



UPSC MONTHLY MAGAZINE

AI Powered Magazine for Smarter UPSC Prep'



From the Editor's Desk

Welcome to the December Issue of PadhAI — an AI-powered magazine designed by UPSC experts to make your preparation smarter, faster, and deeply exam-oriented.

Why This Magazine Exists

Dear Aspirant,

PadhAI Magazine was created from a simple observation: most failures occur not due to lack of effort, but due to three critical gaps—delayed content, scattered resources, and weak exam linkage.

We built this magazine to solve those exact problems.

Most current affairs resources reach you 15–30 days late. By then, exam relevance has already faded. Relevance is everything in UPSC preparation. A topic that matters today becomes a sideshow in a month.

What Makes This Magazine Different

At PadhAI, we operate differently:

Speed & Relevance

- We publish within a week—so you learn while the topic is still relevant for exams
- You grasp concepts before they become old news, giving you a real head start
- Early understanding means better retention and confidence when these topics appear in questions

Exam-Aligned Restructuring

- We don't report news. We extract exam-aligned concepts.
- Every article is built around three core questions:
 - What will Prelims ask?
 - How will Mains expect you to analyze it?
 - What concepts build from this topic?

Complete Integration

- Every article links to previous year questions, practice MCQs, and structured answers
- Alongside this magazine: daily PIB summaries, Current Affairs & GS topics explained, and AI tutor chat support
- One integrated system instead of scattered resources that are wasting your time

What's Inside This Edition

This December edition brings you the most relevant national and international updates, rewritten into crisp, high-retention smart notes. Each topic is restructured to focus on:

- **Concept clarity** – What you need to understand
- **Governance relevance** – Why it matters to India's systems
- **Analytical value** – How to think about it for both Prelims and Mains

Our Core Philosophy

Learn only what matters.

Learn it the right way.

Learn it at the right time.

Let's make learning intelligent – not overwhelming.

—The PadhAI Team

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PERSON IN NEWS

1. Dr. B.R. Ambedkar

2. Pandit Madan Mohan Malaviya

3. Dr. Arvind Panagariya

4. Netaji Subhas Chandra Bose

5. Dr. Kishore M. Paknikar

6. Sangeeta Barooah Pisharoty

7. Guru Teg Bahadur

8. Hardik Singh

9. B. Sairam

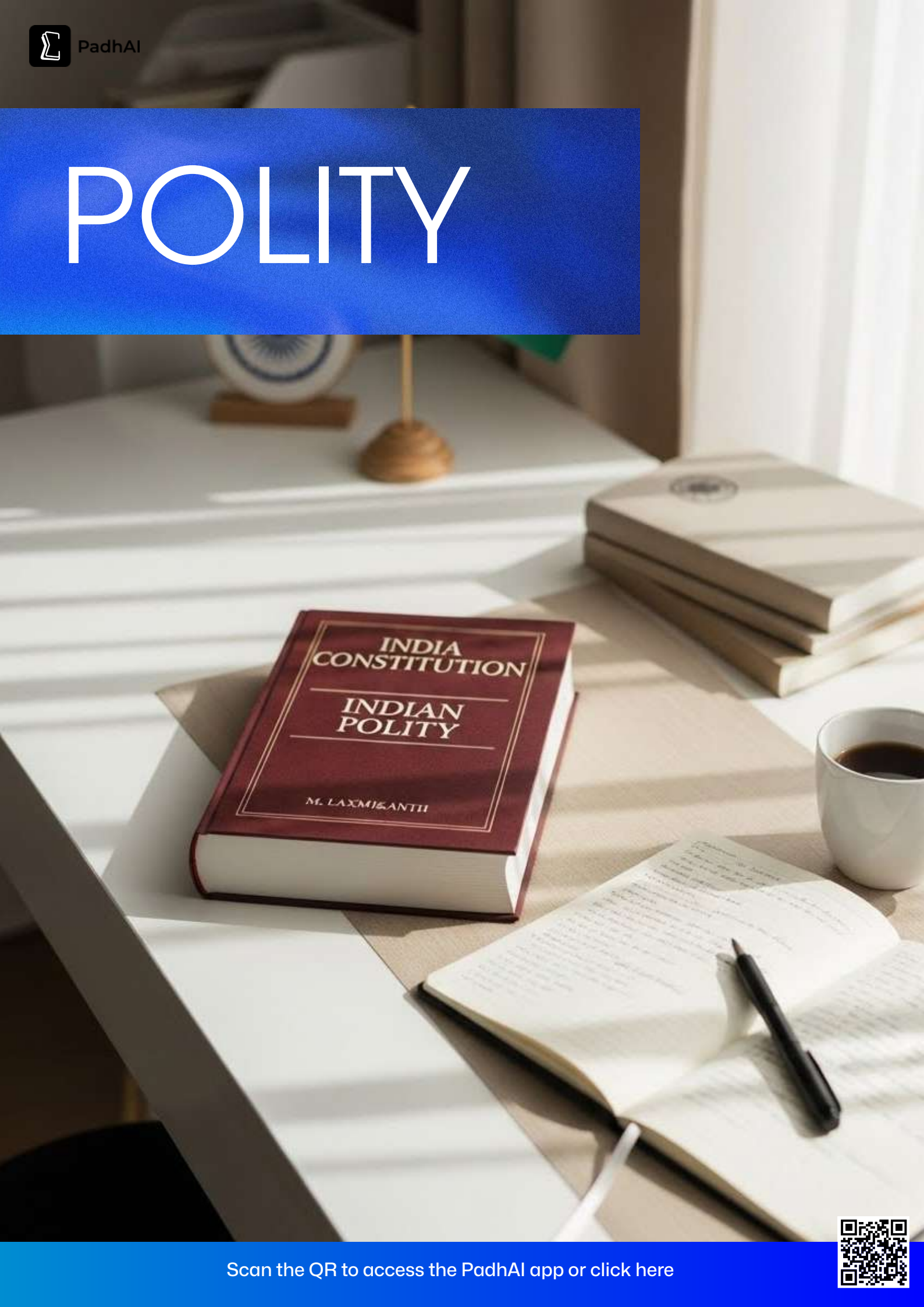
10. Praveen Kumar

11. Jayshree Ullal

12. Shashwat Sharma



POLITY



1. When Law Lets Down the Defenceless: Gaps in Justice Delivery and the Crisis of Protection

WHY IN THE NEWS?

- Recurrent incidents involving **women, children, marginalised communities, and undertrials** have raised concerns about delayed or denied justice.
- High **pendency of cases**, weak enforcement, and procedural hurdles continue to undermine the rule of law.
- Editorial and judicial discourse has highlighted the gap between **constitutional guarantees and lived realities**.

SUMMARY

- Despite a robust constitutional and legal framework, India's justice delivery system often fails the most vulnerable.
- Delays, poor investigation, social prejudice, and limited access to legal aid weaken protection for the defenceless.
- When law does not translate into timely justice, it erodes public trust and constitutional morality.
- Addressing this crisis requires institutional reform, sensitivity in enforcement, and a renewed commitment to access, equity, and accountability.

BACKGROUND / CONTEXT

- I. The **Indian Constitution** guarantees equality before law (Article 14) and protection of life and liberty (Article 21).
- II. Multiple protective laws exist:
 - ✓ IPC & CrPC safeguards
 - ✓ POCSO Act

- ✓ SC/ST (Prevention of Atrocities) Act
 - ✓ Legal Services Authorities Act, 1987
- III. However, **implementation deficits**, not absence of law, lie at the heart of injustice.
 - IV. Structural issues like **4.8+ crore pending cases**, underfunded legal aid, and investigation lapses disproportionately affect those with least social capital.

KEY HIGHLIGHTS

1. Delay as Denial of Justice

- Long trials erode evidence and victim confidence.
- Undertrials remain incarcerated longer than possible sentences.

2. Weak Investigation & Prosecution

- Poor FIR registration, shoddy investigation, and low conviction rates.
- Lack of forensic capacity and witness protection.

3. Access Barriers

- Legal complexity, cost, language barriers, and low legal awareness.
- Inadequate reach of free legal aid and Lok Adalats for serious offences.

4. Social Bias in Law Enforcement

- Discrimination based on caste, gender, class, or religion.
- Victim-blaming and institutional insensitivity.

5. Institutional Capacity Constraints

- Judge–population ratio below global standards.



- Overburdened police and prosecution services.

6. Impact on Rule of Law

- Normalisation of impunity.
- Decline in public trust and rise in extra-legal responses.

PRELIMS BOOSTER BOX

- **Article 14:** Equality before law.
- **Article 21:** Right to life and personal liberty.
- **Legal Aid:** Guaranteed under Article 39A.
- **Undertrial:** Person awaiting trial, not convicted.
- **Justice Delayed = Justice Denied:** Foundational legal principle.

PadhAI PYQ BOOSTER SECTION

Q. (GS2 – Mains, 2020)

“Access to justice is a basic human right. Examine the challenges faced by the justice delivery system in India.”

Q. (Essay – UPSC)

“Law without justice is tyranny.”

PadhAI MAINS PRACTICE QUESTION

“The problem of injustice in India lies not in lack of laws but in failure of implementation.” Critically analyse with reference to vulnerable sections of society. (250 words)

PadhAI-GENERATED UPSC MCQ

Q. Consider the following statements regarding access to justice in India:

1. Article 39A mandates free legal aid for the poor.
2. Delay in trials disproportionately affects underprivileged sections.
3. Lok Adalats can adjudicate serious criminal offences on merits.

Which of the statements given above is/are correct?

- A. 1 and 2 only
- B. 2 only
- C. 1 and 3 only
- D. 1, 2 and 3

Answer: A

(Statement 3 is incorrect — Lok Adalats rely on compromise and do not try serious criminal offences.)

2. Census 2027: ₹11,718 Crore Allocation and Absence of NPR Budget

WHY IN THE NEWS?

- The Union Government has allocated **₹11,718 crore for Census 2027**.
- No separate budgetary allocation has been made for the **National Population Register (NPR)**.
- The announcement has revived debates on **delimitation, federalism, data governance, and demographic policymaking**.

SUMMARY

- The Government has earmarked ₹11,718 crore for conducting Census 2027, reaffirming its commitment to India's



most comprehensive demographic exercise.

- Notably, no funds have been allocated for updating the National Population Register, signalling a clear administrative separation between the Census and NPR.
- The development is significant for governance, welfare targeting, and future political processes such as delimitation, while also addressing concerns related to privacy and citizenship debates.

BACKGROUND / CONTEXT

- I. The **Census of India** is a constitutional and administrative exercise conducted under the **Census Act, 1948**.
- II. India's last full Census was conducted in **2011**; the 2021 Census was postponed due to COVID-19.
- III. The **National Population Register (NPR)** is a database of usual residents, prepared under the Citizenship Rules, 2003.
- IV. Though operationally linked earlier, Census and NPR are **legally distinct exercises**.
- V. NPR became controversial due to perceived links with **citizenship verification**, especially after the CAA debate.

KEY HIGHLIGHTS

1. Census 2027 Allocation

- ₹11,718 crore reflects rising costs due to scale, technology use, and logistics.

- Likely to involve **digital enumeration and mobile-based data collection**.

2. No NPR Budget

- No allocation suggests NPR update is **not planned alongside Census 2027**.
- Helps decouple Census from citizenship-related concerns.

3. Governance and Policy Role

- Census data underpins welfare schemes, fiscal transfers, and infrastructure planning.
- Essential for updating poverty estimates and social indicators.

4. Federal and Political Implications

- Census data is crucial for **future delimitation of parliamentary constituencies**.
- Delays affect Centre-State planning and evidence-based governance.

5. Data Privacy and Trust

- Separation from NPR may rebuild public trust in Census participation.
- Reinforces Census as a **non-intrusive statistical exercise**.

PRELIMS BOOSTER BOX

- **Census Act, 1948:** Legal framework for Census.
- **Frequency:** Every 10 years.
- **Last Census:** 2011.
- **NPR:** Database of usual residents, not citizens.



- **Delimitation:** Based on Census population data.

PadhAI PYQ BOOSTER SECTION

Q. (GS2 – Mains)

“Discuss the importance of Census data for governance and democratic representation in India.”

PadhAI MAINS PRACTICE QUESTION

“The decision to fund Census 2027 without allocating resources for the NPR has both administrative and political implications.”

Examine the statement. (250 words)

PadhAI-GENERATED UPSC MCQ

Q. With reference to Census and NPR in India, consider the following statements:

1. Census is conducted under the Census Act, 1948.
2. NPR is a legally distinct exercise from the Census.
3. Census data is used for delimitation of constituencies.

Which of the statements given above is/are correct?

- A. 1, 2 and 3
- B. 1 and 2 only
- C. 2 and 3 only
- D. 1 only

Answer: A

3. Judicial Collegium: “Far More Open Than It Was, Yet Room to Do Better” – CJI

WHY IN THE NEWS?

- The **Chief Justice of India (CJI)** stated that the **judicial collegium system is more transparent than earlier**, while acknowledging scope for further improvement.
- The remarks come amid continuing debate on **judicial appointments, transparency, and accountability**.
- The issue remains central to discussions on the **balance between judicial independence and democratic oversight**.

SUMMARY

- The Chief Justice of India has observed that the collegium system for judicial appointments has become significantly more transparent over time, though further reforms are desirable.
- With increased disclosure of reasons for selections and rejections, the judiciary has sought to address criticism of opacity. However, concerns over accountability and institutional balance persist, keeping the collegium–NJAC debate alive in India’s constitutional discourse.

BACKGROUND / CONTEXT

- I. The **judicial collegium system** evolved through Supreme Court judgments, not legislation.
- II. Key milestones:
 - ✓ **First Judges Case (1981):** Executive primacy
 - ✓ **Second Judges Case (1993):** Collegium established



✓ **Third Judges Case (1998):**

Collegium expanded

- III. Appointments are made by the President, but based on collegium recommendations.
- IV. The **99th Constitutional Amendment** and **NJAC Act** were struck down in 2015 to protect judicial independence.

KEY HIGHLIGHTS

1. Increased Transparency

- Collegium resolutions are now uploaded on the Supreme Court website.
- Reasons for recommending or reiterating names are often disclosed.

2. Judicial Independence

- Collegium ensures insulation of judicial appointments from political pressure.
- Seen as essential to uphold rule of law and constitutional values.

3. Persisting Criticisms

- Lack of a codified procedure or eligibility criteria.
- Perceived opacity in shortlisting and diversity outcomes.

4. Accountability Concerns

- Limited external oversight or review mechanisms.
- Allegations of nepotism and institutional bias.

5. Scope for Reform

- CJI acknowledged “room to do better” through internal reforms.
- Suggestions include objective criteria, wider consultation, and institutional memory.

PRELIMS BOOSTER BOX

- **Collegium:** System for judicial appointments evolved via case law.
- **NJAC:** National Judicial Appointments Commission (invalidated in 2015).
- **Second Judges Case:** Established collegium system.
- **Third Judges Case:** Clarified collegium composition.
- **Article 124 & 217:** Appointments to Supreme Court and High Courts.

PadhAI PYQ BOOSTER SECTION

Q. (GS2 – Mains)

“Discuss the evolution of the collegium system and the challenges associated with judicial appointments in India.”

PadhAI MAINS PRACTICE QUESTION

“While the collegium system has enhanced judicial independence, concerns of transparency and accountability remain.” Critically examine the statement in light of recent observations by the Chief Justice of India. (250 words).

PadhAI-GENERATED UPSC MCQ

Q. With reference to the judicial collegium system, consider the following statements:



1. The collegium system evolved through Supreme Court judgments.
2. Collegium recommendations are binding on the executive without exception.
3. The National Judicial Appointments Commission was struck down by the Supreme Court.

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

Answer: A

(Statement 2 is incorrect – the executive can seek reconsideration, though reiteration by the collegium prevails.)

4.SHANTI Bill: Opening India's Nuclear Power Sector to Regulated Private Participation

WHY IN THE NEWS?

- The proposed **SHANTI Bill** seeks to **enable private sector participation** in India's nuclear power value chain.
- It marks a shift from the long-standing **state monopoly framework** under the atomic energy regime.
- The proposal is linked to **energy security, clean base-load power, and Net Zero commitments**.

SUMMARY

- The SHANTI Bill proposes calibrated private sector participation in India's nuclear power sector while retaining strategic control with the State.

- By addressing investment, liability, and operational constraints, the Bill aims to accelerate nuclear capacity addition as a clean and reliable energy source.
- The reform reflects India's effort to balance national security imperatives with the need for capital, technology, and scale to meet long-term energy and climate goals.

BACKGROUND / CONTEXT

- I. India's nuclear sector is governed by the **Atomic Energy Act, 1962**, which centralised ownership and operation with the State.
- II. Nuclear power provides **low-carbon, base-load electricity**, complementing intermittent renewables.
- III. Capacity expansion has been constrained by **high capital costs, liability concerns, and limited financing avenues**.
- IV. Global experience shows **public-private models** can speed up deployment without compromising safety when robust regulation exists.

KEY HIGHLIGHTS

1. Nature of Private Participation

- Entry through **joint ventures, EPC roles, O&M contracts, or minority equity**, not full privatisation.
- Core strategic functions remain non-delegable.

2. Safety and Regulatory Oversight



- Nuclear safety, waste management, and security to remain under strict regulatory control.
- Compliance with international best practices and domestic standards.

3. Investment and Technology Mobilisation

- Crowds in long-term private capital for high-capex projects.
- Enables access to advanced reactor technologies and project management expertise.

4. Energy Transition Synergy

- Supports decarbonisation by providing reliable base-load power.
- Reduces dependence on coal while stabilising the grid.

5. Legal and Liability Issues

- Requires clarity and harmonisation of **nuclear liability norms** to reduce investor risk.
- Balances victim compensation with commercial viability.

PRELIMS BOOSTER BOX

- **Atomic Energy Act, 1962:** Governs nuclear activities in India
- **Nuclear Power:** Clean, base-load electricity
- **Private Participation:** Regulated, non-strategic roles
- **Key Constraint:** High capital cost & liability risk
- **Climate Link:** Low-carbon energy transition

PadhAI PYQ BOOSTER SECTION

Q. (GS3 – Mains)

“Discuss the role of nuclear energy in India’s transition to a low-carbon economy.”

PadhAI MAINS PRACTICE QUESTION

“The SHANTI Bill represents a pragmatic shift in India’s nuclear energy policy.” Critically examine the opportunities and concerns associated with allowing private sector participation in nuclear power generation. (250 words)

PadhAI-GENERATED UPSC MCQ

Q. With reference to the SHANTI Bill and nuclear power reforms, consider the following statements:

1. India’s nuclear power sector has traditionally been dominated by the State.
2. The SHANTI Bill proposes limited private participation while retaining strategic control with the government.
3. Nuclear energy is unsuitable for base-load power due to intermittency.

Which of the statements given above are correct?

- A. 1 and 2 only
- B. 2 only
- C. 1 and 3 only
- D. 1, 2 and 3

Answer: A

(Statement 3 is incorrect – nuclear power provides stable base-load electricity.)



5. MGNREGA to be Replaced: Introduction of VB-G RAM G Bill (Viksit Bharat Gramin Rozgar Bill), 2025

WHY IN THE NEWS?

- The government has proposed the **VB-G RAM G Bill, 2025 (Viksit Bharat Gramin Rozgar Bill)** as a replacement for **MGNREGA**.
- The move reflects a shift towards **outcome-oriented, skill-linked, and asset-creating rural employment**.
- The Bill aligns rural employment policy with the long-term vision of **Viksit Bharat 2047**.

SUMMARY

- The proposed Viksit Bharat Gramin Rozgar Bill, 2025 seeks to replace MGNREGA with a more development-focused rural employment framework.
- Unlike wage-centric employment guarantee, the new Bill aims to integrate skills, productivity, and durable asset creation with rural livelihoods.
- The reform attempts to align public employment with local economic development, infrastructure creation, and long-term income sustainability in rural India.

BACKGROUND / CONTEXT

- I. **MGNREGA (2005)** provided a legal guarantee of 100 days of wage employment to rural households.
- II. It played a critical role in **livelihood security, poverty reduction, and**

shock absorption, especially during economic distress.

- III. However, concerns emerged regarding **low productivity, asset quality, fiscal burden, and dependency**.
- IV. The VB-G RAM G Bill represents a policy transition from **relief-based employment to development-led rural growth**.

KEY HIGHLIGHTS

1. Shift from Employment Guarantee to Employability

- Emphasis on **skill training, productivity, and income sustainability**.
- Focus on long-term employability rather than short-term wage support.

2. Asset-Centric Rural Development

- Creation of **durable, economically productive rural assets**.
- Integration with agriculture, allied sectors, and rural enterprises.

3. Localised Planning

- Panchayat-level planning aligned with district and state development goals.
- Focus on region-specific livelihood opportunities.

4. Fiscal and Governance Reform

- Rationalisation of expenditure and leakages.
- Greater monitoring of outcomes instead of workdays generated.



5. Alignment with National Vision

- Supports **Viksit Bharat 2047**, Atmanirbhar Bharat, and rural industrialisation.
- Encourages rural entrepreneurship and value-chain integration.

PRELIMS BOOSTER BOX

- **MGNREGA:** Rights-based wage employment scheme (2005).
- **VB-G RAM G Bill:** Proposed rural employment reform (2025).
- **Key Shift:** From entitlement → productivity.
- **Governance Focus:** Outcome-based monitoring.
- **Vision Link:** Viksit Bharat 2047.

PadhAI PYQ BOOSTER SECTION

Q. (GS3 – Mains)

“Critically evaluate the role of MGNREGA in rural livelihood security and discuss the need for reforms.”

PadhAI MAINS PRACTICE QUESTION

“Replacing MGNREGA with the Viksit Bharat Gramin Rozgar Bill marks a paradigm shift in rural employment policy.” Critically examine the potential benefits and risks of this transition. (250 words)

PadhAI-GENERATED UPSC MCQ

Q. With reference to the proposed VB-G RAM G Bill, consider the following statements:

1. It aims to replace MGNREGA with a productivity- and skill-linked rural employment framework.

2. It completely removes the role of Panchayati Raj Institutions in rural employment planning.
3. It aligns rural employment with the vision of Viksit Bharat 2047.

