **Einstein's Prediction:** Gravitational waves were predicted in **1915 under the General Theory of Relativity**, describing them as **ripples in spacetime caused by massive accelerating bodies**.
- **First Detection (2015):** The first direct detection by LIGO Scientific Collaboration confirmed Einstein's theory, observing waves from **merging black holes ~1.3 billion light-years away**.
- **Nature of Waves:** These waves travel at the **speed of light** and distort spacetime in a **quadrupole pattern**, alternately stretching and compressing distances.
- **Different from Electromagnetic Waves:** Unlike light or radio waves, gravitational waves arise from **gravitational field changes**, making them a **new window to observe the universe**.

Technical Features of LIGO-India

- **Interferometer Design:** The observatory will have **two 4-km long arms placed at 90°**, forming a giant L-shaped interferometer.
- **Laser-Based Detection:** Laser beams travel through vacuum tunnels and reflect between mirrors; any **minute change in distance (~10^{-21})** due to gravitational waves is detected.
- **Ultra-sensitive Technology:** The system requires **high vacuum, seismic isolation, and precision mirrors**, making it one of the most sensitive scientific instruments ever built.
- **Global Network Integration:** Data from LIGO-India will integrate with global detectors, improving **accuracy and reliability of gravitational wave detection**.

Scientific Objectives & Significance

- **Improved Sky Localization:** Adding a detector in India enhances the ability to **pinpoint cosmic events**, especially in the **southern hemisphere**.
- **Better Detection Sensitivity:** A larger network increases **signal strength and detection probability**, enabling study of more distant cosmic events.
- **Understanding Cosmic Phenomena:** Helps study **black hole mergers, neutron stars, supernovae**, and early universe events not visible through traditional telescopes.
- **Multi-Messenger Astronomy:** Combines gravitational wave data with electromagnetic observations, advancing a **holistic understanding of the universe**.

Challenges and Delays

- **Land Acquisition & Infrastructure:** Delays in securing land and developing infrastructure in Hingoli have slowed project progress.
- **Technical Complexity:** Building ultra-sensitive detectors requires **precision engineering and international coordination**, causing time overruns.
- **Financial and Administrative Bottlenecks:** Large-scale scientific projects often face **funding delays and bureaucratic hurdles**.
- **Global Competition:** Delay may reduce India's opportunity to contribute to **early breakthroughs in gravitational wave astronomy**.

Relevance for India

- **Scientific Advancement:** Positions India as a leader in **cutting-edge space science and astrophysics**.
- **Capacity Building:** Encourages development of **high-tech industries, skilled manpower, and research infrastructure**.
- **Global Prestige:** Strengthens India's role in **international scientific collaborations**.

- **Policy Linkages:** Aligns with initiatives like **National Education Policy (NEP) 2020** and **Atmanirbhar Bharat in science & technology**.

Way Forward

- **Fast-track implementation** through better coordination between central and state agencies.
- Strengthen **public funding and institutional support** for large-scale research projects.
- Enhance **international collaboration** for technology transfer and expertise.
- Promote **STEM education and research ecosystem** to maximise long-term benefits.

Conclusion

LIGO-India represents a transformative step in India's scientific journey, bridging **theoretical physics and advanced technology**. Despite delays, its successful completion will not only enhance our understanding of the universe but also establish India as a **key player in global scientific research**.

EXPECTED QUESTIONS FOR UPSC CSE

Prelims MCQ

Que. With reference to gravitational waves, consider the following:

1. They were predicted by Einstein's General Theory of Relativity
2. They travel faster than light
3. They are part of the electromagnetic spectrum

Which of the above is/are correct?

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

Answer: (a)

Descriptive Question

Que. Discuss the significance of the LIGO-India project in advancing India's scientific capabilities and global collaboration in space science. (250 Words, 15 Marks)

AI SOVEREIGNTY & LLMS

Why in News: At the **India-AI Impact Summit 2026**, **Sarvam AI** unveiled indigenous, compute-efficient Large Language Models (LLMs) optimized for Indian languages.

Key Details

- India is developing **indigenous LLMs** to reduce dependence on global AI systems and enhance **digital sovereignty**.
- New architectures like **Mixture of Experts (MoE)** improve **efficiency and cost-effectiveness** in AI deployment.
- Challenges persist in **Indian language datasets, high compute costs, and limited commercial use cases**.
- The **IndiaAI Mission** aims to build a **full-stack AI ecosystem** with strong compute and talent support.

Large Language Models (LLMs): Concept & Architecture

- **Definition & Transformer Architecture:** LLMs are AI systems based on the **Transformer model**, using self-attention to process large-scale text data and generate human-like responses. This architecture enables contextual understanding and scalability.
- **Deep Learning & Data Dependence:** LLM performance depends on **massive datasets and training quality**, including books, code, and web data. High-quality data improves reasoning, accuracy, and linguistic fluency.
- **Capabilities:** LLMs can perform tasks like **translation, summarisation, coding, and question answering**, making them central to sectors like governance, education, and healthcare.
- **Global Context:** Advanced models (e.g., GPT-like systems) have **hundreds of billions of parameters**, highlighting the scale of computation required.

Stages of LLM Training

- **Data Collection & Pre-processing:** Data is sourced from **internet, books, Wikipedia, and code repositories**, then converted into tokens. Cleaning removes bias, duplication, and harmful content to ensure reliability.
- **Pre-training (Self-Supervised Learning):** Models learn through **next-token prediction**, building understanding of grammar, facts, and reasoning. This stage produces a **base model** but lacks instruction-following ability.
- **Supervised Fine-Tuning (Instruction Tuning):** Human-labelled datasets train models to respond accurately to prompts. This enables **conversation, summarisation, and domain-specific tasks**.
- **Alignment (RLHF – Reinforcement Learning from Human Feedback):** Human evaluators rank outputs, creating a reward system that improves **safety, ethics, and usefulness**, reducing bias and harmful responses.

Technological Advancements – Efficiency in LLMs

- **Mixture of Experts (MoE) Architecture:** Unlike traditional models, MoE activates only a subset of parameters per query, improving **speed, efficiency, and reducing computational cost**.
- **Compute Efficiency:** Earlier models activated all parameters, making them resource-intensive. MoE reduces energy consumption, supporting **green AI initiatives**.
- **Indian Innovations:** Models like **Sarvam AI's 105B parameter LLM** and **BharatGen** 17B model focus on **multilingual capabilities and efficiency**.
- **Sectoral Applications:** Efficient models enable deployment in **education, agriculture advisories, healthcare diagnostics, and governance services**.

India's AI Ecosystem – Policy & Institutional Framework

- **IndiaAI Mission (2024):** With an outlay of **₹10,372 crore**, it aims to build a **complete AI ecosystem**, including infrastructure, research, and innovation.
- **Compute Infrastructure:** Over **36,000 GPUs commissioned + 20,000 added**, targeting **1 lakh GPUs by 2026**, addressing compute scarcity.

- **Startup Support:** Startups receive **subsidised compute resources**; Sarvam AI received **~₹100 crore support with 4,096 GPUs**, boosting indigenous innovation.
- **Talent Development:** Over **13,500 students trained**, with establishment of **India Data & AI Labs** to build human capital in AI.

Challenges in India's LLM Development

- **Data Scarcity in Indian Languages:** Lack of high-quality datasets in regional languages limits model accuracy, affecting inclusivity and digital access.
- **High Computational Costs:** Training LLMs requires **massive capital investment**, making entry difficult for startups and public institutions.
- **Token Inefficiency:** Translation into English increases token usage, raising costs and reducing efficiency for Indian language tasks.
- **Limited Market Monetisation:** Immediate commercial applications remain limited, affecting private sector investment and scalability.

Significance for India

- **Digital Sovereignty:** Indigenous LLMs reduce dependence on foreign AI systems, ensuring **data security and strategic autonomy**.
- **Inclusive Governance:** Multilingual AI can enhance **e-governance, public service delivery, and citizen engagement**, especially in rural areas.
- **Economic Growth:** AI is expected to contribute significantly to GDP, aligning with India's **$5 trillion economy vision**.
- **Ethical AI Development:** India can shape global norms on **responsible AI, data protection, and algorithmic fairness**.

Way Forward

- **Develop Indian Language Datasets:** Invest in large-scale, high-quality datasets across **22 scheduled languages** to improve inclusivity and accuracy.
- **Promote Public-Private Partnerships:** Collaboration between government, academia, and industry can accelerate innovation and reduce costs.
- **Strengthen AI Regulation:** Ensure ethical AI through frameworks addressing **bias, privacy, and accountability**.
- **Enhance Skilling & Research:** Expand AI education, research funding, and global collaboration to build a robust talent pipeline.

Conclusion

The development of **indigenous Large Language Models** marks a critical step towards **India's AI sovereignty and digital transformation**. With initiatives like the IndiaAI Mission and innovations in efficient architectures, India is poised to become a global AI leader. However, addressing challenges related to data, cost, and inclusivity will be essential to ensure that AI growth is **sustainable, equitable, and aligned with constitutional values**.

EXPECTED QUESTIONS FOR CSE UPSC

Prelims MCQ

Que. Which of the following best describes Large Language Models (LLMs)?

(a) Rule-based AI systems
(b) Transformer-based deep learning models trained on large datasets
(c) Quantum computing algorithms
(d) Blockchain-based systems

Answer: (b)

BRICS SCIENTIFIC COLLABORATION

Why in News: Under **India's 2026 Presidency**, BRICS is focusing on **deepening scientific collaboration** to address global challenges like digital divide, climate resilience, and technological dependency.

Key Details

- The **17th BRICS Summit in Rio de Janeiro** emphasized **science, technology, and innovation (STI)** cooperation.
- India's presidency theme highlights **Resilience, Innovation, Cooperation, and Sustainability**.
- Expanded **BRICS Plus framework** aims to strengthen **Global South cooperation**.
- Focus areas include **Artificial Intelligence, climate technology, digital health, and energy security**.

BRICS as a Platform for Scientific Cooperation

- **Emergence of Multipolar Scientific Order:** BRICS represents major emerging economies—Brazil, Russia, India, China, and South Africa—working to create a **multipolar global science ecosystem**, reducing Western dominance in research and innovation.
- **Institutional Mechanisms:** Platforms like the **New Development Bank** and BRICS STI Framework enable funding, joint research, and innovation partnerships among member countries.
- **Evolution from Basic to Applied Research:** Initially focused on academic collaboration, BRICS now emphasizes **innovation ecosystems, startups, and technology transfer**, aligning science with economic development.
- **Global South Leadership:** BRICS acts as a voice of developing countries, promoting **inclusive scientific growth** and equitable access to technology.

Need for Science & Technology Collaboration in BRICS

- **Addressing Developmental Challenges:** Collaboration helps tackle shared issues like **energy security, water scarcity, and public health**, as seen during COVID-19 with joint vaccine and digital health initiatives.
- **Reducing Technological Dependency:** BRICS countries aim to reduce reliance on Western technologies in areas like **semiconductors, AI, and biotechnology**, strengthening technological sovereignty.
- **Strengthening Economic Governance:** Coordination in STI enhances global influence in institutions like WTO and IMF, enabling BRICS to shape **rules of global digital and economic governance**.

- **Governance of Emerging Technologies:** BRICS promotes fair and inclusive frameworks for **Artificial Intelligence, data governance, and cybersecurity**, ensuring ethical and equitable use.
- **Geopolitical Resilience:** Scientific collaboration provides an alternative amid sanctions and geopolitical tensions, ensuring **continuity of innovation and supply chains**.

Key Areas of BRICS Scientific Collaboration

- **Artificial Intelligence and Digital Technologies:** Focus on **AI governance, digital public infrastructure, and data sharing**, aligning with India's experience in platforms like Aadhaar and UPI.
- **Climate Change and Sustainability:** Joint research on **renewable energy, climate adaptation, and green technologies** supports commitments under the Paris Agreement.
- **Biotechnology and Health:** Collaboration in **vaccine development, genomics, and digital health systems** enhances preparedness for future pandemics.
- **Space and Advanced Research:** Cooperation in **space technology, remote sensing, and satellite applications** supports disaster management and agriculture.
- **Agricultural Innovation:** Sharing technologies for **climate-resilient agriculture and food security** is crucial for Global South economies.

Challenges in BRICS Scientific Collaboration

- **Uneven Participation:** Engagement varies among BRICS Plus members, limiting the effectiveness of joint projects and reducing collective output.
- **Innovation and R&D Gaps:** Gross Domestic Expenditure on R&D in BRICS countries remains **lower than OECD averages**, affecting global competitiveness.
- **Diverse National Interests:** Differences in economic priorities and political systems hinder **policy coordination and joint decision-making**.
- **Infrastructure Constraints:** Lack of shared high-cost research infrastructure slows progress in areas like **mega-science and polar research**.
- **Institutional Weakness:** Absence of a permanent secretariat leads to discontinuity due to **rotating presidencies and fragmented coordination**.

India's Role in BRICS Scientific Leadership

- **Championing Digital Public Goods:** India can promote scalable solutions like **Digital Public Infrastructure (DPI)** for inclusive development across BRICS nations.
- **Bridging Global South Gaps:** India's leadership can ensure **capacity building and technology transfer** to newly inducted BRICS Plus countries.
- **Promoting Sustainable Innovation:** Focus on **green technologies, climate finance, and renewable energy** aligns with India's commitments under SDGs.
- **Norm Setting in Emerging Technologies:** India can play a key role in shaping **ethical AI frameworks and data governance standards**.

Way Forward

- **Establish Permanent Institutional Mechanism:** A central BRICS **Science and Technology Secretariat** is needed for long-term coordination and monitoring.
- **Promote Mega-Science Projects:** Joint initiatives in **space, climate science, and advanced materials** can enhance global competitiveness.
- **Strengthen Innovation Ecosystems:** Investment in **startups, research institutions, and skill development** will bridge innovation gaps.
- **Inclusive Capacity Building:** Support new BRICS Plus members through **technology sharing and financial assistance**.
- **Enhance Policy Coordination:** Develop common frameworks for **AI governance, cybersecurity, and digital economy regulations**.

Conclusion

BRICS scientific collaboration is a critical pillar for building a **multipolar, inclusive, and innovation-driven global order**. Under India's 2026 presidency, strengthening institutional frameworks, scaling collaborative projects, and promoting equitable technology access can significantly enhance the role of BRICS in addressing global challenges and reducing technological inequalities.

EXPECTED QUESTIONS FOR UPSC CSE

Prelims MCQ

Que. With reference to BRICS, consider the following statements:

1. The New Development Bank is associated with BRICS.
2. BRICS focuses only on economic cooperation and not on science and technology.
3. BRICS Plus aims to include Global South countries.

Which of the above is/are correct?

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

Answer: (c)

Descriptive Question

Que. Discuss the significance of scientific collaboration in BRICS for building a multipolar world and reducing technological dependency. (150 Words, 10 Marks)

DARK OXYGEN DISCOVERY

Why in News: Scientists have reported the presence of **"dark oxygen" in the Clarion–Clipperton Zone**, challenging traditional theories of oxygen generation.

Key Details

- "Dark oxygen" refers to **oxygen produced without sunlight or photosynthesis**, deep in oceanic environments.
- The phenomenon is linked to **polymetallic nodules** found on the seabed.
- These nodules may trigger **electrochemical reactions splitting water into hydrogen and oxygen**.
- The discovery has implications for **deep-sea ecology, astrobiology, and global mining policies**.

Dark Oxygen: Concept & Scientific Basis

- **Non-Photosynthetic Oxygen Production:** Traditionally, oxygen is produced through photosynthesis by plants and algae. Dark oxygen challenges this by showing **oxygen generation in complete absence of sunlight**, redefining biological assumptions.
- **Electrochemical Mechanism:** Scientists suggest that natural electrochemical reactions, similar to electrolysis, may split water molecules. This process produces oxygen **without requiring biological organisms**.
- **Role of Deep-Sea Environment:** Extreme conditions such as **high pressure, low temperature, and absence of light** make this discovery significant for understanding non-traditional biochemical cycles.
- **Scientific Paradigm Shift:** The concept expands the definition of oxygen cycles beyond biosphere-driven processes, introducing **geochemical pathways** into mainstream science.

Polymetallic Nodules – Natural Catalysts

- **Composition and Structure:** These nodules contain **manganese, nickel, cobalt, copper, and iron**, resembling coal-like deposits on the ocean floor.
- **Electrochemical Properties:** The metals act as **natural catalysts**, generating electric charge sufficient to drive electrolysis and release oxygen.
- **Economic Importance:** These nodules are rich in **critical minerals** essential for batteries, electric vehicles, and renewable energy technologies.

Clarion–Clipperton Zone (CCZ) – Strategic Deep-Sea Region

- **Geographical Location:** Situated between Hawaii and Mexico in the Pacific Ocean, it is one of the **largest deep-sea mineral zones globally**.
- **Mineral Wealth:** Contains vast reserves of polymetallic nodules, making it a hotspot for future resource extraction.
- **Governance Mechanism:** Exploration is regulated by the International Seabed Authority under UNCLOS.
- **Ecological Importance:** The region hosts **fragile and poorly understood ecosystems**, with species adapted to extreme environments.

Scientific Significance of the Discovery

- **Revision of Oxygen Cycle Theory:** It challenges the long-held belief that oxygen production is solely dependent on photosynthesis, adding **abiotic processes** to the cycle.
- **Deep-Sea Ecology:** Availability of oxygen in deep oceans may support **previously unknown life forms**, altering marine biodiversity understanding.
- **Astrobiological Implications:** Suggests that oxygen could exist on planets without sunlight, influencing the search for life beyond Earth.
- **Technological Insights:** Natural electrochemical processes may inspire **innovative energy and environmental technologies.**

Environmental Concerns & Deep-Sea Mining Debate

- **Threat to Marine Ecosystems:** Mining polymetallic nodules could disrupt fragile habitats and destroy species not yet studied.
- **Loss of Unknown Ecological Functions:** If nodules contribute to oxygen generation, their removal may affect **deep-sea oxygen balance**.
- **Global Governance Issues:** There is increasing debate on whether commercial mining should proceed without **adequate environmental safeguards**.
- **India's Perspective:** India, with deep-sea exploration initiatives, must balance **resource security with ecological sustainability**.

Way Forward

- **Strengthening Deep-Sea Research:** Promote international collaboration and advanced oceanographic research to better understand deep-sea processes.
- **Precautionary Mining Approach:** Adopt strict environmental impact assessments before allowing large-scale mining in sensitive zones.
- **Global Regulatory Framework:** Strengthen the role of international institutions to ensure **equitable and sustainable resource use**.
- **Integration with Climate and Biodiversity Goals:** Align deep-sea activities with global commitments like **SDGs and biodiversity conservation frameworks**.

Conclusion

The discovery of dark oxygen marks a **transformational moment in ocean science**, challenging existing paradigms of life and oxygen production. It highlights the complexity of Earth's unexplored regions and underscores the need for a **balanced approach between scientific advancement, environmental protection, and resource utilization**.

EXPECTED QUESTIONS FOR UPSC CSE

Prelims MCQ

Que. Dark oxygen refers to:
(a) Oxygen produced through photosynthesis in oceans
(b) Oxygen produced without sunlight or photosynthesis
(c) Oxygen found only in polar regions
(d) Oxygen generated through volcanic activity

Answer: (b)

Descriptive Question

Que. The discovery of dark oxygen challenges conventional understanding of the oxygen cycle. Discuss its scientific and environmental implications. (150 Words, 10 Marks)

ALMA TELESCOPE UPGRADES

Why in News: The Atacama Large Millimeter/submillimeter Array is set to undergo major upgrades to enhance its data capacity and imaging precision for advanced astronomical research.

Key Details

- ALMA is a **state-of-the-art radio telescope array** located in Chile's Atacama Desert.

- It studies celestial objects using **millimetre and submillimetre wavelengths**.
- The telescope consists of **66 high-precision antennas** spread over 16 km.
- Upcoming upgrades will improve **sensitivity, resolution, and data processing capabilities**.

Radio Astronomy: Concept and Scientific Basis

- **Electromagnetic Spectrum Utilisation:** Radio astronomy studies celestial objects through **radio waves**, especially millimetre/submillimetre wavelengths. These wavelengths can penetrate cosmic dust clouds, unlike visible light, revealing hidden structures.
- **Observation of Cold Universe:** ALMA focuses on detecting **cold gas and dust**, which are essential components of star and planet formation. This helps scientists understand the earliest stages of cosmic evolution.
- **Interferometry Technique:** Multiple antennas work together as a single telescope using interferometry, increasing resolution. This technique allows ALMA to achieve precision comparable telescope of 16km diameter.
- **Detection of Faint Signals:** ALMA's high sensitivity enables detection of **extremely weak radio emissions** from distant galaxies. This is crucial for studying objects billions of light-years away.

Structural and Technical Features of ALMA

- **Array of 66 Antennas:** The telescope consists of **66 movable antennas**, each equipped with specialised receivers. These antennas can be repositioned to adjust resolution and field of view.
- **Wide Baseline Range:** Spread across distances up to **16 km**, enabling high spatial resolution imaging. Larger baseline improves the ability to distinguish fine details in space.
- **Frequency-Specific Receivers:** Each antenna has receivers tuned to specific frequency bands of the electromagnetic spectrum. This allows observation of different physical processes in space.
- **Data Integration System:** Signals from antennas are combined using a **supercomputer correlator**, producing high-quality images. Massive data processing is essential due to the volume of signals collected.

Location Advantage: Atacama Desert

- **High Altitude (≈5000 m):** Located on the Chajnantor Plateau (Chilean), reducing atmospheric distortion and signal loss. Higher altitude improves signal clarity and observational accuracy.
- **Low Humidity:** Water vapour absorbs radio waves, but the Atacama Desert has **extremely low moisture levels**. This ensures minimal interference in signal transmission.
- **Clear Sky Conditions:** The region experiences **cloud-free nights**, ideal for continuous astronomical observations. Provides one of the best natural laboratories for space research.
- **Minimal Light Pollution:** Remote location ensures negligible human interference, improving observation quality. Critical for detecting faint cosmic signals.

International Collaboration and Scientific Diplomacy

- **Global Partnership:** ALMA is operated by a consortium including **Europe, USA, Japan, Canada, and Chile**. Demonstrates the importance of **international cooperation in big science projects**.
- **Technology Sharing:** Combines advanced technologies from multiple nations, enhancing research outcomes. Promotes knowledge exchange and capacity building.
- **Strategic Importance:** Such collaborations strengthen **scientific diplomacy and global innovation ecosystems**. Relevant for India's participation in global scientific missions.
- **Model for Future Projects:** ALMA sets a precedent for projects like the **Square Kilometre Array (SKA)**. Encourages multinational investment in science.

Major Scientific Discoveries

- **Starburst Galaxies Discovery (2013):** ALMA identified galaxies forming stars at high rates in the early universe. This reshaped understanding of **galaxy evolution timelines**.
- **Protoplanetary Disk Imaging:** Captured detailed images of the **HL Tauri system**, showing early planet formation. Challenged traditional theories about how planets form.
- **Einstein Ring Observation:** Provided high-resolution images of **gravitational lensing phenomena**. Confirmed predictions of **General Relativity**.
- **Organic Molecules Detection:** Detected complex organic molecules in space, hinting at **building blocks of life**. Important for astrobiology and origin-of-life studies.

ALMA Upgrades: Scientific and Technological Impact

- **Enhanced Data Processing:** Upgrades will increase computing power to handle **larger datasets and faster analysis**. Essential for real-time and high-resolution observations.
- **Improved Sensitivity:** New receivers will detect even fainter signals, expanding observable universe limits. Helps in studying distant and early cosmic structures.
- **Higher Resolution Imaging:** Improved imaging will provide clearer insights into **black holes, galaxies, and star systems**. Critical for advancing astrophysical models.
- **Long-Term Scientific Goals:** Supports research in **dark matter, dark energy, and cosmic evolution**. Aligns with global priorities in space science.

Way Forward

- Strengthen India's participation in **global astronomy projects**.
- Invest in **radio astronomy infrastructure and research institutions**.
- Promote **STEM education and scientific research funding**.
- Enhance collaboration between **ISRO and international observatories**.

Conclusion

The ALMA telescope represents a major leap in **understanding the universe through advanced radio astronomy**. Its upgrades

will further push the boundaries of human knowledge, enabling deeper insights into cosmic origins. For India, engaging with such global scientific initiatives is essential to strengthen its position in **space technology and innovation-driven growth**.

EXPECTED QUESTIONS FOR UPSC CSE

Prelims MCQ

Que. ALMA telescope operates primarily in which part of the electromagnetic spectrum?

(a) Visible light
(b) Infrared
(c) Millimetre and submillimetre waves
(d) Ultraviolet

Answer: (c)

Descriptive Question

Que. Examine the importance of international collaboration in large-scale scientific projects with reference to ALMA. (150 Words, 10 Marks)

ASTEROID 2024 YR4

Why in News: Recent observations by NASA using the James Webb Space Telescope confirmed that asteroid **2024 YR4 will safely pass Earth on 22 December 2032**, ruling out any collision risk.

Key Details

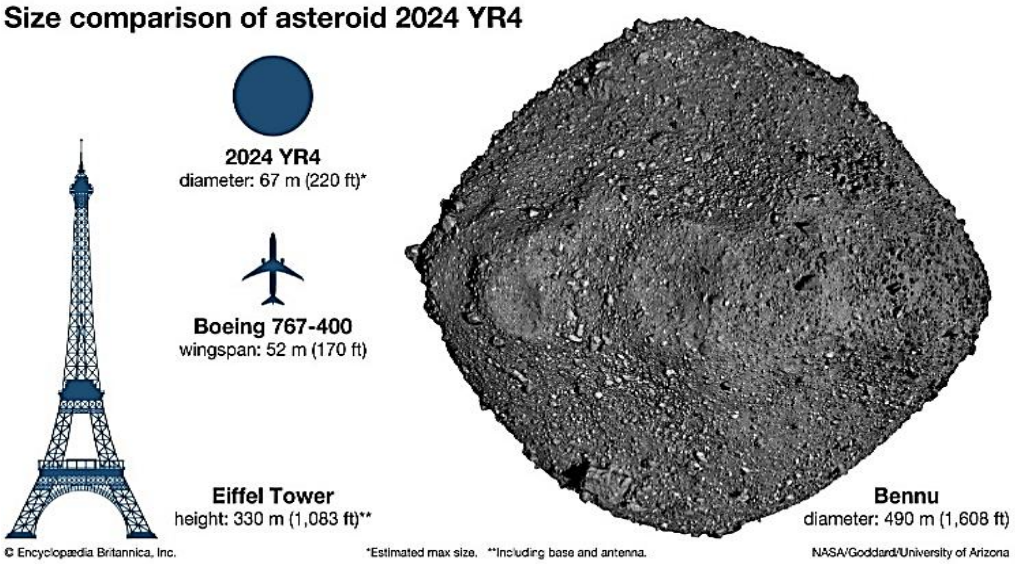
- Asteroid 2024 YR4 is a **Near-Earth Object (NEO)** discovered in December 2024 by the **ATLAS survey (Chile)**.
- It briefly reached a **Torino Scale rating of 3**, indicating a need for close monitoring.
- Refined calculations confirm a **safe flyby distance of ~21,200 km** from Earth/Moon system.
- It triggered **global planetary defence coordination** mechanisms for the first time in recent years.

Near-Earth Objects (NEOs)

- **Definition of NEOs:** Near-Earth Objects are comets or asteroids whose orbits bring them within **1.3 astronomical units (AU)** of the Sun, making them potential Earth-impact threats.
- **Apollo-type Asteroids:** 2024 YR4 belongs to the **Apollo group**, characterised by **Earth-crossing orbits** with semi-major axes greater than Earth's orbit, making them significant for impact monitoring.
- **Categories of NEOs:** Includes **Atira, Aten, Apollo, and Amor groups**, classified based on orbital paths relative to Earth, which is important for tracking collision probabilities.

Origin & Formation Mechanisms

- **Main Asteroid Belt Source:** Scientific studies trace its origin to the **central asteroid belt between Mars and Jupiter**, the primary reservoir of rocky bodies.
- **Yarkovsky Effect:** A crucial concept where **uneven solar heating creates a small thrust**, gradually altering asteroid orbits over millions of years.
- **Fragmentation Process:** 2024 YR4 may have originated as a **fragment (boulder)** chipped off from a larger asteroid due to collision events.
- **Dynamic Solar System:** These processes highlight the **evolving nature of planetary systems**, relevant for understanding cosmic hazards.



Physical Characteristics of Asteroid 2024 YR4

- **Size & Impact Potential:** With a diameter of **53–67 meters**, it is comparable to a **mid-sized building**, capable of causing regional damage if impact occurs.
- **Shape & Rotation:** Its **flattened "hockey puck" shape** and rapid rotation (~20 minutes) indicate a **dense and stable internal structure**.
- **Composition (S-type Asteroid):** Composed of **silicates and nickel-iron**, making it relatively reflective and easier to observe through telescopes.
- **Scientific Importance:** Studying such bodies helps understand **planetary formation, mineral composition, and impact risks**.

Torino Scale & Risk Assessment

- **Torino Impact Hazard Scale:** A scale from **0 to 10** used to assess asteroid impact risk; level 3 indicates **close encounter requiring attention but no immediate threat**.
- **Comparison with Apophis (2004):** Similar alert levels were seen with asteroid **Apophis**, which initially raised concern but was later ruled safe.

- **Dynamic Risk Reduction:** Improved observations reduce uncertainty, often lowering risk levels as more data becomes available.