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

Answer: A

(Statement 2 is incorrect – decentralised planning remains crucial.)

6. Higher Education Regulation (UGC Replacement)

WHY IN THE NEWS?

- The Government is considering **replacing the existing regulatory architecture led by the University Grants Commission (UGC)**.
- The move is aligned with reforms envisaged under the **National Education Policy (NEP) 2020**.
- The objective is to **separate regulation, funding, accreditation, and academic standard-setting** to improve quality and autonomy.

SUMMARY

- India is moving towards a new higher education regulatory framework to replace the UGC, in line with NEP 2020.
- The proposed model aims to simplify regulation, enhance institutional autonomy, and focus on outcomes rather than control.



- By unbundling regulatory functions and emphasising quality assurance, the reform seeks to address long-standing challenges such as over-regulation, uneven quality, and limited global competitiveness of Indian higher education.

BACKGROUND / CONTEXT

- I. The UGC was established in **1956** to coordinate and maintain standards in higher education.
- II. Over time, it combined **multiple roles**—regulation, funding, and quality control—leading to bureaucratic overlap.
- III. NEP 2020 proposed replacing this structure with **independent, specialised bodies**.
- IV. The reform aims to shift from **input-based regulation** (permissions, approvals) to **output-based governance** (learning outcomes, research quality).

KEY HIGHLIGHTS

1. Rationale for Replacing UGC

- Excessive regulatory burden on institutions.
- One-size-fits-all norms ignoring institutional diversity.
- Limited autonomy affecting innovation and research.

2. New Regulatory Philosophy

- **“Light but tight”** regulation.
- Trust-based governance with accountability.

- Reduced micromanagement by the regulator.

3. Separation of Functions

- Regulation, accreditation, funding, and standard-setting handled by **distinct verticals**.
- Minimises conflict of interest and improves efficiency.

4. Institutional Autonomy

- Greater academic, administrative, and financial autonomy for universities.
- Encourages multidisciplinary education and research.

5. Global Alignment

- Brings India closer to **international best practices** in higher education governance.
- Supports global rankings, collaboration, and student mobility.

PRELIMS BOOSTER BOX

- **UGC Act:** 1956
- **NEP 2020:** Advocates overhaul of higher education regulation
- **Key Shift:** Control-based → Outcome-based regulation
- **Core Principle:** Autonomy with accountability
- **Focus:** Quality, innovation, global competitiveness

PadhAI PYQ BOOSTER SECTION

Q. (GS2 – Mains)

“Discuss the challenges in higher education governance in India and suggest reforms to improve quality and autonomy.”



PadhAI MAINS PRACTICE QUESTION

“Replacing the UGC reflects a paradigm shift in India’s higher education governance.” Analyse the rationale, expected benefits, and challenges of the proposed regulatory overhaul. (250 words)

PadhAI-GENERATED UPSC MCQ

Q. With reference to higher education regulation reforms in India, consider the following statements:

1. NEP 2020 recommends separation of regulation, funding, and accreditation functions.
2. The proposed framework seeks to reduce institutional autonomy.
3. Outcome-based regulation is a key objective of the reforms.

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

Answer: A

(Statement 2 is incorrect – the reform aims to increase autonomy.)

7.Right to Disconnect: Balancing Work, Well-being and the Digital Workplace

WHY IN THE NEWS?

- Growing concerns over **burnout, mental health, and excessive work hours** in an always-online work culture.

- Increased **remote and hybrid work** has blurred boundaries between professional and personal life.
- Policymakers and courts are debating the need to **recognise a ‘Right to Disconnect’** to protect workers’ well-being.

SUMMARY

- The Right to Disconnect refers to employees’ ability to disengage from work-related communications outside working hours without adverse consequences.
- In the era of digital work, constant connectivity has intensified stress, reduced work-life balance, and impacted mental health.
- Recognising this right aims to ensure humane working conditions, productivity sustainability, and dignity of labour, while balancing organisational efficiency and employee welfare.

BACKGROUND / CONTEXT

- I. Technological advances have enabled **24×7 connectivity**, intensifying work expectations.
- II. Traditional labour laws focused on **physical workplaces**, not digital intrusion.
- III. Prolonged work hours are linked to **stress, anxiety, cardiovascular risks, and reduced efficiency**.
- IV. Several countries have moved towards formal recognition of this right, prompting debates in India.



- V. In India, discussions intersect with **occupational health, labour reforms, and mental well-being.**

KEY HIGHLIGHTS

1. Rationale for the Right

- Prevents digital overreach by employers.
- Protects employees' personal time and family life.

2. Mental Health and Productivity

- Rest and recovery improve cognitive performance.
- Reduces burnout and absenteeism.

3. Changing Nature of Work

- Remote work increases flexibility but also exploitation risks.
- Informal expectations often replace formal work-hour norms.

4. Legal and Policy Dimensions

- Can be addressed through labour codes, workplace policies, or judicial interpretation.
- Requires sector-specific flexibility rather than rigid uniformity.

5. Implementation Challenges

- Global teams across time zones.
- Informal sector and gig economy complexities.

- **Right to Disconnect:** Freedom from work-related communication after hours.
- **Core Issue:** Digital overreach and burnout.
- **Linked Themes:** Mental health, labour rights.
- **Work Model Impact:** Remote & hybrid work.
- **Governance Need:** Humane labour standards.

PadhAI PYQ BOOSTER SECTION

Q. (GS2 – Mains)

“Discuss the challenges posed by changing work culture to labour rights and workers' well-being in India.”

PadhAI MAINS PRACTICE QUESTION

“In an era of digital work, the Right to Disconnect is essential to safeguard mental health and dignity of labour.” Critically examine the need, benefits, and challenges of recognising this right in India. (250 words)

PadhAI-GENERATED UPSC MCQ

Q. With reference to the Right to Disconnect, consider the following statements:

1. It aims to protect employees from being compelled to engage in work communication outside working hours.
2. It is relevant only to government employees and not the private sector.
3. It seeks to improve work-life balance and mental well-being.

Which of the statements given above is/are correct?

PRELIMS BOOSTER BOX



- A. 1 and 3 only
- B. 1 only
- C. 2 and 3 only
- D. 1, 2 and 3

Answer: A

(Statement 2 is incorrect – the issue is relevant across sectors.)

8. Directorate General of Civil Aviation (DGCA)

WHY IN THE NEWS?

- The **Directorate General of Civil Aviation (DGCA)** has recently been in focus due to actions related to **air safety audits, airline compliance reviews, and passenger protection measures**.
- Growing passenger traffic and incidents have underscored the need for **enhanced aviation oversight**.
- The authority continues aligning India's aviation norms with **International Civil Aviation Organization (ICAO)** standards.

SUMMARY

- The Directorate General of Civil Aviation (DGCA) is India's regulatory body for civil aviation, responsible for safety oversight, licensing, operational regulation, and enforcement.
- As air traffic grows rapidly, the DGCA plays a critical role in ensuring safety, consumer protection, and international compliance.
- Recent developments reflect efforts to strengthen regulatory mechanisms through audits, digital monitoring

systems, and alignment with ICAO norms.

BACKGROUND / CONTEXT

- I. Established under the **Aircraft Act, 1934** and **Aircraft Rules, 1937**.
- II. Primary regulator of civil aviation in India, under the **Ministry of Civil Aviation**.
- III. Growth of India's aviation market (one of the world's fastest growing) demands stronger regulatory frameworks.
- IV. DGCA's role strengthened after audits by **ICAO Universal Safety Oversight Audit Programme (USOAP)**.

KEY HIGHLIGHTS

1. Core Regulatory Functions

- Licenses pilots, engineers, and air traffic controllers.
- Certifies aircraft, airlines, maintenance, and training organizations.

2. Safety and Compliance Oversight

- Conducts inspections, audits, and investigation of incidents.
- Issues safety directives and aviation circulars.

3. Passenger Protection

- Monitors airline compliance with passenger rights (refunds, cancellations, disability assistance, etc.).
- Intervenes during fare abuse or operational disruption.



4. Industry Development

- Supports growth through approvals, airworthiness norms, and policy guidance.
- Facilitates innovation such as **drones & unmanned aircraft systems**.

5. International Alignment

- Coordinates with **ICAO, FAA, EASA** and other regulators for standardisation.
- Enhances India's global aviation safety rating.

PRELIMS BOOSTER BOX

- **DGCA:** Civil aviation regulator of India
- **Statute:** Aircraft Act, 1934
- **Parent Ministry:** Ministry of Civil Aviation
- **Global Link:** ICAO compliance
- **Key Role:** Air safety and regulatory oversight

PadhAI PYQ BOOSTER SECTION

Q. (GS3 – Mains)

“Explain the role of regulatory bodies in improving infrastructure governance in sectors such as aviation and telecom.”

PadhAI MAINS PRACTICE QUESTION

“India's aviation sector is expanding rapidly, necessitating a stronger regulatory ecosystem. Evaluate how DGCA contributes to aviation safety, passenger rights, and international compliance.” (250 words)

PadhAI-GENERATED UPSC MCQ

Q. With reference to the Directorate General of Civil Aviation (DGCA), consider the following statements:

1. It functions under the Ministry of Civil Aviation.
2. It is responsible for issuing pilot licenses and aircraft certifications.
3. It operates independently of ICAO standards and international norms.

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

(Statement 3 is incorrect – DGCA aligns operations with ICAO standards.)

9. Central Information Commission Reaches Full Strength of 11 Members for the First Time in Seven Years

WHY IN THE NEWS?

- The **Central Information Commission (CIC)** has reached its **full sanctioned strength of 11 members**, including the Chief Information Commissioner.
- This is the first time since **2017** that the Commission is fully staffed.
- The move aims to expedite the disposal of pending RTI appeals and complaints.

SUMMARY

- For the first time in seven years, the Central Information Commission is



operating at full sanctioned strength of 11 members.

- The appointments aim to address backlog, reduce delays, and improve the functioning of the RTI regime.
- As the highest appellate body under the Right to Information Act, 2005, a fully staffed CIC is essential to uphold transparency, accountability, and citizens' right to information in public administration.

BACKGROUND / CONTEXT

- I. The RTI Act, 2005 established the CIC as the apex authority for **transparency and information governance**.
- II. Chronic vacancies in recent years caused **case pendency, slower disposal rates, and weakened RTI enforcement**.
- III. Civil society and courts have repeatedly flagged concerns regarding **delayed appointments**.
- IV. A full bench is expected to restore momentum to the RTI adjudication process.

KEY HIGHLIGHTS

1. Full Bench Composition

- One Chief Information Commissioner + Ten Information Commissioners.
- Ensures quorum for multiple simultaneous benches.

2. Expected Operational Gains

- Faster case hearings and appeal disposal.

- Shorter waiting period for RTI applicants.
- Improved administrative efficiency.

3. Strengthening Transparency Mechanism

- Reinforces the RTI Act's role in **accountability and democratic oversight**.
- Encourages proactive disclosure by public authorities.

4. Public Administration Impact

- Curtails information delays that hinder governance monitoring.
- Empowers citizens, media, and civil society.

5. Long-Term Relevance

- Vital for effective grievance redress linked to governance, corruption, and service delivery.

PRELIMS BOOSTER BOX

- **RTI Act, 2005:** Legal foundation of CIC
- **CIC Appointment Authority:** President of India
- **Composition:** Up to 1 Chief + up to 10 Commissioners
- **Tenure:** Up to 3 years or until age 65 (post-2019 amendment)
- **Mandate:** Second appellate authority for RTI

PYQ BOOSTER SECTION

Q. (GS2 – Mains)

“Examine the role of statutory bodies like the Central Information Commission in



strengthening transparency and accountability in governance.”

PadhAI MAINS PRACTICE QUESTION

“**Vacancies in statutory oversight bodies undermine democratic accountability. In this context, evaluate the significance of the Central Information Commission functioning at its full strength.**” (250 words)

PadhAI-GENERATED UPSC MCQ

Q. With reference to the Central Information Commission (CIC), consider the following statements:

1. It is a statutory body created under the Right to Information Act, 2005.
2. The President of India appoints the Chief Information Commissioner on the recommendation of a committee.
3. The Commission can order the disclosure of information even if it relates to national security.

Which of the statements given above is/are correct?

- A. 1 and 2 only
- B. 2 and 3 only
- C. 1 and 3 only
- D. 1, 2 and 3

Answer: A

(Statement 3 is incorrect – national security exemptions apply under Section 8 of RTI.)

10. Centre Considers Bringing Chandigarh under Article 240 via Constitution (131st Amendment) Bill, 2025

WHY IN THE NEWS?

- The Centre is considering the **Constitution (131st Amendment) Bill, 2025** proposing to place **Chandigarh** under **Article 240** of the Constitution.
- The amendment seeks to grant the **President power to make regulations** for Chandigarh similar to other specified Union Territories.
- The proposal aims to **clarify administrative authority, improve governance**, and streamline legislative powers.

SUMMARY

- The Constitution (131st Amendment) Bill, 2025 proposes to bring Chandigarh under Article 240, empowering the President to issue regulations with the force of law for the UT.
- This represents a shift in Chandigarh’s administrative framework, currently governed by a combination of central laws and delegated authority.
- The move seeks to ensure regulatory clarity, strengthen governance mechanisms, and align Chandigarh’s administration with other Union Territories under Article 240.

BACKGROUND / CONTEXT

- I. Chandigarh is a **Union Territory and joint capital** of Punjab and Haryana.
- II. Governance operates through **central administration** under the Ministry of Home Affairs.
- III. **Article 239–241** governs Union Territories; Article 240 grants the President power to make regulations for certain UTs such as **Andaman &**



Nicobar, Lakshadweep, Dadra & Nagar Haveli, Daman & Diu, Ladakh.

- IV. Chandigarh is presently **not listed under Article 240.**

KEY HIGHLIGHTS OF THE PROPOSAL

1. Constitutional Inclusion

- Chandigarh to be added to **Article 240(1)** list.
- Enables presidential regulations with **force of Parliamentary law.**

2. Legislative Recalibration

- Addresses grey zones between **UT Administration vs Parliamentary legislation.**
- Reduces policy delays due to administrative fragmentation.

3. Governance Efficiency

- Streamlines decision-making for key sectors:
Urban Planning | Land Management | Municipal Services | Public Order

4. Federal Considerations

- Balances interests of Punjab and Haryana while asserting Union primacy.
- Requires federal consultation to avoid inter-state friction.

5. Long-Term Impact

- Sets precedent for rationalising **Union Territory classification and governance.**

PRELIMS BOOSTER BOX

- **Article 239:** Administration of Union Territories
- **Article 240:** President's power to make regulations for UTs
- **Chandigarh Status:** UT + shared capital
- **131st Amendment Bill:** Proposed, not enacted
- **Impact Area:** Regulation-making power

PadhAI PYQ BOOSTER SECTION

Q. (GS2 – Mains)

“How do constitutional provisions governing Union Territories reflect the balance between federal control and local governance? Discuss with examples.”

PadhAI MAINS PRACTICE QUESTION

“The proposal to place Chandigarh under Article 240 reflects the evolving nature of Union Territory governance in India.” Examine the constitutional, administrative, and federal implications of the 131st Amendment Bill, 2025. (250 words)

PadhAI-GENERATED UPSC MCQ

Q. With reference to Article 240 of the Constitution of India, consider the following statements:

1. It empowers the President to make regulations having the force of law for certain Union Territories.
2. Regulations issued under Article 240 have the same force as Parliamentary legislation.



3. Chandigarh is already included under Article 240.

Which of the statements given above is/are correct?

- A. 1 and 2 only
- B. 2 only
- C. 1 only
- D. 1, 2 and 3

Answer: A

(Statement 3 is incorrect – the amendment proposes to include Chandigarh.)

11. Sanchar Saathi: Digital Tool to Combat Mobile Fraud and Enhance Telecom Security

WHY IN THE NEWS?

- The government is actively promoting the **Sanchar Saathi app/portal** to improve **telecom security and citizen protection**.
- Recent action against **fraudulent SIM cards**, digital scams, and cyber misuse has highlighted its relevance.
- The initiative strengthens oversight of **mobile connections, IMEI tracking, and identity-linked verification**.

SUMMARY

- Sanchar Saathi is a government platform developed by the Department of Telecommunications to help citizens check, track, and report mobile connections linked to their identity.
- It supports fraud prevention by enabling IMEI tracking for lost/stolen phones, identification of unauthorized

SIMs, and blocking suspicious numbers.

- The initiative enhances digital trust, safeguards telecom networks, and promotes responsible mobile usage in India's fast-growing digital ecosystem.

BACKGROUND / CONTEXT

- I. Telecom fraud, SIM cloning, and unauthorized connections have increased with rising digital penetration.
- II. Identity misuse through fake SIMs impacts **financial security, cybercrime investigations, and national security**.
- III. Sanchar Saathi consolidates **several telecom safety tools** into a single citizen interface.
- IV. It integrates with law enforcement and telecom service providers for faster action.

KEY HIGHLIGHTS

1. CEIR (Central Equipment Identity Register)

- Track and block stolen/lost mobile phones using **IMEI number**.
- Prevents blacklisted devices from operating across networks.

2. TAF COP (Telecom Analytics for Fraud Management)

- Displays all SIM cards issued under an individual's ID.
- Report and disable unauthorized/unknown numbers.



3. Real-Time Alerts

- Flags suspicious SIM activity and KYC inconsistencies.
- Helps curb phone-based financial frauds.

4. Citizen-Centric Transparency

- Easy access via app and web portal.
- No dependency on telecom operators for basic verification.

5. National Security Integration

- Supports law enforcement in identifying **fake SIM networks**.
- Strengthens cybercrime prevention infrastructure.

PRELIMS BOOSTER BOX

- **Sanchar Saathi:** Telecom security and fraud management portal.
- **CEIR:** IMEI blocking and device tracing system.
- **TAF COP:** SIM-card identity audit module.
- **IMEI:** Unique device identifier; international standard.
- **Regulator Link:** DoT under Ministry of Communications.

PadhAI PYQ BOOSTER SECTION

Q. (GS3 – Mains)

“Discuss the role of digital platforms in strengthening citizen-centric service delivery and cybersecurity in India.”

PadhAI MAINS PRACTICE QUESTION

“Sanchar Saathi is a crucial step towards building a secure digital ecosystem.

Evaluate its role in combating telecom fraud and safeguarding citizen identity.” (250 words)

PadhAI-GENERATED UPSC MCQ

Q. With reference to the Sanchar Saathi platform, consider the following statements:

1. It enables IMEI-based blocking of lost or stolen mobile phones.
2. It displays all mobile connections taken on an individual’s identity proof.
3. It is operated by the Telecom Regulatory Authority of India (TRAI).

Which of the statements given above is/are correct?

- A. 1 and 2 only
B. 1 and 3 only
C. 2 and 3 only
D. 1, 2 and 3

Answer: A

(Statement 3 is incorrect – Sanchar Saathi is operated by the DoT, not TRAI.)

12. Rural Lifeline Disruptions: Impact on Welfare Delivery and DPSP Obligations

WHY IN THE NEWS?

- Reports highlight that interruptions in **rural lifeline services** (roads, electricity, health, digital connectivity, water supply) are **adversely affecting access to basic entitlements**.
- These disruptions raise concerns regarding the State’s responsibility to uphold **Directive Principles of State Policy (DPSPs)**.



- Policy gaps and infrastructure challenges are undermining welfare delivery and **inclusive rural development**.

SUMMARY

- Frequent disruptions in rural lifelines such as digital connectivity, health infrastructure, transport, and drinking water supply are impacting livelihoods and welfare service delivery.
- These gaps obstruct access to schemes, financial inclusion, education, and healthcare, indirectly affecting the implementation of the DPSPs.
- As DPSPs guide the State's pursuit of social, economic, and justice-oriented governance, rural disconnect weakens the constitutional vision of equitable development and balanced regional progress.

BACKGROUND / CONTEXT

- I. Rural infrastructure and public services are foundational to welfare distribution, markets, and livelihood opportunities.
- II. DPSPs mandate the State to promote **social, economic, and political justice** and reduce inequalities (Articles **38, 39, 41, 46**).
- III. Disruptions break service chains, increase transaction costs, and disproportionately affect marginalised groups.
- IV. Core concern: **Constitutional commitment vs. implementation reality**.

KEY HIGHLIGHTS

1. Economic Impact

- Broken supply chains, reduced market access for agriculture, inflationary pressures.
- Impeded rural entrepreneurship and micro-enterprise growth.

2. Social Justice Concerns

- Education & health access shrink; digital exclusion deepens inequality.
- Women, elderly, and children face heightened vulnerability.

3. Governance and Welfare Delivery

- Scheme access delayed: DBT failures, offline documentation, banking disruption.
- Higher administrative friction and corruption risk.

4. Constitutional Lens

- Affects realisation of DPSPs promoting welfare state principles.
- Highlights disjunction between **policy intent** and **execution capacity**.

5. Future Risks

- Migration, agrarian distress, and decline in human capital development.
- Undermines long-term goals like **Viksit Bharat 2047** and SDGs.

PRELIMS BOOSTER BOX



- **Articles 36–51:** Directive Principles of State Policy
- **Article 38:** Minimise inequalities; social order
- **Article 39:** Economic justice; equal livelihood opportunities
- **Article 41:** Right to work, education, public assistance
- **Article 46:** Protection of weaker sections

PadhAI PYQ BOOSTER SECTION

Q. (GS2 – Mains)

“In what ways do Directive Principles guide the functioning of the State? Evaluate their relevance in contemporary governance with examples.”

PadhAI MAINS PRACTICE QUESTION

“Rural service disruption is not merely an infrastructural failure, but a constitutional concern that threatens the realisation of DPSPs.” Discuss. (250 words)

PadhAI-GENERATED UPSC MCQ

Q. With reference to Directive Principles of State Policy, consider the following statements:

1. DPSPs are enforceable by courts of law.
2. They direct the State to ensure equitable distribution of resources.
3. Rural service disruption can indirectly hinder the fulfilment of DPSP goals.

Which of the statements given above is/are correct?

- A. 2 and 3 only
- B. 1 and 2 only

- C. 3 only
- D. 1, 2 and 3

Answer: A

(Statement 1 is incorrect — DPSPs are **non-justiciable**.)

13. Health Security and National Security Cess Bill, 2025

WHY IN THE NEWS?

- The government is considering the **National Security Cess Bill, 2025**, linking **health security with national security preparedness**.
- The Bill proposes dedicated **cess to fund healthcare resilience, biosecurity, and emergency response systems**.
- It reflects lessons from pandemics, rising biological risks, and strategic prioritisation of **health as a national security asset**.

SUMMARY

- The National Security Cess Bill, 2025 seeks to levy a dedicated cess to strengthen India’s health security architecture by funding surveillance systems, emergency health infrastructure, biothreat preparedness, and disease control.
- The Bill marks a strategic policy shift, acknowledging that health crises pose direct threats to economic stability, military readiness, and national security.
- Through this fiscal instrument, India aims to create a resilient, secure, and self-reliant health defence ecosystem.



BACKGROUND / CONTEXT

- I. COVID-19 and global health emergencies revealed vulnerabilities in **supply chains, medical infrastructure, and emergency response systems.**
- II. Health disruptions directly impact **armed forces readiness, economic output, and governance capacity.**
- III. Modern security framework includes **bio-warfare risks, antimicrobial resistance (AMR), zoonotic spillovers, and lab-origin pathogens.**
- IV. A cess provides **ring-fenced funds** outside general budget volatility, enabling long-term planning.

KEY HIGHLIGHTS OF THE BILL

1. Dedicated Financing Mechanism

- A targeted cess to ensure **non-lapsable, mission-specific funds.**
- Funds channelled into a health-security corpus.

2. National Security Integration

- Health infrastructure recognised as a **strategic asset.**
- Inter-ministerial coordination between **Health, Defence, Home, Science & Technology.**

3. Biosecurity & Emergency Systems

- Pathogen surveillance, genomic sequencing, and rapid-response medical units.

- Strengthening National Centre for Disease Control (NCDC) and ICMR networks.

4. Industry & Supply Chain Resilience

- Funding for domestic manufacturing of **vaccines, APIs, PPE, diagnostics.**
- Reduces import dependence for critical health commodities. \

5. State and Local Capacity Building

- Support for district health systems, primary care networks, and digital health.
- Strengthens last-mile emergency reach.

PRELIMS BOOSTER BOX

- **Cess:** Tax with earmarked revenue for a specific purpose.
- **National Security Cess:** Funds earmarked for health-security preparedness.
- **Biosecurity:** Systems to protect against biological threats.
- **NCDC / ICMR:** Key institutions for disease surveillance.
- **Strategic Medical Reserve:** Stockpiling of vaccines, essential drugs, oxygen.

PadhAI PYQ BOOSTER SECTION

Q. (GS3 – Mains)

“Health security is no longer a social sector agenda but a national security imperative.” Discuss.

PadhAI MAINS PRACTICE QUESTION



“The National Security Cess Bill, 2025 represents a paradigm shift in linking health resilience with national security priorities.” Examine the rationale, benefits, and potential implementation challenges. (250 words)

PadhAI-GENERATED UPSC MCQ

Q. With reference to the National Security Cess Bill, 2025, consider the following statements:

1. It proposes a dedicated cess to fund health security measures.
2. The cess revenue will be used to build a national biosecurity and emergency response system.
3. The Bill treats health resilience as unrelated to national defence.

Which of the statements given above is/are correct?

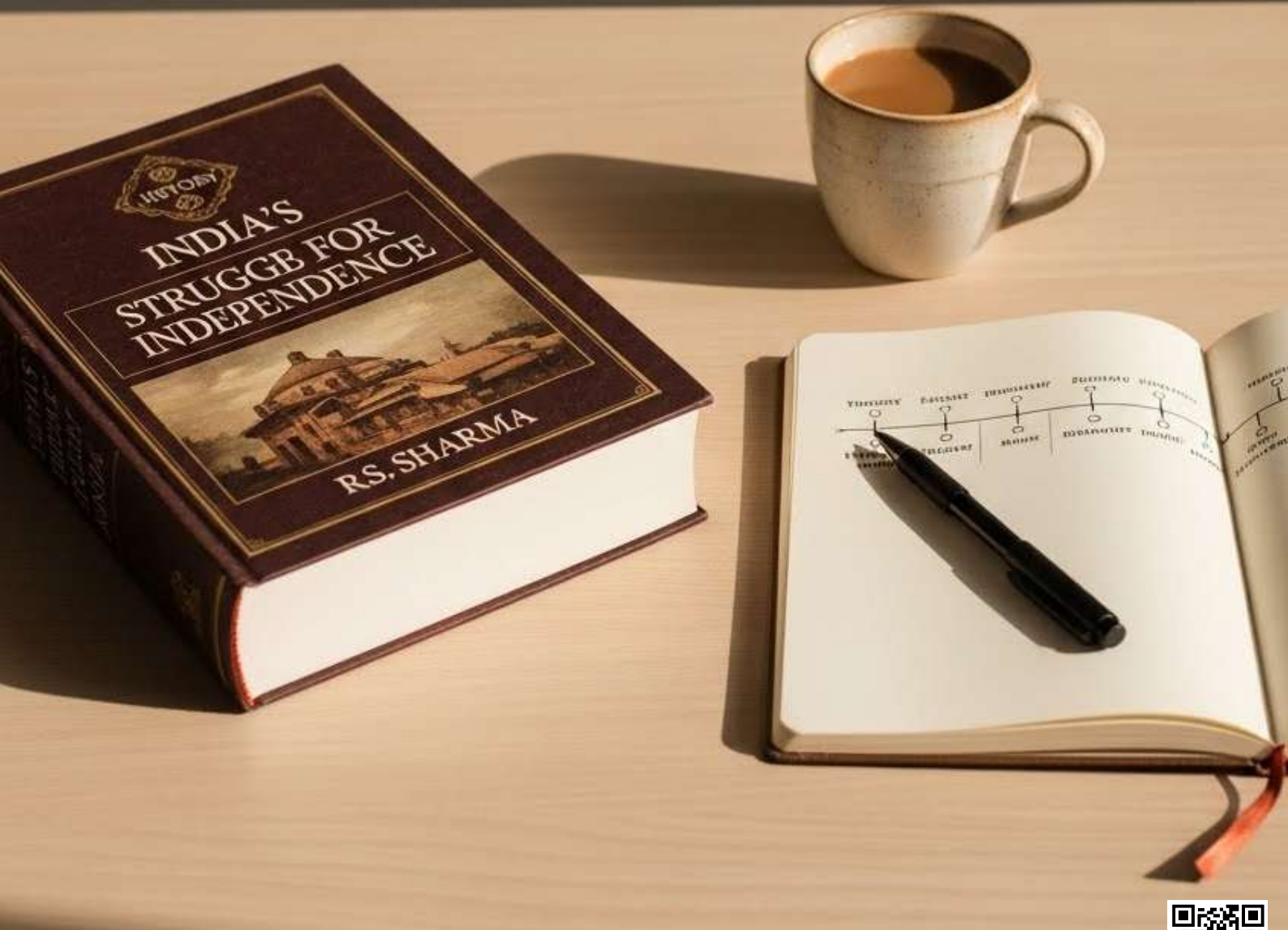
- A. 1 and 2 only
- B. 1 only
- C. 2 and 3 only
- D. 1, 2 and 3

Answer: A

(Statement 3 is incorrect — the Bill explicitly links health to national defence readiness.)



INTERNATIONAL RELATIONS



1. From Strategic Partnership to a Special and Privileged Strategic Bond: India–Russia Relations at a Glance.

WHY IN THE NEWS?

- India and Russia recently reviewed bilateral cooperation across defence, energy, space, nuclear, and economic sectors.
- Both nations reiterated their commitment to a “**Special and Privileged Strategic Partnership**”, emphasising continuity despite global geopolitical realignments.
- New initiatives in defence co-production, energy trade, and connectivity corridors have brought the relationship back into strategic focus.

SUMMARY

- India–Russia relations have evolved from Cold War–era friendship to a **Special and Privileged Strategic Partnership** established in 2010.
- The partnership spans defence cooperation, nuclear energy, hydrocarbons, space collaboration, and emerging domains such as Arctic engagement and digital technologies.
- Despite shifting global dynamics, the relationship remains vital for India’s strategic autonomy, diversification of defence supplies, energy security, and multipolar diplomacy.
- Recent high-level engagements reaffirm long-term cooperation and mutual trust.

BACKGROUND / CONTEXT

- I. India–Russia relations strengthened significantly from the 1971 Treaty of Peace, Friendship & Cooperation.
- II. In 2000, the relationship was institutionalised as a **Strategic Partnership**, upgraded in 2010 to a **Special and Privileged Strategic Partnership**—a status Russia accords only to India.
- III. Russia has historically been India’s largest defence supplier, supporting joint projects like **BrahMos, S-400**, and licensed production of tanks & aircraft.
- IV. Energy and connectivity corridors such as the **International North–South Transport Corridor (INSTC)** have deepened economic engagement.

KEY HIGHLIGHTS

1. Defence & Security Cooperation

- Major platforms: Sukhoi fighter jets, T-90 tanks, S-400 missile systems.
- Joint ventures: BrahMos missile, AK-203 rifles.
- Military exercises: INDRA, naval cooperation in the Indian Ocean & Arctic.
- Expanding focus on **co-development and co-production** under Make in India.

2. Nuclear Energy & Space Cooperation

- **Kudankulam Nuclear Power Plant:** Largest Russia-assisted civil nuclear project.



- Collaboration under India's three-stage nuclear programme.
- ISRO–Roscosmos cooperation in astronaut training and satellite technologies.

3. Energy, Oil & Gas

- Russia is a key supplier of crude oil, LNG, and coking coal to India.
- Indian companies (ONGC Videsh, IndianOil) invested in Russian energy fields (Sakhalin-I, Vankorneft).
- Long-term agreements for discounted oil post-2022 reshaped trade patterns.

4. Trade & Connectivity

- INSTC reduces logistical time & cost for India–Russia–Central Asia trade.
- Chennai–Vladivostok Maritime Corridor under exploration.
- Bilateral trade crossed **USD 50–60 billion**, driven mainly by energy imports.

5. Emerging Areas of Cooperation

- Cybersecurity, AI, rare-earth minerals, pharmaceuticals.
- Russian interest in India's digital public infrastructure.
- India exploring Arctic scientific and commercial opportunities with Russian support.

6. Diplomatic Coordination

- Convergence in BRICS, SCO, G20, UN.
- Shared interest in multipolarity and strategic autonomy.

- Divergences: Russia–China proximity, India's ties with the US, and Ukraine conflict diplomacy.

PRELIMS BOOSTER BOX

- **INSTC:** International North–South Transport Corridor, links India–Iran–Russia.
- **BrahMos:** India–Russia supersonic cruise missile project.
- **Kudankulam:** Largest operational nuclear plant in India; Russian reactors VVER-1000.
- **S-400 Triumph:** Long-range air defence system.
- **INDRA Exercise:** India–Russia bilateral military exercise.
- **Sakhalin-I Project:** Major Russian oil & gas field with Indian participation.

PadhAI PYQ BOOSTER SECTION

Q. (UPSC GS2 – 2017 Mains)

“Examine India–Russia relations in the context of changing global power equations.”

Q. (UPSC Prelims – Theme-Based)

Questions on INSTC, defence platforms, BRICS/SCO membership.

PadhAI MAINS PRACTICE QUESTION

“India–Russia relations have diversified beyond defence into energy, connectivity, nuclear cooperation, and emerging technologies.” Analyse the evolution and strategic relevance of this Special and Privileged Partnership. (250 words).



PadhAI-GENERATED UPSC MCQ

Q. With reference to India–Russia relations, consider the following statements:

1. The term “Special and Privileged Strategic Partnership” was adopted in 2010.
2. Russia supports the Kudankulam Nuclear Power Project in Tamil Nadu.
3. INSTC is a maritime-only connectivity corridor linking India and Russia.

Which of the statements given above is/are correct?

- A. 1 and 2 only
- B. 2 only
- C. 1 and 3 only
- D. 1, 2 and 3

Answer: A

(Statement 3 is incorrect — INSTC is a multi-modal corridor involving sea, rail, and road networks.)

2.South Asia Needs Climate Solidarity: A Shared Responsibility for a Shared Future

WHY IN THE NEWS?

- South Asia is witnessing **intensifying climate impacts** such as floods, heatwaves, cyclones, and glacial melt.
- The region remains one of the **most climate-vulnerable** despite contributing a small share to global emissions.
- Experts and policymakers have called for stronger **regional climate cooperation and solidarity**.

SUMMARY

- South Asia faces disproportionate climate risks driven by geography, population density, and developmental vulnerabilities.
- Extreme weather events increasingly cross national boundaries, making unilateral responses insufficient.
- Climate solidarity—through shared data, finance, technology, and adaptation strategies—is essential to protect livelihoods and ecosystems.
- Strengthened regional cooperation can enhance resilience, ensure climate justice, and enable South Asia to collectively navigate the climate crisis.

BACKGROUND / CONTEXT

- I. South Asia houses **nearly one-fourth of the world’s population**, many dependent on climate-sensitive sectors like agriculture and fisheries.
- II. The region contributes **less than 10% of global emissions** but bears high climate vulnerability.
- III. Climate risks are **transboundary**:
 - ✓ River basin flooding (Indus, Ganga, Brahmaputra)
 - ✓ Himalayan glacier retreat
 - ✓ Cyclones in the Bay of Bengal and Arabian Sea
- IV. Existing regional mechanisms (SAARC) have limited climate coordination, highlighting the need for renewed solidarity



KEY HIGHLIGHTS

1. Shared Climate Vulnerabilities

- Rising frequency of extreme events affecting multiple countries simultaneously.
- Cross-border impacts on food security, water availability, and public health.

2. Climate Justice Dimension

- Least responsible populations face the greatest damage.
- Equity and common but differentiated responsibilities (CBDR) are central.

3. Need for Regional Climate Cooperation

- Joint early warning systems for floods and cyclones.
- Shared climate data, research, and modelling.
- Regional adaptation funds and disaster response mechanisms.

4. Finance and Technology Gaps

- Limited access to climate finance for adaptation.
- Need for affordable technologies for renewable energy, resilient agriculture, and water management.

5. People-Centric Adaptation

- Focus on protecting livelihoods, migration management, and social safety nets.
- Community-based adaptation strategies.

6. India's Leadership Role

- India's initiatives like **International Solar Alliance**, **CDRI**, and **LIFE** can anchor regional efforts.
- Scope for bilateral and sub-regional climate partnerships.

PRELIMS BOOSTER BOX

- **CBDR:** Common But Differentiated Responsibilities.
- **CDRI:** Coalition for Disaster Resilient Infrastructure.
- **ISA:** International Solar Alliance.
- **Transboundary Rivers:** Indus, Ganga, Brahmaputra.
- **Sendai Framework:** Disaster risk reduction (2015–2030).

PadhAI PYQ BOOSTER SECTION

Q. (UPSC GS3 – Mains)

“Climate change impacts transcend national boundaries. Discuss the need for regional cooperation in South Asia to address climate risks.”

PadhAI MAINS PRACTICE QUESTION

“South Asia needs climate solidarity more than climate diplomacy.” Analyse the statement in the context of shared vulnerabilities and regional cooperation challenges. (250 words)



PadhAI-GENERATED UPSC MCQ

Q. With reference to climate change in South Asia, consider the following statements:

1. South Asia contributes a relatively small share of global greenhouse gas emissions.
2. Climate impacts such as floods and cyclones often have transboundary effects.
3. Regional cooperation on climate adaptation is unnecessary as impacts are country-specific.

Which of the statements given above is/are correct?

- A. 1 and 2 only
- B. 2 only
- C. 1 and 3 only
- D. 1, 2 and 3

Answer: A

(Statement 3 is incorrect – climate impacts are often transboundary.)

3.Operation Sagar Bandhu: India's Maritime Humanitarian Outreach and Regional Solidarity

WHY IN THE NEWS?

- India launched **Operation Sagar Bandhu** to provide **humanitarian assistance and disaster relief (HADR)** to friendly nations in the Indian Ocean Region (IOR).
- The operation reflects India's commitment to **maritime cooperation, regional stability, and neighbourhood-first policy**.

- It reinforces India's role as a **net security provider** in the IOR.

SUMMARY

- Operation Sagar Bandhu is a maritime humanitarian initiative aimed at assisting partner countries during emergencies through India's naval and maritime capabilities.
- Building on India's tradition of HADR missions, the operation underscores New Delhi's commitment to regional solidarity, disaster resilience, and cooperative security in the Indian Ocean Region.
- It highlights India's soft power projection and its growing responsibility in ensuring safety, stability, and trust across maritime neighbourhoods.

BACKGROUND / CONTEXT

- I. India's maritime doctrine emphasises **Security and Growth for All in the Region (SAGAR)**.
- II. The Indian Ocean Region is highly vulnerable to:
 - ✓ Cyclones
 - ✓ Tsunamis
 - ✓ Floods
 - ✓ Maritime accidents
- III. India has previously undertaken missions such as **Operation Sagar**, **Operation Samudra Setu**, and **Operation Dost**.
- IV. Operation Sagar Bandhu continues this tradition of **humanitarian diplomacy** through naval reach and rapid response.



KEY HIGHLIGHTS

1. Humanitarian Assistance and Disaster Relief (HADR)

- Deployment of naval ships, aircraft, and logistics assets.
- Supply of food, medicines, medical teams, and relief materials.

2. Maritime Diplomacy

- Strengthens ties with littoral and island nations.
- Enhances trust through timely assistance.

3. Operational Readiness

- Demonstrates India's capability for rapid maritime response.
- Improves interoperability and coordination.

4. Strategic Signalling

- Reinforces India's leadership role in the IOR.
- Counters non-traditional security threats through cooperation.

5. Civil-Military Coordination

- Coordination between defence forces, MEA, and disaster agencies.
- Ensures efficient and needs-based assistance.

PRELIMS BOOSTER BOX

- **SAGAR:** Security and Growth for All in the Region.

- **HADR:** Humanitarian Assistance and Disaster Relief.
- **IOR:** Indian Ocean Region.
- **Net Security Provider:** State contributing to regional stability.
- **Maritime Diplomacy:** Use of naval assets for foreign policy objectives.

PadhAI PYQ BOOSTER SECTION

Q. (GS2 – Mains)

“Discuss the role of humanitarian assistance and disaster relief in India's maritime diplomacy.”

PadhAI MAINS PRACTICE QUESTION

“Operations like Sagar Bandhu reflect India's evolving role as a humanitarian and security partner in the Indian Ocean Region.” Analyse. (250 words)

PadhAI-GENERATED UPSC MCQ

Q. With reference to Operation Sagar Bandhu, consider the following statements:

1. It is a maritime humanitarian assistance initiative led by India.
2. It aligns with India's SAGAR doctrine in the Indian Ocean Region.
3. It focuses exclusively on combat and military exercises.

Which of the statements given above is/are correct?

- A. 1 and 2 only
- B. 2 only
- C. 1 and 3 only
- D. 1, 2 and 3



Answer: A

(Statement 3 is incorrect – the operation is humanitarian, not combat-oriented.)

4. AI Could Widen Inequality in Asia-Pacific: Risks, Realities and the Way Forward**WHY IN THE NEWS?**

- Recent international reports warn that **Artificial Intelligence (AI)** could exacerbate **income, skill, and regional inequalities** in the Asia-Pacific region.
- Advanced economies and tech-ready firms are capturing disproportionate AI gains.
- Developing economies face risks of **job displacement, digital divides, and uneven productivity growth**.

SUMMARY

- Artificial Intelligence promises productivity gains and innovation but also risks widening inequality in the Asia-Pacific region.
- Unequal access to digital infrastructure, skills, and capital may allow advanced economies and large firms to dominate AI benefits, while labour-intensive sectors and developing countries face disruption.
- Without inclusive policies, AI could deepen economic and social divides, making targeted investments in skills, governance, and digital inclusion essential.

BACKGROUND / CONTEXT

- I. The Asia-Pacific region is highly **heterogeneous**, ranging from advanced digital economies to low-income developing states.
- II. AI adoption depends on **data availability, computing power, skilled workforce, and regulatory readiness**.
- III. Many economies rely on **labour-intensive manufacturing and services**, which are vulnerable to automation.
- IV. Pre-existing inequalities in education, gender, and urban-rural access may be amplified by AI-led growth patterns.

KEY HIGHLIGHTS**1. Skill-Based Inequality**

- AI complements high-skilled labour while substituting routine tasks.
- Wage gaps widen between AI-skilled and non-skilled workers.

2. Job Displacement Risks

- Automation threatens jobs in manufacturing, clerical work, and customer services.
- Informal workers lack social security buffers.

3. Digital Divide

- Unequal access to internet, data, and computing infrastructure.
- Rural and small enterprises lag behind urban and large firms.



4. Capital Concentration

- AI benefits accrue to firms with access to data and capital.
- Market power and monopolistic tendencies may increase.

5. Gender and Regional Gaps

- Women and marginalised groups are overrepresented in automatable jobs.
- Smaller economies risk falling behind AI leaders.

PRELIMS BOOSTER BOX

- **Skill Polarisation:** Concentration of jobs at high- and low-skill ends.
- **Digital Divide:** Unequal access to digital technologies.
- **Automation:** Use of machines to perform tasks previously done by humans.
- **AI Governance:** Policies to regulate ethical and inclusive AI use.
- **SDG 10:** Reduced inequalities.

PadhAI PYQ BOOSTER SECTION

Q. (GS3 – Mains)

“Discuss the impact of emerging technologies on employment and inequality”.

PadhAI MAINS PRACTICE QUESTION

“Artificial Intelligence is a double-edged sword for the Asia-Pacific region.” Examine how AI could widen inequalities and suggest policy measures to ensure inclusive outcomes. (250 words)

PadhAI-GENERATED UPSC MCQ

Q. With reference to Artificial Intelligence and inequality in the Asia-Pacific region, consider the following statements:

1. AI tends to complement high-skilled labour more than low-skilled labour.
2. Digital infrastructure gaps can amplify inequality from AI adoption.
3. AI-driven growth automatically ensures inclusive development.