Planetary Defence Mechanisms

- **Global Coordination Bodies:** International Asteroid Warning Network (IAWN) and Space Mission Planning Advisory Group (SMPAG) coordinate global response.
- **Detection Systems:** Ground-based surveys like **ATLAS** and space-based telescopes track and predict asteroid trajectories.
- **Role of JWST:** The James Webb Telescope demonstrated its ability to detect **faint objects**, enhancing early warning capabilities.
- **Deflection Missions:** Missions like NASA's **DART (Double Asteroid Redirection Test)** show the feasibility of **kinetic impactor technology**.

Significance for Science & Technology

- **Advancement in Space Observation:** Use of advanced telescopes improves **precision tracking and prediction models**.
- **Dual-use Technology:** Instruments designed for astronomy are now aiding **planetary defence**, showing technological adaptability.
- **Global Cooperation:** Asteroid threats require **international collaboration**, aligning with global governance in space.
- **India's Relevance:** Agencies like **ISRO** are increasingly contributing to **space situational awareness and global space safety efforts**.

Conclusion

Asteroid 2024 YR4 highlights the importance of **continuous monitoring, advanced technology, and international cooperation** in planetary defence. Strengthening global coordination mechanisms, investing in early detection systems, and enhancing India's capabilities in space surveillance will be crucial to mitigate future cosmic threats. The episode reinforces that while risks exist, **science and preparedness can effectively safeguard humanity**.

EXPECTED QUESTIONS FOR UPSC SE

Prelims MCQ

Que. Consider the following statements about Near-Earth Objects (NEOs):

1. They are objects that orbit only within Earth's atmosphere.
2. Apollo-type asteroids cross Earth's orbit.
3. Torino Scale measures asteroid impact hazard.

Which of the above are correct?

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

Answer: (c)

Descriptive Question

Que. Discuss the significance of planetary defence mechanisms in the context of Near-Earth Objects. How do recent technological advancements improve global preparedness? (250 Words, 15 Marks)

DEFENCE AND SECURITY

NAXAL-FREE INDIA

Why in News: The Union Government announced that India is nearing a **"Naxal-free" status by March 2026**, with significant decline of Left Wing Extremism in traditional strongholds like Bastar.

Key Details

- The number of **LWE-affected districts reduced from 126 (2014) to around 11 (2025)**.
- Bastar region, once the epicenter, has seen **major security successes and development push**.
- Strategy based on **SAMADHAN doctrine + Clear-Hold-Build approach**.
- Focus on transforming **"Red Corridor" into "Growth Corridors"**.

Left Wing Extremism (LWE): Concept & Ideological Basis

- **Maoist Ideology & Objective:** LWE is inspired by Maoist philosophy advocating **"Protracted People's War"** to overthrow the state through armed struggle and establish a communist regime.
- **Historical Origin (1967 Naxalbari):** The movement began in **Naxalbari, West Bengal**, led by Charu Majumdar and others, as a peasant uprising against feudal exploitation.
- **Organizational Structure:** The most dominant group is the **CPI (Maoist)** formed in 2004, banned under UAPA, operating through armed wings and front organizations.
- **Red Corridor Expansion:** At its peak, LWE affected **over 180 districts across central and eastern India**, exploiting forested terrain and governance gaps.

Causes of Left Wing Extremism in India

- **Land Alienation & Agrarian Distress:** Failure of land reforms and concentration of land ownership created resentment among tribals and marginal farmers.
- **Tribal Exploitation & Displacement:** Mining and infrastructure projects led to displacement without adequate rehabilitation, especially in mineral-rich regions like Chhattisgarh and Jharkhand.
- **Governance Deficit:** Lack of basic services like healthcare, education, and justice allowed Maoists to establish **parallel governance systems (Jan Adalats)**.
- **Poverty & Unemployment:** High levels of deprivation and lack of livelihood opportunities made youth vulnerable to recruitment.
- **Forest Rights Issues:** Poor implementation of the Forest Rights Act, 2006 alienated tribal communities dependent on forest resources.

Phases of Naxalism in India

- **Phase I (1967–1975): Ideological Uprising** Focused on peasant revolution; suppressed after operations like **Operation Steeplechase (1971)**.
- **Phase II (1975–2004): Fragmentation & Consolidation** Emergence of groups like PWG and MCC, shifting focus to tribal belts.
- **Phase III (2004–2014): Peak Expansion** Formation of CPI (Maoist), spread across the **Red Corridor**, major attacks like Dantewada (2010).
- **Phase IV (2014–Present): Decline Phase** Strategic security and development measures reduced influence to a few districts.

Government Strategy: Multi-Pronged Approach

- **Policy Framework (National Policy 2015):** Recognizes that insurgency requires a **security + development + governance approach**.
- **Clear-Hold-Build Doctrine:**
  - ✓ **Clear:** Remove insurgents through force
  - ✓ **Hold:** Establish state presence
  - ✓ **Build:** Deliver development and governance
- **SAMADHAN Doctrine (2017):** Smart leadership, Aggressive strategy, Intelligence, Technology use, financial choking of insurgents.
- **Target 2026:** Transform LWE areas into **economically integrated and peaceful regions**.

Security Measures & Counter-Insurgency

- **Special Forces Deployment:** Units like CoBRA, Greyhounds, and DRG specialize in jungle warfare and intelligence-led operations.
- **Major Operations:** Operations like **Octopus, Double Bull, Chakrabandha, and Kagar (2025)** significantly weakened Maoist networks.
- **Forward Operating Bases (FOBs):** Establishment of camps in core areas like Abujhmad ensures **territorial dominance**.
- **Financial Disruption:** Agencies like National Investigation Agency and ED dismantle Maoist funding through extortion networks.

Development-Led Approach

- **Infrastructure Connectivity:** Over **15,000 km roads** under RCPLWEA improved access to remote areas, boosting economy and governance.
- **Digital Inclusion:** Installation of **9000+ mobile towers** ensures communication and digital integration.
- **Education & Skill Development:** EMRS schools and ITIs provide quality education, reducing youth radicalization.
- **Targeted Welfare Schemes:** Dharti Aaba Janjatiya Gram Utkarsh Abhiyan ensures last-mile delivery of essential services in tribal areas.

Decline of LWE: Key Indicators

- **Sharp Reduction in Violence:** Incidents and casualties have significantly decreased since 2014.

- **Geographical Shrinkage:** LWE now confined to **few districts in South Chhattisgarh**.
- **Improved Governance Presence:** Increased police stations, banks, schools, and administrative outreach.
- **Surrender & Rehabilitation:** Thousands of cadres surrendered under attractive rehabilitation schemes.

Current Status of LWE in India

- **Sharp Decline in Violence:** LWE incidents and casualties have reduced by over **70% since 2010** (as per MHA data trends).
- **Core Areas Remaining:** Only **7 districts remain severely affected**:
  - ✓ 5 in **Chhattisgarh**
  - ✓ 1 in **Jharkhand**
  - ✓ 1 in **Odisha**
- **Transformation of Former Hotspots:** Regions like **Andhra Pradesh and Telangana** have seen near elimination due to effective policing and development.
- **Global Comparison:** India's approach is seen as a **model of combining security and development**, unlike purely militaristic strategies elsewhere.

Emerging Challenges Post-Elimination

- **Security Vacuum & Splinter Groups:** Withdrawal of forces may create space for criminal networks or residual insurgents.
- **Transformation into Organized Crime:** Former cadres may shift to illegal activities like mining mafia and extortion.
- **Absentee Governance:** Infrastructure exists, but lack of personnel (teachers, doctors) weakens service delivery.
- **Urban Networks & Ideology:** "Urban Naxalism" and ideological propagation remain a concern.

Way Forward: Towards Sustainable Peace

- **Strengthening Local Police:** Transition from CAPFs to state police ensures long-term stability and local intelligence.
- **Implementation of Tribal Rights:** Effective enforcement of PESA and FRA empowers Gram Sabhas over **Jal, Jangal, Zameen**.
- **Inclusive Development Model:** Transparent use of District Mineral Foundation funds for tribal welfare.
- **Community Participation:** Civic Action Programmes and trust-building measures ensure people's confidence in the state.

Conclusion

India's success in curbing Left Wing Extremism reflects a **balanced strategy of security and development**. However, lasting peace depends on addressing **root socio-economic grievances, ensuring governance delivery, and empowering tribal communities**. The transition from a **security-centric to governance-centric approach** will determine whether India remains truly "Naxal-free".

EXPECTED QUESTION FOR UPSC CSE

Descriptive Question

Q. Naxalism is a manifestation of socio-economic deprivation as much as an internal security challenge. Examine. (150 words, 10 marks)

MISSILE DEFENCE IN US–ISRAEL–IRAN CONFLICT

Why in News: The ongoing **US–Israel–Iran conflict (2026)** has highlighted the critical role of **multi-layered missile defence systems** amid large-scale missile and drone attacks.

Key Details

- Missile defence systems have become central to **modern high-intensity warfare**, especially in West Asia.
- Countries like the **United States, Israel, and Iran** are deploying advanced **multi-layered air defence networks**.
- The conflict has demonstrated both the **effectiveness and limitations** of interception systems.
- Iran's long-range strike attempt (~4000 km) has raised concerns about **expanding missile capabilities and global security**.

Missile Defence System – Concept & Architecture

- **Definition and Objective:** Missile defence refers to a **comprehensive system designed to detect, track, and destroy incoming missiles** before impact. It aims to protect **civilian population, infrastructure, and military assets**.
- **Core Components (Sensors, Command, Interceptors):** Systems rely on **satellites and radars** for detection, **command centres for decision-making**, and **interceptor missiles** for neutralisation. Integration ensures real-time response capability.
- **Phases of Interception:** Interception occurs in **boost phase (launch stage), midcourse phase (space trajectory), and terminal phase (final descent)**. Most operational systems focus on midcourse and terminal interception.
- **Strategic Importance:** Missile defence acts as a **deterrent**, reducing enemy confidence in successful strikes and giving policymakers **critical decision-making time** during crises.

Working of Missile Interceptors

- **Detection and Tracking Mechanism:** Ground-based radars emit radio waves that reflect off objects, allowing computers to calculate **trajectory, speed, and altitude** of incoming threats with high precision.
- **Target Lock and Launch Command:** Once identified as hostile, systems achieve a **"lock"** and command launchers to fire interceptors using automated engagement systems.
- **Guidance and Mid-course Correction:** Interceptors are guided via **ground radar updates and onboard seekers (infrared/radar)**, ensuring accuracy even against moving targets.
- **Terminal Destruction Methods:**
  - ✓ **Hit-to-Kill Technology:** Direct collision using kinetic energy (used in THAAD, SM-3).

- ✓ **Proximity Fuse:** Explosion near target releasing shrapnel (older systems).

Key Missile Defence Systems in the Conflict

1. **United States Systems**
   - **THAAD (Terminal High Altitude Area Defense):** Intercepts ballistic missiles at **high altitudes (exo/endo-atmospheric)** using hit-to-kill technology, protecting large areas like cities and bases.
   - **Patriot Missile System:** Provides **last-line defence** against aircraft, cruise missiles, and ballistic threats; widely deployed across conflict zones.
   - **SM-3 & SM-6 (Naval Systems):**
     - ✓ **SM-3:** Intercepts missiles in midcourse phase (space).
     - ✓ **SM-6:** Targets aircraft, drones, and missiles in terminal phase.
   - **IFPC (Indirect Fire Protection Capability):** Uses **AIM-9X interceptors** to counter drones and rockets, reducing reliance on expensive systems like Patriot.
2. **Israel's Multi-Layered Defence**
   - **Arrow System (Arrow-2 & Arrow-3):** Provides **long-range ballistic missile defence**, with Arrow-3 intercepting threats **outside the atmosphere**.
   - **David's Sling:** Covers **medium-range threats**, bridging the gap between Arrow and Iron Dome with high precision.
   - **Iron Dome:** Highly effective (≈80–97% success rate) against **short-range rockets and drones**, protecting urban areas.
   - **Iron Beam (Laser System):** A **directed-energy weapon (2025 onwards)** that neutralises drones at low cost, addressing interceptor cost challenges.
3. **Iran's Defence Capabilities**
   - **Bavar-373:** Long-range system comparable to advanced SAM systems, capable of intercepting **aircraft and ballistic missiles (~300 km range)**.
   - **Sevom-e-Khordad:** Mobile system targeting **jets, drones, and cruise missiles**, enhancing survivability through relocation.
   - **Tor-M1 & Short-Range Systems:** Protect critical assets from **low-flying threats and precision-guided munitions**.
   - **Drone Defence Systems (Majid, Azarakhsh):** Focus on countering **low-cost drone warfare**, increasingly used in asymmetric conflicts.
4. **Iran's Long-Range Strike & Strategic Implications**
   - **Extended Strike Capability (~4000 km):** Iran's attempt to target **Diego Garcia** indicates a potential doubling of its earlier declared missile range (~2000 km).
   - **Khorramshahr-4 Missile:** A **liquid-fuelled ballistic missile** capable of carrying heavy payloads (>1 tonne), possibly with manoeuvrable re-entry features.
   - **Geopolitical Impact:** A 4000 km range puts parts of **Europe and Indo-Pacific within reach**, altering NATO's threat perception.
   - **Role of Diego Garcia:** A critical **US-UK military base** in the Indian Ocean, enabling long-range operations across Asia, Africa, and West Asia.
5. **Economics of Missile Defence**
   - **High Cost of Interceptors:**
     - **THAAD:** ~$12–15 million per missile
     - **Patriot:** ~$4 million
     - **SM-3:** ~$10–20 million
   - **Asymmetric Warfare Challenge:** Adversaries like Iran use **cheap drones and missiles** to overwhelm costly defence systems (saturation attacks).
   - **Stockpile Constraints:** Limited interceptor production and long replenishment cycles (1–2 years) create strategic vulnerabilities.
   - **Emerging Solutions:** Systems like **Iron Beam (laser)** aim to provide **low-cost, sustainable defence alternatives**.

Relevance for India

- **India's Missile Defence Programme:** India is developing a **Ballistic Missile Defence (BMD) system** with **Prithvi Air Defence (PAD) and Advanced Air Defence (AAD)** interceptors.
- **Strategic Lessons:** Importance of **multi-layered defence**, indigenous capability, and integration with space-based surveillance.
- **Regional Security Context:** With nuclear neighbours like **Pakistan and China**, missile defence becomes critical for India's deterrence posture.
- **Future Warfare Trends:** Increasing role of **AI, drones, hypersonic missiles, and directed energy weapons** in defence strategy.

Conclusion

Missile defence systems are now central to **21st-century warfare**, but they are not foolproof. The US–Israel–Iran conflict highlights the need for **cost-effective, layered, and technologically advanced defence mechanisms**. For India, strengthening indigenous missile defence capabilities and integrating them with broader strategic doctrine is essential to ensure national security in an evolving threat landscape.

EXPECTED QUESTIONS FOR UPSC CSE

Prelims MCQ

Que. Which of the following systems uses "hit-to-kill" technology?

1. THAAD
2. SM-3
3. Patriot (PAC-3)

Which of the above statements are correct?

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

Answer: (d)

Descriptive Questions

Que. "Missile defence systems are reshaping modern warfare but face economic and technological challenges." Discuss with reference to recent conflicts. (250 Words, 15 Marks)

INDO-MYANMAR BORDER

Why in News: Recent developments in **India–Myanmar border security, coastal surveillance upgrades, and India's evolving border infrastructure** have renewed focus on comprehensive border management.

Key Details

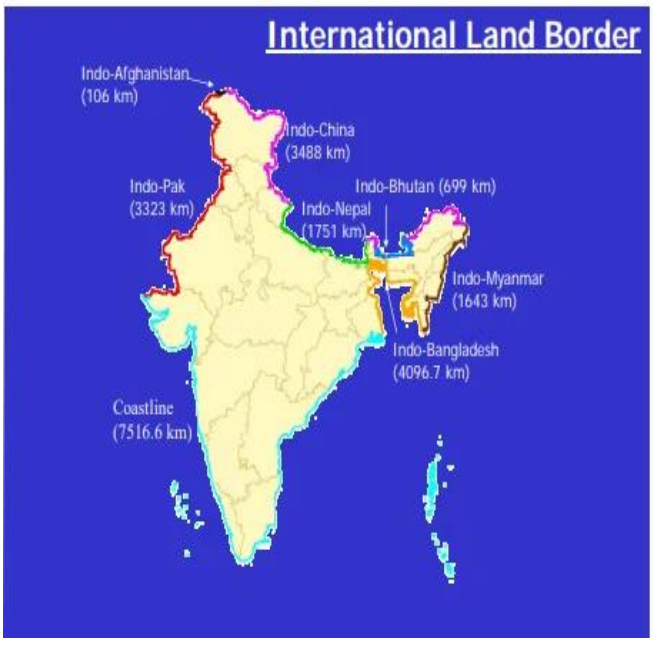
- India shares **15,106 km of land borders** with 7 countries and **7,516 km coastline**, making border management complex.
- Issues like **infiltration, smuggling, illegal migration, and territorial disputes** remain persistent.
- Recent reforms include **scrapping of Free Movement Regime (2024)** and expansion of **smart fencing (CIBMS)**.
- Border management is crucial for **internal security, foreign policy, and economic stability**.

India's Border Geography & Strategic Significance

- **Extensive Land Borders:** India shares borders with **Pakistan, China, Bangladesh, Nepal, Bhutan, Myanmar, and Afghanistan**, covering diverse terrains from deserts to Himalaya. This diversity complicates surveillance and infrastructure development.
- **Maritime Dimension:** India has a coastline of **7,516 km**, including island territories (Andaman & Nicobar, Lakshadweep), making maritime security vital for trade and strategic dominance in the **Indian Ocean Region (IOR)**.
- **Geo-Strategic Importance:** Borders connect India with **South Asia, Central Asia, and Southeast Asia**, impacting initiatives like **Act East Policy** and regional connectivity projects.
- **Economic Relevance:** Borders facilitate trade but also pose risks like **illegal trade, drug trafficking, and counterfeit currency**, affecting economic security.

Key Border Terminologies

- **Line of Control (LoC):** A **de facto boundary** between India and Pakistan (~740 km), arising after the **1972 Simla Agreement**, frequently witnessing ceasefire violations.



- **Line of Actual Control (LAC):** The India-China boundary (~3,488 km) remains **undemarcated**, leading to disputes like **Doklam (2017)** and **Eastern Ladakh standoff (2020)**.
- **International Border (IB):** Fully recognised borders with countries like **Bangladesh and Nepal**, generally peaceful but prone to **illegal migration and smuggling**.
- **Actual Ground Position Line (AGPL):** Located in **Siachen Glacier**, marking troop positions of India and Pakistan, reflecting high-altitude military deployment.

Border Guarding Forces

- **Border Security Force (BSF):** Raised in **1965**, it guards India-Pakistan and India-Bangladesh borders, focusing on **anti-infiltration, anti-smuggling, and internal security**.
- **Indo-Tibetan Border Police (ITBP):** Specialised in **high-altitude warfare**, it guards the LAC and ensures vigilance in difficult Himalayan terrain.
- **Sashastra Seema Bal (SSB):** Handles **India-Nepal and India-Bhutan open borders**, focusing on **community engagement and intelligence gathering**.
- **Assam Rifles:** Oldest paramilitary force (1835), guarding India-Myanmar border with **dual control (MHA + Army)**, important for **counter-insurgency operations**.
- **Indian Coast Guard:** Established under the **Coast Guard Act, 1978**, it ensures **maritime law enforcement, coastal security, and environmental protection**.

Maritime Border Security & Coastal Architecture

- **Three-Tier Coastal Security System:** Tier 1 (State Marine Police), Tier 2 (Coast Guard), Tier 3 (Indian Navy) ensures layered maritime defence from **territorial waters to high seas**.
- **Post-26/11 Reforms:** The **2008 Mumbai attacks** exposed vulnerabilities, leading to creation of **NC3I Network, Sagar Prahari Bal, and AIS tracking systems**.
- **Maritime Zones (UNCLOS):** India exercises sovereignty up to **12 nautical miles**, and economic rights up to **200 nautical miles (EEZ)**.
- **Indian Ocean Strategy:** India's maritime security aligns with **SAGAR (Security and Growth for All in the Region)** doctrine, enhancing regional cooperation.

Major Border Challenges

- **India–Pakistan Border**
  - ✓ Persistent **terror infiltration and ceasefire violations** along LoC.
  - ✓ Rising **drug trafficking (heroin)** via Punjab and Rajasthan sectors.
  - ✓ Difficult terrain limits full fencing effectiveness.
- **India–China Border**
  - ✓ **Undermarketed LAC** leads to frequent standoffs.
  - ✓ China's superior infrastructure creates **strategic asymmetry**.
  - ✓ India is responding via **BRO projects and military deployment**.
- **India–Bangladesh Border**
  - ✓ Issues of **illegal migration, cattle smuggling, and human trafficking**.
  - ✓ **Land Boundary Agreement (2015)** resolved enclave disputes.

- ✓ Smart fencing (CIBMS) being deployed in riverine areas.

- **India–Myanmar Border**
  - ✓ Porous border enables **insurgency, arms smuggling, and refugee inflow**.
  - ✓ **Free Movement Regime (scrapped 2024)** due to security concerns.
  - ✓ Delay in fencing (~43 km completed) highlights implementation gaps.

Technology in Border Management

- **CIBMS (Smart Fencing):** Integrates sensors, radars, cameras, and command systems for **real-time surveillance**, especially in difficult terrain.
- **Drone Surveillance:** Used to monitor infiltration, particularly along **Pakistan and Bangladesh borders**.
- **Satellite Monitoring:** ISRO satellites provide **high-resolution imagery** for tracking movements and infrastructure.
- **Artificial Intelligence:** AI is used for **predictive analysis and anomaly detection**, improving proactive border security.
- **Tunnel Detection Systems:** Advanced technology deployed to detect **cross-border tunnels**, especially in Jammu region.

Border Management & Internal Security Linkages

- Border security directly affects **terrorism, insurgency, and organised crime**.
- It is linked with **Left Wing Extremism and Northeast insurgency networks**.
- Effective border management supports **national integration and economic stability**.

Conclusion

India must adopt a **comprehensive border management strategy** integrating infrastructure, technology, and diplomacy. Enhancing **border infrastructure, resolving inter-agency coordination issues (e.g., Assam Rifles dual control), promoting community participation**, and strengthening **regional cooperation** are essential. A balanced approach between **security and development** will ensure sustainable border governance.

EXPECTED QUESTIONS FOR UPSC CAE

Prelims MCQ

Que. Consider the following statements:

1. LAC is a formally demarcated boundary between India and China.
2. BSF guards both India-Pakistan and India-Bangladesh borders.
3. EEZ extends up to 200 nautical miles.

Which of the statements are correct?

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

Answer: (b)

Descriptive Question

Que. Discuss the major challenges in India's border management and the role of technology in addressing them. (150 words, 10 marks)

THE SUKHOI SU-30MKI

Why in News: The **Sukhoi Su-30MKI** is in focus due to **upgrades with indigenous systems like Uttam AESA radar and increasing indigenisation under Atmanirbhar Bharat in defence**.

Key Details

- The Su-30MKI is a **heavy, multirole air superiority fighter** forming the backbone of the **Indian Air Force**.
- It is a **jointly developed platform** involving **Russia, India, France, and Israel**, making it a unique hybrid aircraft.
- Manufactured in India by **Hindustan Aeronautics Limited**, it reflects strong defence indigenisation.
- It is the **only aircraft capable of carrying the BrahMos missile**, enhancing India's strategic strike capability.

Platform Overview & Strategic Role

- **Air Superiority Fighter:** The Su-30MKI ensures **air dominance in Indian airspace**, capable of offensive and defensive missions including interception, escort, and deep strike operations. It forms the **backbone of IAF's combat fleet**, with over **270 aircraft inducted**, making it the largest fighter fleet in India.
- **Multirole Capability:** It can perform **ground attack, maritime strike, reconnaissance, and electronic warfare**, making it highly versatile in modern warfare scenarios. This flexibility reduces dependence on multiple aircraft types and improves operational efficiency.
- **All-weather & Long-range Operations:** With a **combat radius of ~1,500 km (extendable with refuelling)**, it can conduct missions deep into adversary territory. This capability is crucial for India's **two-front war preparedness (China & Pakistan)**.

Development & International Collaboration

- **Russian Design Base:** The aircraft is based on the Su-30 platform developed by **Sukhoi**, known for its high manoeuvrability and combat performance. It represents advanced Russian fighter design adapted for Indian needs.
- **Indian Manufacturing Leadership:** Produced by HAL at **Nashik**, the aircraft showcases India's capability in **licensed production and aerospace engineering**. This

contributes to **technology absorption and domestic skill development**.

- **Multi-country Integration:** It integrates **French navigation systems, Israeli avionics, and Indian software**, making it a globally collaborative platform. This reflects India's strategy of **defence diversification and strategic autonomy**.

Advanced Technology & Features

- **Super Maneuverability:** Equipped with **thrust vectoring engines and canards**, it can perform advanced maneuvers like the **Cobra maneuver**, giving it an edge in dogfights. This enhances survivability and combat effectiveness in close-range engagements.
- **Avionics & Radar Systems:** Currently uses **PESA radar**, with planned upgrades to **Uttam AESA radar**, improving target detection and tracking capabilities. AESA radar allows **simultaneous tracking of multiple targets and electronic warfare resistance**.
- **Twin-engine Power:** Powered by **AL-31FP engines**, it ensures reliability and safety during long missions and high-altitude operations. Twin engines are crucial for **redundancy and sustained combat operations**.

Weapon Systems & Combat Capability

- **BrahMos Integration:** The Su-30MKI is the only fighter capable of carrying the **BrahMos-A supersonic cruise missile**, with a strike range of **~400–500 km**. This gives India a **stand-off precision strike capability**, critical for deterrence.
- **Heavy Payload Capacity:** It can carry up to **8,000 kg of weapons**, including **Astra (BVR), R-77, Kh-59 missiles**, bombs, and rockets. This enables both **air-to-air and air-to-ground missions simultaneously**.
- **Network-centric Warfare:** Integration with modern communication systems enables **real-time data sharing and coordinated operations**, enhancing battlefield awareness. This aligns with modern warfare trends like **integrated theatre commands**.

Indigenisation & Atmanirbhar Bharat

- **Rising Indigenous Content:** As of 2026, the aircraft has **over 62.6% indigenous components**, including radar warning receivers and mission computers. This reduces import dependency and strengthens **defence self-reliance**.
- **Uttam AESA Radar Upgrade:** The indigenous **Uttam radar** developed by DRDO will replace imported systems, enhancing capability and autonomy. It marks a shift towards **indigenous high-end defence electronics**.
- **Strategic Importance:** Indigenous upgrades ensure **long-term sustainability, lower costs, and export potential**. It aligns with initiatives like **Make in India and Defence Acquisition Procedure (DAP)**.

Conclusion

The Su-30MKI will continue to be the **backbone of India's air power**, but its effectiveness depends on **timely upgrades, indigenous integration, and network-centric capabilities**. Strengthening domestic R&D, accelerating projects like **Uttam AESA**, and ensuring synergy with future platforms like AMCA will be crucial for maintaining India's strategic edge.

EXPECTED QUESTION FOR UPSC CSE

Prelims MCQ

Que. Consider the following statements regarding Su-30MKI:

1. It is manufactured in India by Hindustan Aeronautics Limited.
2. It can carry the BrahMos missile.
3. It uses AESA radar in all variants currently.

Which of the above is/are correct?

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

Answer: (a)

OPERATION SANKALP

Why in News: Operation Sankalp continues to remain crucial amid rising **maritime threats, piracy, and geopolitical tensions in the Indian Ocean Region (IOR)**.

Key Details

- **Operation Sankalp** was launched on **19 June 2019** by the Indian Navy to ensure maritime security.
- It focuses on protecting Indian merchant vessels in **Strait of Hormuz, Gulf of Oman, and Gulf of Aden**.
- The operation gained importance due to **attacks on oil tankers and rising piracy threats**.
- It reflects India's role as a **"Net Security Provider" in the Indian Ocean Region (IOR)**.

Strategic Importance of Indian Ocean Region (IOR)

- **Global Trade Lifeline:** Around **80% of global seaborne oil trade** passes through the Indian Ocean, making it critical for global energy security and trade stability.
- **India's Trade Dependence:** Nearly **90% of India's trade by volume and ~70% by value** is carried via sea routes, highlighting dependence on secure maritime lanes.
- **Critical Chokepoints:** The **Strait of Hormuz** handles about **20% of global petroleum trade**, making it strategically sensitive for India's energy imports.
- **Geopolitical Competition:** The region witnesses growing presence of major powers, including the United States Navy and People's Liberation Army Navy, increasing strategic complexity.

Genesis and Objectives of Operation Sankalp

- **Background of Launch (2019):** Initiated after tanker attacks in the Gulf region amid **US-Iran tensions**, threatening global shipping security.
- **Primary Objective:** To ensure **safe passage of Indian-flagged vessels**, especially oil tankers, through volatile maritime zones.
- **Anti-Piracy Focus:** Addresses piracy threats in the Gulf of Aden, which earlier peaked around **Somalia (2008–2012)**.
- **Economic Security:** Protects India's **energy lifelines**, as over **85% of crude oil imports** are sea-borne.