Which of the statements given above is/are correct?

- A. 1 and 2 only
- B. 2 only
- C. 1 and 3 only
- D. 1, 2 and 3

Answer: A

(Statement 3 is incorrect – inclusive outcomes require deliberate policy intervention.)

5. Putin and China Planning Trilateral Ties: Strategic Signalling in a Shifting Global Order

WHY IN THE NEWS?

- Russia and China have indicated plans to **expand trilateral cooperation frameworks** with select partner countries.
- The move is seen amid **geopolitical polarisation, sanctions on Russia, and strategic competition with the West**.
- Such initiatives aim to strengthen **multipolar diplomacy and alternative geopolitical groupings**.



SUMMARY

- Russia and China are exploring trilateral cooperation mechanisms with third countries to deepen strategic coordination beyond bilateral ties.
- These efforts reflect their shared interest in counterbalancing Western influence, enhancing regional connectivity, and promoting a multipolar world order.
- Trilateral formats offer flexibility in diplomacy, allowing issue-based cooperation in security, economy, and geopolitics, while reshaping regional and global power dynamics.

BACKGROUND / CONTEXT

- I. Russia–China relations have strengthened significantly since the 2010s, driven by:
 - ✓ Strategic distrust of Western-led institutions
 - ✓ Economic complementarities
 - ✓ Shared emphasis on sovereignty and non-interference
- II. Trilateral diplomacy allows both countries to **extend influence without formal alliances**.
- III. Such formats may involve **regional powers, neighbouring states, or Global South partners**, depending on strategic context.
- IV. These initiatives coexist with broader platforms like **BRICS, SCO, and Eurasian groupings**.

KEY HIGHLIGHTS

1. Strategic Rationale

- Diversifies partnerships beyond bilateralism.
- Creates flexible coalitions on security, energy, and connectivity.

2. Security Dimension

- Potential coordination on regional stability, defence dialogues, and counter-terrorism.
- Signals resistance to Western security architectures.

3. Economic & Connectivity Focus

- Trade, energy cooperation, infrastructure, and regional corridors.
- Reduces reliance on Western markets and financial systems.

4. Diplomatic Signalling

- Reinforces the narrative of a **multipolar world order**.
- Enhances bargaining power in global forums.

5. Limits and Constraints

- Asymmetry in Russia–China power balance.
- Differing regional priorities and third-country sensitivities.
- Risk of overdependence on China for Russia.

PRELIMS BOOSTER BOX

- **Trilateral Diplomacy:** Cooperation among three states on shared interests.



- **Multipolar World:** Distribution of power among multiple major states.
- **Strategic Autonomy:** Independent foreign policy decision-making.
- **SCO / BRICS:** Platforms involving Russia and China.
- **Geopolitical Signalling:** Diplomatic moves conveying strategic intent.

PadhAI PYQ BOOSTER SECTION

Q. (GS2 – Mains)

“Discuss the implications of growing Russia–China strategic cooperation for the emerging global order.”

PadhAI MAINS PRACTICE QUESTION

“Trilateral initiatives led by major powers reflect the changing nature of global diplomacy.” Analyse the strategic motivations behind Russia–China trilateral engagements and their implications for global and regional stability. (250 words)

PadhAI-GENERATED UPSC MCQ

Q. With reference to Russia–China trilateral initiatives, consider the following statements:

1. Trilateral cooperation offers flexibility without formal military alliances.
2. Such initiatives are part of efforts to promote a multipolar world order.
3. They eliminate all strategic differences between Russia and China.

Which of the statements given above is/are correct?

- A. 1 and 2 only
- B. 2 only
- C. 1 and 3 only
- D. 1, 2 and 3

Answer: A

(Statement 3 is incorrect – Russia and China continue to have differing interests despite cooperation.)

6. How Countries like Myanmar and Cambodia Turned into Hubs of Cyber Slavery

WHY IN THE NEWS?

- International investigations have exposed large-scale **cyber scam compounds** operating in Myanmar and Cambodia.
- Thousands of foreign nationals, including Indians, have been **trafficked and forced into cyber fraud**.
- Governments and UN agencies have flagged **cyber slavery** as a growing transnational organised crime threat.

SUMMARY

- Myanmar and Cambodia have emerged as global hubs of cyber slavery, where trafficked individuals are coerced into running online scams under inhuman conditions.
- Weak governance, conflict zones, porous borders, and corruption have allowed criminal syndicates to operate with impunity.
- These cybercrime factories exploit digital technologies, human trafficking, and financial anonymity, posing serious challenges to international



security, human rights, and cyber governance.

BACKGROUND / CONTEXT

- I. **Cyber slavery** refers to forced labour where victims are compelled to carry out cyber fraud under threats, torture, or confinement.
- II. Scam compounds expanded rapidly during the **COVID-19 pandemic**, exploiting remote work and digital payments.
- III. Myanmar's border regions and Cambodia's Special Economic Zones became ideal locations due to:
 - ✓ Weak state control
 - ✓ Limited oversight
 - ✓ Proximity to cross-border networks
- IV. Victims are often lured with fake job offers in IT, marketing, or customer service.

KEY HIGHLIGHTS

1. Political Instability and Conflict

- Myanmar's post-coup instability weakened governance and policing.
- Armed groups and militias profit by protecting scam operations.

2. Weak Regulatory and Law Enforcement Capacity

- Poor cybercrime laws and enforcement gaps.
- Corruption enables criminal syndicates to evade action.

3. Human Trafficking Networks

- Victims recruited through social media and fake recruitment agencies.
- Passports confiscated; physical and psychological abuse common.

4. Lucrative Cybercrime Economy

- Scams generate billions annually through crypto and digital payments.
- Low risk–high reward compared to traditional crimes.

5. Digital Anonymity and Financial Opacity

- Use of cryptocurrencies, shell companies, and offshore accounts.
- Difficulties in tracing money flows across jurisdictions.

6. Limited International Coordination

- Jurisdictional issues slow rescue and prosecution.
- Victims are often treated as offenders rather than trafficked persons.

PRELIMS BOOSTER BOX

- **Cyber Slavery:** Forced labour in digital crime operations.
- **Online Scam Compounds:** Organised centres running cyber fraud.
- **Human Trafficking:** Crime under UN Palermo Protocol.
- **Crypto Laundering:** Use of digital currencies to hide proceeds.
- **Transnational Crime:** Crime spanning multiple countries.

PadhAI PYQ BOOSTER SECTION



Q. (GS3 – Mains)

“Cybercrime today is increasingly linked with organised crime and human trafficking. Discuss.”

PadhAI MAINS PRACTICE QUESTION

“The emergence of cyber slavery hubs in Southeast Asia reflects governance gaps in the digital age.” Analyse the causes, consequences, and measures required at national and international levels. (250 words)

PadhAI-GENERATED UPSC MCQ

Q. With reference to cyber slavery, consider the following statements:

1. It involves forced labour in cyber fraud and online scam operations.
2. Political instability and weak governance contribute to its spread.
3. Victims are usually voluntary participants seeking quick income.

Which of the statements given above is/are correct?

- A. 1 and 2 only
- B. 2 only
- C. 1 and 3 only
- D. 1, 2 and 3

Answer: A

(Statement 3 is incorrect — victims are trafficked and coerced.)

7. The opposition parties recently criticized the Prime Minister over India’s exclusion from the United States–led Pax Silica initiative, attributing it to a sharp deterioration in his relationship with the U.S. President.

WHY IN THE NEWS?

- Opposition parties in India have criticised the government after **India’s exclusion from the newly launched Pax Silica alliance**, a U.S.-led strategic initiative on silicon and semiconductor supply chains.
- Critics have linked the omission to what they describe as a **deterioration in India–U.S. ties**, especially between Prime Minister **Narendra Modi** and **Donald Trump**.
- The opposition argues that this reflects a **missed strategic opportunity** for India in advanced technology and AI supply-chain cooperation.

SUMMARY

- India’s absence from the *Pax Silica* initiative — a U.S.-led effort to secure resilient silicon and semiconductor supply chains among trusted partners has drawn sharp political criticism domestically.
- Opposition parties, notably the Indian National Congress, have blamed the government for failing to secure India’s inclusion and linked it to perceived strains in ties between the Indian and U.S. leadership.
- The episode has sparked debate on India’s global strategic positioning in technology diplomacy.



BACKGROUND / CONTEXT

- I. *Pax Silica* is a **United States-led strategic framework** aimed at stabilising and securing global supply chains of silicon and semiconductors, critical for advanced technologies and artificial intelligence.
- II. The grouping includes major technology partners such as **Japan, South Korea, Singapore, the Netherlands, the U.K., Israel, UAE, and Australia**.
- III. India's exclusion has raised questions about the **conditions for participation in high-technology alliances** and the interplay of geopolitical, economic, and diplomatic considerations.

KEY HIGHLIGHTS

1. Opposition's Critique

- Leaders like **Jairam Ramesh** (Congress) linked the omission to a **downturn in India-U.S. relations**, particularly between Modi and Trump since mid-2025.
- They described it as a **missed chance** to integrate into strategic technology supply chains.

2. Strategic Implications

- *Pax Silica* focuses on **critical mineral and semiconductor supply security**, key for next-generation technologies like AI.
- India's absence sparks debate on its role and readiness in high-tech geopolitical coalitions.

3. Government & U.S. Position

- U.S. officials have countered that exclusion is **not due to political tensions** and that talks on broader economic security cooperation with India continue.

4. Geopolitics of Tech Alliances

- The alliance's membership reflects **trusted supply-chain partners in advanced technologies**, not just traditional allies.
- India's deepening but selective engagement shows **balance between strategic autonomy and partnership interests**.

PRELIMS BOOSTER BOX

- **Pax Silica:** U.S.-led initiative to secure silicon/semiconductor supply chains.
- **Key Technology Nodes Covered:** Critical minerals, energy input, semiconductors, AI infrastructure.
- **Inaugural Members:** U.S., Japan, South Korea, Singapore, Netherlands, U.K., Israel, UAE, Australia.
- **India's Position (Dec 2025):** Not part of initial grouping.

PadhAI PYQ BOOSTER SECTION

Q. (GS2 – Mains)

"Analyse how informal multilateral technology alliances influence global supply-chain governance and India's strategic interests."

PadhAI MAINS PRACTICE QUESTION



“India’s exclusion from the U.S.–led Pax Silica initiative has triggered political controversy. Critically examine the strategic and diplomatic factors that may influence participation in such technology and supply-chain alliances.” (250 words)

PadhAI-GENERATED UPSC MCQ

Q. With reference to the Pax Silica Initiative, consider the following statements:

1. Pax Silica focuses on securing silicon and semiconductor supply chains.
2. India was included as a founding member of Pax Silica.
3. The initiative includes countries like Japan, the Netherlands, and Australia.

Which of the statements given above are correct?

- A. 1 and 3 only
- B. 2 only
- C. 1 and 2 only
- D. 1, 2 and 3

Answer: A

(Statement 2 is incorrect – India is not part of the initial initiative.)

8. Operation Thunder 2025: India’s Coordinated Crackdown Against Wildlife Trafficking and Environmental Crimes

WHY IN THE NEWS?

- India participated in **Operation Thunder 2025**, a global enforcement exercise against **wildlife trafficking, illegal timber trade, and environmental crimes**.
- The operation involved coordinated actions by **environment, customs,**

police, and forest agencies across multiple countries.

- Significant seizures and arrests underscore growing international cooperation to combat **eco-crime networks**.

SUMMARY

- Operation Thunder 2025 is a multinational enforcement operation targeting illegal wildlife trade, environmental crime, and associated financial networks.
- Coordinated by intergovernmental agencies, the mission involved India’s forest departments, customs, WCCB, and police forces.
- Through raids, surveillance, and cross-border intelligence-sharing, the operation intercepted wildlife contraband, timber, and protected species products.
- The initiative enhances India’s profile in global wildlife crime prevention and reflects its commitment under CITES and other biodiversity conventions.

BACKGROUND / CONTEXT

- I. Operation Thunder is an **annual global enforcement campaign** against wildlife crime.
- II. Based on intelligence-sharing across countries to disrupt **poaching, smuggling cartels, and trade routes**.
- III. Operation Thunder 2025 focused on **high-risk trafficking corridors in Asia and Africa**, with India being a key operational hub.



- IV. Links to **CITES commitments**, India's **Wildlife Protection Act, 1972**, and national anti-smuggling priorities.

KEY HIGHLIGHTS OF INDIA'S PARTICIPATION

1. Targeted Enforcement

- Focused on airports, ports, railway stations, and border zones.
- Special attention on trafficking of **pangolin scales, ivory, reptile skins, big cat parts**, and exotic species.

2. Technology & Surveillance

- Use of AI-linked customs scanners, digital manifest screening, and intelligence databases.

3. Cross-Border Coordination

- Operational exchanges with countries in **South Asia, Southeast Asia, and Africa**.
- Information sharing on **known traffickers & smuggling networks**.

4. Link to Financial Crime

- Probe into **hawala routes, crypto payments, and shell companies** used to fund trafficking.

5. Community & Local Ranger Support

- Eco-sensitive zones monitored through **joint patrol and informant networks**.

PRELIMS BOOSTER BOX

- **WCCB**: Wildlife Crime Control Bureau, India
- **CITES**: Convention regulating trade in endangered species
- **INTERPOL**: International policing organisation, crime intelligence
- **Wildlife Protection Act, 1972**: Governs protected species in India
- **Operation Thunder**: Annual global enforcement mission

PadhAI PYQ BOOSTER SECTION

"How does transnational cooperation enhance India's capacity to combat wildlife trafficking? Illustrate recent examples."

PadhAI MAINS PRACTICE QUESTION

"Operation Thunder 2025 demonstrates that wildlife trafficking is not merely an environmental issue but a form of organised crime. Discuss." (250 words)

PadhAI-GENERATED UPSC MCQ

Q. Consider the following statements about Operation Thunder 2025:

1. It is coordinated globally by INTERPOL and the World Customs Organization.
2. It targets wildlife crime, illegal timber trade, and environmental trafficking.
3. India did not participate in the 2025 cycle.

Which of the statements given above are correct?

- A. 1 and 2 only
- B. 2 and 3 only
- C. 1 only
- D. 1, 2 and 3



Answer: A

9. The "Belém Political Package" (Post-COP29/30)

WHY IN THE NEWS?

- The "**Belém Political Package**" has emerged as a central reference point in post-COP29/30 climate diplomacy.
- It reflects consensus-driven commitments hosted in **Belém, Brazil**, focusing on **climate finance, forest protection, carbon markets, and just energy transition**.
- The Package is positioned as a bridge between **Global South development needs** and global emission-reduction imperatives.

SUMMARY

- The Belém Political Package is a post-COP29/30 consolidation document outlining priority actions for climate mitigation and adaptation, with emphasis on finance, forests, and carbon markets.
- Positioned as a political accelerator rather than a legally binding treaty, it seeks to operationalise climate finance commitments, expand South-South cooperation, and frame just-transition pathways.
- The Package's goal is to align climate ambition with development equity, enhancing accountability and speeding implementation ahead of the 2030 deadline.

BACKGROUND / CONTEXT

- I. Prior COP outcomes showed **gaps between pledges and delivery**, especially on finance and technology support.
- II. Belém was selected to symbolise **Amazonia and planetary ecosystem stakes**.
- III. Rising global temperatures, debt distress in vulnerable economies, and energy security challenges demanded **post-COP acceleration** beyond declarations.
- IV. The Package positions itself as a **practical roadmap**, not a negotiating platform, supporting implementation until 2030.

KEY HIGHLIGHTS

1. Finance Delivery Framework

- Defines pathways for achieving the **USD 100 bn+ annual finance target** and scaling to **USD 500 bn cumulatively by 2030**.
- Encourages blended finance, de-risking instruments, and sovereign guarantees.

2. Forest & Nature Compact

- Launch of the **Amazon-Congo-Southeast Asia Forest Alliance**.
- Results-based financing for avoided deforestation and indigenous stewardship.

3. Carbon Market Architecture

- Standardisation of **Article 6.2 & 6.4 mechanisms**.



- Digital MRV (Measurement/Reporting/Verification) systems and cross-border registry frameworks.

4. Just Transition Agenda

- Policy frameworks for coal phase-down, green jobs, skill transition, and safety nets.
- Supports **Green Industrial Policy** in developing economies.

5. Loss & Damage Operationalisation

- Pre-defined triggers for fund disbursement (cyclones, sea-level rise thresholds, heatwaves).
- Country platforms for direct access modalities.

PRELIMS BOOSTER BOX

- **Article 6 (UNFCCC):** Carbon markets & cooperative mechanisms
- **Loss & Damage:** Compensation for climate-induced harm
- **Just Transition:** Workers' rights in decarbonisation
- **MRV Systems:** Monitoring climate actions transparently
- **Amazon-Congo-SEA Axis:** Forest geopolitics coalition

PadhAI PYQ BOOSTER SECTION

"How do post-COP political packages shape climate action despite lacking legal enforceability? Illustrate with reference to recent global frameworks."

PadhAI MAINS PRACTICE QUESTION

"The Belém Political Package represents a shift from negotiation to implementation. Discuss how it attempts to resolve long-standing gaps in climate finance and just transition architecture." (250 words)

PadhAI-GENERATED UPSC MCQ

Q. With reference to the Belém Political Package, consider the following statements:

1. It is a legally binding agreement under the UNFCCC.
2. It prioritises climate finance delivery, forest protection, and carbon market mechanisms.
3. It emerged as a consolidation framework following the COP29/30 negotiations.

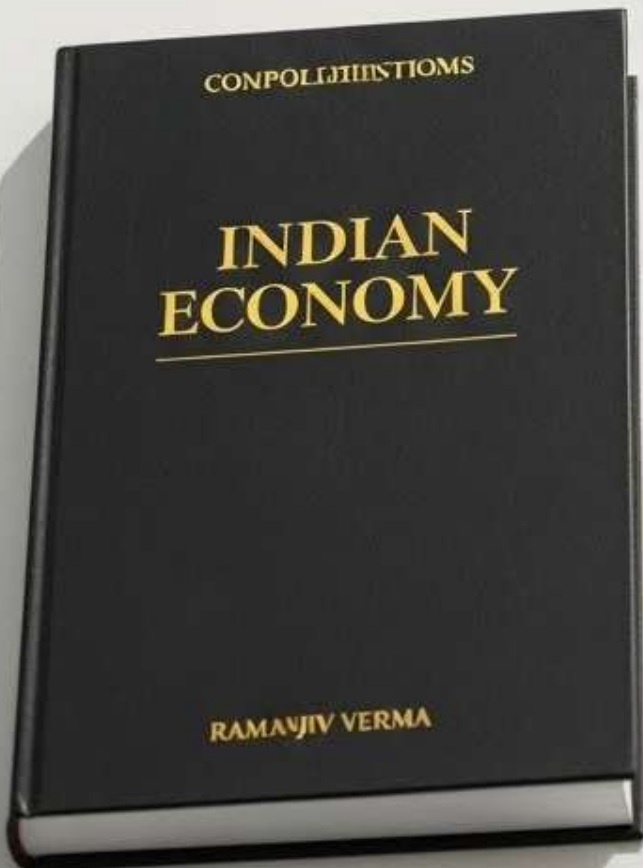
Which of the statements given above is/are correct?

- A. 2 and 3 only
- B. 1 only
- C. 3 only
- D. 1, 2 and 3

Answer: A



ECONOMY



1. MoCA Steps in Amid IndiGo Operational Crisis: Passenger Refund Protection Measures Announced

WHY IN THE NEWS?

- The **Ministry of Civil Aviation (MoCA)** intervened following significant flight disruptions and cancellations by **IndiGo**, India's largest airline.
- Thousands of passengers were affected due to operational challenges, prompting MoCA to mandate strict **refund and passenger-rights protection** measures.
- The incident raised concerns regarding airline accountability, safety compliance, and consumer rights in India's civil aviation sector.

SUMMARY

- The Ministry of Civil Aviation initiated corrective steps after IndiGo faced operational disruptions resulting in widespread cancellations and delays.
- MoCA directed the airline to ensure immediate refunds, transparent communication, and enhanced passenger grievance redressal.
- The ministry emphasised strict compliance with DGCA norms on passenger rights and operational reliability.
- The intervention aims to strengthen consumer protection, maintain sectoral stability, and ensure airlines adhere to safety and service standards.

BACKGROUND / CONTEXT

- I. IndiGo experienced a major operational disruption due to crew unavailability, scheduling failures, or technical constraints (depending on official disclosures).
- II. Airlines in India are bound by **DGCA Civil Aviation Requirements (CAR)** on compensation, refunds, and cancellations.
- III. Past disruptions (COVID-time shutdowns, GoFirst insolvency, Vande Bharat repatriation delays) highlighted the need for stronger passenger protection regulations.
- IV. MoCA's response reflects increasing governmental oversight as air travel rebounds rapidly and airlines operate at high capacity.

KEY HIGHLIGHTS

1. Immediate MoCA Directives

- IndiGo instructed to **refund full ticket amounts** for cancelled flights without penalty.
- Mandatory **free rescheduling** for impacted passengers.
- Strict monitoring of backlog refund processing.

2. DGCA Oversight Strengthened

- DGCA ordered compliance reports on flight rotations, crew duty hours, and safety procedures.
- Airlines are directed to maintain a minimum **operational buffer** to avoid cascading disruptions.



- Review of airline manpower planning initiated.

3. Passenger Protection Measures

- Airlines must provide:
 - ✓ Real-time flight status
 - ✓ Compensation for long delays
 - ✓ Meals and accommodation as per DGCA rules
- Enhanced visibility of passenger rights on airline websites and ticketing portals.

4. Technology-Enabled Redressal

- AirSewa platform activated for rapid grievance escalation.
- Airlines required to update delay/cancellation data on the centralised system.

5. Sector-Wide Preventive Steps

- MoCA considering new norms on:
 - Crisis management reserves
 - Minimum service continuity obligations
 - Stronger penalty framework for repeated disruptions

6. Maintaining Market Stability

- Ensures confidence in Indian aviation amid rising passenger volumes.
- Prevents revenue losses and reputational damage to the industry.