Key Features and Operational Mechanism

- **Continuous Naval Deployment:** Indian Navy maintains **frontline warships (frigates, destroyers)** in mission-based deployments for constant surveillance.
- **Escort Missions:** Hundreds of merchant vessels have been escorted safely, ensuring **uninterrupted supply chains**.
- **24/7 Surveillance:** Use of maritime patrol aircraft like **P-8I Poseidon** ensures real-time monitoring of threats.
- **Special Forces Deployment:** Elite commandos such as **MARCOS** provide rapid response capability.
- **Legal Backing:** Strengthened by the **Maritime Anti-Piracy Act 2022**, enabling prosecution of pirates under Indian jurisdiction.

India as a Net Security Provider in IOR

- **First Responder Role:** India has emerged as a **"Preferred Security Partner"**, providing assistance during maritime emergencies and evacuations.
- **Mission-Based Deployments:** Operation Sankalp is part of India's broader doctrine of **Mission-Based Deployments (MBD)** for proactive maritime security.
- **Regional Cooperation:** Supports frameworks like **SAGAR**, promoting cooperative security.
- **Humanitarian Assistance:** Indian Navy has conducted rescue missions and evacuation operations (e.g., Operation Rahat), enhancing credibility.

Challenges in Maritime Security

- **Piracy and Non-Traditional Threats:** Threats include piracy, terrorism, arms trafficking, and cyber threats to shipping infrastructure.
- **Geopolitical Tensions:** Conflicts in West Asia and great power rivalry increase risks to maritime trade routes.
- **Legal and Coordination Issues:** Despite laws, enforcement across international waters remains complex due to jurisdictional limitations.
- **Emerging Threats:** Use of drones, unmanned vessels, and hybrid warfare tactics pose new challenges to naval operations.

Conclusion

Operation Sankalp reflects India's transition from a **passive maritime actor to an active security provider** in the Indian Ocean. Strengthening naval capabilities, enhancing regional cooperation, leveraging technology (AI-based surveillance), and promoting legal frameworks will be crucial. Ensuring secure sea lanes is vital not only for India's economic growth but also for maintaining stability in global trade.

EXPECTED QUESTIONS FOR UPSC CSE

Prelims MCQ

Que. Consider the following statements regarding Operation Sankalp:

1. It was launched in 2019 to ensure maritime security in the Indian Ocean Region.
2. It focuses on protecting Indian vessels in the Strait of Malacca only.
3. It is supported by the Maritime Anti-Piracy Act, 2022.

Which of the statements is/are correct?

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

Answer: (a)

Descriptive Question

Que. Examine the challenges of maritime security in the Indian Ocean Region and evaluate India's response through Operation Sankalp. (250 words, 15 marks)

EXERCISE DWEEP SHAKTI

Why in News: India conducted **Exercise Dweep Shakti** to strengthen **tri-service jointness and island defence preparedness** in the strategically important Andaman & Nicobar region.

Key Details

- **Dweep Shakti** is a **tri-service military exercise** involving the Indian Army, Navy, and Air Force.
- Conducted under the **Andaman and Nicobar Command**, India's only integrated theatre command.
- Focuses on **amphibious warfare, maritime dominance, and rapid deployment** in island territories.
- Incorporates **modern warfare technologies** like drones, electronic warfare, and real-time data sharing.

Strategic Importance of Andaman & Nicobar Islands

- **Geostrategic Location:** The islands lie near the **Malacca Strait**, through which nearly **40% of global trade passes**, making them critical for maritime surveillance and control.
- **Gateway to Indo-Pacific:** These islands act as India's **forward operating base** in the Indo-Pacific, enabling monitoring of Chinese naval activities and securing Sea Lines of Communication (SLOCs).
- **Military Advantage:** Presence of airstrips, naval bases, and surveillance systems enhances India's ability for **rapid force projection and deterrence**.
- **Act East Policy Linkage:** The islands support India's **Act East Policy**, strengthening connectivity and defence cooperation with Southeast Asian nations.

Tri-Service Jointness and Theatre Command Concept

- **Integrated Military Operations:** Exercise Dweep Shakti demonstrates **joint operations of Army, Navy, and Air Force**, ensuring seamless coordination during conflict situations.

- **Theatre Command Model:** The Andaman and Nicobar Command is India's **only operational theatre command**, serving as a model for future integrated commands.
- **Force Multiplication:** Jointness reduces duplication of resources & enhances **combat efficiency and operational synergy**.
- **Reforms in Defence:** Aligns with recommendations of **Kargil Review Committee and Shekatkar Committee** for integrated military structures.

Amphibious Warfare and Coastal Defence

- **Amphibious Assault Capability:** The exercise includes **sea-to-land operations**, crucial for defending or reclaiming island territories during conflict.
- **Strategic Relevance:** Amphibious operations are vital in scenarios involving **territorial disputes, humanitarian assistance, and disaster relief (HADR)**.
- **Logistical Preparedness:** Landing of heavy equipment like tanks tests India's **logistics, mobility, and rapid deployment capability**.
- **Global Comparison:** Similar capabilities are maintained by major powers like the **USA and China**, highlighting its importance in modern warfare.

Maritime Security and Indo-Pacific Context

- **Securing Sea Lines of Communication (SLOCs):** India's trade depends heavily on maritime routes; exercises like Dweep Shakti ensure **protection of these lifelines**.
- **Countering Emerging Threats:** Addresses threats like **piracy, maritime terrorism, and strategic competition in the Indo-Pacific**.
- **China Factor:** Growing presence of China in the Indian Ocean Region (IOR) through its **String of Pearls strategy** necessitates strong maritime preparedness.
- **QUAD and Regional Cooperation:** Enhances India's role in groupings like **QUAD**, promoting a **free, open, and inclusive Indo-Pacific**.

Technological Integration in Modern Warfare

- **Drone Warfare:** Use of **swarming drones** improves surveillance, reconnaissance, and precision strikes.
- **Electronic Warfare Systems:** Helps in disrupting enemy communication and gaining **information superiority**.
- **Network-Centric Warfare:** Real-time data sharing between forces ensures **faster decision-making and coordinated action**.
- **Future Warfare Trends:** Reflects the shift towards **AI-enabled, multi-domain warfare**, a key feature of 21st-century conflicts.

Multi-Domain Interoperability

- **Unified Communication Systems:** Integration of air, sea, and land platforms ensures **seamless coordination during operations**.

- **Real-Time Intelligence Sharing:** Enhances situational awareness and reduces response time during threats.
- **Joint Training Doctrine:** Standardisation of procedures improves **interoperability among forces**.
- **Operational Readiness:** Ensures India can respond effectively to **both conventional and asymmetric threats**.

Conclusion

Exercise Dweep Shakti highlights India's shift towards **integrated military capability, technological modernisation, and maritime security preparedness**. Strengthening theatre commands, investing in advanced technologies, and enhancing regional cooperation will be crucial for India to emerge as a **net security provider in the Indo-Pacific**. Such exercises reinforce India's commitment to safeguarding its territorial integrity and strategic interests.

EXPECTED QUESTIONS FOR UPSC CSE

Prelims MCQ

Que. Consider the following statements regarding Exercise Dweep Shakti:

1. It is a tri-service military exercise.
2. It is conducted under the Andaman and Nicobar Command.
3. It focuses only on land-based warfare.

Which of the statements are correct?

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

Answer: (a)

Descriptive Question

Que. "Integrated theatre commands are essential for modern warfare." Discuss in the context of India's defence reforms. (150 words, 10 marks)

EXERCISE SEA DRAGON

Why in News: India participated in **Exercise Sea Dragon 2026**, a US-led multinational anti-submarine warfare exercise in the Indo-Pacific region.

Key Details

- **Exercise Sea Dragon** is an annual **US Navy-led anti-submarine warfare (ASW) exercise** conducted near Guam in the Western Pacific.
- India, along with the US, Japan, Australia, and New Zealand, participated to enhance **maritime security cooperation**.
- The exercise focuses on **maritime patrol aircraft operations** like the **Boeing P-8 Poseidon**.
- It aims to ensure a **free, open, and rules-based Indo-Pacific region**.

Indo-Pacific Strategy & India's Role

- **Strategic Importance of Indo-Pacific:** The Indo-Pacific region accounts for over **60% of global trade and maritime traffic**, making it crucial for India's economic and strategic interests. Ensuring secure Sea Lines of Communication (SLOCs) is vital for energy imports.
- **India's Vision – SAGAR Doctrine:** India's policy of Security and Growth for All in the Region (SAGAR) emphasizes **cooperative maritime security, capacity building, and regional stability**.
- **Act East Policy & Maritime Outreach:** India's engagement in exercises like Sea Dragon aligns with its **Act East Policy**, strengthening ties with ASEAN and Indo-Pacific partners.

- **Role in QUAD Framework:** Participation complements India's engagement in the **Quadrilateral Security Dialogue (QUAD)**, focusing on a **rules-based maritime order**.

Anti-Submarine Warfare (ASW) – Strategic Significance

- **Rising Submarine Threats:** Increasing deployment of submarines, especially in the Indo-Pacific, has heightened the need for **advanced underwater surveillance systems**.
- **ASW as a Force Multiplier:** Effective ASW capabilities ensure **deterrence, maritime dominance, and protection of naval assets**, especially aircraft carriers and trade routes.
- **Technological Integration:** ASW operations rely on advanced technologies like **sonobuoys, radar, acoustic sensors, and data fusion systems**, improving detection accuracy.
- **Relevance for India:** India's coastline of over **7,500 km** and heavy dependence on maritime trade necessitate strong ASW capabilities.

Key Features of Exercise Sea Dragon

- **Multinational Cooperation:** The exercise includes navies from India, the US, Japan, Australia, and New Zealand, enhancing **interoperability and trust among partners**.
- **Maritime Patrol Aircraft Operations:** Aircraft like the **P-8 Poseidon** and **Kawasaki P-1** are used for long-range surveillance, equipped with cutting-edge sensors and communication systems.
- **Realistic Combat Simulation:** Participants engage in **tracking and neutralizing simulated submarines**, improving real-time decision-making and tactical coordination.
- **Performance-Based Evaluation:** Teams are evaluated on operational efficiency, & the best performers are awarded the **Dragon Belt**, encouraging competitive excellence.

India's Participation – Strategic Gains

- **Operational Experience:** The Indian Navy gains exposure to **advanced ASW tactics and global best practices**, enhancing combat readiness.
- **Defence Diplomacy:** Participation strengthens India's role as a **net security provider** in the Indian Ocean Region (IOR).
- **Technology and Skill Upgradation:** Interaction with advanced naval forces facilitates **knowledge sharing and technological learning**.
- **Strategic Signalling:** India's involvement sends a message of commitment to **regional stability and freedom of navigation**.

Indo-Pacific Geopolitics & Maritime Security

- **Freedom of Navigation:** Ensuring adherence to international laws like **UNCLOS (United Nations Convention on the Law of the Sea)** is crucial for maritime order.
- **China Factor:** Increasing Chinese naval presence in the Indo-Pacific has intensified the need for **collective maritime security initiatives**.
- **Regional Stability:** Exercises like Sea Dragon contribute to **confidence-building measures and deterrence**, reducing the risk of conflicts.
- **Blue Economy Linkages:** Secure maritime spaces are essential for sustainable use of ocean resources, including fisheries, energy, and trade.

Conclusion

Exercise Sea Dragon highlights the growing importance of **multilateral maritime cooperation** in addressing emerging security challenges. India must continue to strengthen its naval capabilities, deepen strategic partnerships, and uphold a **rules-based Indo-Pacific order**. Enhancing indigenous defence production and maritime domain awareness will further reinforce India's position as a key maritime power.

EXPECTED QUESTIONS FOR UPSC CSE

Prelims MCQ

Que. With reference to Exercise Sea Dragon, consider the following statements:

1. It is a naval exercise conducted in the Indian Ocean.
2. It focuses on anti-submarine warfare operations.
3. India is a participating country.

Which of the statements are correct?

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

Answer: (b)

Descriptive Question

Que. Discuss the significance of anti-submarine warfare exercises like Sea Dragon in strengthening India's maritime security in the Indo-Pacific region. (150 words, 10 marks)

STEALTH FRIGATE TARAGIRI

Why in News: India has advanced its naval modernisation with the induction of the **stealth frigate INS Taragiri (Project 17A)**, boosting maritime security and indigenous defence capability.

Key Details

- **INS Taragiri (F41)** is a **Project 17A stealth guided-missile frigate** designed for multi-dimensional warfare.
- Built by **Mazagon Dock Shipbuilders Limited**, Mumbai with **75%+ indigenous content**.
- Supports **surface, air, and anti-submarine warfare (ASW)** capabilities.
- Strengthens **Atmanirbhar Bharat in defence** and enhances India's maritime deterrence.

Maritime Security & Internal Security Linkage

- **Coastal Security Challenges:** India has a **7,500 km coastline**, making it vulnerable to infiltration, smuggling, and maritime terrorism (e.g., **26/11 Mumbai attacks**). Naval assets like stealth frigates enhance surveillance and deterrence.
- **Blue Economy Protection:** India's maritime zones contribute significantly to trade (**~95% by volume**) and energy imports, requiring strong naval presence to secure Sea Lines of Communication (SLOCs).

- **Non-Traditional Threats:** Piracy, illegal fishing, and trafficking pose internal security risks, especially in regions like the **Arabian Sea and Indian Ocean Region (IOR)**.
- **Strategic Geography:** India's location near critical chokepoints like the **Strait of Hormuz and Malacca Strait** necessitates advanced naval capability for national security.

Project 17A & Indigenous Defence Manufacturing

- **Atmanirbhar Bharat in Defence:** With **75% indigenous content**, Project 17A reflects India's push towards reducing defence imports and building domestic capability.
- **Industrial Ecosystem:** Over **200 MSMEs** are involved, boosting employment, innovation, and technological diffusion in the defence sector.
- **Strategic Autonomy:** Indigenous shipbuilding reduces dependence on foreign suppliers, ensuring **operational independence during conflicts**.
- **Policy Support:** Initiatives like **Defence Acquisition Procedure (DAP 2020)** and **Make in India** promote indigenous defence production.

Stealth Technology & Modern Naval Warfare

- **Reduced Radar Cross Section (RCS):** Stealth design minimizes radar detection, enabling **surprise attacks and survivability** in hostile environments.
- **Electronic Warfare Advantage:** Advanced stealth features help evade enemy sensors and improve **electronic countermeasure effectiveness**.
- **Future Warfare Trends:** Modern naval conflicts increasingly rely on **network-centric and stealth-based operations**, making such frigates crucial.
- **Comparative Capability:** Project 17A frigates match global standards, comparable to advanced frigates of leading navies.

Multi-Dimensional Combat Capability

- **Surface Warfare:** Equipped with **supersonic anti-ship missiles**, enabling engagement of enemy ships at long range.
- **Air Defence Systems:** Advanced missile systems provide protection against **fighter jets, drones, and incoming missiles**.
- **Anti-Submarine Warfare (ASW):** Sonars and torpedoes detect and neutralise underwater threats, critical in the **Indian Ocean Region**.
- **Combat Management System (CMS):** Integrates sensors and weapons, ensuring **real-time situational awareness and rapid decision-making**.

Operational Flexibility & Internal Security Role

- **Maritime Surveillance:** Continuous patrolling helps monitor suspicious activities, enhancing coastal and offshore security.
- **Escort & Deterrence:** Protects merchant vessels and strategic assets, ensuring safe trade routes.
- **Humanitarian Assistance & Disaster Relief (HADR):** Used during natural disasters (cyclones, tsunamis), strengthening India's role as a **net security provider**.
- **Joint Operations:** Supports coordination with Coast Guard and other agencies for **comprehensive maritime security**.

Strategic Significance in Indian Ocean Region (IOR)

- **Countering Regional Threats:** Enhances India's capability amid increasing naval presence of countries like China in the IOR.
- **Indo-Pacific Strategy:** Supports India's vision of **SAGAR (Security and Growth for All in the Region)**.
- **Power Projection:** Enables India to operate in **blue-water environments**, extending its strategic reach.
- **Diplomatic Leverage:** Strengthens India's position in global maritime partnerships and exercises like **Malabar**.

Conclusion

INS Taragiri represents a significant step in **modernising India's naval forces and strengthening internal security through maritime capability**. Going forward, India must focus on **indigenous R&D, integration of AI-driven warfare systems, and enhanced maritime domain awareness (MDA)**. A strong navy is essential not only for external defence but also for addressing **internal security challenges linked to coastal and maritime threats**.

EXPECTED QUESTIONS FOR UPSC CSE

Prelims MCQ

Que. Consider the following statements about Project 17A frigates:

1. They are indigenously built stealth frigates.
2. They are capable of surface, air, and sub-surface warfare.
3. They are built entirely with 100% indigenous content.

Which of the statements given above is/are correct?

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

Answer: (a)

Descriptive Question

Que. Discuss the role of modern naval platforms like stealth frigates in addressing India's internal security challenges related to maritime threats

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NATIONAL FOOD SECURITY ACT (NFSA), 2013

Why in News: India's **National Food Security Act, 2013** is in news due to concerns over **persistent anaemia and uneven improvements in women's nutrition**, despite a decade of implementing the country's **right-to-food framework**.

Key Details

- The **National Food Security Act, 2013** forms the backbone of India's **right-to-food framework**, guaranteeing subsidised food grains and nutrition support.
- The Act provides **subsidised cereals, supplementary nutrition for pregnant and lactating women, young children, and maternity entitlements**.
- Several states have expanded food programmes by including **local foods, millets, and fortified staples** in public nutrition schemes.
- Despite these initiatives, **improvements in women's nutrition remain uneven across regions**.
- **Anaemia among women continues to be a major concern**, indicating persistent nutritional challenges.

Background and Objective

- The **National Food Security Act, 2013** aims to ensure **food and nutritional security** by providing subsidised food grains as a **legal entitlement**.
- It shifts India's food policy from a **welfare-based approach to a rights-based framework**.
- It seeks to guarantee **access to adequate quantity and quality of food at affordable prices**.

Coverage of Population

- Covers about **67% of India's population**.
- Includes:
  - ✓ **75% of the rural population**.
  - ✓ **50% of the** urban **population**.
- Beneficiaries are classified as:
  - ✓ **Priority** households.
  - ✓ **Antyodaya Anna Yojana (AAY) households**.

Food Grain Entitlements

- **Priority households:**
  - ✓ **5 kg food grains per** person **per month**.
- **AAY households:**
  - ✓ **35 kg food grains per** household **per month**.
- Subsidised prices fixed under the Act:
  - ✓ **Rice – ₹3/kg**
  - ✓ **Wheat – ₹2/kg**
  - ✓ **Coarse grains – ₹1/kg.**

Nutritional Support for Vulnerable Groups

- **Children (6 months–6 years)** receive **nutritious meals through Anganwadi centres** under **Integrated Child Development Services**.
- **School children (6–14 years)** receive **mid-day meals** through **Mid-Day Meal Scheme**.
- **Pregnant and lactating women** receive:
  - ✓ **Nutritious meals**.
  - ✓ **Maternity benefit of at least ₹6,000.**

Women Empowerment Provision

- The **eldest woman (18 years or above)** in the household is recognised as the **head of the ration card**.
- Promotes **women's empowerment and decision-making in households**.

Food Security Allowance

- If food grains are **not supplied to beneficiaries**, they are entitled to a **food security allowance** from the government.

Implementation Mechanism

- Implemented through the **Targeted Public Distribution System (TPDS)**.
- Involves **procurement, storage, and distribution of food grains** by the government.

Transparency and Accountability Measures

- **Social audits** to ensure transparency.
- Mandatory **public disclosure of records related to food distribution.**
- Use of **technology such as digitised ration cards and Aadhaar linking** to reduce leakages.

Grievance Redressal System

- Establishment of **State Food Commissions** to monitor implementation.
- District grievance redressal officers to address complaints.
- Mechanisms for **citizens to report irregularities in food distribution**.

Significance

- Provides **legal backing to food security in India**.
- Helps **reduce hunger and malnutrition** among vulnerable populations.
- Strengthens **social protection and poverty alleviation**.
- Improves **nutrition among children, women, and disadvantaged groups**.

Major Challenges

- **Identification errors** leading to exclusion of deserving beneficiaries.
- **Leakages and corruption** in the Public Distribution System.
- **Storage and transportation issues** causing wastage of food grains.
- **High fiscal burden** due to food subsidies.
- Need for **better nutritional diversification beyond cereals**.

Conclusion

India's **National Food Security Act, 2013** has strengthened the right-to-food framework by expanding access to subsidised food and nutrition programmes. However, persistent anaemia and uneven improvements in women's nutrition highlight gaps in implementation. Strengthening diet diversity, maternal nutrition programmes, and state-level innovations will be essential to ensure the Act effectively improves nutritional outcomes across the country**.**

DOUBLE BURDEN OF MALNUTRITION

Why in News: India is witnessing a **rapid rise in obesity alongside persistent undernutrition**, highlighting the need to redesign its nutrition policy framework.

Key Details

- India faces a **double burden of malnutrition** — undernutrition and rising obesity.
- Overweight prevalence has increased sharply, especially among **children and adolescents**.
- Changing diets, urbanisation, and sedentary lifestyles are key drivers.
- Existing policies focus largely on **hunger and undernutrition**, neglecting obesity prevention.

Double Burden of Malnutrition in India

- **Coexistence of Undernutrition and Obesity:** India continues to struggle with undernutrition (stunting, wasting) while obesity is rising rapidly, creating a **dual nutritional challenge**. This reflects uneven development and dietary transitions.
- **Statistical Trends:** Overweight and obesity among individuals aged 15–54 have increased significantly, with **nearly 1 in 4 adults affected** as per recent survey trends (NFHS-5).
- **Intergenerational Impact:** Malnutrition in early childhood leads to poor health outcomes, while obesity in adulthood increases risk of **non-communicable diseases (NCDs)**.

DOUBLE BURDEN OF MALNUTRITION: AN URBANIZING COMMUNITY'S CHALLENGE

Double Burden of Malnutrition: One household, two sides of nutrition insecurity. Left: Micronutrient deficiency and wasting. Right: Obesity and related health risks.

- **Global Context:** India is part of a broader **nutrition transition** seen in developing countries, where economic growth shifts dietary patterns toward unhealthy consumption.

Changing Dietary Patterns and Food Environment

- **Rise of Ultra-Processed Foods:** Increased availability of **processed, calorie-dense foods** high in sugar, salt, and fat has altered consumption patterns, especially in urban and semi-urban areas.
- **Affordability Paradox:** Unhealthy foods are often **cheaper and more accessible**, while nutritious foods like fruits, pulses, and proteins remain relatively expensive.
- **Decline in Dietary Diversity:** Lower-income groups depend on **cereal-heavy diets**, leading to micronutrient deficiencies, while middle-income groups shift toward processed foods.
- **Market and Supply Chain Influence:** Aggressive marketing, food delivery platforms, and global food chains contribute to **dietary homogenisation and unhealthy choices.**

Lifestyle Changes and Urbanisation

- **Sedentary Work Patterns:** Urbanisation and technological advancement have reduced physical activity, with **desk jobs and screen-based routines** becoming dominant.
- **Reduced Physical Activity in Youth:** Despite adolescence being a physically active phase, rising screen time and lifestyle changes have led to **sharp increases in obesity among children**.
- **Urban vs Rural Trends:** While obesity was earlier urban-centric, it is now spreading to **rural areas due to lifestyle diffusion and economic changes**.
- **Impact of Built Environment:** Lack of public spaces, walkability issues, and unsafe urban design discourage physical activity, worsening health outcomes.

Health Implications and NCD Burden

- **Link with Non-Communicable Diseases:** Obesity is a major risk factor for diseases like **diabetes, hypertension, cardiovascular diseases, and stroke**.
- **Rising Healthcare Burden:** Increased NCD prevalence puts pressure on India's healthcare system, raising **public expenditure and out-of-pocket costs**.

- **Demographic Transition:** As life expectancy rises, unhealthy lifestyles among youth today will shape the **disease burden of an ageing population**.
- **Economic Impact:** Productivity losses, increased healthcare costs, and reduced workforce efficiency can negatively impact **economic growth**.

Policy Framework and Institutional Response

- **Focus on Undernutrition:** Government initiatives like **Integrated Child Development Services (ICDS)** and **POSHAN Abhiyaan** have primarily targeted maternal and child undernutrition.
- **Gap in Obesity Prevention:** There is no large-scale, comprehensive policy addressing obesity, reflecting a **policy lag in addressing emerging challenges**.
- **Food Security vs Nutrition Security:** Schemes like **Public Distribution System (PDS)** ensure calorie intake but often fail to ensure **nutritional adequacy and diversity**.
- **Need for Convergence:** Nutrition requires coordination between sectors like **health, agriculture, education, and urban planning**, which is currently limited.

Structural and Socio-Economic Factors

- **Income and Consumption Patterns:** Rising incomes do not guarantee better nutrition, as dietary choices depend on **awareness, access, and cultural preferences**.
- **Inequality in Access:** Poor households face **nutritional deficiencies**, while middle classes face obesity risks, highlighting structural inequalities.
- **Behavioural Aspects:** Lack of awareness and poor dietary habits lead to **misinformed food choices**, even when healthier options are available.
- **Gender Dimension:** Women face dual challenges of undernutrition and obesity, influenced by **social norms, care burden, and access to resources**.

Conclusion

India must transition from a **calorie-centric to a nutrition-sensitive approach**, addressing both deficiency and excess. Policies should promote **healthy diets, behavioural change, physical activity, and regulatory measures on unhealthy food**. A multi-sectoral strategy integrating health, agriculture, and urban planning is essential to tackle the double burden of malnutrition and ensure long-term human capital development.

EXPECTED QUESTIONS FOR UPSC CSE

Prelims MCQ

Que. Which of the following best describes the "double burden of malnutrition"?
(a) Coexistence of hunger and poverty
(b) Coexistence of undernutrition and obesity
(c) Malnutrition in rural and urban areas
(d) Food scarcity and food wastage

Answer: (b)

Descriptive Question

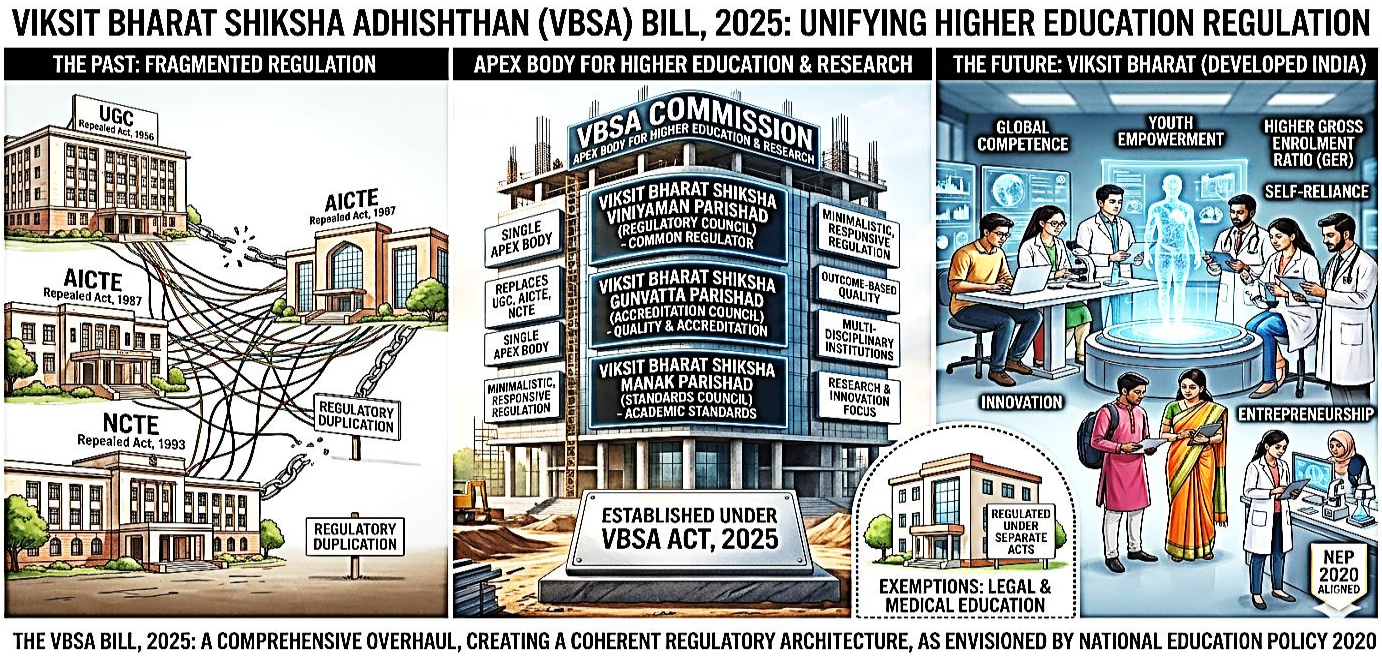
Que. "A nutrition system designed for scarcity must adapt to address excess." Examine in the context of India's changing dietary patterns and health challenges. (150 Words, 10 Marks)

HIGHER EDUCATION REFORMS & REGULATION

Why in News: The proposed **Viksit Bharat Shiksha Adhishthan (VBSA) Bill** seeks to replace the University Grants Commission but has raised concerns regarding centralisation, autonomy, and commercialization of higher education.

Key Details

- The bill proposes replacing the **University Grants Commission (UGC)** with a new umbrella body (VBSA).
- It is inspired by the reform vision of the **National Education Policy 2020**, which aimed for independent and transparent regulation.
- Critics argue that the bill increases **central control and reduces institutional autonomy**.
- The proposal is currently under examination by a **Parliamentary Standing Committee**.