PRELIMS BOOSTER BOX

- **DGCA (Directorate General of Civil Aviation):** Regulates safety & service standards in civil aviation.

- **Civil Aviation Requirements (CAR):** Mandate compensation, refunds, boarding denial norms.
- **AirSewa Portal:** Unified grievance redressal for passengers.
- **Passenger Rights Charter:** Ensures transparency in flight delays, refunds, and cancellations.
- **MoCA:** Responsible for policy, planning, and regulation of India's aviation sector.

PadhAI PYQ BOOSTER SECTION

Q. (UPSC Prelims – Theme-Based)

Questions on regulatory bodies like DGCA, TRAI, IRDAI, and their roles in consumer protection.

Q. (UPSC GS2 – Mains)

“Discuss the role of regulatory bodies in safeguarding consumer interests in India's service sectors.”

PadhAI MAINS PRACTICE QUESTION

“The IndiGo operational crisis and MoCA's intervention highlight urgent gaps in passenger protection and aviation governance.” Examine the existing regulatory framework and suggest reforms to enhance consumer rights in civil aviation. (250 words).

PadhAI-GENERATED UPSC MCQ

Q. With reference to MoCA's intervention during IndiGo's operational crisis, consider the following statements:



1. MoCA mandated full refunds for cancelled flights without any deductions.
2. DGCA issued compliance advisories to ensure flight safety and crew duty regulation.
3. Airlines are legally exempt from providing compensation for flight delays under Indian law.

Which of the statements given above is/are correct?

- A. 1 and 2 only
- B. 2 only
- C. 1 and 3 only
- D. 1, 2 and 3

Answer: A

(Statement 3 is incorrect – DGCA's CAR mandates compensation for certain categories of delays and cancellations.)

RBI to Conduct ₹1 Lakh Crore Government Securities Purchase via OMO to Manage Liquidity and Bond Yields

2. RBI to Conduct ₹1 Lakh Crore Government Securities Purchase via OMO to Manage Liquidity and Bond Yields

WHY IN THE NEWS?

- The **Reserve Bank of India (RBI)** announced that it will purchase **₹1 lakh crore worth of government securities (G-secs)** through **Open Market Operations (OMO)**.
- The move aims to stabilise long-term bond yields and ensure adequate liquidity in the banking system.
- The decision comes amid tight liquidity conditions, high government

borrowing, and volatile global financial markets.

SUMMARY

- The Reserve Bank of India will buy ₹1 lakh crore of government securities via Open Market Operations to infuse durable liquidity and ease pressure on bond yields.
- The measure is intended to support financial stability amid tight banking liquidity caused by high currency leakage, tax outflows, and global risk aversion.
- RBI's calibrated liquidity management through OMOs is expected to improve credit flow, stabilise markets, and support economic growth.

BACKGROUND / CONTEXT

- I. **Open Market Operations (OMOs)** are conducted by RBI to regulate liquidity by buying or selling government securities.
- II. Liquidity has tightened due to:
 - ✓ GST & advance tax outflows
 - ✓ Higher currency in circulation
 - ✓ Elevated government borrowing
 - ✓ Global financial volatility
- III. Tight liquidity impacts lending rates, market borrowing costs, and credit availability.
- IV. RBI often uses OMOs alongside LAF tools (SDF, MSF) to maintain orderly financial conditions.

KEY HIGHLIGHTS



1. Large-Scale Liquidity Injection

- ₹1 lakh crore G-sec purchase is one of the largest OMO operations in recent years.
- Aimed at easing liquidity shortfalls facing banks.

2. Stabilising Bond Yields

- Yield spikes affect government borrowing costs and private investments.
- OMO purchases reduce supply pressure and help moderate long-term interest rates.

3. Support to Banking System

- Additional liquidity strengthens banks' ability to lend to MSMEs, corporates, and retail sectors.
- Helps avoid a credit squeeze during peak borrowing cycles.

4. Macroeconomic Considerations

- RBI balancing act: support liquidity without triggering inflation.
- Move seen as growth-supportive amid global slowdown signals.

5. Alignment With Monetary Policy

- Complementary to existing monetary tightening stance.
- Focus on managing durable liquidity while keeping inflation within the target band.

6. Impact on Markets

- Positive for bond markets; expected softening in yields.
- Enhances investor confidence and reduces volatility.

PRELIMS BOOSTER BOX

- **OMO:** RBI buys (injects liquidity) or sells (absorbs liquidity) government securities.
- **G-sec:** Government security, risk-free sovereign bond.
- **SDF (Standing Deposit Facility):** Allows RBI to absorb liquidity without collateral.
- **MSF (Marginal Standing Facility):** Banks borrow overnight funds from RBI.
- **Liquidity Adjustment Facility (LAF):** Framework for managing day-to-day liquidity.

PadhAI PYQ BOOSTER SECTION

Q. (UPSC Prelims 2020)

“What happens when RBI conducts Open Market Purchase of government securities?”
(Concept tested repeatedly)

Q. (UPSC GS3 – Mains)

“Discuss how RBI’s liquidity management tools influence economic growth and inflation.”

PadhAI MAINS PRACTICE QUESTION

“RBI’s decision to purchase ₹1 lakh crore worth of government securities reflects a calibrated approach to liquidity management.” Analyse its implications for financial stability, bond markets, and economic growth. (250 words)



PadhAI-GENERATED UPSC MCQ

Q. With reference to RBI's OMO operations, consider the following statements:

1. When RBI buys government securities, it injects liquidity into the banking system.
2. OMO purchases help moderate long-term bond yields.
3. OMO operations require prior approval from the Ministry of Finance.

Which of the statements given above is/are correct?

- A. 1 and 2 only
- B. 2 only
- C. 1 and 3 only
- D. 1, 2 and 3

Answer: A

(Statement 3 is incorrect — RBI conducts OMOs independently as part of monetary policy operations.)

3. Why the Rupee Has a Capital Account Problem

WHY IN THE NEWS?

- The Indian Rupee has faced **persistent depreciation pressures** despite stable macro fundamentals.
- Analysts increasingly point to **capital account vulnerabilities**, rather than trade deficits alone, as the core issue.
- Global monetary tightening, volatile capital flows, and portfolio outflows have exposed structural weaknesses in India's capital account.

SUMMARY

- While India's current account pressures often draw attention, the deeper challenge for the rupee lies in its capital account.
- Heavy reliance on volatile portfolio flows, sensitivity to global interest rate cycles, and limited currency internationalisation make the rupee vulnerable during global risk-off phases.
- Structural dependence on foreign capital to finance growth creates recurring exchange rate stress, highlighting the need for stable long-term inflows and domestic financial deepening.

BACKGROUND / CONTEXT

- I. **Balance of Payments (BoP)** consists of:
 - ✓ **Current Account** (trade in goods/services, remittances)
 - ✓ **Capital Account** (FDI, FPI, loans, banking capital)
- II. India typically runs a **current account deficit (CAD)**, which must be financed through capital inflows.
- III. Unlike export-led economies, India's growth model relies significantly on **external capital**, making the rupee sensitive to shifts in global liquidity.
- IV. During global shocks, capital flows reverse faster than trade adjusts, putting pressure on the currency.

KEY HIGHLIGHTS



1. Overdependence on Portfolio Flows

- FPIs are **short-term and highly reversible**.
- Global risk aversion, US bond yields, or geopolitical tensions trigger sudden outflows.
- These outflows directly weaken the rupee.

2. Interest Rate Differential Risk

- When US Federal Reserve rates rise, capital moves from emerging markets to safe assets.
- India must balance inflation control with growth, limiting aggressive rate hikes.

3. Limited Rupee Internationalisation

- The rupee is not widely used in global trade invoicing or reserves.
- Low global demand for rupees increases vulnerability during capital flight.

4. External Debt and ECB Exposure

- Indian corporates borrow abroad via **External Commercial Borrowings (ECBs)**.
- Rupee depreciation raises repayment costs and increases dollar demand.

5. Asymmetric Capital Account

- Capital inflows are liberalised faster than outflows for residents.
- This asymmetry amplifies volatility during stress periods.

6. RBI's Defensive Role

- RBI uses **forex reserves** to smooth volatility, not defend a fixed level.
- Persistent intervention drains reserves during prolonged capital outflows.

PRELIMS BOOSTER BOX

- **Capital Account:** Records cross-border capital flows.
- **FPI:** Volatile, market-sensitive capital.
- **FDI:** Stable, long-term investment.
- **CAD:** Excess of imports over exports.
- **Forex Reserves:** Buffer used by RBI to manage volatility.

PadhAI PYQ BOOSTER SECTION

Q. (UPSC GS3 – Mains)

“Capital flow volatility is a major source of macroeconomic instability in India. Discuss.”

Prelims Theme-Based:

BoP, exchange rate regimes, RBI interventions.

PadhAI MAINS PRACTICE QUESTION

“The weakness of the Indian rupee is less a trade problem and more a capital account problem.” Critically analyse in the context of India's external sector. (250 words)

PadhAI-GENERATED UPSC MCQ

Q. With reference to the depreciation of the Indian rupee, consider the following statements:

1. Volatile portfolio capital flows can cause sudden pressure on the rupee.



2. Capital account transactions adjust more slowly than trade flows.
3. Greater reliance on stable FDI reduces currency volatility.

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

Answer: A

(Statement 2 is incorrect — capital flows adjust **faster** than trade flows.)

4. Seven States Pay More Taxes Than They Receive: Debates on Fiscal Federalism and Tax Devolution

WHY IN THE NEWS?

- Recent data and political debates highlight that **seven Indian states contribute more in central taxes than what they receive through tax devolution.**
- This has revived discussions on **fiscal federalism, equity vs efficiency**, and the Finance Commission's devolution formula.
- Concerns have been raised by economically stronger states regarding **perceived fiscal imbalance.**

BACKGROUND / CONTEXT

- I. India follows a system of **vertical and horizontal fiscal devolution**:
 - ✓ Vertical: Sharing of taxes between Centre and States
 - ✓ Horizontal: Distribution among states

- II. Under **Article 270**, the Finance Commission recommends the share of states in central taxes.
- III. The **15th Finance Commission** fixed states' share at **41%** of the divisible pool.
- IV. Distribution criteria include:
 - ✓ Income distance
 - ✓ Population
 - ✓ Area
 - ✓ Forest cover
 - ✓ Demographic performance
 - ✓ Tax effort
- V. Wealthier states with stronger tax bases often receive less per rupee contributed.

KEY HIGHLIGHTS

1. Who Are the Net Contributor States?

- Typically industrialised and urbanised states with high GST and income tax collections.
- Examples often cited: Maharashtra, Tamil Nadu, Karnataka, Gujarat, Telangana, Haryana, and Delhi (UT).

2. Rationale for Redistribution

- Addresses historical regional imbalances.
- Ensures minimum standards of public services across states.
- Reflects constitutional commitment to **social and economic justice.**

3. Grievances of Contributor States

- Feel penalised for better governance and tax efficiency.



- Argue that population-based criteria disadvantage states with better demographic control.
- Concern over reduced fiscal space for infrastructure and social spending.

4. Counter-Arguments

- Stronger states benefit from a **unified national market**, labour mobility, and central spending.
- Redistribution supports national stability and long-term growth.

5. GST and Fiscal Centralisation

- GST has reduced states' indirect tax autonomy.
- Delays and disputes over compensation have intensified fiscal stress.

6. Role of Finance Commission

- Balances efficiency, equity, and performance incentives.
- Introduced weightage for **tax effort and demographic performance** to address some concerns.

PRELIMS BOOSTER BOX

- **Article 270:** Deals with tax sharing between Centre and States.
- **Finance Commission:** Constitutional body under Article 280.
- **Divisible Pool:** Net proceeds of central taxes shared with states.
- **Horizontal Devolution:** Distribution among states.

- **GST:** Major reform affecting fiscal federalism.

PadhAI PYQ BOOSTER SECTION

Q. (GS2 – Mains)

“Examine the role of the Finance Commission in maintaining fiscal federal balance in India.”

Prelims Theme-Based:

Finance Commission criteria, GST, Centre–State finances.

PadhAI MAINS PRACTICE QUESTION

“The fact that some states pay more taxes than they receive through devolution reflects both the strength and strain of India’s fiscal federalism.” Critically analyse. (250 words)

PadhAI-GENERATED UPSC MCQ

Q. With reference to tax devolution in India, consider the following statements:

1. The Finance Commission recommends the distribution of central taxes between the Centre and States.
2. Income distance is used to promote fiscal equalisation among states.
3. States that collect more taxes are guaranteed higher devolution.

Which of the statements given above is/are correct?

- A. 1 and 2 only
- B. 2 only



- C. 1 and 3 only
- D. 1, 2 and 3

Answer: A

(Statement 3 is incorrect – devolution is based on formula, not contribution alone.)

In the Power Sector, More Players Are the Answer: Rethinking Bailouts and Promoting Competition

5. In the Power Sector, More Players Are the Answer: Rethinking Bailouts and Promoting Competition

WHY IN THE NEWS?

- Recurrent **financial stress of DISCOMs** has revived debates on repeated **government bailouts**.
- Power sector reforms increasingly emphasise **competition, private participation, and market-based mechanisms**.
- Policymakers and experts argue that structural reforms, not fiscal bailouts, are key to sustainable power sector health.

SUMMARY

- India's power sector has long relied on periodic bailouts to address the chronic inefficiencies of electricity distribution companies.
- However, repeated fiscal support has failed to resolve underlying structural issues such as monopoly control, inefficiency, and political interference.
- Greater competition through multiple players, open access, and market reforms offers a more sustainable solution by improving efficiency, accountability, and service quality

while reducing the fiscal burden on governments.

BACKGROUND / CONTEXT

- I. India's power sector underwent reforms under the **Electricity Act, 2003**, which aimed to introduce competition, especially in generation.
- II. While generation has become competitive, **distribution remains a monopoly** in most states.
- III. DISCOM losses stem from:
 - ✓ High AT&C losses
 - ✓ Tariff distortions and cross-subsidies
 - ✓ Delayed subsidy payments by states
- IV. Major bailouts include **UDAY (2015)** and subsequent liquidity infusion schemes.
- V. Despite bailouts, financial stress persists, indicating **moral hazard** and weak accountability.

KEY HIGHLIGHTS

1. Problems with Bailouts

- Encourage inefficiency and fiscal irresponsibility.
- Shift burden to taxpayers without structural correction.
- Create moral hazard by shielding poor governance.

2. Case for More Players

- Competition in distribution can improve billing efficiency and service delivery.



- Private participation introduces professional management and technology adoption.

3. Role of Open Access

- Allows consumers to choose power suppliers.
- Promotes competitive pricing and reduces monopoly power.

4. Market-Based Power Pricing

- Real-time markets and power exchanges improve price discovery.
- Aligns supply-demand signals and reduces losses.

5. Regulatory and Governance Reforms

- Strengthening State Electricity Regulatory Commissions (SERCs).
- Timely tariff revisions and direct subsidy transfers (DBT).

6. Risks and Safeguards

- Risk of cherry-picking profitable consumers by private players.
- Need for universal service obligations and consumer protection.

- **UDAY:** Ujwal DISCOM Assurance Yojana.
- **Open Access:** Consumer choice of power supplier.

PadhAI PYQ BOOSTER SECTION

Q. (GS3 – Mains)

“Discuss the structural issues affecting the power distribution sector in India and suggest reforms.”

PadhAI MAINS PRACTICE QUESTION

“Repeated bailouts of DISCOMs have failed to cure the power sector’s structural inefficiencies.” Examine whether greater competition and multiple distribution players can provide a sustainable solution. (250 words)

PadhAI-GENERATED UPSC MCQ

Q. With reference to reforms in India’s power sector, consider the following statements:

1. Competition in power generation is higher than in power distribution.
2. Repeated DISCOM bailouts can create moral hazard.
3. Open access allows consumers to choose their electricity supplier.

Which of the statements given above are correct?

- A. 1, 2 and 3
- B. 1 and 2 only
- C. 2 only
- D. 1 and 3 only

Answer: A

PRELIMS BOOSTER BOX

- **Electricity Act, 2003:** Legal basis for power sector reforms.
- **DISCOMs:** Electricity distribution companies.
- **AT&C Losses:** Aggregate Technical and Commercial losses.



6. Behind China's \$1-Trillion Trade Surplus: Structural Drivers and Global Implications

WHY IN THE NEWS?

- China has recorded a **trade surplus approaching \$1 trillion**, the highest in its history.
- The surplus persists despite global slowdown, trade tensions, and supply-chain diversification.
- It has intensified debates on **global imbalances, deindustrialisation elsewhere, and currency-trade dynamics**.

SUMMARY

- China's near \$1-trillion trade surplus is driven by a powerful export machine rooted in manufacturing dominance, state-led industrial policy, and weak domestic consumption.
- Even as imports stagnate, exports of machinery, electronics, EVs, and green technologies surge.
- The imbalance reflects structural features of China's growth model and has significant implications for global trade, capital flows, and geopolitical economic relations.

BACKGROUND / CONTEXT

- I. **Trade surplus** occurs when exports exceed imports.
- II. China has followed an **export-led growth model** since the 1990s, anchored in large-scale manufacturing.

- III. Post-pandemic, while many economies boosted consumption-led imports, China faced **property slowdown, household caution, and subdued domestic demand**.
- IV. Simultaneously, China moved up the value chain into **high-tech and green manufacturing**, sustaining export growth even amid global headwinds.

KEY HIGHLIGHTS

1. Manufacturing Overcapacity

- Massive investments in factories and capital goods.
- Production exceeds domestic absorption, pushing exports outward.

2. State-Led Industrial Policy

- Subsidies, cheap credit, land support, and energy pricing.
- Strategic focus on EVs, batteries, solar panels, and semiconductors.

3. Weak Domestic Consumption

- High household savings, real estate stress, and demographic ageing.
- Consumption lags production, limiting import growth.

4. Exchange Rate & Cost Competitiveness

- Managed currency flexibility cushions exporters.
- Scale economies and logistics efficiency keep prices competitive.

5. Global Supply Chain Position



- China remains central to global manufacturing networks despite diversification efforts.
- Intermediate goods exports remain strong.

6. Limited Import Elasticity

- Energy and commodity imports rise, but consumer goods imports remain muted.

PRELIMS BOOSTER BOX

- **Trade Surplus:** Exports > Imports.
- **Export-Led Growth:** Growth driven by external demand.
- **Overcapacity:** Production exceeding domestic demand.
- **Industrial Policy:** State intervention to shape industry structure.
- **China+1:** Supply-chain diversification strategy.

PadhAI PYQ BOOSTER SECTION

Q. (GS3 – Mains)

“Discuss the causes and consequences of persistent trade surpluses and deficits in the global economy.”

PadhAI MAINS PRACTICE QUESTION

“China’s record trade surplus reflects structural imbalances rather than temporary advantages.” Analyse the factors behind China’s export dominance and its implications for the global economy. (250 words)

PadhAI-GENERATED UPSC MCQ

Q. With reference to China’s large trade surplus, consider the following statements:

1. Weak domestic consumption in China contributes to lower import growth.
2. State-led industrial policies have supported export competitiveness.
3. A trade surplus automatically indicates strong household consumption.

Which of the statements given above is/are correct?

- A. 1 and 2 only
- B. 2 only
- C. 1 and 3 only
- D. 1, 2 and 3

Answer: A

(Statement 3 is incorrect — large surpluses often coexist with weak domestic consumption.)

7. Government to Rename MGNREGS as ‘Pujya Bapu Rozgar Yojana’: Symbolism, Policy Continuity and Debate

WHY IN THE NEWS?

- The Government has proposed to **rename MGNREGS as ‘Pujya Bapu Rozgar Yojana’**, invoking Mahatma Gandhi’s legacy.
- The move has triggered debate on **symbolism versus substantive reform** in welfare schemes.
- Concerns and discussions have emerged regarding **federal consensus, legislative process, and scheme continuity**.



SUMMARY

- The proposal to rename the Mahatma Gandhi National Rural Employment Guarantee Scheme (MGNREGS) as 'Pujya Bapu Rozgar Yojana' seeks to reaffirm Gandhian ideals of dignity of labour and rural self-reliance.
- While the scheme's objectives and legal guarantees remain unchanged, the renaming has sparked political and policy debates over symbolism, historical legacy, and the need to prioritise implementation efficiency over nomenclature changes.

BACKGROUND / CONTEXT

- I. MGNREGS was enacted through the **Mahatma Gandhi National Rural Employment Guarantee Act, 2005**.
- II. It provides a **statutory guarantee of 100 days of wage employment** to rural households.
- III. The scheme is demand-driven and aims at **livelihood security, poverty alleviation, and durable asset creation**.
- IV. Named after Mahatma Gandhi, it symbolises **dignity of labour and decentralised development**.
- V. Any renaming requires **legislative changes** to the parent Act.

KEY HIGHLIGHTS

1. Rationale Behind Renaming

- Emphasises Gandhian philosophy of self-reliance and rural empowerment.

- Attempts to reframe the scheme's identity in contemporary governance discourse.

2. Legal and Administrative Aspects

- The scheme is backed by an Act of Parliament; renaming necessitates statutory amendment.
- Operational guidelines, entitlements, and funding structure remain unchanged.

3. Implementation Concerns

- Persistent issues: delayed wage payments, fund constraints, and uneven state performance.
- Critics argue that focus should be on **improving delivery rather than rebranding**.

4. Political and Federal Dimensions

- Naming of centrally sponsored schemes often attracts political contestation.
- States play a critical role in implementation, requiring cooperative federalism.

5. Continuity of Welfare Architecture

- The core rights-based nature of the programme remains intact.
- Renaming does not dilute statutory employment guarantee.

PRELIMS BOOSTER BOX

- **MGNREGA, 2005:** Statutory employment guarantee law.



- **Guarantee:** 100 days of wage employment.
- **Nature:** Demand-driven, rights-based scheme.
- **Funding Pattern:** Centre–State shared (wages largely central).
- **Gandhian Ideal:** Dignity of labour and rural self-reliance.