THE VBSA BILL, 2025: A COMPREHENSIVE OVERHAUL, CREATING A COHERENT REGULATORY ARCHITECTURE, AS ENVISIONED BY NATIONAL EDUCATION POLICY 2020

Structural Issues in UGC

- **Bureaucratic Inefficiency:** The UGC has long been criticised for excessive red tape and delays in approvals, affecting timely decision-making in universities.
- **Conflict of Interest:** Overlapping roles in funding, regulation, and accreditation create inherent conflicts, reducing transparency and accountability.
- **Limited Capacity:** With over **1,000 universities and 40,000+ colleges**, UGC lacks adequate domain expertise and institutional capacity for effective regulation.
- **Weak Autonomy:** Despite being a statutory body, UGC often functions under strong government influence, limiting academic independence.

Reform Vision under NEP 2020

- **Separation of Functions:** The NEP proposed dividing regulation, funding, accreditation, and standard-setting into independent verticals to ensure checks and balances.
- **"Light but Tight" Regulation:** Emphasis was on reducing bureaucratic interference while ensuring accountability through transparent norms.
- **Promotion of Autonomy:** Institutions were to be granted academic and administrative freedom, encouraging innovation and research excellence.
- **Ending 'Inspection Raj':** Shift from prior approvals to self-disclosure and outcome-based evaluation mechanisms.

Key Features of VBSA Bill

- **Centralised Appointment Mechanism:** The central government retains control over appointment and removal of members, raising concerns about independence.
- **Umbrella Regulatory Structure:** VBSA supervises multiple councils for regulation, accreditation, and standards, but lacks functional autonomy among them.
- **Expanded Regulatory Powers:** The body can penalise institutions, derecognise degrees, and even recommend closure, indicating coercive authority.
- **Delinking of Funding and Regulation:** Unlike UGC, the bill separates funding without clarity on alternative mechanisms, creating uncertainty.

Issues with the Proposed Bill

- **Centralisation of Power:** Despite multiple bodies, effective control remains with the Union government, contradicting decentralisation principles.
- **Threat to Federalism:** States, which manage over **80%** of higher education institutions, have minimal representation in the proposed structure.
- **Erosion of Academic Autonomy:** Increased regulatory intervention may restrict curriculum design, faculty recruitment, and institutional innovation.
- **Commercialisation Concerns:** Lack of emphasis on public funding may push institutions towards market-driven models, affecting accessibility.

Federalism and Higher Education Governance

- **Constitutional Framework:** Education falls under the Concurrent List**,** requiring cooperative federalism between Centre and States.
- **Role of States:** States establish and fund most universities, making their exclusion from decision-making problematic.
- **Past Mechanisms:** Earlier proposals like advisory councils ensured at least consultative participation of states.
- **Need for Cooperative Governance:** Balanced representation is essential for effective policy implementation and regional diversity.

Public Purpose of Higher Education

- **Equity and Access:** Higher education is crucial for **social mobility**, especially for first-generation learners.
- **Human Capital Development:** Universities contribute to economic growth through skilled workforce and innovation.
- **Social Justice:** Policies like reservations and scholarships aim to reduce inequalities in access.
- **State Responsibility:** Public funding ensures affordability and prevents exclusion due to commercialization.

Way Forward

Reforming the higher education regulatory framework is necessary, but it must align with the principles of **autonomy, federalism, and public accountability**. A balanced approach should:

- Ensure **independent and transparent institutions**
- Strengthen **state participation**
- Maintain **adequate public funding**
- Promote **academic freedom and innovation**

A reform that merely replaces one centralised structure with another risks undermining the very goals of higher education transformation in India.

EXPECTED QUESTIONS FOR UPSC CSE

Prelims MCQ

Que. Consider the following statements regarding higher education regulation in India:

1. UGC performs regulatory, funding, and accreditation functions.
2. NEP 2020 recommends separation of these functions.
3. Education is exclusively a State subject.

Which of the statements are correct?

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

Answer: (a)

Descriptive Question

Que. Critically analyse the need for reform in higher education regulation in India in light of recent legislative proposals. (150 Words, 10 Marks)

INCLUSIVE DIGITAL ACCESSIBILITY

Why in News: Recently, India mandates accessibility features like audio description and captions in all new films, ensuring inclusion of persons with disabilities.

Key Details

- Mandatory **audio description (for visually impaired)** and **same-language captions (for hearing impaired)** in films.
- Based on **Section 42 of the Rights of Persons with Disabilities Act, 2016**.
- Triggered by judicial intervention in the **Pathaan case (Delhi High Court, 2023)**.
- Guidelines issued by the **Ministry of Information and Broadcasting (2024)**.

Legal Framework for Disability Rights

- **Rights of Persons with Disabilities (RPwD) Act, 2016:** Section-42 mandates the government to ensure accessibility in electronic media, making it a **legal obligation rather than a welfare measure**.
- **Constitutional Backing:** Articles **14, 19, and 21** guarantee equality, freedom, and dignity, forming the constitutional basis for **inclusive access to information and culture**.
- **International Commitments:** India is a signatory to the **UN Convention on the Rights of Persons with Disabilities (UNCRPD)**, which obligates states to ensure **equal participation in cultural life**.
- **Shift from Charity to Rights-Based Approach:** Disability is now seen through a **social model**, focusing on removing barriers rather than treating persons with disabilities as passive beneficiaries.

Accessibility in Cinema and Digital Ecosystem

- **Audio Description Technology:** It provides narration of visual elements (actions, expressions, settings), enabling **visually impaired persons to understand films independently**.
- **Same-Language Captions:** Captions display dialogues and sound cues, ensuring **accessibility for hearing-impaired individuals** and improving overall comprehension.
- **App-Based Synchronisation:** Mobile applications sync with theatre audio systems, delivering **real-time accessibility features without disrupting others' viewing experience**.
- **Growing Role of Digital Platforms:** OTT platforms and digital cinema offer **scalable solutions**, but implementation remains uneven compared to theatrical mandates.

Role of Judiciary in Advancing Accessibility

- **Delhi High Court Intervention (2023):** The court addressed lack of accessibility in the film Pathaan, recognising exclusion as a **violation of fundamental rights**.
- **Directive to Government:** It directed the Ministry of Information and Broadcasting to **formulate clear accessibility guidelines**, ensuring systemic reform.
- **Judicial Activism for Inclusion:** Courts have increasingly interpreted accessibility as part of **Article 21 (right to life with dignity)**.
- **Precedent for Future Cases:** The case sets a benchmark for **enforcing accessibility across media sectors**, including OTT and broadcasting.

Government Policy and Implementation

- **Accessibility Guidelines (2024):** Issued by the Ministry of Information and Broadcasting, mandating accessibility features in films by **March 2026**.
- **Time-Bound Compliance:** Clause 6.1 ensures a **clear deadline**, making compliance mandatory for all new releases, including multilingual films.
- **National Awards Linkage:** Accessibility features are linked with eligibility for awards, creating **incentives for industry compliance**.
- **Gaps in OTT Regulation:** OTT platforms have a **phased and delayed implementation timeline**, raising concerns about policy inconsistency.

Socio-Cultural and Economic Implications

- **Inclusion in Cultural Discourse:** Cinema is a major cultural medium; accessibility ensures persons with disabilities can **participate in shared social experiences**.
- **Economic Opportunities:** Expanding accessibility opens up a **large consumer base (over 2.2% of India's population as per Census 2011)**.
- **Reduction of Social Exclusion:** Accessible entertainment promotes **dignity, confidence, and social integration**.

- **Alignment with Digital India:** Supports initiatives like **Digital India and Accessible India Campaign (Sugamya Bharat Abhiyan)**.

Challenges and Limitations

- **Implementation Costs:** Smaller producers may face **financial and technical constraints** in integrating accessibility features.
- **Lack of Awareness:** Limited awareness among filmmakers and theatre owners affects **quality and consistency of implementation**.
- **Technological Barriers:** Dependence on smartphones and apps may exclude users with **limited digital access or literacy**.
- **OTT Sector Delay:** Extended timelines for OTT platforms undermine the goal of **universal accessibility across media**.

Conclusion

India's move to mandate accessibility in cinema marks a significant step towards **inclusive governance and digital equality**. However, ensuring uniform implementation across theatres and OTT platforms, promoting awareness, and supporting industry adaptation are crucial. Accessibility must be seen not as compliance, but as a **fundamental right and an essential component of an inclusive society**. This reform transforms cinema from a selective experience into a **shared national space for all citizens**.

EXPECTED QUESTION FOR UPSC CSE

Prelims MCQ

Que. With reference to the Rights of Persons with Disabilities Act, 2016, consider the following:

1. It mandates accessibility in electronic media.
2. It is based on a rights-based approach.
3. It applies only to government institutions.

Which of the statements are correct?

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

Answer: (a)

HISTORY AND CULTURE

ANCIENT HERITAGE EXCAVATION

Why in News: The **Archaeological Survey of India (ASI)** has initiated large-scale scientific excavation at the **Balirajgarh** site to uncover evidence of ancient settlement linked to the **Videha Kingdom**.

Key Details

- Excavation is being conducted at Balirajgarh, believed to be the **gateway to ancient Mithila civilisation**.
- The site spans **~176 acres** with massive brick fortifications and multi-period habitation evidence.
- Artefacts from **Mauryan, Sunga, Kushan, Gupta, and Pala periods** have been previously found.
- Modern techniques like **satellite mapping and trench excavation** are being used for scientific study.

Archaeological Significance of Balirajgarh

- **Ancient Urban Settlement Evidence:** Balirajgarh shows signs of a **well-planned fortified settlement**, with brick structures indicating advanced urbanisation comparable to early historic sites in India.
- **Continuity of Civilisation:** Excavations suggest habitation across multiple periods including **Mauryan to Pala eras**, reflecting cultural continuity and evolution over centuries.
- **Link to Videha Kingdom:** Scholars associate the site with the **ancient Videha Kingdom (Mithila region)**, known from Vedic and later texts, indicating its historical importance.
- **Mythological Association:** Local traditions connect the site with **King Bali**, highlighting the overlap of mythology and archaeology in reconstructing India's past.

Role of the Archaeological Survey of India (ASI)

- **Nodal Heritage Institution:** Established in **1861**, ASI is responsible for **archaeological research, excavation, and conservation** of monuments under the Ministry of Culture.
- **Scientific Excavation Methods:** The use of **satellite imagery, GIS mapping, and stratigraphic excavation** ensures accuracy in identifying settlement layers and timelines.
- **Protected Site Status:** Balirajgarh has been an ASI-protected site since **1938**, ensuring legal protection and regulated exploration.
- **Cultural Resource Management:** ASI plays a key role in balancing **heritage preservation with development**, ensuring sustainable utilisation of archaeological sites.

Cultural and Historical Context of Mithila Region

- **Centre of Ancient Learning:** Mithila was a prominent centre of **Vedic scholarship and philosophy**, associated with figures like **King Janaka** and traditions of **Nyaya philosophy**.
- **Contribution to Indian Culture:** The region is known for **Madhubani painting**, classical literature, and rich cultural heritage.
- **Iron Age and Early Historic Phase:** The excavation may confirm links to **Iron Age settlements**, potentially pushing back the timeline of organised habitation.
- **Trade and Economy:** Artefacts such as **punch-marked coins and beads** indicate active trade networks and economic activity.

Archaeological Findings and Their Implications

- **Material Culture Evidence:** Discovery of **terracotta figurines, copper objects, and bone tools** reflects technological advancement and social practices.
- **Urban Planning Indicators:** Fortifications and structural remains suggest **planned settlements**, drainage systems, and administrative organisation.
- **Chronological Reconstruction:** Stratified excavation helps establish a **cultural sequence** from Mauryan to later periods, aiding historical reconstruction.
- **Interdisciplinary Insights:** Archaeology integrates with **history, anthropology, and environmental studies** to provide a holistic understanding of past societies.

Contemporary Relevance: Heritage and Development

- **Tourism Potential:** Development of a museum and infrastructure can transform the site into a **major cultural tourism hub**, boosting local economy.
- **Cultural Diplomacy:** Showcasing ancient civilisations enhances India's **soft power and global cultural standing**.
- **Local Economic Growth:** Heritage-based development can generate **employment, infrastructure, and regional development** in Bihar.
- **Challenges in Excavation:** Issues like **high water table, conservation costs, and encroachment** pose challenges to archaeological work.

Conclusion

The excavation at Balirajgarh represents a significant step in uncovering India's ancient past and strengthening cultural identity. Scientific exploration combined with sustainable development can transform such sites into centres of knowledge and economic growth. A balanced approach involving **heritage conservation, community participation, and technological integration** is essential to preserve India's civilisational legacy for future generations.

EXPECTED QUESTIONS FOR UPSC CSE

Prelims MCQ

Que. The Archaeological Survey of India (ASI) functions under:

(a) Ministry of Education
(b) Ministry of Culture
(c) Ministry of Tourism
(d) Ministry of Home Affairs

Answer: (b)

Descriptive Question

Que. Discuss the significance of archaeological excavations in reconstructing ancient Indian history. Illustrate with the example of recent excavations in Bihar. (150 Words, 10 Marks)

PREAH VIHEAR TEMPLE

Why in News: The **Preah Vihear Temple on the Cambodia–Thailand border** has again drawn attention after renewed tensions and damage to the UNESCO World Heritage Site during recent military clashes.

Key Details

- **Preah Vihear Temple**, located in the **Dangrek Mountains**, lies along the disputed **Cambodia–Thailand border**.
- It is a **UNESCO World Heritage Site (2008)** and an important monument of **Khmer architecture dedicated to Lord Shiva**.
- The **International Court of Justice (ICJ)** has ruled that the temple belongs to **Cambodia**, but border tensions persist.
- Recent clashes have caused **damage to the temple complex and displaced civilians**, raising concerns over heritage protection.

Historical Significance of Preah Vihear Temple

- **Ancient Khmer Architecture:** Preah Vihear Temple was built between the **9th and 12th centuries** during the Khmer Empire. It is considered a masterpiece of Khmer architecture similar to Angkor monuments but predates many of them.
- **Religious Importance:** Originally dedicated to **Lord Shiva**, the temple later became a **Buddhist sanctuary**, reflecting the religious transition in Southeast Asia.
- **Unique Mountain Temple Design:** Unlike most Khmer temples located in plains, Preah Vihear sits on a **525-metre-high cliff in the Dangrek Mountains**, designed as a symbolic "stairway to heaven".
- **Cultural Heritage Value:** The temple complex includes **pavilions, courtyards, and stone causeways**, showcasing advanced architectural and artistic traditions of the Khmer civilisation.

Cambodia–Thailand Border Dispute

- **Colonial-Era Boundary Issues:** The border dispute originates from **French colonial maps of 1907**, when Cambodia was part of French Indochina. Thailand later contested the boundary interpretation.
- **International Court of Justice (ICJ) Judgement (1962):** The ICJ ruled that **Preah Vihear Temple belongs to Cambodia**, although the surrounding territory remained disputed.
- **UNESCO Listing and Renewed Tensions (2008):** When the temple was declared a **UNESCO World Heritage Site**, Thailand protested, leading to renewed diplomatic and military tensions.
- **Recent Military Clashes:** Sporadic clashes between Cambodian and Thai forces have caused **casualties, displacement of civilians, and damage to cultural heritage structures**.

Strategic and Geopolitical Importance

- **Border Geography:** The temple is located on a **cliff overlooking Thailand**, giving it strategic military significance despite being primarily a heritage site.
- **Symbol of National Identity:** Both Cambodia and Thailand view the temple as a **symbol of national pride and cultural heritage**, intensifying political sensitivities.
- **Security Concerns:** The region has historically witnessed conflict, including being a **stronghold of the Khmer Rouge** in the late 20th century.
- **Regional Stability Issues:** Border disputes between neighbouring states can affect **ASEAN cooperation and regional diplomatic relations**.

Threats to Cultural Heritage

- **Damage from Armed Conflict:** Artillery fire, landmines, and military infrastructure have damaged **ancient carvings, columns, and temple structures**.
- **Loss of Archaeological Heritage:** Experts warn that once destroyed, original heritage structures **cannot be authentically restored**, leading to permanent cultural loss.
- **Unexploded Ordnance and Landmines:** The surrounding region remains contaminated with **unexploded explosives**, restricting conservation work and tourism.
- **Interrupted Restoration Projects:** International restoration efforts involving **India, China, and the United States** have slowed due to security concerns.

Protection of Cultural Heritage during Conflict

- **International Conventions:** The **1954 Hague Convention for the Protection of Cultural Property in Armed Conflict** seeks to safeguard heritage sites during wars.
- **UNESCO's Role:** UNESCO monitors World Heritage Sites and provides technical and financial support for conservation.
- **Global Examples of Heritage Loss:** Conflicts in **Syria, Iraq, and Afghanistan** have shown how wars can destroy invaluable historical monuments.
- **Need for International Cooperation:** Heritage preservation requires **diplomatic coordination, demilitarisation of heritage zones, and joint conservation initiatives**.

Conclusion

The Preah Vihear dispute highlights the complex relationship between **heritage, nationalism, and geopolitics**. While international rulings have clarified ownership, sustainable peace requires diplomatic dialogue, confidence-building measures, and joint conservation efforts. Protecting cultural heritage during conflicts is not only a regional responsibility but also a global commitment to preserving humanity's shared past.

HERITAGE CONSERVATION IN INDIA

Why in News: The Archaeological Survey of India was criticised by the Delhi High Court for delays in surveying encroachments around Tughlaqabad Fort.

Key Details

- The court had directed ASI to conduct a **survey of encroachments**, but the work has been delayed for nearly six months.
- The survey will identify **illegal occupations, jhuggi clusters, residential and commercial structures**.
- The report is to be submitted to the **Ministry of Housing and Urban Affairs** for further action.
- The court expressed concern over **administrative inefficiency and lack of accountability**.

Archaeological Survey of India (ASI)

- **Nodal Agency for Heritage Conservation:** ASI functions under the **Ministry of Culture** and is responsible for the protection, preservation, and maintenance of **centrally protected monuments** across India.
- **Legal Authority under AMASR Act, 1958:** The Ancient Monuments and Archaeological Sites and Remains Act 1958 empowers ASI to regulate construction and prevent encroachments within protected and prohibited areas.
- **Scale of Responsibility:** ASI protects over **3,600 monuments**, including UNESCO World Heritage Sites, requiring extensive administrative and technical capacity.
- **Functions Beyond Conservation:** It undertakes **archaeological excavations, epigraphy, museum management, and heritage awareness**, making it a multidisciplinary institution.

Tughlaqabad Fort: Historical & Cultural Significance

- **Medieval Architectural Heritage:** Built in the 14th century by Ghiyasuddin Tughlaq, the fort represents **Tughlaq architecture** characterised by massive stone structures and defensive planning.
- **Strategic and Urban Importance:** It was conceived as a fortified city, reflecting **early urban planning and military strategy** during the Delhi Sultanate.
- **Protected Monument Status:** The site is a centrally protected monument under ASI, making it legally safeguarded from encroachments and illegal constructions.
- **Tourism and Educational Value:** The fort is an important **historical and tourist site in Delhi**, contributing to cultural awareness and heritage education.

Issue of Encroachments on Heritage Sites

- **Urbanisation Pressure:** Rapid urban expansion in cities like Delhi has led to **informal settlements and commercial encroachments** around protected monuments.
- **Socio-economic Dimensions:** Encroachments often involve **economically weaker sections**, making eviction politically and socially sensitive.
- **Impact on Heritage Integrity:** Illegal constructions damage **structural stability, aesthetic value, and archaeological context** of monuments.
- **Examples Across India:** Encroachment issues are also seen at sites like **Red Fort, Qutub Minar surroundings, and Purana Qila**, indicating a systemic challenge.

Governance & Administrative Challenges

- **Delay in Implementation:** The six-month delay in issuing a survey work order highlights **bureaucratic inefficiency and procedural delays**.
- **Coordination Issues:** Effective action requires coordination between **ASI, state authorities, municipal bodies, and police**, which often remains weak.
- **Capacity Constraints:** ASI faces **shortage of manpower, technical expertise, and financial resources**, affecting timely execution of projects.
- **Judicial Intervention:** Frequent court interventions indicate gaps in executive functioning and underline the **role of judiciary in governance oversight**.

Legal & Policy Framework for Heritage Protection

- **AMASR (Amendment) Act, 2010:** Introduced **prohibited (100m) and regulated (200m) zones** around monuments to control construction activities.
- **National Monuments Authority (NMA):** Regulates construction in protected areas and grants permissions, ensuring **balanced development and conservation**.
- **UNESCO & Global Commitments:** India follows international conventions on heritage preservation, emphasising **sustainable management of cultural assets**.
- **Smart Cities & Urban Planning:** Integration of heritage conservation into **urban planning frameworks** remains inadequate and needs strengthening.

Broader Implications

- **Threat to Cultural Identity:** Neglect of monuments undermines India's **civilisational heritage and historical continuity**.
- **Tourism and Economic Loss:** Poor conservation affects tourism potential, leading to **loss of revenue and employment opportunities**.
- **Rule of Law Concerns:** Failure to act against encroachments weakens **legal enforcement and governance credibility**.
- **Need for Public Participation:** Conservation cannot succeed without **community involvement and awareness**.

Way Forward

- **Time-bound Surveys and Action Plans:** Ensure strict deadlines and accountability mechanisms for ASI and concerned agencies.
- **Use of Technology:** Employ GIS mapping, drones, and digital records for accurate and efficient surveys.
- **Community Engagement:** Involve local communities through awareness campaigns and rehabilitation measures.
- **Institutional Strengthening:** Increase funding, manpower, and inter-agency coordination for effective heritage governance.
- **Integrated Urban Planning:** Align conservation efforts with urban development policies to ensure sustainable protection.

Conclusion:

The Tughlaqabad case highlights the urgent need to balance **heritage conservation with urban realities**, ensuring that India's cultural legacy is preserved for future generations.

EXPECTED QUESTIONS FOR UPSC CSE

Prelims MCQ

Que. The Ancient Monuments and Archaeological Sites and Remains Act, 1958 is related to:

(a) Wildlife conservation
(b) Heritage protection
(c) Forest management
(d) Urban governance

Answer: (b)

Descriptive Question

Que. Discuss the challenges faced by the Archaeological Survey of India in protecting heritage sites in India. Suggest measures for effective conservation. (250 Words, 15 Marks)

GOLESTAN PALACE

Why in News: Golestan Palace reportedly suffered damage due to nearby airstrikes amid West Asian tensions (2026).

About Golestan Palace

- A historic royal complex in Tehran, associated with the Qajar dynasty.
- One of the **oldest monuments in Tehran** and former seat of royal power.
- Inscribed as a UNESCO World Heritage Site in **2013**.

Key Features

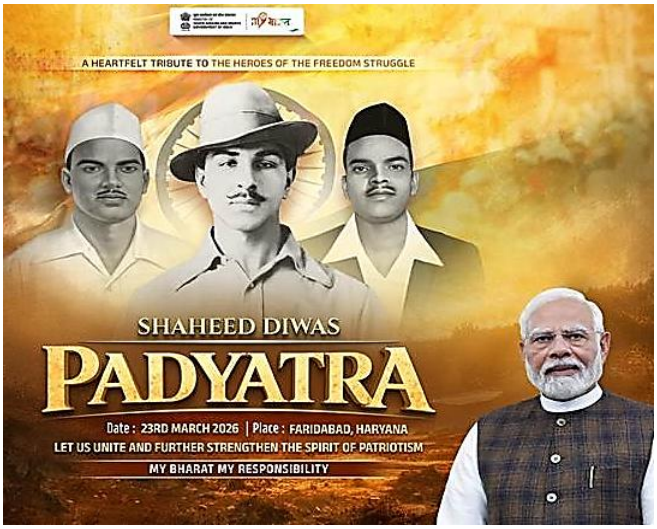
- **Architectural Complex:**
  - ✓ Comprises ~17 structures including palaces, halls, museums, and gardens.
- **Fusion of Styles:**
  - ✓ Blend of **Persian architecture** with **European artistic elements** (19th century influence).
- **Important Structures:**
  - ✓ Marble Throne (Takht-e Marmar)
  - ✓ Shams-ol-Emareh (Edifice of the Sun)
  - ✓ Mirror Hall, Salam Hall, Diamond Hall
- **Cultural Repository:**
  - ✓ Houses **manuscripts, archival records, and early photographic collections** of Iran.
- **Ceremonial Significance:**
  - ✓ Venue for **coronations, royal functions, and diplomatic events**.

SHAHEED DIWAS AND REVOLUTIONARY NATIONALISM IN INDIA

Why in News: Shaheed Diwas is observed annually on 23rd March to honour the sacrifices of Bhagat Singh, Shivaram Rajguru, and Sukhdev Thapar, who were executed by the British colonial government in 1931.

Key Details

- Shaheed Diwas is observed every year on 23rd March to commemorate the martyrdom of three prominent revolutionaries. This day highlights their sacrifice and contribution to India's freedom struggle.
- They were executed in Lahore Central Jail by the British government in 1931. The execution became a turning point in inspiring revolutionary nationalism across India.



- India also observes Martyrs' Day on 30th January to mark the assassination of Mahatma Gandhi. Both days honour sacrifices but reflect different strands of the freedom movement.
- Shaheed Diwas represents the role of revolutionary ideology alongside non-violent resistance. It emphasises the diversity of approaches adopted in India's struggle for independence.

Historical Background

- **Simon Commission Protest (1928):** Lala Lajpat Rai was injured during a lathi charge while protesting against the commission. His death became a major trigger for revolutionary actions against British officials.
- **Revolutionary Response:** Members of the Hindustan Socialist Republican Association planned to avenge his death. This marked a shift towards organised revolutionary resistance against colonial rule.
- **Lahore Conspiracy Case (1929):** Revolutionaries targeted British officer J.P. Saunders instead of James Scott. This incident led to their arrest and eventual trial under colonial laws.
- **Execution (1931):** The three revolutionaries were executed on 23rd March 1931. Their sacrifice turned them into national heroes and symbols of resistance.

Bhagat Singh: Ideology and Contribution

- **Early Life:** Bhagat Singh was born in 1907 in Punjab and came from a politically active family. His upbringing deeply influenced his commitment to the freedom struggle.
- **Influence of Events:** The Jallianwala Bagh massacre had a profound impact on his thinking. It strengthened his resolve to fight against British oppression.
- **Revolutionary Activities:** He joined revolutionary organisations and founded youth groups like Naujawan Bharat Sabha. These efforts aimed to mobilise young Indians for nationalist causes.
- **Assembly Bomb Incident (1929):** Along with Batukeshwar Dutt, he threw non-lethal bombs in the Central Legislative Assembly. The act was symbolic, intended to protest repressive laws and "make the deaf hear."
- **Ideological Contributions:** His writings like Why I Am an Atheist reflect rationalism and social justice. He advocated equality and opposed exploitation in all forms.
- **Legacy:** Known as "Shaheed-e-Azam", he popularised the slogan "Inquilab Zindabad". His ideas continue to inspire youth and democratic values in India.

Sukhdev Thapar and Shivaram Rajguru

- **Sukhdev Thapar:** A key member of HSRA who organised revolutionary networks in Punjab. He played a major role in planning and executing revolutionary activities.
- **Shivaram Rajguru:** Known for his courage and marksmanship in revolutionary actions. He actively participated in the assassination of Saunders as part of the HSRA plan.
- **Collective Contribution:** Both were close associates of Bhagat Singh and shared similar ideological beliefs. Their coordinated efforts strengthened the revolutionary movement.
- **Martyrdom:** Their execution alongside Bhagat Singh symbolised unity and sacrifice. It intensified nationalist sentiments across the country.

Revolutionary Nationalism vs Non-Violence

- **Revolutionary Approach:** Focused on armed resistance and direct action against colonial authorities. It aimed to awaken masses through bold and symbolic acts.
- **Non-Violent Approach:** Led by leaders like Mahatma Gandhi, emphasising peaceful resistance. It sought mass participation through civil disobedience and moral pressure.
- **Complementary Roles:** Both approaches contributed significantly to India's independence. They represented different strategies towards a common goal.

Significance of Shaheed Diwas

- **National Integration:** The sacrifices of revolutionaries unite people across regions and communities. It reinforces a shared sense of national identity and pride.
- **Youth Inspiration:** Their courage motivates young individuals to contribute to nation-building. It promotes values like patriotism, courage, and sacrifice.
- **Historical Awareness:** Observance of the day keeps alive the memory of India's freedom struggle. It ensures that future generations understand their heritage.
- **Contemporary Relevance:** It reminds citizens of the importance of safeguarding democratic values. It also highlights the need for active civic participation.

Way Forward

- **Promoting Awareness:** Include detailed study of revolutionary movements in education. This will help students understand the diversity of India's freedom struggle.
- **Preservation of Memorials:** Sites like Hussainiwala National Martyrs Memorial should be preserved and promoted. They serve as important reminders of historical sacrifices.
- **Youth Engagement:** Encourage participation in debates, essays, and discussions on nationalism. This will connect younger generations with historical values.
- **Balanced Perspective:** Recognise both revolutionary and non-violent contributions equally. This ensures a holistic understanding of India's independence movement.

Conclusion

Shaheed Diwas symbolises the spirit of sacrifice and revolutionary nationalism in India's freedom struggle. The contributions of Bhagat Singh, Rajguru, and Sukhdev highlight the importance of courage, ideology, and commitment in achieving independence.