PadhAI PYQ BOOSTER SECTION

Q. (GS3 – Mains)

“MGNREGS has acted as a social safety net during economic distress. Discuss its role and challenges.”

PadhAI-GENERATED UPSC MCQ

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

1. It is a statutory scheme backed by an Act of Parliament.
2. The scheme guarantees wage employment on a demand-driven basis.
3. Renaming the scheme automatically alters its legal entitlements.

Which of the statements given above is/are correct?

- A. 1 and 2 only
- B. 2 only
- C. 1 and 3 only
- D. 1, 2 and 3

Answer: A

(Statement 3 is incorrect — legal entitlements remain unchanged unless the Act itself is amended.)

8. SEBI Reviews Decades–Old Brokerage Norms to Modernise Securities Market Regulation

WHY IN THE NEWS?

- The **Securities and Exchange Board of India (SEBI)** has initiated a review of **brokerage fee norms**, many of which are outdated and based on legacy market structures.
- The revision seeks to reflect the evolution of markets from **floor-based trading to digital platforms**.
- Aim: strengthen transparency, investor protection, and fair pricing in brokerage services.

SUMMARY

- SEBI is reviewing long-standing brokerage norms to align them with current market practices such as algorithmic trading, online broking, and discount brokerage models.
- The reforms are expected to create uniformity in fee structures, curb hidden charges, and strengthen investor safeguards.
- The change represents a shift towards modernisation, cost rationalisation, and equitable pricing, while supporting competition and innovation across India’s rapidly expanding retail investor base.

BACKGROUND / CONTEXT

- I. Previous norms were framed during the physical/**FLOOR trading** era.
- II. Emergence of **discount brokers, low-fee models, algorithmic trading,**



- **and retail boom** made older rules insufficient.
- III. Rising retail participation (demat accounts crossing historic highs) requires **clear cost regimes**.
- IV. SEBI's review aligns with India's transition to a **technology-driven capital market ecosystem**.

KEY HIGHLIGHTS OF THE REVIEW

1. Fee Structure Modernisation

- Introducing limits and transparency requirements for brokerage components.
- Proposed standardisation of **"all-inclusive pricing"** to avoid hidden levies.

2. Oversight on Digital Brokerages

- Regulation of fee models used in **discount and online app-based brokers**.
- Monitoring of **subscription-based investment platforms**.

3. Algorithmic & High-Frequency Trading

- Fee caps for **algo execution**, ensuring parity with non-algo trading.
- Audit trails for cost attribution.

4. Investor Protection

- Mandatory **pre-trade brokerage disclosure**.
- Grievance redressal escalation mechanisms.

5. Capital Market Ecosystem Impact

- Reduces entry barriers for retail investors.
- Supports financial inclusion via regulated market access costs.

PRELIMS BOOSTER BOX

- **SEBI:** Regulator of capital markets in India.
- **Brokerage:** Fee charged for executing buy/sell orders.
- **Algo Trading:** Automated trading via coded strategies.
- **Discount Broker:** Low-fee digital broker, no advisory services.
- **Investor Protection:** Central mandate of SEBI Act, 1992.

PadhAI PYQ BOOSTER SECTION

"How do regulatory reforms in India's capital markets contribute to improving investor confidence and financial sector stability? Discuss."

PadhAI MAINS PRACTICE QUESTION

"The review of decades-old brokerage norms reflects SEBI's pivot toward a digital-first, investor-centric regulatory framework." Examine. (250 words)

PadhAI-GENERATED UPSC MCQ

Consider the following statements with reference to SEBI's review of brokerage norms:

1. The review aims to update brokerage fee structures designed during the physical trading era.



2. It seeks to improve transparency and prevent hidden charges in brokerage services.
3. The reform prohibits algorithmic trading in Indian markets.

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

(Statement 3 is incorrect – the reform regulates but does not prohibit algo trading.)

9. Sugar Mills Seek Revision of Minimum Selling Price (MSP) to Offset Rising Costs

WHY IN THE NEWS?

- Sugar mills have demanded a **revision of the Minimum Selling Price (MSP)** of sugar.
- Mills argue current MSP is **below production cost**, impacting liquidity and dues to farmers.
- Rising input costs and regulatory restrictions on exports have intensified industry pressure.

SUMMARY

- Sugar mills have sought an upward revision of the Minimum Selling Price of sugar, stating that the existing rate does not cover current production and operational costs.
- The industry claims this weak price regime risks increasing arrears owed to sugarcane farmers and weakening financial health of mills.

- A revised MSP is projected to stabilise the sector, support timely farmer payments, and maintain viability amid fluctuating global and domestic market conditions.

BACKGROUND / CONTEXT

- I. **MSP for sugar** acts as a floor price below which mills cannot sell.
- II. Ensures mills recover costs and pay farmers' dues under the **Fair & Remunerative Price (FRP)** system.
- III. Global market volatility and domestic policy on **ethanol blending & stock limits** influence mill profitability.
- IV. A mismatch between FRP (paid to farmers) and current sugar MSP pressures margins.

KEY HIGHLIGHTS

1. Cost-Revenue Gap

- FRP hikes have increased input cost for mills.
- Current MSP allegedly does not match the cost of **cane + conversion + overheads**.

2. Impact on Farmers

- Delayed payments and accumulating dues.
- Potential backlash in sugar-producing states: UP, Maharashtra, Karnataka.

3. Ethanol Policy Link

- Mills rely on **ethanol revenue** to balance sugar price constraints.
- Ethanol blending programme provides an alternative monetisation pathway.



4. Export Regulation Factor

- Periodic restrictions to manage domestic inflation affect **margins and stock clearance**.
- Domestic saturation without exports raises inventory burden.

5. Need for Long-Term Pricing Framework

- Industry demand for **formula-based MSP** aligned with FRP and market signals.
- Advocates multi-year MSP guidelines for stability.

PRELIMS BOOSTER BOX

- **MSP (Minimum Selling Price):** Floor price for sale of sugar by mills.
- **FRP (Fair & Remunerative Price):** Govt-mandated price paid to farmers for cane.
- **Ethanol Blending Programme:** Diversion of cane for fuel-grade ethanol.
- **Cooperative Sugar Mills:** Major structure in Maharashtra & Karnataka.
- **Market Intervention:** Export controls, buffer stock subsidy, and MSP revision.

PadhAI PYQ BOOSTER SECTION

“How do pricing policies in the sugar sector reflect the challenges of balancing consumer interests, farmer incomes, and industrial viability?”

PadhAI MAINS PRACTICE QUESTION

“Current MSP mechanisms for sugar do not adequately reflect structural changes in input costs and ethanol-linked diversification. Examine the need for revision with respect to financial viability and farmer welfare.” (250 words)

PadhAI-GENERATED UPSC MCQ

Consider the following statements regarding MSP in the sugar sector:

1. The Minimum Selling Price is the price at which sugar mills sell sugar to consumers.
2. FRP is the price mills must pay to farmers for procurement of sugarcane.
3. MSP revisions have direct implications for farmer dues and ethanol market strategy.

Which of the statements given above are correct?

- A. 1 and 2 only
- B. 2 and 3 only
- C. 3 only
- D. 1, 2 and 3

Answer: B

(Statement 1 is incorrect — MSP is the floor price for mills, not the final consumer retail price.)

10.Sabka Bima Sabki Raksha (Insurance Laws Amendment) Bill, 2025: Towards Universal Insurance Coverage

WHY IN THE NEWS?

- The Government introduced the **Sabka Bima Sabki Raksha (Insurance Laws**



Amendment) Bill, 2025 to modernise India's insurance architecture.

- The Bill aims to **increase insurance penetration**, promote innovation, and simplify licensing norms.
- It supports the larger objective of **universal protection and financial resilience** under Viksit Bharat 2047.

SUMMARY

- The Sabka Bima Sabki Raksha (Insurance Laws Amendment) Bill, 2025 proposes changes to existing insurance laws to broaden access, deepen competition, and enhance regulatory flexibility.
- Key reforms include simplified licensing for new players, micro-insurance expansion, capital requirement adjustments, and digital-first compliance.
- The Bill aligns with national strategies to strengthen household resilience, formalise the economy, and improve safety nets via comprehensive insurance inclusion.

BACKGROUND / CONTEXT

- I. India's insurance penetration remains **below global average**, especially in rural and informal sectors.
- II. Rising climate, health, and business risks highlight gaps in **risk-protection architecture**.
- III. Existing norms restrict innovation due to **high capital requirements** and limited product categories.

- IV. The Bill revisits legacy regulations to match India's **growing digital and FinTech ecosystem**.

KEY HIGHLIGHTS OF THE BILL

1. Licensing Reform

- New categories: **Micro-insurers, Regional Insurers, Niche/Digital Insurers**.
- Specialised licences to deepen coverage in **agri, MSME, gig workforce** segments.

2. Capital Requirement Flexibility

- Tiered capital norms replacing one-size-fits-all model.
- Easier entry for smaller and digital-only firms.

3. Micro & Nano Insurance Push

- Regulatory support for **low-premium, high-reach** products.
- Targeting gig workers, migrant labour, small farmers, and women SHGs.

4. Digital Compliance & Transparency

- Digital policy issuance, e-KYC and paperless claim frameworks.
- AI-enabled risk assessment under regulatory oversight.

5. Consumer Protection Strengthened

- Faster claim settlement timelines.
- Penalties for mis-selling and non-transparent contracts.



6. Ease of Doing Business

- Streamlined product approvals and **innovation sandbox** pathways.
- Energy, climate, health, and catastrophe covers are prioritised.

PRELIMS BOOSTER BOX

- **IRDAI:** Insurance sector regulator.
- **Micro-insurance:** Low-cost products for low-income groups.
- **Protection Gap:** Difference between coverage needed vs available.
- **Tiered Capital Norms:** Different capital for different licence categories.
- **Digital Insurer:** Online-only underwriting & servicing model.

PadhAI PYQ BOOSTER SECTION

“Discuss how insurance reforms contribute to financial inclusion, risk protection, and economic stability in India.”

PadhAI MAINS PRACTICE QUESTION

“The Sabka Bima Sabki Raksha Bill, 2025 seeks to democratise insurance by enabling structural and regulatory innovation. Analyse its potential to close India’s protection gap.” (250 words)

PadhAI-GENERATED UPSC MCQ

With reference to the Sabka Bima Sabki Raksha (Insurance Laws Amendment) Bill, 2025, consider the following statements:

1. It introduces specialised licensing categories like micro-insurers and digital insurers.

2. It proposes uniform capital requirements for all insurance companies.
3. It focuses on expanding insurance for informal and gig economy workers.

Which of the statements given above are correct?

- A. 1 and 3 only
- B. 2 and 3 only
- C. 1 only
- D. 1, 2 and 3

Answer: A

(Statement 2 is incorrect – the Bill moves towards **tiered capital norms**.)

11. Securities Markets Code Bill, 2025: A Unified Framework to Modernise India’s Capital Market Regulation

WHY IN THE NEWS?

- The Government introduced the **Securities Markets Code Bill, 2025** to **consolidate and streamline** India’s securities market laws.
- The Bill proposes **merging multiple legislations** into a single integrated code.
- Aim: Strengthen regulatory clarity, reduce compliance burden, and improve investor protection in a rapidly evolving capital market ecosystem.

SUMMARY

- The Securities Markets Code Bill, 2025 seeks to unify various market-related laws into a single legislation, covering securities contracts, depositories, and regulation of intermediaries.



- The Bill enhances SEBI's supervisory architecture, simplifies compliance for market participants, and updates legal provisions to reflect digital trading, algorithmic finance, and cross-border capital flows.
- It aims to create a modern, technology-responsive regulatory ecosystem aligned with India's ambitions of becoming a global investment hub.

BACKGROUND / CONTEXT

- I. India's securities regulation evolved **fragmentedly** over decades.
- II. Digitalisation, algorithmic trading, high-frequency platforms, fintech, and cross-border investment demand a **unified legislative framework**.
- III. Regulatory gaps and overlaps hinder enforcement and dispute resolution.
- IV. Global markets increasingly use **unified codes** for accountability and competitiveness.

KEY HIGHLIGHTS OF THE BILL

1. Consolidated Regulatory Architecture

- Single code for **market infrastructure institutions, intermediaries, and trading systems**.
- Harmonised compliance and reporting standards.

2. SEBI's Strengthened Powers

- Enhanced enforcement tools for fraud, insider trading, and market manipulation.

- Quicker adjudication and penalty implementation systems.

3. Digital & Algorithmic Trading Oversight

- Legal recognition of **AI/Algo-based trading frameworks**.
- Clear audit, disclosure, and accountability norms.

4. Market Infrastructure Reforms

- Unified governance rules for **Stock Exchanges, Clearing Corporations, Depositories**.
- Improved risk management and cyber-resilience norms.

5. Investor-Centric Provisions

- Faster grievance redress through digital ODR systems.
- Simplified norms for retail participation in **government securities & corporate bonds**.
- Improved transparency on fees and product suitability.

PRELIMS BOOSTER BOX

- **SEBI:** Regulator of securities markets.
- **Market Infrastructure Institutions:** Stock Exchanges, CCPs, Depositories.
- **Algo Trading:** Computer-coded trade execution.
- **SC(R)A 1956:** Governs securities contracts.
- **Depositories Act, 1996:** Legal basis for dematerialised securities.



PadhAI PYQ BOOSTER SECTION

“Assess how capital market reforms contribute to financial stability and economic growth. Use recent legislative examples to support your answer.”

PadhAI MAINS PRACTICE QUESTION

“The Securities Markets Code Bill, 2025 aims to simplify regulatory frameworks without compromising investor protection. Critically examine the benefits and potential challenges.” (250 words)

PadhAI-GENERATED UPSC MCQ

Consider the following statements with reference to the Securities Markets Code Bill, 2025:

1. It proposes merging multiple laws, including the SEBI Act and Depositories Act, into a unified code.
2. The Bill grants SEBI wider enforcement powers to regulate algorithmic trading.
3. The Bill eliminates the requirement for market infrastructure institutions to be regulated.

Which of the statements given above are correct?

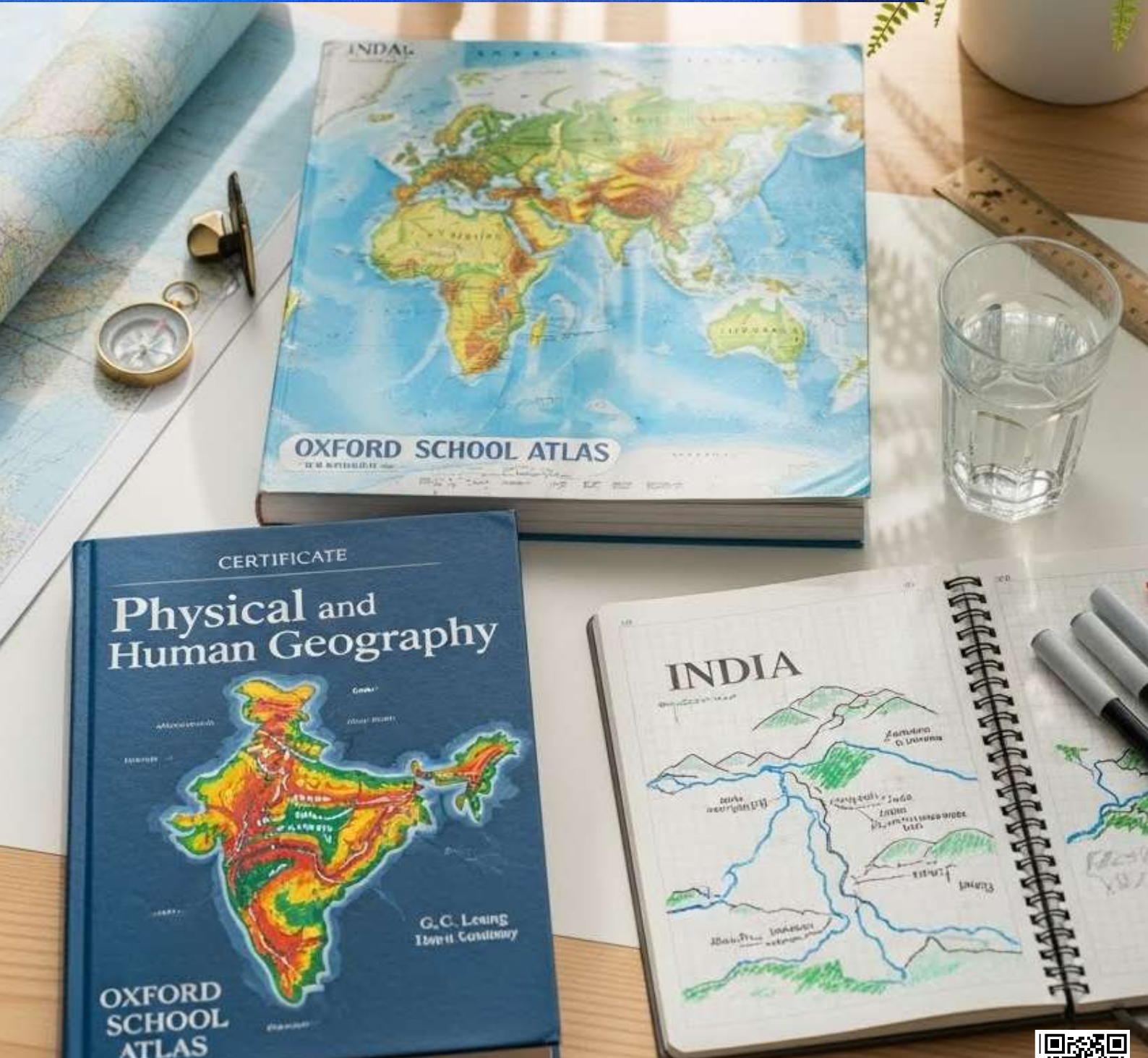
- A. 1 and 2 only
- B. 2 and 3 only
- C. 1 only
- D. 1, 2 and 3

Answer: A

(Statement 3 is incorrect — regulation of MIIs remains central to the code.)



GEOGRAPHY



1. Cyclone Ditwah: Tracking the Arabian Sea Weather System and its Regional Impacts

WHY IN THE NEWS?

- **Cyclone Ditwah**, a severe cyclonic storm forming over the **Arabian Sea**, gained attention due to its rapid intensification and projected movement towards West Asia.
- IMD and global meteorological agencies issued alerts for heavy rainfall, strong winds, and sea roughness along affected maritime zones.
- The cyclone highlights the increasing frequency of **Arabian Sea cyclones** linked to warming ocean temperatures and climate variability.

SUMMARY

- Cyclone Ditwah, a severe cyclonic system over the Arabian Sea, developed under favourable oceanic and atmospheric conditions, including high sea surface temperatures and reduced vertical wind shear.
- Although not expected to make landfall in India, the system affects maritime operations, coastal weather patterns, and fisher advisory protocols.
- It reinforces concerns about rising Arabian Sea cyclogenesis driven by climate change, necessitating improved preparedness and forecasting.

BACKGROUND / CONTEXT

- I. Cyclones in the Arabian Sea have increased in frequency and intensity

- II. due to **higher sea surface temperatures** (1–1.5°C above normal).
- II. Climate models show the Arabian Sea warming faster than other global ocean basins.
- III. Prior notable cyclones: Tauktae (2021), Nisarga (2020), Kyarr & Maha (2019).
- IV. Cyclone Ditwah formed due to:
 - ✓ Warm ocean conditions (>28°C)
 - ✓ Low wind shear
 - ✓ Enhanced moisture inflow
 - ✓ Madden–Julian Oscillation (MJO) influence
- V. Improved satellite-based early-warning systems guide India's disaster preparedness.

KEY HIGHLIGHTS

1. Meteorological Characteristics

- Classified as a severe cyclonic storm.
- Maximum sustained wind speeds crossing 80–100 km/h (as per IMD advisories).
- Spiral cloud bands and central dense overcast formation visible on satellite imagery.

2. Track and Movement

- Moved northwestward over the Arabian Sea toward the Gulf region.
- IMD indicated minimal direct landfall risk for India.
- Potential to influence Oman–Yemen coastal belt.

3. Impact on India

- High waves and rough sea conditions along western coastal states.



- Fishing activities suspended in Kerala, Karnataka, Goa, and Maharashtra.
- Cloudiness and isolated rainfall in coastal belts.

4. Preparedness Measures

- IMD issued orange/yellow alerts for fishermen and maritime agencies.
- Indian Coast Guard sensitised fishing communities.
- Ports advised to pause deep-sea operations.

5. Climate Change Linkages

- Rising sea surface temperatures increasing cyclone intensity.
- More frequent pre- and post-monsoon systems in the Arabian Sea.
- Greater unpredictability in Indian Ocean dynamics.

PRELIMS BOOSTER BOX

- **Cyclogenesis Factors:** Warm SSTs (>27°C), Coriolis force, low wind shear, moisture convergence.
- **IMD Cyclone Categories:** Depression → Deep Depression → Cyclonic Storm → Severe Cyclonic Storm → Very Severe → Extremely Severe → Super Cyclone.
- **Madden–Julian Oscillation (MJO):** Enhances convection and cyclone formation phases.
- **Arabian Sea Warming:** 20–40% rise in cyclone frequency in past two decades.

PYQ BOOSTER SECTION

Q. (UPSC 2020 – Prelims)

“Consider the following pairs regarding tropical cyclones and their regions...” (Theme: cyclone geography)

Q. (UPSC GS3 – Mains)

“Discuss how climate change is influencing cyclonic activity in the Indian Ocean region.”

PadhAI MAINS PRACTICE QUESTION

“Cyclone Dityah underscores the growing trend of rapid cyclogenesis in the Arabian Sea. Discuss the drivers, potential impacts on India, and the measures needed for improved cyclone preparedness.” (250 words)

PadhAI-GENERATED UPSC MCQ

Q. With reference to Cyclone Dityah, consider the following statements:

1. It formed over the Arabian Sea under conditions of high sea surface temperature.
2. It posed a direct landfall threat to the Indian mainland.
3. Fishermen along the western coast were advised to avoid deep-sea ventures.

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



Answer: A

(Statement 2 is incorrect – the cyclone was not projected to make landfall in India.)