EXPECTED QUESTION FOR UPSC CSE

Prelims MCQ

Que. With reference to Shaheed Diwas and revolutionary movements in India, consider the following statements:

1. Shaheed Diwas is observed on 23rd March to commemorate the execution of Bhagat Singh, Rajguru, and Sukhdev.
2. The Lahore Conspiracy Case involved the assassination of British officer James Scott.
3. Bhagat Singh and Batukeshwar Dutt threw bombs in the Central Legislative Assembly as a symbolic protest.

How many of the above statements are correct?

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

Answer: (b)

Descriptive Question

Que. "Revolutionary nationalism played a crucial role alongside non-violent movements in India's freedom struggle." Discuss with reference to Bhagat Singh and his associates. (250 words, 15 marks)

DANDI MARCH AND CIVIL DISOBEDIENCE MOVEMENT

Why in News: The Vice President paid homage to Mahatma Gandhi and participants of the Dandi March, highlighting its relevance in promoting self-reliance and guiding India towards Atmanirbhar Bharat.

Key Details

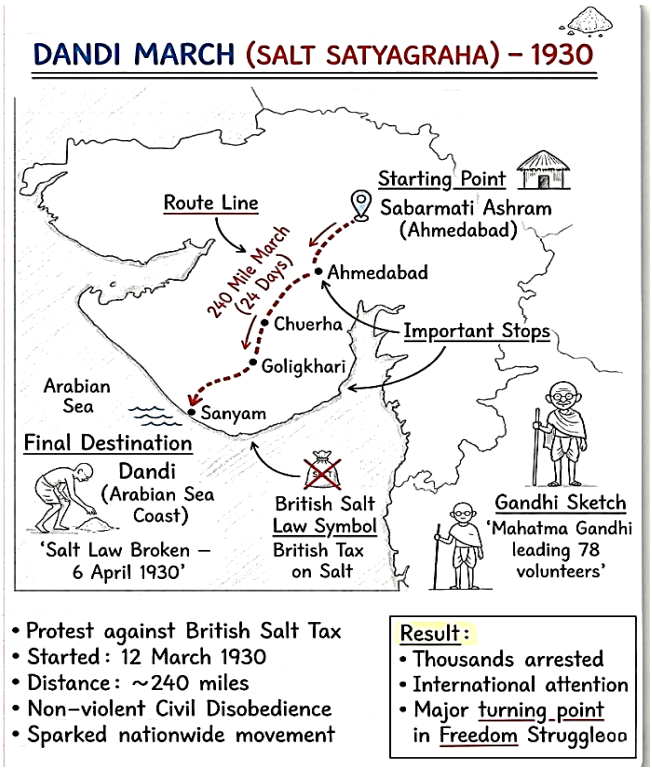
- The Dandi March (1930) was a landmark event in India's freedom struggle led by Mahatma Gandhi. It aimed to challenge British colonial rule through peaceful civil disobedience.
- The movement targeted the unjust salt tax imposed by the British government. Salt was chosen as it was a basic necessity, affecting every Indian regardless of class.
- The march transformed into a nationwide mass movement with widespread participation. It mobilised people from rural and urban areas, strengthening the freedom struggle.
- It marked the beginning of the Civil Disobedience Movement in India. This phase intensified the demand for complete independence (Purna Swaraj).

Civil Disobedience Movement

- **Definition:** Civil disobedience refers to the non-violent refusal to obey unjust laws. It is based on moral resistance and aims to challenge authority without violence.
- **Gandhian Philosophy:** Gandhi emphasised truth (Satya) and non-violence (Ahimsa). This approach ensured mass participation while maintaining ethical legitimacy.
- **Objective:** The movement sought to weaken British authority and assert Indian rights. It aimed to achieve Swaraj through peaceful resistance.
- **Mass Participation:** People from all sections—peasants, women, and students—joined. This made the movement a truly national struggle rather than an elite initiative.

Timeline and Key Events of Dandi March

- **Start of the March:** The march began on 12th March 1930 from Sabarmati Ashram. Gandhi was accompanied by 78 selected volunteers initially.
- **Journey and Expansion:** The march covered around 240 miles to Dandi in Gujarat. During the journey, thousands of people joined, turning it into a mass movement.
- **Breaking the Salt Law:** On 6th April 1930, Gandhi picked up salt from the seashore. This symbolic act marked open defiance of British laws.
- **Spread Across India:** Leaders like C. Rajagopalachari and K. Kelappan led similar movements. This decentralised resistance strengthened the national movement.



British Policies and Economic Exploitation

- **Salt Tax and Monopoly:** The British imposed a tax on salt and controlled its production. This forced Indians to buy expensive salt, even though it was naturally available.
- **Impact on Poor:** The tax disproportionately affected poor and marginalised communities. It highlighted the exploitative nature of colonial economic policies.
- **Symbolic Resistance:** Salt became a powerful symbol of oppression and resistance. It connected the freedom struggle to everyday life of common people.
- **Legal Framework:** Laws like the Salt Act of 1882 enforced strict control. Violation of these laws invited punishment, making resistance risky yet impactful.

Repression and British Response

- **Mass Arrests:** The British government arrested thousands of protestors. Gandhi himself was arrested on 5th May 1930.
- **Dharasana Incident:** After Gandhi's arrest, Sarojini Naidu led protests at Dharasana Salt Works. Peaceful protestors faced brutal lathi-charge by British police.
- **International Reporting:** Journalist Webb Miller reported the violence globally. This exposed the brutality of British rule to the world.

- **Suppression Strategy:** The British aimed to crush the movement through force. However, repression further strengthened public resistance.

Impact and Significance

- **Mass Mobilisation:** The movement united people across regions and social groups. It transformed the freedom struggle into a nationwide mass movement.
- **Global Attention:** The march attracted international media coverage. It highlighted the moral strength of India's non-violent resistance.
- **Challenge to British Legitimacy:** It exposed the unjust nature of colonial rule. This weakened Britain's moral authority globally.
- **Inspiration to World:** Leaders like Martin Luther King Jr. drew inspiration from Gandhi. It influenced global movements for civil rights and justice.

Relevance in Contemporary India

- **Atmanirbhar Bharat:** The idea of self-reliance reflects Gandhi's principles. It promotes economic independence and sustainable development.
- **Democratic Values:** Peaceful protest remains a cornerstone of democracy. It ensures accountability and citizen participation.
- **Ethical Leadership:** Gandhi's approach emphasises moral responsibility. It remains relevant in governance and public life today.
- **Nation Building:** The spirit of unity and participation is essential for progress. It continues to guide India's development journey.

Way Forward

- **Promoting Civic Awareness:** Educating citizens about constitutional rights and duties. This strengthens democratic participation and accountability.
- **Encouraging Non-violent Methods:** Peaceful protest should remain the primary tool. It ensures stability while addressing grievances.
- **Inclusive Development:** Policies must reflect the needs of all sections of society. This aligns with Gandhi's vision of social justice.
- **Historical Awareness:** Learning from past movements strengthens national identity. It helps in building informed and responsible citizens.

Conclusion

The Dandi March was not just a protest against salt tax but a powerful assertion of freedom, dignity, and self-reliance. Its principles of non-violence and mass participation remain highly relevant in modern India and global politics.

EXPECTED QUESTIONS FOR UPSC CSE

Prelims MCQ

Que. Which of the following statements is/are correct regarding the Salt March?

1. It started from Sabarmati Ashram.
2. It ended in Karachi.
3. Sarojini Naidu led the Dharasana protest after Gandhi's arrest.

Select the correct answer using the code below:

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

Answer: (b)

Descriptive Question

Que. "The Dandi March transformed India's freedom struggle into a mass movement." Discuss its significance and relevance in contemporary India. (250 words, 15 marks)

MAHAD SATYAGRAHA

Why in News: The Mahad Satyagraha marks its 99th anniversary on 20 March 2026, which is also observed as Social Empowerment Day, highlighting its role in India's fight against caste discrimination.

Key Details

- The Mahad Satyagraha was led by B. R. Ambedkar in 1927 to secure equal access to public water sources. It was one of the first organized mass movements against caste-based discrimination in India.
- The movement asserted the rights of Dalits (Depressed Classes) to access the Chavdar Tank in Maharashtra. This was both a legal and moral assertion of equality in public spaces.
- It exposed the deep-rooted caste prejudices in Indian society despite legal provisions supporting equality. The resistance from upper castes showed the gap between law and social practice.
- The event is considered a milestone in India's social reform movements and Dalit empowerment. It laid the foundation for future struggles for equality and constitutional rights.

Background of the Mahad Satyagraha

- **S. K. Bole Resolution (1923):** It mandated opening public spaces like wells and dharamshalas to Depressed Classes. However, its implementation faced strong opposition from dominant caste groups.
- **Mahad Municipal Decision (1924):** The local body officially allowed access to Chavdar Tank. Despite this, social resistance prevented Dalits from exercising this right.
- **Denial of Rights:** Dalits were still barred from accessing public resources. This highlighted the persistence of untouchability in society.
- **Need for Direct Action:** Legal provisions alone proved insufficient to ensure equality. This led to the launch of a mass movement under Ambedkar.

Events of the Mahad Satyagraha (1927)

- **March for Dignity:** On 20 March 1927, Ambedkar led a peaceful march to drink water from the Chavdar Tank. This act symbolized the assertion of basic human rights and equality.

- **Social Backlash:** Upper-caste groups attacked protestors and opposed the movement. The tank was symbolically "purified," reflecting entrenched caste prejudice.
- **Burning of Manusmriti:** Ambedkar publicly burned the Manusmriti in December 1927. This act rejected the ideological basis of caste discrimination.
- **Legal Victory (1937):** The Bombay High Court ruled in favour of Dalits' access to the tank. This marked the eventual success of the movement through legal means.

Significance of the Mahad Satyagraha

- **Shift to Direct Action:** It marked a transition from petitions to active mass mobilisation. This empowered marginalized communities to assert their rights directly.
- **Assertion of Human Rights:** Access to water symbolized dignity and equality. The movement highlighted that basic resources are fundamental rights.
- **Social Awakening:** It challenged caste-based discrimination at its roots. It also inspired similar movements across India.
- **Political Consciousness:** Dalits became more aware of their rights and identity. This strengthened the foundation of Dalit political movements.

Feminist Dimensions of the Movement

- **Role of Women:** Dalit women actively participated in the movement. This made it one of the early examples of inclusive social reform.
- **Ambedkar's Appeal:** He encouraged women to reject symbols of caste oppression. This promoted dignity and equality among women.
- **Intersectionality:** The movement addressed both caste and gender discrimination. It highlighted the interconnected nature of social inequalities.
- **Social Reform Impact:** Women's participation strengthened the movement's reach. It contributed to broader social transformation.

Constitutional Linkages

- **Article 15:** Prohibits discrimination on grounds of religion, race, caste, sex, or place of birth. It reflects the ideals of equality promoted during the Mahad movement.
- **Article 17:** Abolishes untouchability in all forms. This directly addresses the issues raised during the Satyagraha.
- **Moral Foundation:** The movement influenced the framing of constitutional values. It ensured legal protection for marginalized communities.
- **Social Justice Framework:** It laid the groundwork for affirmative action policies. This continues to shape India's democratic structure.

Mahad Satyagraha vs Salt Satyagraha

- **Nature of Oppression:** Mahad targeted caste-based social oppression, while the Salt Satyagraha targeted British colonial rule. This highlights internal vs external dimensions of exploitation.
- **Symbolism:** Water represented basic human dignity, while salt symbolized economic freedom. Both used essential resources to mobilize masses.
- **Concept of Swaraj:** Ambedkar emphasized social equality before political freedom. Gandhi focused on political independence from British rule.
- **Depth of Reform:** Mahad demanded structural social change. Salt Satyagraha focused on specific colonial policies.

Way Forward

- **Strengthening Social Equality:** Continuous efforts are needed to eliminate caste-based discrimination. Legal provisions must be supported by social awareness.
- **Inclusive Development:** Policies should focus on marginalized communities. This ensures equitable access to resources and opportunities.
- **Education and Awareness:** Promoting constitutional values is essential. This can help reduce social prejudices over time.
- **Institutional Support:** Strong implementation of laws is necessary. This will ensure justice and equality in practice.

Conclusion

The Mahad Satyagraha was a landmark movement in India's struggle for social justice and equality. It demonstrated that true freedom requires both social and political empowerment, making it highly relevant even today.

EXPECTED QUESTIONS FOR UPSC CSE

Prelims MCQ

Que. Which of the following Articles of the Indian Constitution are directly related to the ideals of the Mahad Satyagraha?

1. Article 14
2. Article 15
3. Article 17
4. Article 21

Select the correct answer using the code below:

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

Answer: (c)

Descriptive Question

Que. "The Mahad Satyagraha was not just a struggle for access to water but a movement for human dignity and social justice." Discuss its significance in shaping modern India. (250 words, 15 marks)

GOVERNMENT SCHEMES

PRADHAN MANTRI KAUSHAL VIKAS YOJANA (PMKVY)

Why in News: PMKVY is in news due to government review of its performance, focus on improving placement outcomes, **strengthening industry linkages**, and aligning skill training with emerging sectors and employment demands.

Key Details

- Launched in **2015** under Skill India Mission.
- Provides **free, industry-linked skill training**.
- Includes **STT and RPL** certification.
- Targets **unemployed youth and informal workers**.
- Aims to improve **employability and productivity**.

About

- Flagship skill certification scheme of the Government of India.
- Launched in **2015** under the **Skill India Mission**.
- Implemented by the **Ministry of Skill Development and Entrepreneurship (MSDE)**.
- Focuses on demand-driven, industry-linked skill training.

Vision and Goals

- Create a **skilled and job-ready workforce**.
- Reduce the gap between **education and employability**.
- Support India's demographic dividend.
- Contribute to economic growth through **human capital development**.

Key Objectives

- Provide **short-term training (STT)** to unemployed youth.
- Promote **Recognition of Prior Learning (RPL)** for informal workers.
- Encourage **entrepreneurship and self-employment**.
- Improve placement opportunities through industry partnerships.

Main Components

- **Short-Term Training (STT):** Skill courses with assessment and certification.
- **Recognition of Prior Learning (RPL):** Certification of existing skills.
- **Special Projects:** Customized training for special groups, regions, or sectors.
- **Kaushal and Rozgar Melas:** Job fairs for placement support.

Salient Features

- Training aligned with **National Skill Qualification Framework (NSQF)**.
- Courses designed as per **Sector Skill Councils (SSCs)** standards.
- Assessment by independent third-party agencies.
- Soft skills, financial literacy, and digital literacy included.
- Focus on practical, hands-on learning.

Target Beneficiaries

- Unemployed youth (18–35 years generally).
- School/college dropouts.
- Workers in the unorganized sector.
- Women, SC/ST, minorities, & other disadvantaged groups.

Sectors Covered

- Manufacturing and construction.
- Healthcare and retail.
- IT and electronics.
- Tourism and hospitality.
- Agriculture and allied sectors.

Positive Impacts

- Enhances employability and productivity.
- Supports initiatives like Make in India and Atmanirbhar Bharat.
- Formal recognition of informal skills.
- Promotes inclusive growth and social mobility.

Challenges

- Quality control and monitoring issues.
- Placement sustainability concerns.
- Skill mismatch with industry demand in some sectors.
- Need for stronger industry–training center linkage.

Conclusion

Pradhan Mantri Kaushal Vikas Yojana plays a vital role in strengthening India's human capital by equipping youth **with industry-relevant skills**. It supports employability, entrepreneurship, and inclusive growth while addressing the country's skill gap. However, **improving training quality,** monitoring mechanisms, and sustainable placements is essential to maximize its long-term impact on economic development and **workforce productivity.**

EXPECTED QUESTION FOR UPSC CSE

Prelims MCQ

Que. With reference to the Pradhan Mantri Kaushal Vikas Yojana, consider the following statements:

1. It was launched under the Skill India Mission in 2015.
2. It provides Recognition of Prior Learning (RPL) to informal workers.

3. It is implemented by the Ministry of Labour and Employment.
Which of the statements given above is/are correct?
(a) 1 and 2 only
(b) 2 and 3 only
(c) 1 and 3
(d) 1, 2 and 3

Answer: (a)

MODIFIED UDAN

Why in News: The Union Cabinet has approved the Regional Connectivity Scheme – UDAN (Modified UDAN) with an outlay of ₹28,840 crore for 2026–2036 to enhance regional air connectivity and strengthen India's aviation ecosystem.

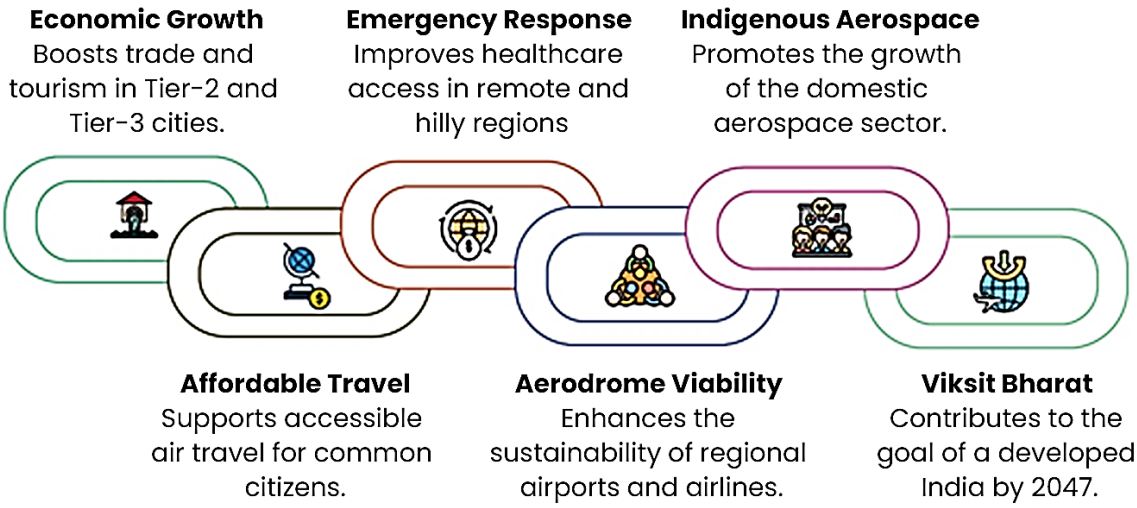
Key Details

- The Modified UDAN is an upgraded version of India's regional connectivity scheme aimed at improving accessibility to underserved regions. It focuses on making air travel affordable, widespread, and sustainable for the next decade.
- The scheme was approved in March 2026 and will be implemented from FY 2026–27. It builds upon the success of the original UDAN scheme launched in 2016.
- It aims to connect Tier-2 and Tier-3 cities with major urban centres. This will help integrate remote regions into the national economic framework.
- The scheme aligns with the vision of Viksit Bharat 2047. It seeks to create a globally competitive and inclusive aviation sector in India.

About UDAN Scheme

- **Full Form:** UDAN stands for "Ude Desh ka Aam Nagrik". It aims to make air travel accessible to the common citizen at affordable rates.
- **Launch:** The original scheme was launched in 2016 under the Ministry of Civil Aviation. It marked a major shift towards inclusive and regional air connectivity.
- **Objective:** To connect unserved and underserved airports across India. This helps reduce regional imbalance in infrastructure development.
- **Fare Cap Mechanism:** Airfares are subsidised and capped under the scheme. This ensures affordability while maintaining airline participation.

Potential Impact of Modified UDAN Scheme



Key Features of Modified UDAN

- **Infrastructure Expansion (CAPEX):** ₹12,159 crore allocated to develop 100 new airports. This will utilise existing airstrips and improve regional aviation infrastructure.
- **Modern Helipad Network:** 200 helipads will be developed, especially in hilly and remote regions. This will enhance connectivity in areas where traditional airports are not feasible.
- **Viability Gap Funding (VGF):** ₹10,043 crore allocated to support airline operations. It ensures airlines remain financially viable while offering low-cost tickets.
- **Operation & Maintenance Support:** Government support for 3 years for around 441 aerodromes. This ensures sustainability of newly developed infrastructure.
- **Atmanirbhar Aviation Push:** Focus on indigenous aircraft like HAL Dhruv and Dornier. This promotes domestic manufacturing and reduces dependence on imports.

Significance of the Scheme

- **Regional Economic Growth:** Improved connectivity boosts trade, tourism, and investment. It integrates smaller cities into the national and global economy.
- **Inclusive Development:** Enhances accessibility for people in remote and rural areas. This supports balanced regional development and reduces disparities.
- **Disaster Management Support:** Helipads improve emergency response and medical evacuation. This is particularly useful in hilly and disaster-prone regions.
- **Affordable Air Travel:** Subsidised fares enable common citizens to access air transport. This democratizes aviation and increases passenger traffic.

Challenges and Concerns

- **Financial Sustainability:** High dependence on government subsidies may strain public finances. Long-term viability depends on increasing passenger demand and operational efficiency.
- **Infrastructure Bottlenecks:** Land acquisition and regulatory clearances can delay projects. This may affect timely implementation of new airports and helipads.
- **Airline Participation:** Limited participation by private airlines in low-demand routes. This may impact connectivity goals in remote regions.
- **Operational Challenges:** Maintaining low fares while ensuring profitability is difficult. This creates a challenge for both airlines and policymakers.

Way Forward

- **Public-Private Partnerships:** Encourage private investment in regional aviation infrastructure. This can reduce fiscal burden and improve efficiency.
- **Demand Creation:** Promote tourism and local industries to increase passenger traffic. Higher demand will improve route viability.
- **Technological Integration:** Use digital platforms for route optimisation and passenger services. This will enhance efficiency and reduce operational costs.
- **Policy Stability:** Ensure long-term policy support and regulatory clarity. This will encourage sustained investment in the aviation sector.

Conclusion

The Modified UDAN scheme is a major step towards inclusive and sustainable aviation growth in India. By improving regional connectivity and promoting indigenous capabilities, it supports economic development and national integration. However, addressing financial and operational challenges will be crucial for its long-term success.

EXPECTED QUESTION FOR UPSC CSE

Descriptive Question

Que. "Regional connectivity is critical for inclusive economic growth in India." Discuss the significance of the UDAN scheme and examine the challenges in its effective implementation. (250 words, 15 marks)

BHARAT AUDYOGIK VIKAS YOJNA (BHAVYA) AND INDUSTRIAL GROWTH

Why in News: The Union Cabinet has approved the Bharat Audyogik Vikas Yojna with an outlay of ₹33,660 crore to develop 100 plug-and-play industrial parks to boost manufacturing and ease of doing business.

Key Details

- The scheme aims to establish 100 industrial parks with ready infrastructure across states and UTs. This will enable industries to start production quickly without delays in approvals or land acquisition.
- It provides a plug-and-play ecosystem with pre-approved land and utilities. This reduces bureaucratic hurdles and improves efficiency in project implementation.
- The Centre will provide financial assistance for infrastructure development. This includes support for both internal facilities and external connectivity.
- Projects will be selected through a challenge-based mechanism. This ensures only investment-ready and reform-oriented proposals are approved.

BHAVYA Scheme

- **Objective:** To promote manufacturing-led growth and strengthen industrial infrastructure. It focuses on improving ease of doing business and attracting both domestic and global investments.
- **Nodal Ministry:** Implemented under DPIIT, Ministry of Commerce and Industry. It ensures policy coordination and alignment with national industrial goals.
- **Implementing Agency:** Executed by NICDC under the industrial corridor framework. This ensures professional project management and integration with existing corridors.
- **Coverage:** Industrial parks ranging from 100 to 1000 acres across India. This promotes balanced regional development and reduces industrial concentration.

Plug-and-Play Industrial Ecosystem

- **Pre-approved Infrastructure:** Includes land, utilities, and clearances. This helps industries transition quickly from planning to production stage.
- **Core Infrastructure:** Roads, drainage, and underground utility systems are provided. This ensures smooth industrial operations and long-term sustainability.
- **Value-added Facilities:** Testing labs, warehousing, and factory sheds are included. These enhance productivity and competitiveness of industries.
- **Social Infrastructure:** Worker housing and amenities are part of the design. This improves labour welfare and supports inclusive development.

Financial Support and Incentives

- **Central Assistance:** Up to ₹1 crore per acre is provided for infrastructure development. This reduces the financial burden on states and encourages faster implementation.
- **External Connectivity Support:** Up to 25% of project cost is funded. This improves connectivity with highways, railways, and ports.
- **Investment Promotion:** Financial incentives attract private and foreign investors. This boosts capital inflow and industrial expansion.
- **Cost Efficiency:** Shared infrastructure reduces costs for individual industries. This enhances competitiveness of MSMEs and startups.

Strategic Integration

- **PM GatiShakti Alignment:** Integrates industrial parks with multimodal connectivity. This improves logistics efficiency and reduces transportation costs.
- **No-Dig Model:** Underground utility corridors prevent repeated excavation. This ensures uninterrupted infrastructure services and sustainability.
- **Green Energy Use:** Promotes renewable energy integration in industrial parks. This supports India's climate commitments and sustainable growth.
- **Supply Chain Strengthening:** Enhances domestic manufacturing ecosystems. This reduces dependency on imports and improves resilience.

Significance for Indian Economy

- **Boost to Manufacturing:** Strengthens India's position as a global manufacturing hub. It supports initiatives like Make in India and Atmanirbhar Bharat.
- **Employment Generation:** Creates large-scale direct and indirect jobs. It benefits both skilled and unskilled workforce across sectors.
- **Ease of Doing Business:** Reduces regulatory delays and improves investor confidence. This enhances India's global competitiveness.
- **Regional Development:** Promotes industrialisation in less-developed regions. This helps in balanced economic growth across states.

Way Forward

- **Effective Implementation:** Ensure timely execution and coordination between Centre and states. This will maximise the impact of the scheme.
- **Skill Development:** Align workforce skills with industrial requirements. This will improve productivity and employment outcomes.
- **Sustainability Focus:** Promote green and resilient infrastructure. This is essential for long-term industrial growth.
- **Private Sector Participation:** Encourage PPP models for better efficiency. This will bring innovation and investment into the sector.

Conclusion

BHAVYA is a transformative initiative aimed at accelerating industrial growth through ready-to-use infrastructure. By reducing delays, promoting investment, and enhancing logistics, it can significantly boost India's manufacturing sector and economic development.

EXPECTED QUESTION FOR UPSC CSE

Prelims MCQ

Que. With reference to the Bharat Audyogik Vikas Yojna (BHAVYA), consider the following statements:

1. It aims to develop plug-and-play industrial parks with pre-approved infrastructure.
2. It is implemented by NITI Aayog under the Ministry of Finance.
3. It provides financial support for both internal infrastructure and external connectivity.

How many of the above statements are incorrect?

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

Answer: (a)

PM E-DRIVE SCHEME

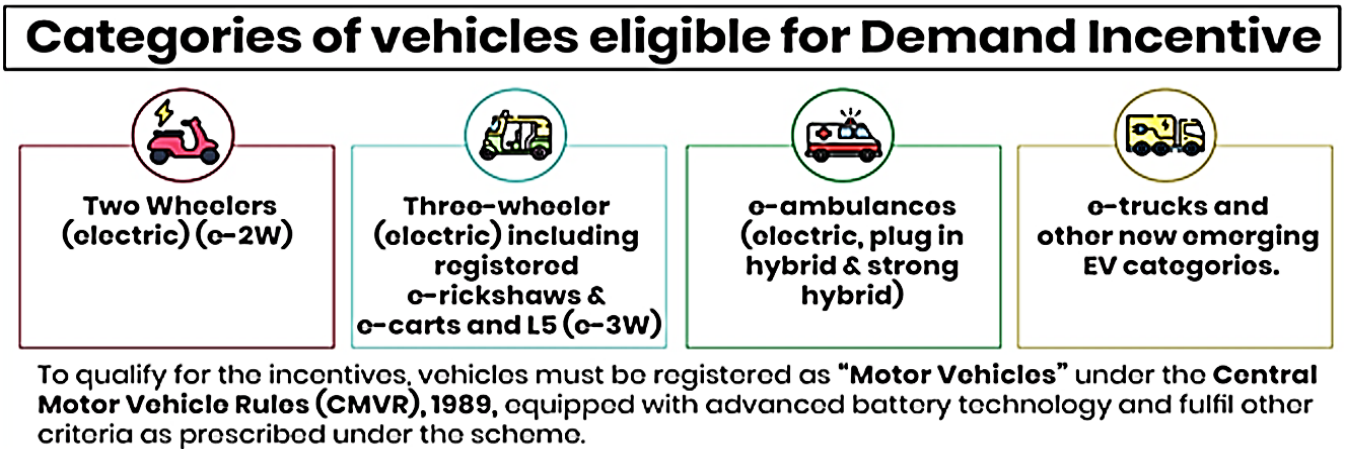
Why in News: The Government of India has revised and extended the PM E-DRIVE Scheme to accelerate electric vehicle adoption and strengthen charging infrastructure as part of India's Net Zero 2070 commitment.

Key Details

- The PM E-DRIVE Scheme is a ₹10,900 crore Central Sector Scheme launched in 2024. It aims to replace FAME-II and promote faster adoption of electric vehicles across multiple segments.
- The scheme focuses on demand incentives, charging infrastructure, and support for public transport like e-buses. It also aligns with the vision of Aatmanirbhar Bharat by promoting domestic EV manufacturing.
- As of December 2025, the e-3W (L5 category) target was achieved ahead of schedule. This reflects strong adoption in the commercial mobility segment.
- The scheme has been extended for select components like e-buses and e-trucks till 2028. This extension accounts for longer gestation periods in heavy vehicle segments.