2. Protecting the Aravalis: Legal, Ecological, and Governance Measures to Save India's Oldest Mountain System**WHY IN THE NEWS?**

- Concerns over **mining, construction, and encroachments** have intensified ecological degradation in the Aravalis.
- Centre and states are exploring **legislative and policy mechanisms** to strengthen protection frameworks.
- Aravalis are crucial to the **environmental security of North India**, especially NCR.

SUMMARY

- The Aravali Range—India's oldest fold mountain system—acts as a natural barrier against desertification and a key regulator of ecological balance in northern India.
- Protection efforts center on stricter enforcement of mining bans, ecological restoration, afforestation, groundwater recharge, and legal recognition through conservation-focused legislation.
- Coordinated strategies across Centre–State agencies aim to curb land degradation, secure wildlife habitats, and sustain climate resilience for NCR, Haryana, Rajasthan, and Western UP.

BACKGROUND / CONTEXT

- I. Formed **1.8 billion years ago**, among the world's oldest mountain systems.
- II. Aravalis have **significant biodiversity and groundwater recharge capacity**.
- III. Rapid **urbanisation and deforestation** have fragmented ecosystems and hill corridors.
- IV. Recognised as a **natural climate defence** for North India, requiring integrated conservation.

KEY MEASURES**1. Legislative & Policy Framework**

- Notifying Aravalis as **No-Go Zones** for mining and unsanctioned development.
- Introducing a dedicated law: **Aravali Conservation & Protection Act**.
- Integrating Aravali protection mandates in **urban planning & zoning laws**.

2. Strict Mining Regulation

- Zero-tolerance enforcement of mining bans in sensitive areas.
- Drone-based surveillance and geo-fencing of mining blocks.
- Real-time environmental compliance dashboard for states.

3. Ecological Restoration

- Mass afforestation with **native species** (dhok, salar, khair).
- Rewilding corridors to restore **wildlife connectivity**.
- Soil regeneration and micro-catchment water harvesting.



4. Groundwater & Hydrology Management

- Recharge zones declared **ecologically protected spaces**.
- Banning borewells in ecologically sensitive blocks.
- Construction of check dams, johads, bunds.

5. Governance Reforms

- Establishing a **National Aravali Management Authority**.
- Cross-state coordination (Delhi–Haryana–Rajasthan–Gujarat).
- Accountability provisions for **illegal construction**.

6. Community & Citizen Participation

- Eco-tourism, Van Panchayats, and co-managed forest governance.
- Local livelihood integration: nursery development, eco-restoration jobs.
- Citizen reporting app for illegal activities detection.

PRELIMS BOOSTER BOX

- **Aravali Range:** Formed during Precambrian era.
- **Key Passes:** Khetri, Delwara.
- **Highest Peak:** Guru Shikhar (1722 m, Rajasthan).
- **Major Rivers Originating:** Banas, Sahibi, Luni tributaries.
- **Key Law Touchpoints:** Forest Conservation Act, Environment Protection Act, Wildlife Protection Act.

PadhAI PYQ BOOSTER SECTION

“How does the degradation of the Aravali range impact climate resilience, water security, and air quality in North India? Discuss.”

PadhAI MAINS PRACTICE QUESTION

“The Aravalis are not merely geographical formations but an ecological shield for North India. Evaluate the need for a dedicated legal and institutional framework for their protection.” (250 words)

PadhAI-GENERATED UPSC MCQ

Consider the following statements:

1. The Aravali Range acts as a natural barrier preventing the westward spread of the Thar Desert.
2. Illegal mining and unregulated urbanisation are major threats to the Aravalis.
3. The highest peak of the Aravali Range lies in Haryana.

Which of the statements given above are correct?

- A. 1 and 2 only
- B. 2 and 3 only
- C. 1 and 3 only
- D. 1, 2 and 3

Answer: A

(Statement 3 is incorrect — the highest peak is **Guru Shikhar in Rajasthan**.)

3.Pamir Ice Cores Offer Clues to Rapid Glacier Loss in High Asia

WHY IN THE NEWS?



- Scientists studying **ice cores from the Pamir Mountains** have identified patterns that may explain **accelerated glacier loss** in High Asia.
- The findings link glacier decline to **atmospheric warming, aerosol deposition, and shifts in monsoon-westerly interactions**.
- The results are significant for **water security in Central and South Asia**, including India's Himalayan basins.

SUMMARY

- Research on Pamir ice cores indicates that recent glacier mass loss may be driven by a combination of rising temperatures, changing precipitation regimes, and pollutants trapped in snow layers.
- The changing balance between westerlies and monsoon systems, combined with soot and dust deposition, is accelerating melt rates.
- These scientific insights are crucial for predicting glacier futures in High Asia and assessing long-term impacts on rivers feeding India and neighbouring regions.

BACKGROUND / CONTEXT

- I. The **Pamir-Karakoram-Himalaya** arc forms one of the world's largest **freshwater storehouses outside the poles**.
- II. Ice cores preserve climate history in **trapped air bubbles and layered snow**, functioning like "climate archives."

- III. Earlier models underestimated melt in High Asia due to **limited long-term datasets**.
- IV. New findings help explain **regional differences** in glacier behaviour (e.g., paradox of stability in parts of Karakoram vs rapid decline elsewhere).

KEY HIGHLIGHTS

1. Climate Signal in Ice Layers

- Thick layers from colder periods thinning rapidly in modern samples.
- Chemical signatures reflect **industrial-era pollution and atmospheric soot**.

2. Aerosol & Black Carbon Impact

- Black carbon reduces reflectivity → **lower albedo** → **faster melt**.
- Seasonal dust storms from Central Asia accelerate warming.

3. Monsoon–Westerly Interaction Shift

- Core evidence suggests **weaker westerlies**, altering snowfall cycles.
- Combined with changing monsoon patterns → **less glacier recharge**.

4. Cryosphere Security

- Faster melting → **early season floods + late season water scarcity**.
- Direct implications for **India's river systems**, including Indus & Ganga headwaters.

5. Long-term Projections



- Stable water supply windows are shrinking by **multiple weeks per year**.
- Increased risk of **outburst floods (GLOFs)**.

PRELIMS BOOSTER BOX

- **Ice Core:** Cylindrical sample of ice as climate record.
- **Albedo:** Reflective power of a surface; lower albedo accelerates warming.
- **GLOF:** Glacier Lake Outburst Flood.
- **Westerlies:** Wind systems dominating mid-latitudes, affecting snow input in High Asia.
- **Third Pole:** Cryosphere of Himalaya-Karakoram-Tibetan Plateau, world's third-largest ice reserve.

PadhAI PYQ BOOSTER SECTION

“Explain how changes in cryospheric systems influence river regimes and socio-economic stability in South Asia.”

PadhAI MAINS PRACTICE QUESTION

“Recent Pamir ice core findings reveal that glacier melt in High Asia is driven by more than just temperature increase. Analyse the atmospheric and anthropogenic factors responsible and their implications for India.” (250 words)

PadhAI-GENERATED UPSC MCQ

With reference to the Pamir ice core findings, consider the following statements:

1. Ice cores are used to reconstruct historical climate and pollution trends.

2. Soot and aerosol deposition increase glacier albedo, slowing melt rates.
3. Changes in westerly winds and monsoon balance can affect glacier recharge.

Which of the statements given above are correct?

- A. 1 and 3 only
- B. 2 only
- C. 1 and 2 only
- D. 1, 2 and 3

Answer: A

(Statement 2 is incorrect – soot lowers albedo and accelerates melting.)



ENVIRONMENT & ECOLOGY



1. Water Management and Conservation in India: Strategies, Challenges & Policy Interventions

WHY IN THE NEWS?

- The Union Government recently reviewed national water security measures amid rising water stress in multiple states.
- New initiatives under **Jal Shakti Abhiyan 2024**, **Atal Bhujal Yojana**, and **PM Krishi Sinchayee Yojana** were launched or expanded.
- Reports from NITI Aayog and the CGWB highlighted critical groundwater depletion in Punjab, Haryana, Rajasthan, and parts of Karnataka.

SUMMARY

- Water management and conservation are central to India's environmental and development agenda due to rising demand, erratic rainfall, groundwater depletion, and climate-induced water scarcity.
- The government is implementing multi-dimensional strategies including watershed development, aquifer recharge, smart irrigation, river rejuvenation, community-led conservation, and digital water monitoring.
- These initiatives aim to enhance water security, improve agricultural efficiency, reduce drought vulnerability, and ensure sustainable utilisation of India's freshwater resources.

BACKGROUND / CONTEXT

- I. India has **18% of the world's population** but only **4% of global freshwater resources**.
- II. NITI Aayog's **Composite Water Management Index (CWMI)** warns that 21 major cities may run out of groundwater soon.
- III. Over 60% of India's irrigation and 85% of rural drinking water supply come from groundwater.
- IV. Climate change, unsustainable agricultural practices, and rapid urbanisation have intensified water stress.
- V. Water management now integrates **technology, community participation, river basin planning, and nature-based solutions**.

KEY HIGHLIGHTS

1. Groundwater Management

- **Atal Bhujal Yojana (ABHY):** Community-led groundwater budgeting, aquifer mapping, water security plans.
- **Aquifer mapping by CGWB:** Covers >90% of India's geographical area.
- Mandatory groundwater recharge systems in urban construction.

2. Surface Water Conservation

- **Jal Shakti Abhiyan:** Rainwater harvesting, check dams, desilting, watershed rejuvenation.
- **PMKSY-Har Khet Ko Pani:** Canal restoration, micro-irrigation expansion.
- Revival of traditional water bodies – tanks, baolis, johads, kunds.



3. Irrigation Efficiency & Agriculture

- **Micro-irrigation (drip & sprinkler):** Enhances efficiency up to 70–90%.
- **Per Drop More Crop:** Encourages water-efficient crops and precision farming.
- Crop diversification from water-intensive sugarcane & paddy to millets, pulses, oilseeds.

4. Urban Water Management

- **AMRUT 2.0:** 100% coverage of water supply & sewerage.
- Smart metering, leakage detection, treated wastewater reuse.
- Stormwater harvesting in Smart Cities.

5. River Rejuvenation

- **Namami Gange:** River ecological flow (e-flow), STPs, wetlands, afforestation.
- State-level river rejuvenation missions (e.g., Narmada, Cauvery, Yamuna).

6. Community & Traditional Systems

- Jal Gram Panchayats, Water User Associations.
- Traditional techniques: Ahar–Pyne (Bihar), Khadin (Rajasthan), Kattas (Karnataka).
- MGNREGA-led watershed work in drought-prone districts.

7. Technology & Innovation

- Remote-sensing-based groundwater monitoring.
- IoT sensors for irrigation scheduling.
- Mobile apps for rainfall prediction and water budgeting.

- Wastewater treatment & reuse technologies.

PRELIMS BOOSTER BOX

- **Atal Bhujal Yojana:** World Bank-assisted groundwater project
- **Jal Shakti Abhiyan:** Time-bound water conservation campaign
- **PMKSY:** Har Khet Ko Pani + Per Drop More Crop
- **CWMI:** Composite Water Management Index by NITI Aayog
- **Namami Gange:** Integrated Ganga conservation project
- **Important Terms:** Aquifer, Percolation tank, Micro-irrigation, E-flow, Greywater reuse

PadhAI PYQ BOOSTER SECTION

Q. (UPSC 2020 – GS3 Mains)

“India’s water crisis is a governance problem as much as it is an environmental challenge.” Discuss.

Q. (UPSC Prelims – Various Years)

Questions on PMKSY, groundwater, watershed management, rainwater harvesting.

PadhAI MAINS PRACTICE QUESTION

“Efficient water management and conservation are essential for addressing India’s growing water scarcity.” Examine key government interventions and evaluate their effectiveness. (250 words)

PadhAI-GENERATED UPSC MCQ



Q. With reference to water management and conservation initiatives in India, consider the following statements:

1. Atal Bhujal Yojana focuses on community-led groundwater management.
2. Micro-irrigation under PMKSY improves water-use efficiency up to 80–90%.
3. The Jal Shakti Abhiyan is implemented only in urban areas.

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

(Statement 3 is incorrect — JSA is for both rural and urban water-stressed areas.)

2. Framework for the Carbon Credit Trading Scheme (CCTS): India's Market-Based Pathway to Decarbonisation

WHY IN THE NEWS?

- The Ministry of Power and the Bureau of Energy Efficiency (BEE) recently notified the **operational framework for the Carbon Credit Trading Scheme (CCTS)**.
- India launched regulatory guidelines to implement a **domestic carbon market (DCM)** for industries, power plants, and large energy consumers.
- The scheme is central to India's 2070 net-zero roadmap and aligns with global carbon pricing mechanisms.

SUMMARY

- The Carbon Credit Trading Scheme (CCTS) provides a market-based mechanism for reducing greenhouse gas emissions by allowing obligated entities to trade carbon credits generated through verified emission reductions.
- Implemented by the Bureau of Energy Efficiency, CCTS will function in phases—starting with a compliance carbon market and eventually linking to voluntary markets. The framework introduces sectoral baselines, monitoring protocols, trading registries, and regulatory oversight to accelerate India's low-carbon transition.

BACKGROUND / CONTEXT

- I. India announced during COP26 the goal of **net-zero emissions by 2070**.
- II. Existing mechanisms like the **PAT Scheme** created energy savings certificates but were sector-limited.
- III. The CCTS expands beyond industrial energy efficiency into a **full-fledged carbon credit market**.
- IV. The **Energy Conservation (Amendment) Act, 2022** legally empowered the government to establish a carbon market.
- V. Carbon markets globally (EU ETS, US RGGI, China ETS) show market pricing drives cost-effective emission reductions.

KEY HIGHLIGHTS



1. Two-Part Market Structure

1. **Compliance Carbon Market (CCM)**
 - Mandatory participation for identified sectors
 - Carbon credit obligations based on sectoral baselines
2. **Voluntary Carbon Market (VCM)**
 - Voluntary participation by private entities
 - Carbon credits for green initiatives like afforestation, renewable energy, waste-to-energy

2. Role of Key Institutions

- **BEE (Market Regulator):** Sets baselines, issues credits, certifies reductions
- **Grid Controller of India:** Registry & transaction platform
- **Central Electricity Regulatory Commission (CERC):** Regulates carbon trading

3. Sector Coverage

Initially planned for:

- Power generation
- Steel
- Cement
- Fertilisers
- Pulp & paper
- Textile
- Oil & gas
- Transport & buildings (later phases)

4. Carbon Credit Mechanism

- Baseline emissions assigned to each entity
- Entities reducing emissions below baseline generate **Carbon Reduction Units (CRUs)**
- Entities exceeding limits must **purchase credits** from the market
- Credits recorded in a national registry

5. Monitoring, Reporting & Verification (MRV)

- Third-party accredited verifiers
- Digital MRV system for transparency
- Penalties for non-compliance

6. Phased Implementation

1. **Phase I:** Registry creation, pilot sectors
2. **Phase II:** Obligatory trading for selected industries
3. **Phase III:** Integration with global carbon markets

PRELIMS BOOSTER BOX

- **Carbon Credit:** Certificate for reducing 1 tonne of CO₂ equivalent
- **CRU:** Carbon Reduction Unit under CCTS
- **BEE:** Nodal agency for carbon market regulation
- **Energy Conservation Act 2022:** Legal basis for carbon markets
- **PAT Scheme:** Precursor to CCTS
- **ETS:** Emission Trading System (global model: EU ETS)

PadhAI PYQ BOOSTER SECTION



Q. (UPSC 2020 – Prelims)

“Consider the following statements regarding carbon markets...” (Theme alignment with CCTS)

Q. (UPSC GS3 – Mains)

“Market-based instruments such as carbon trading can play a crucial role in India’s climate strategy.” Discuss.

PadhAI MAINS PRACTICE QUESTION

“The Carbon Credit Trading Scheme (CCTS) represents a shift from prescriptive regulation to market-driven climate governance.” Critically evaluate the framework and its implementation challenges. (250 words)

PadhAI-GENERATED UPSC MCQ

Q. With reference to India’s Carbon Credit Trading Scheme (CCTS), consider the following statements:

1. The scheme creates a compliance-based domestic carbon market regulated by the Bureau of Energy Efficiency.
2. Carbon credits under CCTS can only be generated by renewable energy projects.
3. The Energy Conservation (Amendment) Act, 2022 provides the legal basis for establishing India’s carbon market.

Which of the statements given above is/are correct?

- A. 1 and 3 only
- B. 2 and 3 only
- C. 1 only
- D. 1, 2 and 3

Answer: A

(Statement 2 is incorrect – credits can be generated by any verified emission-reducing activity.)

3. India Launches R&D Roadmap for Carbon Capture, Utilisation & Storage (CCUS) to Accelerate Net-Zero Transition**WHY IN THE NEWS?**

- The Government of India launched a comprehensive **R&D Roadmap on Carbon Capture, Utilisation and Storage (CCUS)** to support India’s **Net Zero 2070** commitment.
- The roadmap outlines priority research areas, pilot projects, and industry–research collaborations needed to commercialise CCUS technologies.
- It was prepared with inputs from national laboratories, academia, energy-intensive industries, and international experts.

SUMMARY

- India has unveiled an R&D Roadmap for Carbon Capture, Utilisation and Storage (CCUS) to enable large-scale deployment of CO₂ mitigation technologies across power, steel, cement, chemicals, and refineries.
- The roadmap aims to advance indigenous capability in CO₂ capture, transport, conversion, and geological storage.



- By reducing industrial emissions and facilitating carbon circularity, the roadmap is central to achieving India's Net Zero targets and strengthening clean energy innovation.

BACKGROUND / CONTEXT

- I. CCUS is recognised globally as a **critical mitigation tool** for hard-to-abate sectors like steel, cement, and chemicals.
- II. India's **Net Zero by 2070** pathway requires solutions beyond renewable energy and efficiency measures.
- III. Heavy industries contribute a significant share of India's CO₂ emissions; thus, CCUS deployment is essential for deep decarbonisation.
- IV. Mission Innovation and global initiatives (IEA, IPCC) emphasise the need for large-scale CCUS R&D for emerging economies.
- V. India's roadmap aims to reduce cost barriers, build domestic technological capacity, and integrate CCUS with carbon markets.

KEY HIGHLIGHTS

1. Priority Research Areas

- Low-cost CO₂ capture solvents, membranes, sorbents
- Biomass-based negative emissions technologies
- CO₂ mineralisation, conversion to fuels & chemicals
- Long-term geological storage (saline aquifers, depleted oil fields)

- Carbon capture integrated with hydrogen and ammonia plants

2. Pilot & Demonstration Projects

- Pilot-scale capture units at thermal power plants
- CCUS demonstrations in steel and cement clusters
- CO₂-to-methanol and synthetic fuel pilot projects
- Partnerships with ONGC, NTPC, IndianOil, and private sector companies

3. Enabling Infrastructure

- Framework for **CO₂ transport networks** (pipelines, shipping).
- Mapping of sedimentary basins for geological storage.
- National CO₂ utilisation and storage database.

4. Policy & Regulation

- Harmonisation with the **Carbon Credit Trading Scheme (CCTS)**.
- Safety and liability protocols for geological storage.
- Standards for CO₂ purity, monitoring, and verification.

5. Industry–Academia Collaboration

- Joint R&D with CSIR labs, IISc, IITs, and energy industries.
- Knowledge-sharing with international CCUS hubs (USA, Norway, Australia).

PRELIMS BOOSTER BOX



- **CCUS:** Capturing CO₂ → transporting → storing or converting into useful products.
- **Hard-to-abate sectors:** Steel, cement, fertiliser, chemicals.
- **Geological Storage:** Saline aquifers, basalt formations, depleted oil/gas fields.
- **IEA Estimate:** CCUS accounts for 15–20% of global emissions reductions needed by 2050.
- **Negative Emissions:** Bioenergy with CCS (BECCS), direct air capture.

PadhAI PYQ BOOSTER SECTION

Q. (UPSC GS3 – 2021 Mains)

“Discuss the role of Carbon Capture and Storage (CCS) technologies in climate change mitigation.”

Q. (UPSC Prelims – Theme-Based)

Questions on CCS, climate technologies, IPCC mitigation strategies.

PadhAI MAINS PRACTICE QUESTION

“India’s R&D Roadmap for CCUS marks a major institutional step toward decarbonising heavy industries. Discuss the challenges and opportunities associated with scaling CCUS technologies in India.”
(250 words)

PadhAI-GENERATED UPSC MCQ

Q. With reference to India’s CCUS R&D Roadmap, consider the following statements:

1. CCUS technologies are particularly important for decarbonising hard-to-abate industrial sectors.
2. Geological storage of CO₂ involves injecting carbon dioxide into deep underground **formations**.
3. **The roadmap eliminates the need for renewable energy expansion.**

Which of the statements given above is/are correct?

- A. 1 and 2 only
- B. 2 only
- C. 1 and 3 only
- D. 1, 2 and 3

Answer: A

(Statement 3 is incorrect – CCUS complements, but does not replace, renewable energy expansion.)

4. Man–Animal Conflict Poses Escalating Threat to India’s Wildlife Conservation Efforts

WHY IN THE NEWS?

- Rising incidents of **man–animal conflict** across states such as Assam, Odisha, Karnataka, Kerala, Uttarakhand, and Maharashtra have intensified concerns over wildlife safety and human livelihoods.
- Recent cases involving elephants, tigers, and leopards have resulted in



human casualties, crop damage, and retaliatory killings of wildlife.

- Conservationists highlight habitat loss, climate stress, and fragmentation as key drivers behind increasing conflict.

SUMMARY

- India is experiencing a surge in man–animal conflict as expanding human settlements, agricultural intensification, and shrinking habitats force wildlife into closer contact with people.
- Elephants, big cats, and herbivores frequently enter human–dominated landscapes, leading to loss of lives, property damage, and threats to endangered species.
- Government agencies and conservation groups are initiating mitigation strategies such as habitat restoration, early–warning systems, and community–based conflict management to protect both people and wildlife.