About PM E-DRIVE Scheme

- **Central Sector Scheme:** Implemented by the Ministry of Heavy Industries. It is fully funded by the central government and focuses on clean mobility transition.
- **Replacement of FAME-II:** Builds upon earlier initiatives like FAME India Scheme. It aims to address gaps in infrastructure and manufacturing observed in previous phases.
- **Objective:** To accelerate EV adoption, reduce emissions, and promote sustainable transport. It also contributes to India's climate commitments under global agreements.
- **Net Zero Alignment:** Supports India's target of achieving net-zero emissions by 2070. The transport sector is a major contributor to emissions, making EV transition critical.



Core Objectives of the Scheme

- **Accelerate EV Adoption:** Focuses on increasing EV penetration in public and commercial transport. This helps reduce vehicular emissions and improve urban air quality.
- **Develop Charging Infrastructure:** Aims to reduce "range anxiety" among users. Widespread charging stations improve confidence and usability of EVs.
- **Boost Domestic Manufacturing:** Encourages local production under Aatmanirbhar Bharat. It reduces dependency on imports, especially for batteries and components.
- **Promote Sustainable Mobility:** Reduces fossil fuel dependency and oil imports. This also enhances energy security and environmental sustainability.

Key Features and Components

- **Demand Incentives:** ₹3,679 crore allocated for EV subsidies across categories. These incentives reduce upfront costs, making EVs more affordable for consumers.
- **Support for E-Buses:** ₹4,391 crore allocated for deployment of over 14,000 e-buses. This promotes electrification of public transport in major cities.
- **Charging Infrastructure:** ₹2,000 crore for 72,300 public fast-charging stations. This ensures availability of charging points across highways and urban areas.
- **E-Ambulances and E-Trucks:** ₹500 crore each allocated. E-truck incentives are linked to scrapping old vehicles, promoting cleaner logistics.
- **Aadhaar-linked E-Vouchers:** Digital system for subsidy disbursement. It ensures transparency and reduces leakages in benefit transfer.

Implementation Mechanism

- **Timeline:** Initially from 2024 to 2026, extended for select segments till 2028. This allows sufficient time for infrastructure development and adoption.
- **Institutional Role:** Ministry of Heavy Industries is the nodal agency. It coordinates with states, transport bodies, and private players.
- **Technology Integration:** Digital platforms for subsidy and monitoring. This enhances efficiency and reduces administrative delays.
- **Public Transport Focus:** Emphasis on buses and shared mobility. This ensures maximum environmental impact per vehicle deployed.

Achievements and Progress

- **Three-Wheeler Success:** Target achieved ahead of schedule with high adoption rates. This indicates strong market readiness in commercial segments.
- **EV Penetration Growth:** Around 32% penetration in the e-3W segment. It shows a transition towards sustainable transport in this category.
- **Two-Wheeler Expansion:** Over 1.8 million e-2Ws sold under the scheme. This highlight growing acceptance among individual consumers.
- **Market Transformation:** EV ecosystem is gradually becoming self-sustaining. Increased demand is driving innovation and investment.

Challenges in Implementation

- **Exclusion of Private EVs:** Lack of incentives for e-4W and light commercial vehicles. This limits adoption in personal mobility and logistics sectors.
- **Infrastructure Bottlenecks:** Issues like land acquisition and grid stability persist. High setup costs discourage private investment in charging stations.
- **Digital Divide:** Aadhaar-based e-voucher system may exclude some users. Rural populations may face challenges due to limited digital access.
- **Financing Issues:** Private operators face high upfront costs. Lack of easy credit and uncertainty about battery life affect investments.

Link with Industrial Policy

- **Domestic Manufacturing Push:** Linked with Production Linked Incentive Scheme. This encourages local production of EV components and batteries.
- **Reducing Import Dependence:** Focus on battery manufacturing ecosystem. This helps reduce reliance on imports from countries like China.
- **Technology Development:** Promotes innovation in EV technologies. It strengthens India's position in the global EV market.
- **Economic Impact:** Creates jobs and boosts industrial growth. Supports long-term economic sustainability.

Way Forward

- **Inclusive Coverage:** Extend incentives to private EVs and logistics vehicles. This will ensure comprehensive EV adoption across all segments.

- **Innovative Financing:** Promote Battery-as-a-Service (BaaS) and credit support. This reduces financial burden on consumers and operators.
- **Strengthen PPP Model:** Encourage public-private partnerships in infrastructure. This will accelerate charging network expansion.
- **Standardisation:** Develop uniform charging and battery standards. It ensures interoperability and ease of use for consumers.

Conclusion

The PM E-DRIVE Scheme marks a significant step towards India's clean mobility transition. While it has shown success in segments like three-wheelers and public transport, addressing challenges in infrastructure, financing, and inclusivity will be crucial for achieving long-term sustainability.

EXPECTED QUESTIONS FOR UPSC CSE

Prelims MCQ

Que. With reference to the PM E-DRIVE Scheme, consider the following statements:

1. It is a Centrally Sponsored Scheme implemented jointly by Centre and States.
2. It provides demand incentives for electric vehicles through Aadhaar-linked e-vouchers.
3. It aims to promote domestic manufacturing of EVs and reduce import dependence.

How many of the above statements are incorrect?

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

Answer: (a)

Descriptive Question

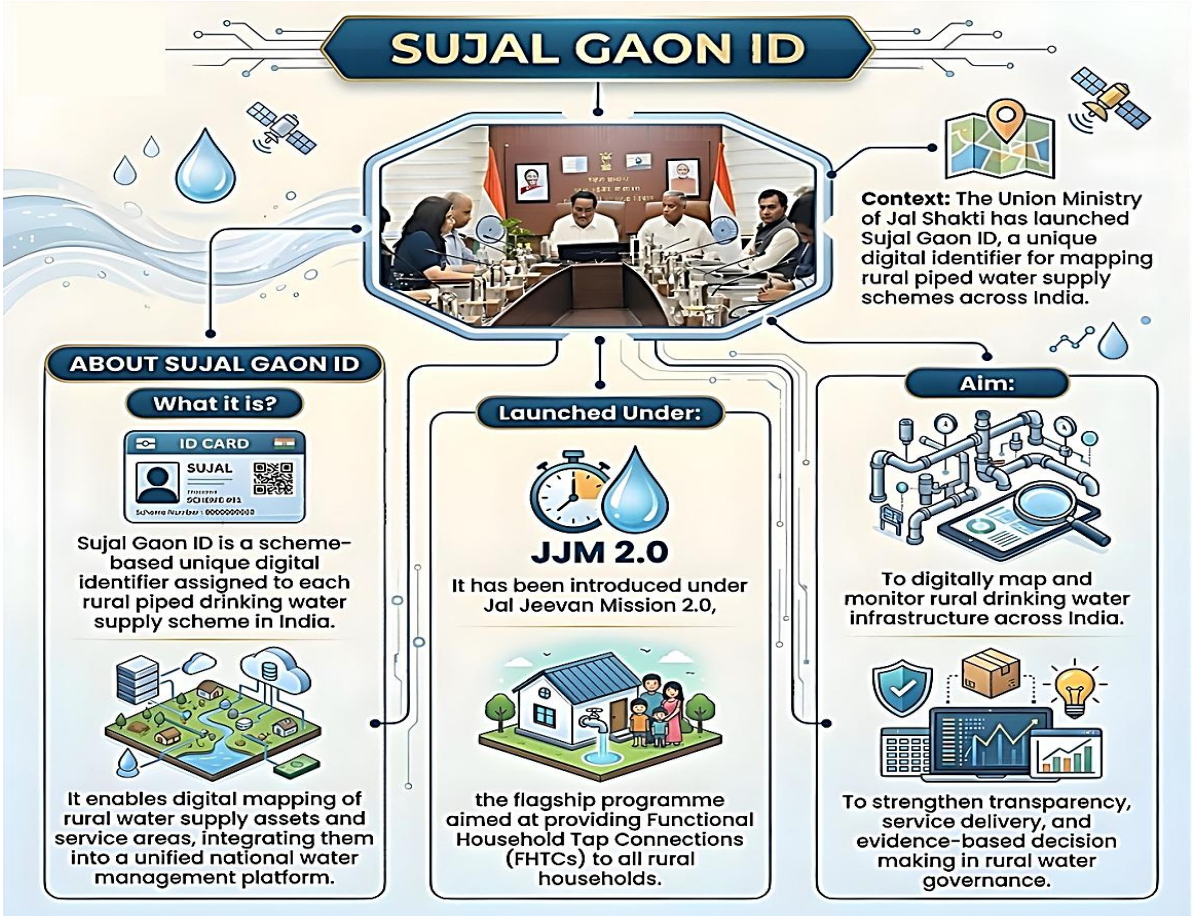
Que. Discuss the role of the PM E-DRIVE Scheme in accelerating India's transition to electric mobility. Highlight its achievements, challenges and suggest measures to improve its effectiveness. (250 words, 15 marks)

SUJAL GAON ID

Why in News: The Government of India has introduced **Sujal Gaon ID** under Jal Jeevan Mission to strengthen digital monitoring and governance of rural drinking water infrastructure.

Key Details

- **Sujal Gaon ID** is a unique digital identifier assigned to each rural piped drinking water scheme. It helps in identifying, tracking, and managing water supply assets across rural areas.
- The scheme integrates rural water infrastructure into a unified national digital platform. This enables better coordination between central, state, and local authorities.
- It has been launched under Jal Jeevan Mission 2.0, focusing on universal tap water access. The mission aims to provide Functional Household Tap Connections (FHTCs) to all rural households.
- The initiative supports transparency, efficiency, and data-driven decision-making in governance. It also improves accountability in service delivery systems.



Jal Jeevan Mission

- **Launch and Objective:** Jal Jeevan Mission was launched in 2019 to provide safe and adequate drinking water to rural households. It aims to ensure tap water supply to every rural home by strengthening infrastructure.
- **Focus on FHTCs:** The mission prioritises Functional Household Tap Connections for all households. This ensures regular & safe water supply at the household level.
- **Decentralised Approach:** Implementation involves local bodies like Panchayats and community participation. This promotes sustainability and local ownership of water resources.
- **Integration with Technology:** Digital tools are increasingly used for monitoring and service delivery. Sujal Gaon ID is a key step in this digital transformation.

Objectives of Sujal Gaon ID

- **Digital Mapping:** To create a comprehensive digital map of rural water supply infrastructure. This includes pipelines, treatment plants, and service areas.
- **Improved Monitoring:** To track performance and functioning of water schemes in real time. This helps in identifying gaps and ensuring timely maintenance.
- **Transparency and Accountability:** To ensure better governance through data visibility. It reduces leakages and improves service delivery efficiency.
- **Evidence-Based Planning:** To support policy decisions using reliable data. This leads to more effective allocation of resources.

Key Features of Sujal Gaon ID

- **Unique Digital Identification:** Each rural water scheme gets a distinct ID for tracking. This ensures traceability and avoids duplication of records.
- **Integration with Sujalam Bharat Platform:** IDs are linked with service-area mapping systems. This creates a complete picture of infrastructure and beneficiaries.
- **National Digital Architecture:** Enables source-to-tap monitoring of water supply systems. This ensures end-to-end visibility of water distribution networks.
- **Real-time Monitoring:** Authorities can track infrastructure status and service delivery instantly. This improves response time and operational efficiency.
- **Wide Coverage:** Over 1.64 lakh IDs have been generated across states and UTs. This reflects large-scale adoption of digital governance in the water sector.

Significance in Rural Water Governance

- **Efficient Resource Management:** Digital mapping helps optimise water distribution and usage. It reduces wastage and improves sustainability.
- **Improved Service Delivery:** Real-time data enables timely maintenance and repairs. This ensures continuous water supply to households.
- **Strengthening Local Governance:** Panchayats can access accurate data for better decision-making. This enhances grassroots-level governance and accountability.
- **Support for SDG Goals:** Contributes to Sustainable Development Goal 6 (Clean Water and Sanitation). It ensures safe and equitable access to drinking water.

Challenges and Concerns

- **Digital Divide:** Limited digital infrastructure in rural areas may hinder implementation. This can affect real-time data collection and monitoring.
- **Capacity Building:** Local officials may lack technical skills to manage digital systems. Training and awareness programmes are essential.
- **Data Accuracy:** Ensuring reliable and updated data is a major challenge. Inaccurate data can lead to poor decision-making.
- **Inter-Agency Coordination:** Multiple stakeholders need to work together effectively. Lack of coordination can delay implementation.

Way Forward

- **Strengthening Digital Infrastructure:** Improve internet connectivity in rural areas. This will enhance the effectiveness of digital monitoring systems.
- **Capacity Building:** Train local officials and stakeholders in digital tools. This ensures better utilisation of the platform.
- **Data Governance Framework:** Establish clear standards for data collection and validation. This will improve reliability and decision-making.
- **Community Participation:** Involve local communities in monitoring and feedback. This enhances transparency and sustainability of water schemes.

Conclusion

Sujal Gaon ID represents a significant step towards digital governance in rural water management. By integrating technology with infrastructure, it enhances transparency, efficiency, and sustainability. Strengthening implementation and addressing challenges will be crucial for achieving universal water access in India.

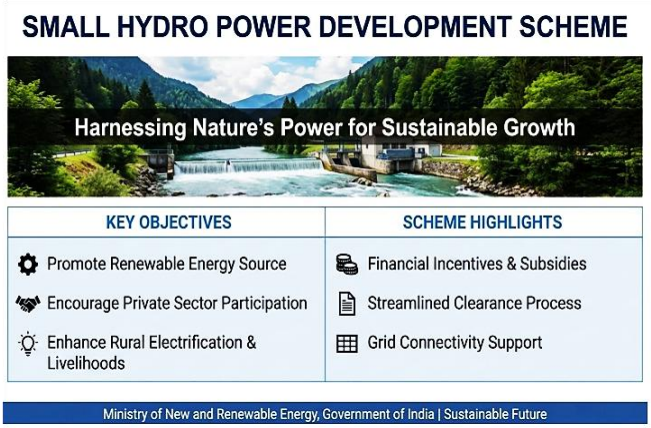
EXPECTED QUESTION FOR UPSC CSE

Descriptive Question

Que. Discuss the role of digital initiatives like Sujal Gaon ID in improving rural water governance in India. Highlight the challenges and suggest measures for effective implementation. (250 Words, 15 Marks)

SMALL HYDRO POWER (SHP) DEVELOPMENT SCHEME

Why in News: The Union Cabinet has approved the Small Hydro Power Development Scheme to promote clean and decentralised energy.



About the Small Hydro Power Development Scheme:

- **Nodal Ministry:** Ministry of New and Renewable Energy (MNRE).
- **Objective:** To promote generation of electricity from small hydro projects **in a sustainable & eco-friendly manner.**
- **Tenure and Financial Outlay:** The scheme has been approved for **FY 2026–27 to 2030–31** with a total outlay of **₹2584.60 crore**.
- **Capacity:** It supports small hydro projects with capacity between **1–25 MW** and targets installation of **~1500 MW capacity**.
- **Focus Areas:** Special emphasis on **hilly regions, North Eastern States, and border districts** with high hydro potential.
- **Financial Assistance:** Higher support for **NE and border areas (₹3.6 crore/MW or 30% cost)** and lower for **other states (₹2.4 crore/MW or 20% cost),** with project-wise caps.

Small Hydro Power (SHP):

Small Hydro Power (SHP) refers to electricity generated from small-scale hydroelectric projects, typically with a capacity of **up to 25 MW** in India.

IMPORTANT REPORTS

CHILD MORTALITY REDUCTION TRENDS

Why in News: The United Nations Inter-Agency Group for Child Mortality Estimation has highlighted that India has made significant progress in reducing neonatal and under-five mortality rates.

Key Details

- The UNIGME Report 2025 shows global progress in reducing child mortality, but regional disparities remain significant. Sub-Saharan Africa continues to bear the highest burden of under-five deaths globally.
- In 2024, around 4.9 million children died before the age of five, including 2.3 million newborns. Most of these deaths were preventable through low-cost healthcare interventions.
- The pace of decline in child mortality has slowed since 2015. This indicates challenges in achieving global health targets under SDGs.
- India has shown strong improvement in reducing both neonatal and under-five mortality rates. This reflects better healthcare access and targeted government interventions.

Neonatal Mortality Rate

- **Definition:** Neonatal Mortality Rate (NMR) refers to deaths of infants within the first 28 days per 1,000 live births. It is a key indicator of maternal and newborn healthcare quality.
- **Critical Period:** The neonatal phase is the most vulnerable stage of a child's life. Most deaths occur due to complications during birth or infections.
- **Global Target:** Under Sustainable Development Goals, the aim is to reduce NMR to 12 or fewer by 2030. This target reflects the global commitment to improving child survival.
- **Policy Importance:** Reducing NMR requires strengthening healthcare systems and institutional deliveries. It is closely linked with maternal health and nutrition.

Child Mortality

- **Definition:** Child mortality refers to deaths of children under five years of age. It reflects overall socio-economic and healthcare conditions of a country.
- **Measurement:** It is measured through the Under-Five Mortality Rate (U5MR). This is calculated as deaths per 1,000 live births.
- **Development Indicator:** U5MR is widely used as a key human development indicator. It helps assess progress in public health and welfare policies.
- **Global Concern:** High child mortality indicates gaps in healthcare, nutrition, and sanitation. It remains a major challenge in developing regions.

Global Trends in Child Mortality

- **Declining Trend:** Under-five mortality has reduced by more than 50% since 2000. This shows the success of global health initiatives and interventions.
- **Slowing Progress:** Since 2015, the rate of decline has slowed significantly. This poses a challenge for achieving SDG targets by 2030.
- **Regional Disparity:** Sub-Saharan Africa accounts for the majority of child deaths. This reflects inequality in healthcare access and infrastructure.
- **Preventable Deaths:** Most child deaths are preventable with basic healthcare. This highlights the importance of affordable and accessible medical services.

Major Causes of Child Mortality

- **Infectious Diseases:** Diseases like malaria remain leading causes of death. They are particularly prevalent in tropical and low-income regions.
- **Neonatal Causes:** Premature birth, birth asphyxia, and infections are major factors. These require improved maternal and neonatal care systems.
- **Malnutrition:** Poor nutrition weakens immunity in children. This increases susceptibility to diseases and mortality risk.
- **Healthcare Gaps:** Lack of timely medical care contributes significantly to deaths. This is more severe in rural and underdeveloped areas.

India's Progress in Child Mortality Reduction

- **U5MR Decline:** India's under-five mortality rate reduced from 127 (1990) to 26.6 (2024). This represents a significant improvement in child survival rates.
- **NMR Reduction:** Neonatal mortality declined from 57 (1990) to 17 (2024). This reflects progress in maternal and newborn healthcare services.
- **Government Initiatives:** Programs like NHM and institutional delivery schemes have helped. They improved access to healthcare and reduced mortality rates.
- **Remaining Challenges:** India still needs to achieve SDG targets fully. Regional disparities and healthcare gaps persist.

Challenges in Achieving SDG Targets

- **Slowing Progress:** Reduction in mortality rates has slowed globally. This may delay achievement of SDG 3 targets.
- **Inequality:** Large differences exist between developed and developing regions. This creates uneven progress in child health outcomes.
- **Healthcare Access:** Many populations lack access to quality healthcare. This is a major barrier to reducing preventable deaths.
- **Funding Constraints:** Limited resources affect healthcare delivery systems. This impacts implementation of child health programmes.

Way Forward

- **Strengthening Healthcare:** Improve maternal and child healthcare services. This will directly reduce neonatal and under-five mortality.
- **Focus on Prevention:** Expand immunisation and nutrition programmes. Preventive care is more effective and cost-efficient.
- **Address Inequality:** Target vulnerable regions and populations. This will ensure inclusive healthcare development.
- **Global Cooperation:** Enhance international collaboration on child health. Sharing best practices can accelerate progress.

Conclusion

India's progress in reducing child mortality is significant, but challenges remain in achieving SDG targets. Strengthening healthcare systems and focusing on preventive care will be crucial for sustaining progress and ensuring child survival.

EXPECTED QUESTION FOR UPSC CSE

Prelims MCQ

Que. With reference to child mortality indicators, consider the following statements:

1. Neonatal Mortality Rate refers to deaths of children under five years of age.
2. Under-Five Mortality Rate is measured per 1,000 live births.
3. SDG Target aims to reduce Neonatal Mortality Rate to 12 or fewer by 2030.

How many of the above statements are incorrect?

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

Answer: (a)

Descriptive Question

Que. "Despite significant progress, child mortality remains a challenge in achieving SDG targets." Discuss with reference to global and Indian trends. (150 words, 10 marks)

HIMALAYAN GLACIERS AND CLIMATE CRISIS

Why in News: A recent report by the International Centre for Integrated Mountain Development titled "Changing Dynamics of Glaciers in the Hindu Kush Himalayan Region (1990–2020)" has highlighted rapid glacier loss and rising climate risks in the region.

Key Details

- The report mapped around **63,761 glaciers** covering nearly **55,782 sq km** in the Hindu Kush Himalayan region. These glaciers are crucial as they sustain major river systems and support billions of people across Asia.
- The study is based on long-term observations from glaciers monitored since 1974. This makes it one of the most comprehensive datasets on Himalayan glacier behaviour.
- The report highlights increasing glacier melt rates and climate-induced risks. It indicates growing threats of floods, water scarcity, and ecological imbalance.
- The region is witnessing more frequent extreme events linked to glacial changes. This includes glacial lake outburst floods and landslides affecting mountain communities.

About ICIMOD

- **Nature:** ICIMOD is a regional intergovernmental organisation working on sustainable mountain development. It focuses on climate resilience, biodiversity conservation, and livelihood security in the HKH region.
- **Member Countries:** Afghanistan, Bangladesh, Bhutan, China, India, Myanmar, Nepal, and Pakistan. This makes it a key platform for regional cooperation on transboundary environmental issues.
- **Objective:** To promote environmentally sound and economically viable mountain ecosystems. It also supports scientific research and policy-making for climate adaptation.

Hindu Kush Himalayan Region

- **Geographical Extent:** The HKH region stretches about 3,500 km across eight countries. It forms one of the largest mountain systems in the world.
- **Third Pole:** It is known as the "Third Pole" due to the largest ice reserves outside polar regions. This makes it critical for global climate regulation.
- **Water Tower of Asia:** It feeds 10–12 major river systems like Indus, Ganga, and Brahmaputra. These rivers support nearly one-third of the global population.
- **Biodiversity Hotspot:** The region contains multiple global biodiversity hotspots. It supports diverse ecosystems and millions of livelihoods.

Key Findings of the ICIMOD Report

- **Elevation-Dependent Warming:** Around 78% of glacier area lies between 4,500–6,000 m altitude. These regions are warming faster than lower altitudes, accelerating glacier melt.
- **Doubling of Melt Rate:** Glacier melting has doubled since 2000. This indicates rapid climate change impacts in high mountain regions.
- **Loss of Glacier Area:** Significant glacier loss has been recorded in Indus, Ganga, and Brahmaputra basins. This threatens long-term water availability and ecosystem balance.
- **Vulnerability of Small Glaciers:** Smaller glaciers (<0.5 sq km) are shrinking faster. These glaciers are highly sensitive to temperature changes and climate variability.

Glacial Disasters and Risks

- **2021 Chamoli Disaster:** Caused by glacier burst and landslide, leading to loss of lives and infrastructure. It highlighted the vulnerability of Himalayan regions to climate-induced disasters.
- **South Lhonak Lake Flood (2023):** Triggered by glacial lake outburst in Sikkim. It caused severe downstream flooding and damage to hydropower infrastructure.
- **Increasing Frequency:** Such disasters are becoming more frequent due to glacier instability. This raises concerns about disaster preparedness in mountain regions.

Impact on Water and Livelihoods

- **Water Security Threat:** Glaciers act as natural water reservoirs. Their depletion can lead to long-term water shortages in downstream regions.
- **Agriculture Impact:** River systems fed by glaciers support irrigation. Changes in flow patterns can disrupt food production.
- **Disaster Risk:** Increased glacier melt leads to floods and landslides. This threatens lives, infrastructure, and economic stability.
- **Community Vulnerability:** Mountain communities are highly dependent on glacier ecosystems. They face immediate risks due to changing climate conditions.

Glacier Monitoring in India

- **Initiation:** Glacier monitoring began in 1974 by the Geological Survey of India. This marked the beginning of systematic glacier studies in India.
- **Key Glacier:** Chhota Shigri Glacier has the longest mass balance record. It provides valuable data for understanding glacier trends.
- **Need for Monitoring:** Continuous observation is essential for climate modelling. It helps in predicting future water availability and disaster risks.

Way Forward

- **Climate Adaptation Strategies:** Develop policies for glacier conservation and sustainable water use. This will help reduce long-term climate risks.
- **Disaster Preparedness:** Strengthen early warning systems for glacial lake outburst floods. This can minimise loss of life and infrastructure damage.
- **Regional Cooperation:** Enhance collaboration among HKH countries. Transboundary river management requires coordinated efforts.
- **Scientific Research:** Invest in advanced glacier monitoring and climate modelling. This will improve understanding and policy responses.

Conclusion

The ICIMOD report highlights the urgent need to address glacier loss in the HKH region. Sustainable management, regional cooperation, and climate resilience strategies are essential to secure water, environment, and livelihoods in Asia.

EXPECTED QUESTIONS FOR UPSC CSE

Prelims MCQ

Que. Consider the following statements regarding glacier melting:

1. Elevation-dependent warming leads to faster temperature rise at higher altitudes.
2. Smaller glaciers are more stable than larger glaciers.
3. Glacier melting has slowed down globally since 2000.

How many of the above statements are incorrect?

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

Answer: (c)

Descriptive Question

Que. "The Hindu Kush Himalayan region is crucial for Asia's water security but faces severe threats due to climate change." Discuss. (250 words, 15 marks)

INSIGHTS FROM WORLD HAPPINESS REPORT 2026

Why in News: The **World Happiness Report 2026** ranked **Afghanistan as the unhappiest country**, while highlighting the **negative impact of excessive social media use on youth well-being**.

Key Details

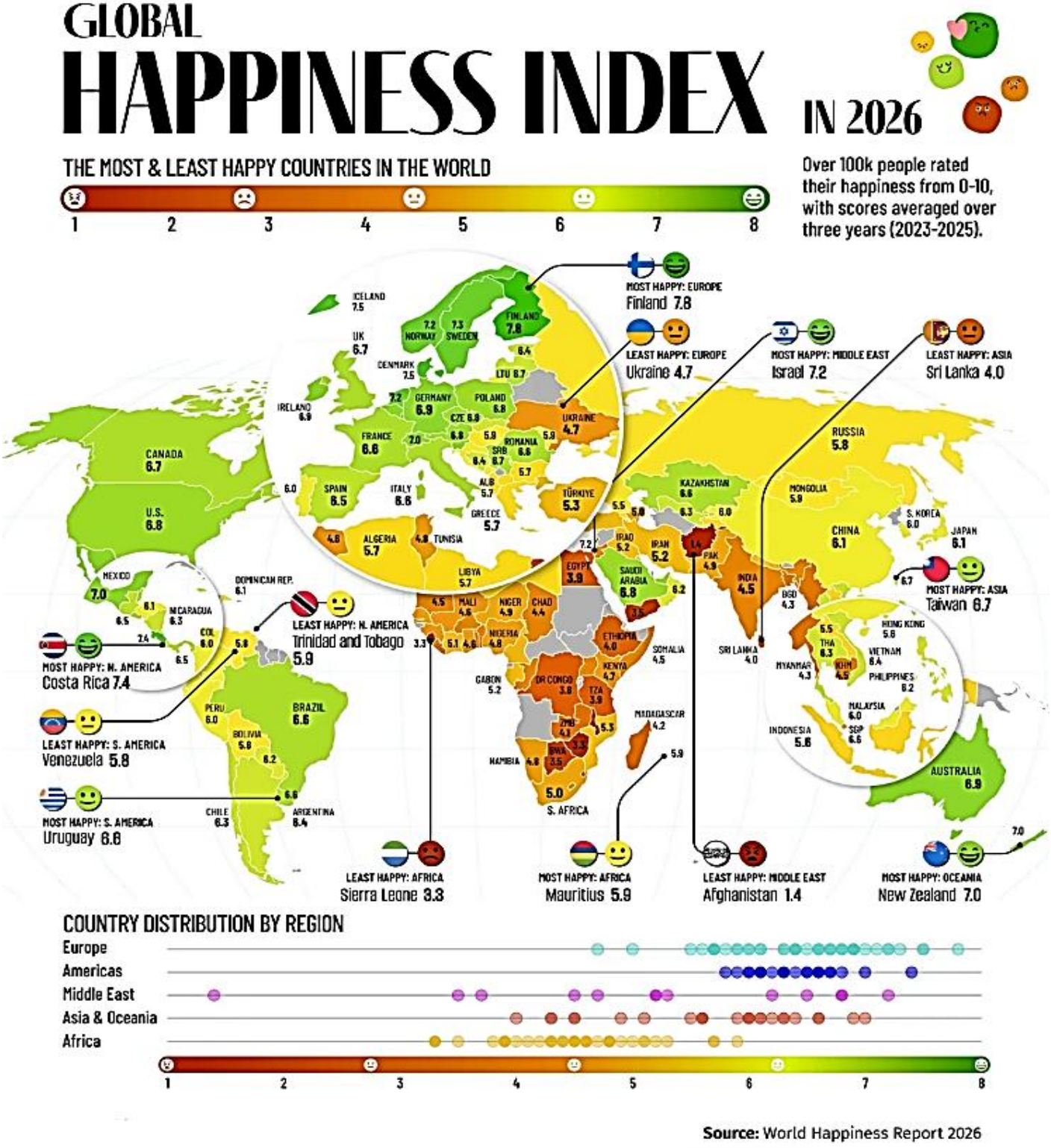
- **Afghanistan** remains the least happy country, followed by **Sierra Leone and Malawi**.
- **Finland** ranked as the happiest country for the **9th consecutive year**, with Nordic countries dominating the top ranks.
- The report flags **declining well-being among youth**, especially due to **heavy social media usage**.
- Rankings are based on **life evaluation surveys across ~140 countries**, conducted with **Gallup and UN SDSN**.
- In 2026, India's rank improved slightly to **116th**, continuing a steady upward trend from 118th in 2025 and 126th in 2024.

World Happiness Report: Concept & Methodology

- **Global Well-being Measurement:** The report is published by the **UN Sustainable Development Solutions Network (SDSN)** and evaluates happiness using **self-reported life satisfaction scores (0–10 scale)**.
- **Sample Size & Data Collection:** Around **100,000 respondents across 140 countries** are surveyed annually, ensuring a representative global comparison of well-being.
- **Key Determinants of Happiness:** Factors include **GDP per capita, social support, healthy life expectancy, freedom, generosity, and corruption perception**.
- **Subjective Well-being Approach:** Unlike traditional economic indicators, it focuses on **quality of life and human experience**, aligning with broader development goals.

Global Trends in Happiness Rankings

- **Nordic Model Success:** Countries like **Finland, Denmark, and Sweden** consistently rank high due to **strong welfare systems, income equality, and trust in institutions**.
- **Role of Welfare State:** Universal healthcare, social security, and education reduce uncertainty, enhancing **citizens' sense of security and well-being**.
- **Conflict and Instability:** Countries like **Afghanistan** rank lowest due to **political instability, conflict, poverty, and weak governance structures**.
- **Emerging Performers:** Nations like **Costa Rica** have improved rankings due to **strong community bonds and social cohesion**, despite moderate income levels.



Social Media and Youth Well-being

- **Declining Youth Happiness:** Life satisfaction among individuals under **25 years** has declined significantly in countries like the **USA, UK, and Australia**.
- **Excessive Screen Time:** Adolescents spend around **2.5 hours daily on social media**, with heavy usage linked to **lower mental well-being**.
- **Gendered Impact:** The negative effects are more pronounced among **teenage girls**, due to **body image issues and social comparison pressures**.
- **Algorithm-driven Platforms:** Visual and influencer-based platforms promote **comparison culture**, leading to anxiety, low self-esteem, and dissatisfaction.
- **Optimal Usage Insight:** Moderate use (**less than 1 hour/day**) is associated with **higher well-being**, indicating the need for balanced digital habits.

Regional Variations in Social Media Impact

- **Western vs Non-Western Trends:** Negative effects are stronger in **Western and English-speaking countries**, where individualism and comparison culture are higher.
- **Positive Role in Some Regions:** In regions like **South America and the Middle East**, social media enhances **social connectivity and community engagement**.
- **Cultural Context Matters:** The impact depends on **social norms, family structures, and offline support systems**, which moderate digital effects.

- **Digital Divide Factor:** In developing countries, social media can act as a tool for **information access, education, and empowerment**.

Happiness, Development & Public Policy

- **Beyond GDP Approach:** Happiness reflects **inclusive growth, social equity, and quality of governance**, aligning with the concept of **human development**.
- **Link with SDGs:** The report complements **Sustainable Development Goals (SDGs)**, especially **SDG 3 (Health), SDG 10 (Inequality), and SDG 16 (Institutions)**.
- **Mental Health as Policy Priority:** Rising stress and anxiety highlight the need for **mental health policies**, especially for youth.
- **India's Perspective:** India's ranking reflects challenges like **income inequality, social stress, and urbanisation**, despite economic growth.

India and the Happiness Debate

- **Demographic Dividend & Youth:** With a large youth population, issues like **digital addiction and mental health** are increasingly relevant.
- **Government Initiatives:** Programs like **National Mental Health Programme** and digital awareness campaigns aim to improve well-being.
- **Social Capital Strength:** Family systems and community networks in India act as **buffers against stress**, unlike highly individualistic societies.
- **Need for Holistic Development:** Emphasis should shift towards **well-being, not just economic growth**, in policy planning.

Conclusion

The World Happiness Report highlights that **true development lies beyond economic indicators**, focusing on **mental health, social cohesion, and governance quality**. Governments must ensure **responsible digital ecosystems, stronger welfare measures, and inclusive growth policies**. For countries like India, balancing **economic progress with social well-being** is crucial to achieving sustainable and equitable development.

EXPECTED QUESTION FOR UPSC CSE

Descriptive Question

Que. Economic growth alone cannot ensure happiness. Discuss in the context of the World Happiness Report. (150 Words, 10 Marks)

PERSONALITIES IN NEWS

SAVITRIBAI PHULE

Why in News: Union Home Minister paid tribute to Savitribai Phule on her death anniversary (10th March), highlighting her role in promoting women's education during an era of deep-rooted social evils.

Early Life and Background

- Savitribai Phule was born in 1831 in Satara, Maharashtra. She belonged to the Mali community and was married to Jyotiba Phule at a young age.
- She emerged as one of India's first female teachers and reformers. Her work challenged deeply entrenched caste and gender inequalities.

Women's Education

- Savitribai Phule co-founded **India's first Indian-run girls'** school in **Pune in 1848**. This was a revolutionary step at a time when female education was socially discouraged.
- She and Jyotiba Phule established multiple schools for girls and marginalised communities. This contributed significantly to the spread of modern education in India.

Gender Justice and Social Reform

- She founded **Mahila Seva Mandal** to promote women's rights. The organisation worked towards awareness and empowerment of women.
- She actively campaigned against child marriage and supported widow remarriage. These efforts challenged orthodox social practices prevalent in society.

Combating Social Evils

- She established **Balhatya Pratibandhak Griha** to prevent female infanticide. It provided shelter to vulnerable women, including widows and victims of exploitation.
- She worked for caste equality through the **Satyashodhak movement**. This promoted social justice and dignity for lower castes.

Literary Contributions and Ideas

- Her works like **Kavya Phule** and **Bavan Kashi Subodh Ratnakar** spread reformist ideas. Her poem **"Go, Get Education"** encouraged oppressed communities to seek knowledge.
- Her writings reflected themes of equality, education, and social justice. They continue to inspire modern social reform movements.

Challenges and Legacy

- Savitribai Phule faced social resistance, including harassment and attacks. Despite this, she continued her reform efforts with determination.
- She died in 1897 while serving plague patients. Her life represents dedication to humanity and social service.

Conclusion

Guru Hargobind Sahib Ji and Savitribai Phule represent two dimensions of Indian thought—spiritual strength with justice and social reform through education. Their contributions remain highly relevant for building an inclusive, ethical, and resilient society.

EXPECTED QUESTION FOR UPSC CSE

Prelims MCQ

Que. Which of the following statements about Savitribai Phule is/are correct?

1. She established the first girls' school in India run by Indians.
2. She supported child marriage reforms and widow remarriage.
3. She was associated with the Satyashodhak movement.

Select the correct answer:

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

Answer: (c)

GURU HARGOBIND SAHIB

Why in News: The Union Home Minister paid tribute to Guru Hargobind Sahib Ji on his Jyoti-Jyot Diwas (22nd March 2026) highlighted his enduring legacy in establishing the Saint Soldier tradition & protecting humanity.

Key Details

- Guru Hargobind Sahib Ji is remembered for introducing the concept of Miri-Piri, symbolising the integration of temporal authority and spiritual leadership. He emphasized the duty to uphold righteousness and defend the oppressed.
- He strengthened the Sikh community by promoting courage, self-discipline, and collective responsibility. His leadership laid the foundation for a resilient and self-reliant society.
- During a period of political and religious challenges, he championed justice, freedom of conscience, and resistance against oppression. His teachings inspired both spiritual growth and social responsibility.
- His legacy continues to influence contemporary discussions on ethical leadership, social harmony, and the

protection of human dignity. He remains a symbol of balanced governance rooted in faith and service.

Guru Hargobind Sahib Ji: Spiritual Leadership and Military Assertion

Early Life and Background

- Born in 1595 in Amritsar, Punjab, Guru Hargobind Sahib Ji became the 6th Sikh Guru in 1606. He assumed leadership after the martyrdom of Guru Arjan Dev Ji, marking a turning point in Sikh history.
- His leadership period witnessed increasing conflict with Mughal authority. This shaped his approach towards combining spirituality with resistance.

Miri-Piri Doctrine

- The concept of Miri (temporal power) and Piri (spiritual authority) was introduced by him. It symbolised the integration of political responsibility with spiritual guidance.
- This doctrine is represented by two swords worn by the Guru. It emphasised that religious leaders must also protect justice and societal order.

Saint-Soldier Tradition

- Guru Hargobind Sahib Ji institutionalised the Sant-Sipahi ideal. This required Sikhs to be spiritually enlightened and physically prepared to defend righteousness.
- This transformation strengthened the Sikh community against external threats. It laid the foundation for later militarisation under Guru Gobind Singh Ji.

Establishment of Akal Takht

- The Akal Takht was established in 1609 as the highest temporal authority in Sikhism. It serves as a centre for political and social decision-making for the Sikh community.
- It is located opposite the Harmandir Sahib. This spatial arrangement symbolises the balance between spiritual and temporal authority.

Bandi Chhor Divas

- Guru Hargobind Sahib Ji was imprisoned in Gwalior Fort by Mughal Emperor Jahangir. He secured not only his release but also the freedom of 52 imprisoned princes.
- This event is commemorated as Bandi Chhor Divas. It symbolises justice, compassion, and leadership beyond personal interest.

Military and Political Role

- He was the first Sikh Guru to maintain a standing army. This marked a strategic shift towards organised defence of the community.
- He fought several battles against Mughal forces under Shah Jahan. These conflicts established the Sikh identity as both spiritual and martial.

MISCELLANEOUS

BUREAU OF ENERGY EFFICIENCY (BEE)

Why in News: Bureau of Energy Efficiency marked its **25th Foundation Day (1 March 2026)** with launch of BEE@25 logo, **RCO Portal**, and Star Label mobile app.

About BEE

ऊर्जा दक्षता ब्यूरो
(भारत सरकार, विद्युत मंत्रालय)
BUREAU OF ENERGY EFFICIENCY
(Government of India, Ministry of Power)

- **Establishment:** Set up in **2002** under the Energy Conservation Act, 2001.
- **Nodal Ministry:** Ministry of Power
- **Objective:** Reduce **energy intensity** of the Indian economy through policy, regulation, and capacity building.

Core Functions

- **Regulatory Role:**
  - ✓ Sets **energy efficiency standards** for appliances.
  - ✓ Identifies and monitors **energy-intensive industries (Designated Consumers)**.
- **Promotional Role:**
  - ✓ Awareness campaigns, **capacity building**, and support for **energy audits & R&D**.

Flagship Initiatives

- **Star Labelling Programme (2006):**
  - ✓ 1–5 star rating for appliances to guide consumers towards energy-efficient choices.
- **PAT Scheme (Perform, Achieve and Trade):**
  - ✓ Market-based mechanism under National Mission for Enhanced Energy Efficiency to reduce industrial energy consumption.
- **RCO Portal (Renewable Consumption Obligation):**
  - ✓ Digital platform to track compliance of **non-fossil energy obligations**.
- **Carbon Credit Trading Scheme (CCTS):**
  - ✓ BEE acts as nodal agency for **India's domestic carbon market**.

Key Achievements

- **~36% reduction** in emission intensity of GDP (from 2005 levels).
- **~52% installed power capacity** from non-fossil sources (ahead of 2030 targets).

ANAVARAN PORTAL

Why in News: Forest Survey of India has **stopped issuing AI-based deforestation alerts**, and the portal has not been updated since **November 2025**.

About Anavaran Portal

- An **AI and satellite-based deforestation alert system** operational since **January 2024**.
- Developed by **Forest Survey of India (FSI)** under the Ministry of Environment, Forest and Climate Change.
- Provides **near real-time monitoring** of forest cover loss.

Objective

- Detect **forest cover changes** and send **location-specific alerts** to states.
- Enable **timely field verification and enforcement**.

Key Features

- **Fortnightly Alerts:**
  - ✓ Alerts issued every **15 days** with precise geographic coordinates.
- **Advanced Technology:**
  - ✓ Built on **Google Earth Engine (GEE)**.
  - ✓ Uses **Sentinel-2 (optical)** and **Sentinel-1 (SAR)** satellite data for all-weather monitoring.
- **High Resolution Monitoring:**
  - ✓ Spatial resolution of **10–20 metres**, enabling precise detection.
- **Machine Learning Integration:**
  - ✓ Detects deforestation by comparing **temporal satellite imagery**.

Performance & Status

- Issued **12,000+ alerts (2024–2025)**; higher alerts during peak deforestation season (Nov–March).
- Currently **paused/reviewed** as it was a **pilot initiative**; feedback from states under evaluation.

Institutional Background (FSI)

- Established in **1981** (successor to PISFR, 1965).
- Mandate: **Assessment and monitoring of forest resources**.
- Publishes **India State of Forest Report (ISFR)** biennially.

Global Comparison

- Comparable to **Terra-I system (Peru)**, but with **higher spatial resolution**.

DAILY MCQS FROM THE HINDU & INDIAN EXPRESS
(March 2026)

DAILY MCQs PRACTICE

Que 1. Consider the following statements regarding the Islamic Revolutionary Guard Corps (IRGC) of Iran:
1. It was established after the 1979 Islamic Revolution to safeguard the ideological foundations of the Iranian state.
2. The IRGC functions purely as a military force and has no role in Iran's political or economic spheres.
3. Former IRGC commanders have occupied important political offices in Iran in recent decades.

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

Que 2. Consider the following statements regarding institutional and societal approaches to strengthening integration of India's border regions:
1. Development-focused institutional mechanisms for the Northeast were initiated during the tenure of Atal Bihari Vajpayee.
2. Legal and policing measures alone are sufficient to achieve long-term national integration of culturally distinct regions.
3. Introducing curriculum content on border regions in school education can contribute to attitudinal change among citizens.
4. Experiential exposure of civil servants to border areas can improve administrative sensitivity toward regional concerns.

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

Que 3. Consider the following statements:
Statement I: GSDP represents the total monetary value of all final goods and services produced within a State during a given financial year.
Statement II: GSDP cannot be calculated using production, income, and expenditure methods similar to those used for national GDP estimation.
Statement III: GSDP includes income earned by residents of the State from foreign countries but excludes income generated within the State by non-residents.
Which one of the following is correct in respect of the above statements?
(a) Both Statement II and Statement III are correct and both of them explain Statement I
(b) Both Statement II and Statement III are correct but only one of them explains Statement
(c) Only one of the Statements II and III is correct and that explains Statement I
(d) Neither Statement II nor Statement III is correct

Que 4. Consider the following with reference to Article 275 of the Indian Constitution:
1. It provides for grants-in-aid from the Union to certain States.
2. The grants are charged on the Consolidated Fund of India.
3. It specifically provides for grants for promoting the welfare of Scheduled Tribes and administration of Scheduled Areas.

How many of the above is/are correct?
(a) Only one
(b) Only two
(c) All three
(d) None

Que 5. Consider the following statements:
1. Article 2(4) of the UN Charter prohibits the use of force against the territorial integrity or political independence of any state.
2. Article 51 of the Indian Constitution directs the State to promote international peace and security.
3. Non-alignment in India's foreign policy meant permanent neutrality in all global conflicts.
4. Strategic autonomy enhances a country's diplomatic credibility in multilateral negotiations.

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

Que 6. Consider the following statements regarding recent geopolitical tensions in West Asia:
1. The Strait of Hormuz is strategically significant because it connects the Persian Gulf with the Arabian Sea and is a major route for global oil trade.
2. The Assembly of Experts in Iran is constitutionally empowered to appoint the Supreme Leader.
3. Al Udeid Air Base is located in Bahrain and hosts the headquarters of the US Fifth Fleet.

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

Que 7. Consider the following statements:
Statement I: The National Medical Commission aims to improve transparency and accountability in medical education.
Statement II: The NMC conducts the National Exit Test (NExT) for medical graduates.
Statement III: The NMC directly manages all government hospitals in India.
Which one of the following is correct in respect of the above statements?
(a) Both Statement II and Statement III are correct and both of them explain Statement I

(b) Both Statement II and Statement III are correct but only one of them explains Statement
(c) Only one of the Statements II and III is correct and that explains Statement I
(d) Neither Statement II nor Statement III is correct

Que 8. The Durand Line agreement was signed between Amir Abdur Rahman Khan and:
(a) Lord Curzon
(b) Lord Ripon
(c) Sir Mortimer Durand
(d) Lord Mountbatten

Que 9. Which of the following statements are correct in respect of Vande Mataram -
1. It was composed by Bankim Chandra Chattopadhyay.
2. It was originally written in Sanskrit.
3. It was first published in the novel Anandamath.

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

Que 10. Consider the following statements:
Statement 1: The distribution of legislative powers between the Centre and the States is provided in the Seventh Schedule of the Constitution.
Statement 2: The Seventh Schedule contains the Union List, State List and Concurrent List.
Which one of the following is correct in respect of the above statements?
(a) Both statement 1 and Statement 2 are correct and statement 2 explains statement 1
(b) Both statement 1 and Statement 2 are correct and statement 2 does not explains statement 1
(c) Statement 1 is correct, but Statement 2 is incorrect
(d) Statement 2 is correct, but Statement 1 is incorrect

Que 11. Consider the following statements:
1. The Natanz facility in Iran is associated with uranium enrichment activities and has been central to international concerns regarding Iran's nuclear programme.
2. The Strait of Hormuz connects the Red Sea with the Mediterranean Sea and is a key maritime chokepoint for global oil trade.

Which of the statements given above is/are correct?
(a) 1 only
(b) 2 only
(c) Both 1 and 2
(d) Neither 1 nor 2

Que 12. In the context of modern warfare, cloud data centres are increasingly regarded as strategic assets primarily because they:
(a) Function as global internet regulators
(b) Store only private corporate data
(c) Host critical digital services supporting economic and defence systems
(d) Operate independently of national power grids

Que 13. Which of the following statements are correct in respect of United Nations Security Council Resolution 1325:
1. It recognizes the disproportionate impact of armed conflict on women and girls.
2. It calls for greater participation of women in peacebuilding and conflict resolution processes.
3. It makes membership of women mandatory in the UN Security Council.

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

Q14. Consider the following statements:
Statement 1: The Women's Reservation Act, 2023 provides 33% reservation for women in the Lok Sabha and State Legislative Assemblies.
Statement 2: The Act aims to increase women's political representation and participation in legislative decision-making.
Which one of the following is correct in respect of the above statements?
(a) Both statement 1 and Statement 2 are correct and statement 2 explains statement 1
(b) Both statement 1 and Statement 2 are correct and statement 2 does not explains statement 1
(c) Statement 1 is correct, but Statement 2 is incorrect
(d) Statement 2 is correct, but Statement 1 is incorrect

Que 15. Consider the following statements regarding organisations and institutional aspects related to rice production and exports in India:
1. The Indian Council of Agricultural Research coordinates agricultural research and has developed several high-yielding rice varieties in India.
2. The Indian Agricultural Research Institute has played a major role in developing improved basmati varieties such as Pusa Basmati-1509.
3. The Agricultural and Processed Food Products Export Development Authority is responsible for promoting and regulating the export of agricultural and processed food products including basmati rice.
4. The Food Corporation of India primarily regulates international rice trade and sets export quotas for rice shipments.

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

Que 16. Consider the following countries mentioned in the context of recent geopolitical tensions in the Middle East:
1. Qatar
2. Iran
3. Kuwait
4. Oman

How many of the above countries are members of the Gulf Cooperation Council (GCC)?

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

Que 17. Which of the following statements are correct in respect of National Food Security Act (NFSA), 2013?
1. It legally entitles eligible households to receive subsidised food grains through the Public Distribution System (PDS).
2. It provides nutritional support to pregnant women, lactating mothers and children through schemes such as ICDS and Mid-Day Meal.
3. It guarantees universal free food grains to all citizens of India irrespective of income.

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

Que 18. Consider the following statements:
Statement 1: Prof. M.S. Swaminathan is known as the "Father of the Green Revolution in India."
Statement 2: He played a key role in introducing high-yielding varieties (HYV) of wheat and rice and promoting modern agricultural practices in India.
Which one of the following is correct in respect of the above statements?
(a) Both statement 1 and Statement 2 are correct and statement 2 explains statement 1
(b) Both statement 1 and Statement 2 are correct and statement 2 does not explains statement 1
(c) Statement 1 is correct, but Statement 2 is incorrect
(d) Statement 2 is correct, but Statement 1 is incorrect

Que 19. Consider the following statements:
1. The Strait of Hormuz is a strategically important maritime chokepoint through which a significant share of the world's oil trade passes.
2. The SAGAR (Security and Growth for All in the Region) doctrine of India primarily aims at establishing nuclear deterrence in the Indian Ocean Region.

Which of the statements given above is/are correct?
(a) 1 only
(b) 2 only
(c) Both 1 and 2
(d) Neither 1 nor 2

Que 20. Consider the following statements regarding international student mobility and the United States:
1. The F-1 visa is issued by the United States to foreign nationals seeking to pursue full-time academic studies at recognised institutions.
2. The Student and Exchange Visitor Information System (SEVIS) is used by the United States to monitor and track international students and exchange visitors.
3. According to recent global education data, India has emerged as the largest source of international students in the United States, surpassing China.
4. The US Department of State is responsible for issuing non-immigrant visas through its embassies and consulates abroad.

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

Que 21. Which of the following statements are correct in respect of Model Code of Conduct (MCC)?
1. The Model Code of Conduct comes into force immediately after the Election Commission of India announces the election schedule.
2. The Model Code of Conduct is a legally enforceable law enacted by Parliament.
3. The Model Code of Conduct restricts the ruling party from announcing new schemes that may influence voters.

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

Que 22. Consider the following statements:
Statement 1: The Constitution (One Hundred and Twenty-ninth Amendment) Bill, 2024 seeks to enable simultaneous elections to the Lok Sabha and State Legislative Assemblies across India.
Statement 2: The Bill proposes constitutional changes to synchronize the tenure of State Assemblies with the Lok Sabha, even if some Assemblies have to face shortened or extended terms during the transition period.
Which one of the following is correct in respect of the above statements?
(a) Both statement 1 and Statement 2 are correct and statement 2 explains statement 1
(b) Both statement 1 and Statement 2 are correct and statement 2 does not explains statement 1
(c) Statement 1 is correct, but Statement 2 is incorrect 1
(d) Statement 2 is correct, but Statement 1 is incorrect

Que 23. Consider the following statements regarding Farm Loan Waiver Schemes in India:
1. The Agricultural and Rural Debt Relief Scheme (ARDRS), 1990) was the first nationwide farm loan waiver programme implemented by the Government of India.
2. The Agricultural Debt Waiver and Debt Relief Scheme (ADWDRS), 2008) extended coverage to cooperative credit institutions in addition to scheduled commercial banks and regional rural banks.
3. The Reserve Bank of India (RBI) has repeatedly cautioned that farm loan waivers may weaken credit culture and increase moral hazard among borrowers.

How many of the statements given above are correct?
(a) Only one
(b) Only two
(c) All three
(d) None

Que 24. Which of the following countries border the Red Sea?
1. Sudan

2. Eritrea
3. Jordan
4. Yemen

Select the correct answer using the code given below:

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

Que 25. Which of the following statements are correct in respect of recently countries that joined North Atlantic Treaty Organization (NATO):

1. Finland
2. Sweden
3. Ukraine

Select the correct answer using the code given below:

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

Que 26. Consider the following statements:

Statement I: The Iranian Revolution significantly altered the political structure of Iran.

Statement II: After the revolution, Iran adopted a system known as the Islamic Republic, combining elements of religious authority and elected institutions.

Statement III: The revolution strengthened the monarchy and expanded the powers of the Shah.

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

(a) Both Statement II and Statement III are correct and both of them explain Statement I
(b) Both Statement II and Statement III are correct but only one of them explains Statement
(c) Only one of the Statements II and III is correct and that explains Statement I
(d) Neither Statement II nor Statement III is correct

Que 27. Consider the following statements regarding India's strategic and economic interests in West Asia:

1. India's energy security is closely linked with developments in West Asia because a substantial share of its crude oil and gas imports originate from this region.
2. Geopolitical instability in West Asia can affect India through disruptions in trade routes, remittances from the Indian diaspora, and volatility in global energy prices.

Which of the statements given above is/are correct?

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

Que 28. The "India VIX Index", often reported in financial news, primarily indicates which of the following?

(a) The average price movement of the top 50 companies listed on the National Stock Exchange
(b) The expected volatility in the stock market based on Nifty option prices
(c) The average return earned by foreign institutional investors in the Indian equity market
(d) The difference between government bond yields and stock market returns

Que 29. Which of the following statements are correct in respect of removal of the Speaker of the Lok Sabha?

1. The Speaker can be removed by a resolution passed by a majority of all the then members of the Lok Sabha.
2. A 14-day notice must be given before moving the resolution for removal.
3. When the resolution for removal of the Speaker is under consideration, the Speaker can preside over the sitting of the House.

Select the correct answer using the code given below:

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

Que 30. Consider the following statements:

Statement 1: The United States was the first country to recognize Israel after its declaration of independence in 1948.

Statement 2: The United States has never used its veto power in the UN Security Council in favor of Israel.

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

(a) Both statement 1 and Statement 2 are correct and statement 2 explains statement 1
(b) Both statement 1 and Statement 2 are correct and statement 2 does not explains statement 1
(c) Statement 1 is correct, but Statement 2 is incorrect
(d) Statement 2 is correct, but Statement 1 is incorrect

Que 31. Consider the following statements regarding India's foreign policy approach in international conflicts:

1. India's doctrine of non-alignment historically meant strict neutrality and avoiding taking positions in global conflicts.
2. India maintained a largely muted response to the Soviet interventions in Hungary (1956), Czechoslovakia (1968), and Afghanistan (1979).
3. India actively supported the United Nations resolution condemning China's intervention in the Korean War in 1950.
4. India's contemporary approach to the Gulf region is strongly influenced by economic interests, energy security, and the presence of a large Indian diaspora.

How many of the statements given above are correct?

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

Que 32. Consider the following statements regarding the removal of the Chief Election Commissioner (CEC) of India:

1. The Chief Election Commissioner can be removed from office in the same manner and on the same grounds as a Judge of the Supreme Court.

2. Election Commissioners can be removed by the President on the recommendation of the Chief Election Commissioner.
3. A motion for removal of a Supreme Court judge must be supported by at least two-thirds of the total membership of each House of Parliament.

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

Que 33. Which of the following statements are correct in respect of International Energy Agency (IEA)?
1. The International Energy Agency was established in 1974 in response to the 1973 oil crisis.
2. The IEA operates as an autonomous agency within the framework of the Organisation for Economic Co-operation and Development (OECD).
3. India is a full member of the IEA.

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

Que 34. Consider the following statements:
Statement 1: The Strait of Hormuz lies between Iran to the north and Oman and the United Arab Emirates to the south.
Statement 2: The strait serves as a critical maritime route for oil exports from countries such as Saudi Arabia, Iraq, Kuwait, and Qatar.
Which one of the following is correct in respect of the above statements?
(a) Both statement 1 and Statement 2 are correct and statement 2 explains statement 1
(b) Both statement 1 and Statement 2 are correct and statement 2 does not explains statement 1
(c) Statement 1 is correct, but Statement 2 is incorrect
(d) Statement 2 is correct, but Statement 1 is incorrect

Que 35. Consider the following statements regarding the use of Artificial Intelligence (AI) in military applications:
1. Lethal Autonomous Weapon Systems (LAWS) refer to weapons capable of selecting and engaging targets without human intervention.
2. Many AI companies developing frontier models have proposed safeguards against mass surveillance and fully autonomous weapons.
3. International humanitarian law explicitly bans all forms of autonomous weapons.

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

Que 36. Consider the following countries:
1. China
2. Nepal
3. Myanmar
4. Sri Lanka

Which of the above countries share a land border with India?
(a) 1, 2 and 3 only
(b) 2 and 4 only
(c) 1, 3 and 4 only
(d) 1, 2, 3 and 4

Que 37. Consider the following statements regarding the powers and role of the Supreme Court of India:
1. The Supreme Court has the power of judicial review to examine the constitutional validity of legislative and executive actions.
2. Freedom of speech and expression under the Constitution of India is an absolute right and cannot be restricted by the State.
3. The Supreme Court has emphasised that institutional accountability and transparency are essential for maintaining public confidence in the judiciary.
4. The doctrine of separation of powers ensures that the legislature, executive, and judiciary function independently while maintaining checks and balances.

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

Que 38. Consider the following statements regarding the Chief Election Commissioner (CEC) of India:
1. The Chief Election Commissioner can be removed from office in the same manner and on the same grounds as a judge of the Supreme Court of India.
2. A motion for the removal of the Chief Election Commissioner can be initiated only in the Lok Sabha.
3. The motion for removal must be passed by each House of Parliament by a special majority.

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

Que 39. Consider the following with reference to SHANTI Act, 2025:
1. The Act seeks to strengthen nuclear energy infrastructure and fuel cycle management in India.
2. It encourages international cooperation for nuclear technology and fuel supply.
3. It mandates that all nuclear power plants must be owned exclusively by State Governments.

How many of the above is/are correct?
(a) Only one
(b) Only two
(c) All three
(d) None

Que 40. Consider the following statements:
1. The Global Innovation Index is jointly published by the World Intellectual Property Organization (WIPO) along with other international institutions.

2. The index evaluates countries based on innovation inputs and innovation outputs such as research, infrastructure, knowledge and technology outputs.

Which of the statements given above is/are correct?

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

Que 41. Which of the following statements are correct in respect of Washington Consensus (WC):

1. The Washington Consensus refers to a set of economic policy reforms promoted for developing countries by institutions such as the IMF and World Bank.
2. The policies emphasised market-oriented reforms such as trade liberalisation, fiscal discipline and privatisation.
3. The Washington Consensus mainly focused on expanding state control and protectionism in the economy.

Select the correct answer using the code given below:

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

Que 42. Consider the following statements:

Statement 1: Consumer Price Index (CPI) measures the change in prices of a basket of goods and services consumed by households.

Statement 2: CPI in India is compiled and released by the National Statistical Office (NSO) under the Ministry of Statistics and Programme Implementation.

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

(a) Both statement 1 and Statement 2 are correct and statement 2 explains statement 1
(b) Both statement 1 and Statement 2 are correct and statement 2 does not explains statement 1
(c) Statement 1 is correct, but Statement 2 is incorrect
(d) Statement 2 is correct, but Statement 1 is incorrect

Que 43. The debate on mandatory menstrual leave in workplaces, recently discussed by the Supreme Court of India, is primarily associated with which of the following themes in public policy?

(a) Corporate taxation reforms and labour productivity
(b) Gender justice, workplace equality, and labour policy
(c) Federal distribution of legislative powers
(d) Judicial review of constitutional amendments

Que 44. Consider the following statements regarding the economic and non-economic costs of modern wars:

1. The Costs of War Project at Brown University estimated that the total budgetary cost and future obligations of the United States related to post-9/11 wars exceed $8 trillion.
2. Military conflicts often generate indirect global economic costs, including higher crude oil prices and inflationary pressures.
3. The United States Department of Defense is among the world's largest institutional consumers of petroleum-based fuels.

How many of the statements given above are correct?

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

Que 45. Which of the following statements are correct in respect of factors can contribute to a rise in Labour Force Participation Rate:

1. Increase in employment opportunities
2. Higher female participation in workforce
3. Economic slowdown forcing more people to seek jobs

Select the correct answer using the code given below:

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

Que 46. Consider the following statements:

Statement I: Zero Hour is a parliamentary device used by Members of Parliament to raise urgent matters without prior notice.

Statement II: Zero Hour starts immediately after Question Hour in both the Lok Sabha and the Rajya Sabha.

Statement III: Zero Hour is mentioned explicitly in the Rules of Procedure of the Indian Parliament.

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

(a) Both Statement II and Statement III are correct and both of them explain Statement I
(b) Both Statement II and Statement III are correct but only one of them explains Statement
(c) Only one of the Statements II and III is correct and that explains Statement I
(d) Neither Statement II nor Statement III is correct

Que 47. Consider the following statements:

1. The National Council of Educational Research and Training (NCERT) is a statutory body established by an Act of Parliament.
2. NCERT functions as an autonomous organisation under the Ministry of Education, Government of India.
3. The Supreme Court of India has the constitutional authority to enforce Fundamental Rights through judicial review.
4. The NCERT is responsible for preparing the National Curriculum Framework and developing school textbooks.

Which of the statements given above are incorrect?

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

Que 48. Consider the following statements:

1. The North Block and South Block in New Delhi were designed by the British architects Edwin Lutyens and Herbert Baker.
2. These buildings were constructed after India became independent in 1947 to house the central secretariat.
3. The design of these buildings symbolised the authority and permanence of the British colonial administration.

How many of the statements given above are correct?

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

Que 49. Which of the following statements are correct in respect of Tropical Forest Forever Facility (TFFF):
1. It is a permanent global finance mechanism for tropical forest conservation.
2. It relies primarily on short-term donor aid funding.
3. Payments to countries are based on verified forest preservation.

Select the correct answer using the code given below:

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

Que 50. Consider the following statements:
Statement 1: The Global Forest Coalition (GFC) is an international coalition of civil society and indigenous peoples' organizations that works to protect forests and the rights of forest-dependent communities.
Statement 2: The coalition promotes community-based forest conservation and challenges large-scale industrial activities that cause deforestation.
Which one of the following is correct in respect of the above statements?
(a) Both statement 1 and Statement 2 are correct and statement 2 explains statement 1
(b) Both statement 1 and Statement 2 are correct and statement 2 does not explains statement 1
(c) Statement 1 is correct, but Statement 2 is incorrect
(d) Statement 2 is correct, but Statement 1 is incorrect

Que 51. Consider the following statements regarding wildlife management in India:
1. The Central Zoo Authority (CZA) functions under the Ministry of Environment, Forest and Climate Change and regulates standards for zoos in India.
2. Any facility keeping wild animals for public display must obtain recognition from the Central Zoo Authority.
3. The Wildlife Institute of India (WII) is a statutory body responsible for granting zoo recognition in India.

How many of the statements given above are correct?

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

Que 52. Consider the following countries located around the Persian Gulf region:
1. Iran
2. Oman
3. Kuwait
4. Qatar

How many of the above countries have a coastline along the Strait of Hormuz?
(a) Only one
(b) Only two
(c) Only three
(d) All four

Que 53. Which of the following statements are correct with respect of Sixth Schedule of the Indian Constitution:
1. It provides for autonomous administrative divisions in certain tribal areas of Northeast India.
2. It applies to all tribal areas across India including central India.
3. Autonomous District Councils can make laws on specified subjects like land and forests.

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

Que 54. Consider the following statements:
Statement I: BRICS is an intergovernmental grouping aimed at promoting economic cooperation and reforming global financial institutions.
Statement II: BRICS countries collectively represent a large share of global GDP and population, which strengthens their demand for reforms in global financial institutions.
Statement III: BRICS functions as a formal military alliance similar to NATO.
Which one of the following is correct in respect of the above statements?
(a) Both Statement II and Statement III are correct and both of them explain Statement I
(b) Both Statement II and Statement III are correct but only one of them explains Statement
(c) Only one of the Statements II and III is correct and that explains Statement I
(d) Neither Statement II nor Statement III is correct

Que 55. With reference to the estimation of Gross Domestic Product (GDP) in India, consider the following statements:
1. In the absence of a full-fledged Producer Price Index (PPI), the Wholesale Price Index (WPI) is used as a proxy for deflating GDP.
2. The Consumer Price Index (CPI) is preferred over WPI for estimating real GDP across all sectors of the economy.
3. Corporate sector data is sometimes used as a proxy to estimate informal sector output due to limitations in data availability.
4. India's National Accounts rely exclusively on direct annual surveys of the informal sector for GDP estimation.

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

Que 56. With reference to the impact of social media on adolescents, consider the following statements:
1. The minimum age of 13 years for social media use is based on scientific research related to adolescent brain development.
2. The prefrontal cortex, associated with decision-making and impulse control, is not fully developed in adolescents.

3. Social media platforms are mandated globally to adopt "safety-by-design" measures before launching features.

How many of the statements given above are correct?

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

Que 57. Which of the following statements are correct in respect of Shanghai Cooperation Organization (SCO)?

1. It was established in 2001 to promote political, economic, and security cooperation among member states.
2. India and Pakistan became full members of SCO in 2017.
3. The headquarters of SCO is located in Moscow, Russia.

Select the correct answer using the code given below:

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

Que 58. Consider the following statements:

Statement 1: UDISE (Unified District Information System for Education) is a database system used by the Government of India to collect school-level data on education.

Statement 2: It helps in planning, policy formulation, and monitoring of schemes in the school education sector.

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

(a) Both statement 1 and Statement 2 are correct and statement 2 explains statement 1
(b) Both statement 1 and Statement 2 are correct and statement 2 does not explains statement 1
(c) Statement 1 is correct, but Statement 2 is incorrect
(d) Statement 2 is correct, but Statement 1 is incorrect

Que 59. With reference to the Tughlakabad Fort and its protection, consider the following statements:

1. Tughlakabad Fort is a centrally protected monument under the Archaeological Survey of India.
2. The Archaeological Survey of India functions under the Ministry of Culture.
3. Encroachments on protected monuments are governed by the Ancient Monuments and Archaeological Sites and Remains Act, 1958.

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

Que 60. Consider the following statements:

1. The power to punish for contempt of court in India is derived both from the Constitution and statutory law.
2. Fair and reasonable criticism of judicial functioning is permissible under the right to freedom of speech.
3. The Constitution explicitly provides for Public Interest Litigation (PIL) as a mechanism for judicial access.
4. The power of judicial review is explicitly mentioned in the Constitution of India.

How many of the above statements are correct?

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

Que 61. With reference to maternity benefits in India, consider the following statements:

1. The Maternity Benefit Act, 1961 provides maternity leave benefits to adoptive mothers.
2. The Supreme Court of India has held that denying maternity leave to adoptive mothers based on the age of the child violates Article 14.
3. Article 21 of the Constitution has been interpreted to include reproductive autonomy limited only to biological reproduction.

Which of the statements given above is/are correct?

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

Que 62. With reference to inter-state river water disputes in India, consider the following statements:

1. The Indus Waters Treaty (1960) gives India the right to unrestricted use of the waters of the "Eastern Rivers"—Ravi, Beas, and Sutlej.
2. Under Article 131 of the Constitution, the Supreme Court has original jurisdiction to settle disputes between states regarding the use, control, or distribution of inter-state river waters.
3. The Inter-State River Water Disputes Act, 1956, explicitly bars the jurisdiction of the Supreme Court and other courts over disputes referred to a water tribunal.
4. India's water allocation often includes non-riparian states based on historical agreements or tribunal awards, rather than following a strict riparian principle.

Which of the statements given above are correct?

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

Que 63. Which of the following is not a function of the RBI?

(a) Banker to the Government
(b) Controller of Credit
(c) Issuing authority of coins
(d) Custodian of foreign exchange

Que 64. Consider the following statements:

1. The NavIC (Navigation with Indian Constellation) provides accurate position information service primarily over India and the surrounding region.
2. It is operated and maintained by the Indian Space Research Organisation (ISRO).

Which of the statements given above is/are correct?

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

Que 65. Consider the following PVTG pairs:

Tribe	Region
1. Jarawa	Andaman Islands
2. Birhor	Jharkhand
3. Chenchu	Rajasthan

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

Que 66. Which of the following statements are not correct in respect of Maternity Benefit (Amendment) Act, 2017?
1. It increased paid maternity leave from 20 weeks to 32 weeks.
2. It introduced work-from-home provisions.
3. It applies to all women irrespective of employment status.

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

Que 67. Consider the following statements regarding parental leave provisions in India:
Statement 1: The Supreme Court has held that maternity benefits are linked only to the biological act of childbirth and hence cannot be extended to adoptive or commissioning mothers.
Statement 2: The Supreme Court has recommended that the government should consider recognising and expanding paternity leave to promote gender equality in caregiving.
Which one of the following is correct?
(a) Both Statement 1 and Statement 2 are correct
(b) Both Statement 1 and Statement 2 are incorrect
(c) Statement 1 is correct but Statement 2 is incorrect
(d) Statement 1 is incorrect but Statement 2 is correct

Que 68. With reference to the recent depreciation of the Indian rupee, consider the following:
1. A sustained increase in crude oil prices tends to widen India's trade deficit and put downward pressure on the rupee.
2. Large outflows of foreign portfolio investment generally lead to appreciation of the domestic currency.
3. Intervention by the Reserve Bank of India in the foreign exchange market can reduce volatility but may lead to a decline in foreign exchange reserves.

How many of the above are correct?
(a) Only one
(b) Only two
(c) All three
(d) None

Que 69. Which of the following statements are correct in respect of Section 69A of the Information Technology Act, 2000:
1. It empowers the Central Government to block public access to information on online platforms in the interest of sovereignty, security, and public order.
2. It allows intermediaries to voluntarily remove content without any government direction.
3. Orders under this section are subject to judicial review.

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

Que 70. Consider the following statements:
Statement I: The Citizenship (Amendment) Act, 2019 provides for granting Indian citizenship to certain religious minorities from neighboring countries.
Statement II: It applies to Hindus, Sikhs, Buddhists, Jains, Parsis, and Christians from Pakistan, Bangladesh, and Afghanistan.
Statement III: It includes Muslims from these countries as beneficiaries under the Act.
Which one of the following is correct in respect of the above statements?
(a) Both Statement II and Statement III are correct and both of them explain Statement I
(b) Both Statement II and Statement III are correct but only one of them explains Statement
(c) Only one of the Statements II and III is correct and that explains Statement I
(d) Neither Statement II nor Statement III is correct

Que 71. Consider the following statements regarding urban governance and public health in India:
1. Urban public health outcomes depend significantly on municipal services such as sanitation, water supply, and waste management.
2. Urban Local Bodies (ULBs) in India have fiscal autonomy comparable to those in OECD countries.
3. Climate adaptation in India is largely driven at national and state levels, with limited fiscal autonomy for cities.
4. The Finance Commission has emphasized untied grants to ULBs to enhance their flexibility in addressing local priorities.

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

Que 72. Consider the following statements regarding India's foreign exchange reserves:
1. Foreign exchange reserves help in managing volatility in the exchange rate of the Indian rupee.
2. During the 1991 Balance of Payments crisis, India had sufficient forex reserves to cover more than six months of imports.
3. Capital outflows by foreign investors can lead to depletion of foreign exchange reserves.

How many of the statements given above are correct?
(a) Only one
(b) Only two

(c) All three
(d) None

Que 73. Which of the following statements are correct in respect of Delimitation Commission?
1. The Delimitation Commission is set up through an Act of Parliament
2. Its orders have the force of law and cannot be challenged in court.
3. It works under the supervision of the Election Commission of India.

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

Que 74. Consider the following statements:
Statement 1: A higher per capita income always means equitable distribution of income in a country.
Statement 2: Per capita income does not reflect income inequalities within a population.
Which one of the following is correct in respect of the above statements?
(a) Both statement 1 and Statement 2 are correct and statement 2 explains statement 1
(b) Both statement 1 and Statement 2 are correct and statement 2 does not explains statement 1
(c) Statement 1 is correct, but Statement 2 is incorrect
(d) Statement 2 is correct, but Statement 1 is incorrect

Que 75. Consider the following statements regarding climate change and Earth's energy balance:
1. Even if greenhouse gas emissions stop immediately, the Earth may continue to warm due to accumulated heat surplus.
2. Oceans act as major heat sinks and absorb a large portion of excess heat trapped by greenhouse gases.
3. Increase in atmospheric greenhouse gases strengthens Earth's outgoing radiation, restoring energy balance naturally.

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

Que 76. The primary purpose of maintaining Strategic Petroleum Reserves (SPRs) in India is to:
(a) Stabilize domestic fuel prices in the retail market
(b) Ensure availability of crude oil during supply disruptions
(c) Promote exports of refined petroleum products
(d) Reduce fiscal deficit by controlling oil imports

Que 77. Which of the following statements are correct in respect of PSLV (Polar Satellite Launch Vehicle):
1. PSLV has a four-stage configuration with alternating solid and liquid stages.
2. It has been used to launch interplanetary missions like Mars Orbiter Mission.
3. It is mainly used for heavy-lift missions like GSLV Mk III.

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

Que 78. Consider the following statements:

Statement 1: The Solicitor General of India is the second highest law officer of the country after the Attorney General.
Statement 2: The Solicitor General is a constitutional post mentioned in the Constitution of India.
Which one of the following is correct in respect of the above statements?
(a) Both statement 1 and Statement 2 are correct and statement 2 explains statement 1
(b) Both statement 1 and Statement 2 are correct and statement 2 does not explains statement 1
(c) Statement 1 is correct, but Statement 2 is incorrect
(d) Statement 2 is correct, but Statement 1 is incorrect

Que 79. With reference to the "Make America Great Again (MAGA)" movement associated with Donald Trump, consider the following statements:
1. It supports economic protectionism and national sovereignty.
2. It promotes liberal immigration policies.
3. It is associated with right-wing populist ideology.

How many of the statements given above are correct?
(a) Only one
(b) Only two
(c) All three
(d) None

Que 80. Which of the following best explains the significance of the Human Papillomavirus (HPV) vaccination introduced in India?
(a) It provides immunity against all types of cancers affecting women
(b) It helps in preventing cervical cancer by targeting a major causative infection
(c) It is primarily used for treating already diagnosed cervical cancer patients
(d) It replaces the need for cancer screening programmes entirely

Que 81. Consider the following statements regarding the informal sector in India:
1. The informal sector includes only agricultural enterprises that are not registered with the government.
2. The Annual Survey of Unincorporated Sector Enterprises (ASUSE) is conducted by Ministry of Statistics and Programme Implementation.
3. Gross Value Added (GVA) per worker is an indicator of labour productivity in the economy.

How many of the statements given above is/are correct?
(a) One only
(b) Two only
(c) All three
(d) None

Que 82. With reference to India's engagement with BRICS and the evolving geopolitical situation in West Asia, consider the following statements:

1. BRICS was established as a formal security alliance to counter Western military influence.
2. India's foreign policy approach in BRICS is guided by the principle of strategic autonomy.
3. Expansion of BRICS has introduced greater diversity in geopolitical interests among its members.
4. India's relations with countries like Iran are influenced solely by energy security considerations.

Which of the statements given above is/are correct?

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

Que 83. Consider the following with reference to Public Accounts Committee:

1. It examines the reports of the Comptroller and Auditor General of India.
2. It consists only of members from the Lok Sabha.
3. The Chairperson of the committee is appointed by the Speaker of the Lok Sabha.

How many of the above is/are correct?

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

Que 84. Which of the following best describes Treasury Bills?

(a) Long-term securities with fixed interest
(b) Short-term instruments issued at a discount
(c) Equity instruments of the government
(d) Bonds with periodic coupon payments

Que 85. With reference to India's commitments under the Paris Agreement and its updated Nationally Determined Contributions (NDCs), consider the following statements:

1. India has already achieved more than 50% of its installed electricity capacity from non-fossil fuel sources.
2. Emissions intensity reduction becomes progressively easier as efficiency improves over time.
3. Carbon sinks created through afforestation are part of India's NDC targets.
4. Even if global emissions become zero immediately, climate change impacts would continue for some time.

Which of the statements given above are correct?

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

Que 86. Consider the following statements with reference to the ongoing Iran–US–Israel geopolitical tensions:

1. The Strait of Hormuz is a critical chokepoint for global oil trade.
2. India has officially joined a military coalition against Iran in the conflict.
3. Asymmetric warfare includes the use of non-conventional tactics by weaker states against stronger powers.
4. The conflict has potential implications for global energy security.

How many of the above statements are correct?

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

Que 87. Consider the following with reference to Supreme Court of India:

1. It can transfer cases from one High Court to another.
2. It can punish for contempt of itself.
3. It can advise the President under certain circumstances.

How many of the above is/are correct?

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

Que 88. Who is the Chairperson of the GST Council?

(a) Prime Minister
(b) Finance Minister
(c) President
(d) RBI Governor

Que 89. With reference to the Group of Seven (G7), consider the following statements:

1. It is an informal grouping of advanced economies with no permanent secretariat.
2. All its members are also part of the North Atlantic Treaty Organization (NATO).
3. It regularly invites non-member countries like India to participate in its outreach sessions.

Which of the statements given above is/are correct?

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

Que 90. With reference to the excavation at the Balirajgarh site, consider the following statements:

1. The site shows evidence of continuous habitation from the Mauryan to the Pala period.
2. Northern Black Polished Ware (NBPW) is associated with the Mauryan period.
3. The presence of punch-marked coins indicates a monetised economy in ancient India.
4. The site has been conclusively proven to predate the Iron Age.

How many of the above statements are correct?

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

Que 91. Consider the following with reference to UDAN Scheme:

1. The scheme aims to enhance regional air connectivity.
2. It provides financial incentives to airlines to operate on underserved routes.
3. It is implemented by the Ministry of Road Transport and Highways.

How many of the above is/are correct?

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

Que 92. Which sea is connected with the Baltic ports?

(a) Mediterranean Sea
(b) Baltic Sea
(c) Black Sea
(d) Arabian Sea

Que 93. Which of the following statements are correct in respect of Foreign Contribution Regulation Act?

1. It regulates acceptance and utilisation of foreign contributions by individuals and organisations.
2. It is implemented by the Ministry of Finance.
3. It aims to prevent activities detrimental to national interest.

Select the correct answer using the code given below:

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

Que 94. Consider the following statements:

Statement 1: The maximum strength of the Lok Sabha is fixed at 552 members by the Constitution.

Statement 2: Out of the total strength, up to 535 members can represent States and up to 15 members can represent Union Territories.

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

(a) Both statement 1 and Statement 2 are correct and statement 2 explains statement 1
(b) Both statement 1 and Statement 2 are correct and statement 2 does not explains statement 1
(c) Statement 1 is correct, but Statement 2 is incorrect
(d) Statement 2 is correct, but Statement 1 is incorrect

Que 95. Consider the following statements regarding fund flow and utilisation in Centrally Sponsored Schemes (CSS) in India:

1. The Single Nodal Agency (SNA) framework consolidates funds into a single account to improve transparency and tracking.
2. SNA-SPARSH enables just-in-time release of funds directly to beneficiaries to reduce idle funds.
3. Improving fund flow mechanisms alone is sufficient to ensure higher utilisation of funds in welfare schemes.

How many of the statements given above are correct?

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

Que 96. With reference to greenhouse gas emissions and their impact on global warming, which one of the following statements is the most appropriate?

(a) All greenhouse gases contribute equally to global warming regardless of their atmospheric lifetime.
(b) Methane contributes less to global warming than carbon dioxide because it remains in the atmosphere for a shorter duration.
(c) The impact of greenhouse gases on warming depends on both their heat-trapping ability and the duration for which they remain in the atmosphere.
(d) Carbon dioxide has the highest short-term warming impact among all greenhouse gases due to its long atmospheric lifetime.

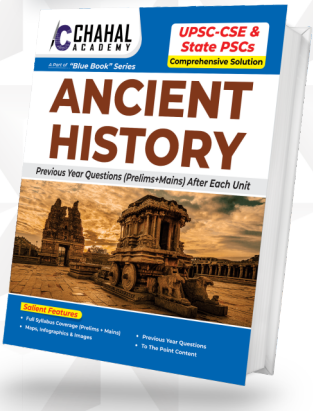
ANSWER KEY

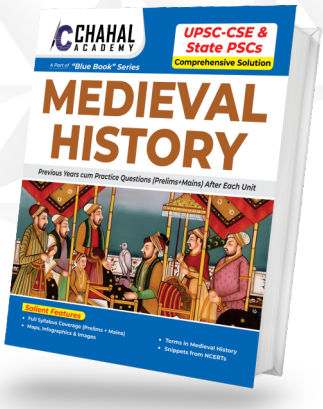
Que 1	A	**Que 2**	C (1, 3 & 4)	**Que 3**	D	**Que 4**	C	**Que 5**	C (1, 2 & 4)
Que 6	A	**Que 7**	C	**Que 8**	C	**Que 9**	C	**Que 10**	A
Que 11	A	**Que 12**	C	**Que 13**	A	**Que 14**	A	**Que 15**	B
Que 16	C (1, 3 & 4)	**Que 17**	A	**Que 18**	A	**Que 19**	A	**Que 20**	D
Que 21	C	**Que 22**	A	**Que 23**	C	**Que 24**	C	**Que 25**	A
Que 26	C	**Que 27**	C	**Que 28**	B	**Que 29**	A	**Que 30**	C
Que 31	B (2 & 4)	**Que 32**	B	**Que 33**	A	**Que 34**	B	**Que 35**	B
Que 36	A	**Que 37**	B	**Que 38**	C	**Que 39**	B (1 & 2)	**Que 40**	C
Que 41	A	**Que 42**	B	**Que 43**	B	**Que 44**	C	**Que 45**	D
Que 46	C	**Que 47**	A	**Que 48**	B (1 & 3)	**Que 49**	C	**Que 50**	A
Que 51	B (1 & 2)	**Que 52**	B (1 & 2)	**Que 53**	C	**Que 54**	C	**Que 55**	A
Que 56	A (2 Only)	**Que 57**	A	**Que 58**	A	**Que 59**	D	**Que 60**	C (1, 2 & 4)
Que 61	A (1 & 2)	**Que 62**	B	**Que 63**	A (1 & 2)	**Que 64**	B	**Que 65**	C
Que 66	C	**Que 67**	D	**Que 68**	B	**Que 69**	C	**Que 70**	C
Que 71	C (1, 3 & 4)	**Que 72**	B (1 & 3)	**Que 73**	A	**Que 74**	D	**Que 75**	A
Que 76	B	**Que 77**	A	**Que 78**	C	**Que 79**	B (1 & 3)	**Que 80**	B
Que 81	A	**Que 82**	A	**Que 83**	B (1 & 3)	**Que 84**	A	**Que 85**	A
Que 86	C (1, 3 & 4)	**Que 87**	C	**Que 88**	B	**Que 89**	A	**Que 90**	C (1, 2 & 3)
Que 91	B (1 & 2)	**Que 92**	B	**Que 93**	C	**Que 94**	C	**Que 95**	B
Que 96	C								

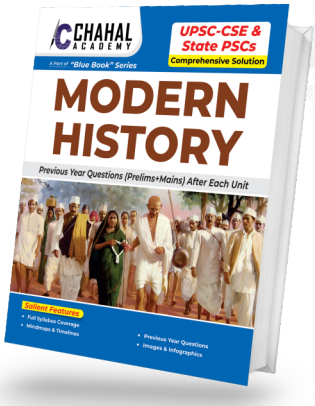
Blue Book Series

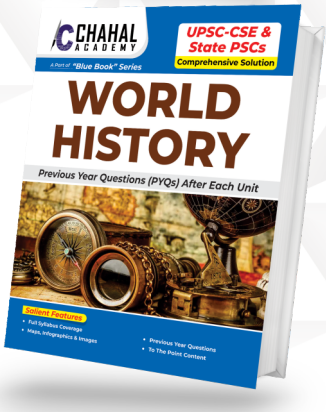
By Chahal Academy

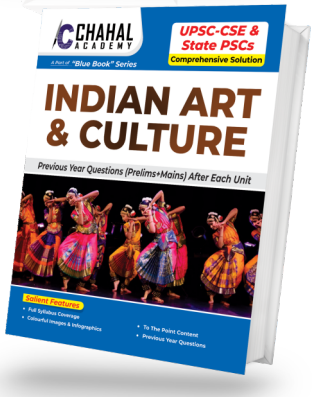
Books in Our "Blue Book" Series

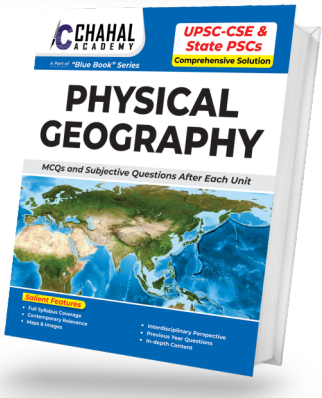


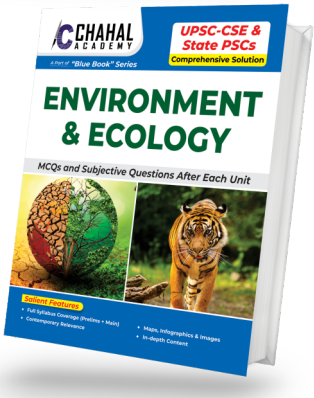


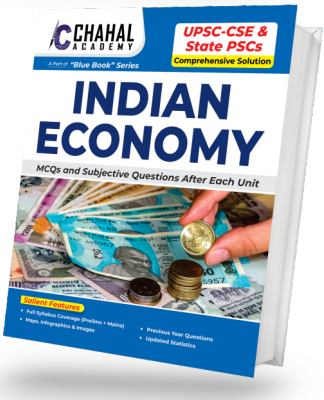


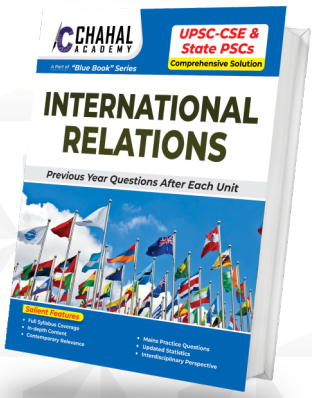


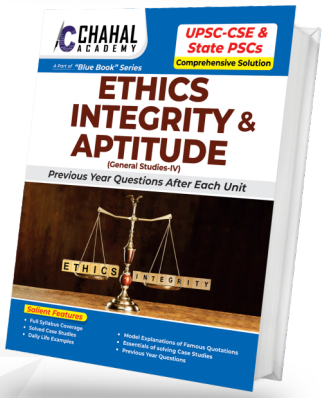


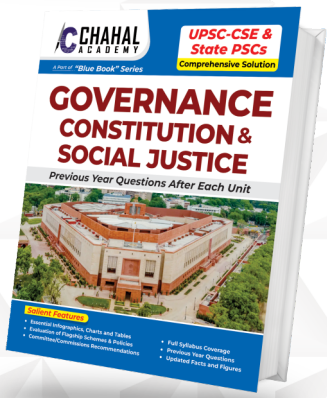












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