BACKGROUND / CONTEXT

- I. India hosts **~8% of global biodiversity** but also has one of the world’s highest population densities, creating significant overlap between humans and wildlife.
- II. Forest loss due to infrastructure, mining, linear projects, and agriculture forces animals to leave their habitats.
- III. Climate change alters migration routes—for example:
 - ✓ Drought pushing elephants into farmlands

✓ Rising temperatures affecting tiger prey base

- IV. Wildlife corridors have become increasingly fragmented, reducing safe animal movement.
- V. Retaliatory killings and human distress have become a major conservation and livelihood challenge.

KEY HIGHLIGHTS

1. Key Species–Specific Conflict Patterns

- **Elephants:** Crop raids, property damage, accidental electrocution, train collisions.
- **Tigers & Leopards:** Attacks on livestock and occasional human encounters in buffer villages.
- **Herbivores:** Crop depredation by deer, nilgai, wild boar leading to farmer distress.

2. Ecological Drivers

- Fragmented habitats and degraded corridors (e.g., Elephant Reserves).
- Shrinking prey availability forcing big cats toward livestock.
- Climate variability driving animals beyond traditional ranges.

3. Socio–Economic Drivers

- Expansion of agriculture and rubber, tea, and coffee plantations.
- Unplanned urban growth near protected areas.



- Lack of compensation or delayed payments causing hostility toward conservation.

4. Government Initiatives

- **Project Elephant:** Mitigation measures (fencing, trenches, corridor protection).
- **Project Tiger:** Buffer zone management and prey restoration.
- **CAMPA Funds:** Afforestation and habitat improvement.
- **Haathi Mitra & Village Vigilance Committees:** Community-based conflict reduction.

5. Technological Solutions

- Early-warning systems using drones, CCTVs, thermal cameras.
- SMS alerts and mobile apps for community preparedness.
- Solar-powered fences and bio-fencing (chilli, lemongrass strips).

6. Landscape-Level Solutions

- Securing wildlife corridors (Elephant Corridors, Nilgiri Landscape).
- Eco-sensitive zone (ESZ) management.
- Incentives for coexistence and compensation for victims.

PRELIMS BOOSTER BOX

- **Project Elephant (1992):** Elephant conservation & conflict mitigation.
- **Project Tiger (1973):** Landscape-based tiger protection.

- **Eco-Sensitive Zones (ESZ):** Buffer areas around PAs to minimise conflict.
- **Legal Framework:** Wildlife Protection Act 1972 (amended 2022).
- **Animal Corridors:** Safe passage routes linking fragmented habitats.
- Major Elephant Corridors: Kaziranga–Karbi Anglong, Nilgiri Corridor, East–Central India Corridors.

PadhAI PYQ BOOSTER SECTION

Q. (UPSC GS3 – Mains 2020)

“Human–animal conflicts are increasing in India. Discuss causes, impacts, and mitigation strategies.”

Q. (UPSC Prelims – Repeated Themes)

Questions on elephant reserves, tiger reserves, corridors, and conservation schemes.

PadhAI MAINS PRACTICE QUESTION

“Man–animal conflict has emerged as one of India’s most pressing conservation and socio-economic challenges.” Examine the ecological and human drivers of rising conflict and suggest long-term mitigation strategies. (250 words)

PadhAI-GENERATED UPSC MCQ

Q. With reference to rising man–animal conflicts in India, consider the following statements:

1. Habitat fragmentation is a major factor pushing wildlife into human settlements.
2. Climate change has no significant role in altering animal movement patterns.



3. Project Elephant aims to mitigate human–elephant conflict.

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

Answer: A

(Statement 2 is incorrect – climate change significantly influences animal behaviour and migration.)

5.Cheetah Cub Dies After Wild Release: Concerns Rise Over India’s Cheetah Reintroduction Programme



WHY IN THE NEWS?

- A **cheetah cub born in Kuno National Park** died shortly after being released into the wild, raising fresh concerns about the survival prospects of reintroduced cheetahs.
- The incident reignited debate over habitat suitability, prey base adequacy, and stress-related vulnerabilities.
- Forest officials and wildlife biologists are reviewing management protocols

under the **Project Cheetah** programme.

SUMMARY

- A cheetah cub born under India’s cheetah reintroduction project died soon after its transition into the wild, highlighting biological, ecological, and climatic challenges in Kuno National Park.
- The mortality adds to concerns about stress, territorial conflict, disease vulnerability, and habitat limitations.
- While cheetah births under the project indicate successful breeding, survival rates remain a concern.
- Authorities are reassessing monitoring strategies, habitat expansion plans, and veterinary protocols.

BACKGROUND / CONTEXT

- I. India’s **Project Cheetah** began with the translocation of cheetahs from Namibia and South Africa to reintroduce the species after its extinction in 1952.
- II. Kuno National Park was selected for its grassland habitat and low human disturbance, but experts have flagged:
 - ✓ Limited carrying capacity
 - ✓ High temperatures
 - ✓ Competition with leopards
- III. While births in the wild demonstrate adaptation, cub survival is naturally low in cheetahs (often <30% even in Africa).
- IV. Mortality cases highlight the need for long-term ecological suitability evaluation.



KEY HIGHLIGHTS

1. Cause of Death

- Preliminary assessments suggest:
 - **Malnutrition linked to heat stress**, or
 - **Weak post-release adaptation**, or
 - **Predation risk**
- Detailed necropsy awaited to confirm.

2. Wild Release Challenges

- Cubs born in captivity or enclosures face difficulties transitioning to free-ranging life.
- Limited training for hunting skills increases vulnerability.

3. Habitat Suitability Concerns

- Kuno's **prey base** (chital, sambar, wild boar) may be insufficient for sustaining large cheetah populations.
- Presence of **leopards** poses predation risk for cubs.
- Lack of continuous grassland corridors restricts free movement.

4. Climate and Stress Factors

- Extreme summer temperatures (45°C+) can severely affect cheetah physiology.
- Stress from radio-collaring, monitoring, and human presence can weaken immunity.

5. Management Response

- Increased monitoring of surviving cubs and adult females.
- Veterinary check-ups and enhanced hydration support during heatwaves.
- Review of release protocols and consideration of additional habitats (Gandhi Sagar, Mukundra Hills).

PRELIMS BOOSTER BOX

- **Project Cheetah:** Launched in 2022 to reintroduce cheetahs into India.
- **Cheetah Status:** Extinct in India since 1952; vulnerable globally (IUCN).
- **Kuno National Park:** Dry deciduous forest with grassland patches; Madhya Pradesh.
- **Carrying Capacity:** Estimated 20–25 cheetahs in Kuno; experts say even lower.
- **Predation Risk:** Leopards and hyenas can prey on cheetah cubs.
- **Natural Mortality:** Cheetah cub mortality is high globally due to predation and malnutrition.

PadhAI PYQ BOOSTER SECTION

Q. (UPSC Prelims 2023)

“Project Cheetah is sometimes mentioned in the context of which of the following?”
(Theme: species reintroduction)

Q. (UPSC GS3 – Mains)

“Discuss the challenges and benefits of species reintroduction projects in India.”

PadhAI MAINS PRACTICE QUESTION

“The death of a cheetah cub after wild release highlights ecological and



managerial challenges in India’s cheetah reintroduction programme.” Analyse the issues and suggest measures to strengthen conservation outcomes. (250 words)

PadhAI-GENERATED UPSC MCQ

Q. With reference to cheetah reintroduction in India, consider the following statements:

1. Cheetah cub mortality is naturally high due to predation and nutritional stress.
2. Kuno National Park has been criticised for its limited prey base and high predator density.
3. Cheetahs were reintroduced in India from Southeast Asia.

Which of the statements given above is/are correct?

- A. 1 and 2 only
- B. 1 only
- C. 2 and 3 only
- D. 1, 2 and 3

Answer: A

(Statement 3 is incorrect – cheetahs were reintroduced from Africa.)

6. Air Pollution: India’s Top Health Threat

WHY IN THE NEWS?

- Recent health assessments rank **air pollution as the leading environmental health risk in India.**
- Rising incidences of **respiratory, cardiovascular, and metabolic diseases** are linked to poor air quality.
- Persistent non-attainment of **National Ambient Air Quality Standards**

(NAAQS) across major cities has renewed policy focus.

SUMMARY

- Air pollution has emerged as India’s most severe public health threat, contributing significantly to premature mortality and disease burden.
- Exposure to fine particulate matter (PM2.5) affects both urban and rural populations through transport emissions, industrial activity, biomass burning, and household fuels.
- Despite regulatory frameworks and action plans, structural sources and governance gaps persist, demanding coordinated, multi-sectoral interventions to safeguard public health.

BACKGROUND / CONTEXT

- **Air pollution** consists of harmful substances including particulate matter (PM2.5, PM10), NO₂, SO₂, ozone, and carbon monoxide.
- India accounts for a significant share of **global air pollution-related deaths.**
- Rural pollution is driven largely by **household solid fuel use**, while urban pollution stems from vehicles, industry, and construction.
- Air pollution has been judicially recognised as a violation of the **Right to Life (Article 21).**
- Climate change and air pollution are interlinked through fossil fuel combustion.



KEY HIGHLIGHTS

1. Health Impacts

- Increased risk of asthma, COPD, lung cancer, heart disease, and stroke.
- Adverse effects on children's cognitive development and birth outcomes.

2. Economic Costs

- Productivity losses, higher healthcare expenditure, and reduced labour participation.
- Long-term drag on economic growth.

3. Major Pollution Sources

- Transport emissions and aging vehicle fleet.
- Coal-based power generation and industrial clusters.
- Crop residue burning and household biomass use.

4. Policy and Regulatory Response

- **National Clean Air Programme (NCAP)** targets reduction in PM levels.
- **Graded Response Action Plan (GRAP)** for emergency measures in NCR.
- Promotion of clean fuels, EVs, and BS-VI emission norms.

5. Implementation Gaps

- Weak enforcement and inter-agency coordination.
- Limited air quality monitoring in smaller cities and rural areas.
- Behavioural and socio-economic constraints.

PRELIMS BOOSTER BOX

- **PM2.5:** Fine particles ≤ 2.5 microns, most harmful.
- **NAAQS:** National Ambient Air Quality Standards.
- **NCAP:** National Clean Air Programme.
- **GRAP:** Emergency pollution control framework.
- **Article 21:** Right to life includes a clean environment.

PadhAI PYQ BOOSTER SECTION

Q. (GS3 – Mains)

“Discuss the health and economic impacts of air pollution in India and evaluate the effectiveness of current policy responses.”

PadhAI MAINS PRACTICE QUESTION

“Air pollution is no longer an environmental issue alone but India’s foremost public health challenge.” Analyse the causes, impacts, and policy measures required to address it. (250 words)

PadhAI-GENERATED UPSC MCQ

Q. With reference to air pollution in India, consider the following statements:

1. PM2.5 poses greater health risks than PM10 due to deeper lung penetration.
2. Air pollution affects only urban populations in India.
3. The National Clean Air Programme aims to reduce particulate pollution.



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

Answer: A

(Statement 2 is incorrect – rural populations are significantly affected due to biomass burning.)

7. Are Methane Emissions in India Being Missed? Gaps in Measurement and Climate Implications

WHY IN THE NEWS?

- Recent analyses and satellite observations suggest **India's methane (CH₄) emissions may be underestimated** in official inventories.
- Methane is a **short-lived but highly potent greenhouse gas**, making accurate accounting critical for near-term climate action.
- The issue has implications for **India's NDCs, climate credibility, and mitigation strategies**.

SUMMARY

- Concerns are growing that India's methane emissions are being under-captured due to limitations in measurement methods and sectoral data gaps.
- As methane has a much higher warming potential than CO₂ in the short term, inaccurate estimates can weaken climate policy effectiveness.

- Major sources such as livestock, rice cultivation, waste, and fossil fuels pose monitoring challenges, necessitating improved measurement, reporting, and verification mechanisms.

BACKGROUND / CONTEXT

- I. Methane is the **second-largest contributor** to anthropogenic global warming after CO₂.
- II. India reports methane emissions through **national GHG inventories** submitted under the Paris Agreement.
- III. Estimation largely relies on **bottom-up approaches** using activity data and default emission factors.
- IV. **Top-down satellite measurements** sometimes show higher emissions than official estimates.
- V. Accurate methane data is essential for **short-term climate mitigation** and air-quality co-benefits.

KEY HIGHLIGHTS

1. Sectoral Under-Reporting Risks

- Livestock emissions depend on region-specific feeding practices not fully reflected in generic factors.
- Rice cultivation methods vary widely, affecting methane output.

2. Waste Sector Blind Spots

- Informal landfills and wastewater systems lack systematic monitoring.
- Rapid urbanisation worsens data gaps.

3. Fossil Fuel Emissions



- Coal mines and gas pipelines may leak methane episodically, escaping routine accounting.

4. Methodological Issues

- Over-reliance on default IPCC emission factors.
- Limited integration of satellite and ground-based observations.

5. Policy Opportunity

- Methane reduction offers **quick climate gains** at relatively low cost.

PRELIMS BOOSTER BOX

- **Methane (CH₄):** Short-lived but highly potent GHG.
- **Top-Down Measurement:** Satellite/atmospheric observation.
- **Bottom-Up Inventory:** Sectoral emission estimation.
- **NDC:** Nationally Determined Contribution.
- **Co-benefits:** Climate mitigation + air quality improvement.

PadhAI PYQ BOOSTER SECTION

Q. (GS3 – Mains)

“Why is methane considered a priority greenhouse gas for near-term climate action?”

PadhAI MAINS PRACTICE QUESTION

“Accurate estimation of methane emissions is crucial for effective climate policy.”

Discuss why methane emissions in India

may be underestimated and suggest measures to address this challenge. (250 words)

PadhAI-GENERATED UPSC MCQ

Q. With reference to methane emissions in India, consider the following statements:

1. Methane has a much higher warming potential than CO₂ over a 20-year period.
2. Livestock and rice cultivation are major sources of methane in India.
3. Satellite-based measurements always perfectly match national emission inventories.

Which of the statements given above is/are correct?

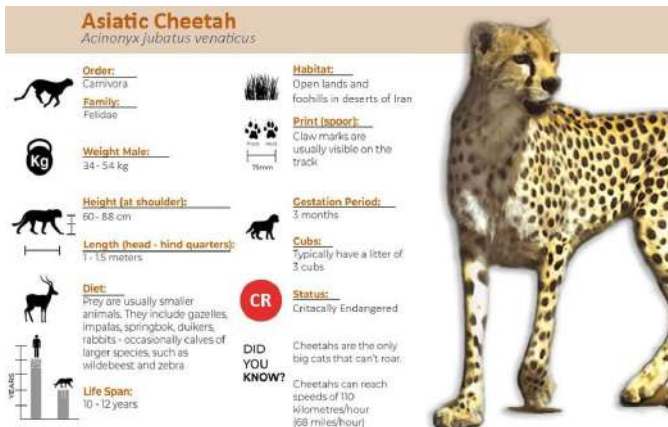
- A. 1 and 2 only
- B. 2 only
- C. 1 and 3 only
- D. 1, 2 and 3

Answer: A

(Statement 3 is incorrect – discrepancies often exist between satellite and inventory estimates.)



8. Nauradehi Wildlife Sanctuary Declared as Madhya Pradesh's Third Cheetah Habitat



WHY IN THE NEWS?

- **Nauradehi Wildlife Sanctuary** has been identified as the **third cheetah habitat in Madhya Pradesh**.
- The move is part of India's long-term **Cheetah Reintroduction Programme**.
- It aims to **expand the spatial range** of cheetahs beyond existing sites and ensure genetic and ecological sustainability.

SUMMARY

- Nauradehi Wildlife Sanctuary has been selected as Madhya Pradesh's third habitat for cheetah conservation, marking a significant expansion of India's cheetah reintroduction efforts.
- After Kuno and Gandhi Sagar landscapes, Nauradehi offers suitable grassland-forest mosaic, prey base, and connectivity potential.
- The decision strengthens landscape-level conservation, reduces pressure on single sites, and supports long-term ecological restoration and biodiversity goals.

BACKGROUND / CONTEXT

- The **cheetah became extinct in India in 1952** due to habitat loss and hunting.
- India launched the **Cheetah Reintroduction Programme** to restore lost ecological functions.
- Madhya Pradesh has emerged as the **core state for cheetah conservation** due to its suitable habitats.
- Nauradehi is one of the **largest wildlife sanctuaries in central India**, offering scope for landscape-level management and future connectivity.

KEY HIGHLIGHTS

1. Ecological Suitability

- Large contiguous area with grassland patches.
- Adequate prey species such as chital, sambar, and wild boar.

2. Strategic Expansion

- Reduces over-dependence on a single cheetah landscape.
- Facilitates future translocation and population dispersal.

3. Conservation Synergies

- Enhances protection of dry deciduous ecosystems.
- Supports co-benefits for other grassland and forest species.



4. Community and Governance Aspect

- Requires relocation management, community participation, and livelihood safeguards.
- Strengthens state-led wildlife governance capacity.

5. Scientific Management

- Long-term monitoring, prey augmentation, and habitat management planned.
- Aligns with adaptive conservation strategies.

PRELIMS BOOSTER BOX

- **Cheetah Extinction in India:** 1952
- **Reintroduction Programme:** Species restoration initiative
- **Habitat Type:** Grassland-dry deciduous forest
- **Core State:** Madhya Pradesh
- **Conservation Approach:** Landscape-level management

PadhAI PYQ BOOSTER SECTION

Q. (GS3 – Mains)

“Discuss the challenges and ecological significance of species reintroduction programmes in India.”

PadhAI MAINS PRACTICE QUESTION

“The selection of Nauradehi as a cheetah habitat reflects a shift towards landscape-based conservation.” Analyse the ecological and governance implications of this approach. (250 words)

PadhAI-GENERATED UPSC MCQ

Q. With reference to cheetah conservation in India, consider the following statements:

1. The cheetah became extinct in India in the early 1950s.
2. Madhya Pradesh hosts multiple identified habitats for cheetah reintroduction.
3. Grasslands are ecologically insignificant for wildlife conservation.

Which of the statements given above is/are correct?

- A. 1 and 2 only
- B. 2 only
- C. 1 and 3 only
- D. 1, 2 and 3

Answer: A

(Statement 3 is incorrect – grasslands are vital but often under-protected ecosystems.)

9. Lessons from China: Strategic Approaches to Combat Air Pollution & Rapid Environmental Degradation

WHY IN THE NEWS?

- China’s rapid improvement in air quality has emerged as a reference point for developing nations tackling pollution.
- Comparative studies highlight **Beijing’s PM2.5 reduction by over 50% in a decade**, driven by targeted policy interventions.
- India’s urban pollution crisis has intensified, prompting debate on whether elements of China’s anti-pollution strategy can be adapted domestically.



SUMMARY

- China's approach to pollution control offers insights through strict enforcement, industrial restructuring, clean energy transition, and regional coordination of air quality management.
- While governance models differ, successful outcomes in reducing PM2.5 levels, phasing out coal in urban regions, and investing in public transport demonstrate scalable practices.
- Adopting context-tailored elements could help India improve air quality, strengthen regulatory institutions, and accelerate clean technology adoption.

BACKGROUND / CONTEXT

- I. Early 2000s industrial boom → severe smog & health crisis.
- II. 2013 Action Plan for Air Pollution Prevention launched nationwide corrective measures.
- III. Emphasis: **coal reduction, industrial relocation, emission standards, public disclosure systems.**
- IV. Designed as a **central-state cooperative enforcement** model with performance-linked accountability.

KEY HIGHLIGHTS

1. Accountability for Local Administrations

- China sets **non-negotiable air quality targets** for provinces.

- Incentives & penalties link performance to governance outcomes.
- Lesson: Strengthen **inter-state accountability** beyond Delhi-NCR.

2. Industrial Policy + Environment Integration

- Relocated heavy industries away from high-density cities.
- Strict emission caps with continuous monitoring systems.
- India can evaluate **industrial zoning reforms** and emission-linked taxation.

3. Coal & Energy Transition

- Urban coal-fired boilers phased out; natural gas & renewables scaled.
- India can prioritise **coal phase-down roadmaps** in critical hotspots.

4. National Monitoring & Data Transparency

- China: Real-time air monitoring across cities; public alert dashboards.
- India: Expand and mandate **continuous emissions monitoring systems (CEMS)**.

5. Transport Sector Discipline

- Investments in metro, EVs, fuel standards; congestion control in cities.
- Lesson: **Demand-side reduction**, not just supply-side improvement.

6. Regional Emission Control Zones

- Air quality is managed at **regional airshed level**, not city level.



- For India: focus on **Indo-Gangetic airshed**, not just Delhi.

PRELIMS BOOSTER BOX

- **Airshed Management:** Regional approach to pollution control across geographic boundaries.
- **CEMS:** Continuous Emissions Monitoring System.
- **PM2.5:** Fine particulate pollutant; major urban health hazard.
- **Low-Emission Zones:** Areas restricting polluting industries/vehicles.
- **Source Apportionment Studies:** Identifying major contributors to pollution city-wise.

PadhAI PYQ BOOSTER SECTION

“How can India integrate industrial policy, transport planning, and energy transitions to address urban air pollution? Examine with reference to recent global examples.”

PadhAI MAINS PRACTICE QUESTION

“China’s pollution reduction strategy shows that air quality improvement is achievable through coordinated governance and structural reforms. Analyse how India can adopt and adapt these lessons while respecting its federal and democratic framework.” (250 words)

PadhAI-GENERATED UPSC MCQ

With reference to international approaches to pollution control, consider the following statements:

1. Airshed-based planning treats pollution control as a regional challenge rather than a city-specific issue.
2. Continuous Emissions Monitoring Systems involve real-time tracking of industrial emissions.
3. China’s model of air pollution control is based on decentralised governance without central oversight.

Which of the statements given above are correct?

- A. 1 and 2 only
- B. 2 and 3 only
- C. 1 only
- D. 1, 2 and 3

Answer: A

(Statement 3 is incorrect – China’s model is centrally coordinated.)

10. Elephant calf dies in assam train collision.



WHY IN THE NEWS?

- An elephant calf was killed after being hit by a speeding train in Assam.



- The incident occurred in a known **elephant movement corridor**, highlighting protection gaps.
- Renewed calls for improved railway-wildlife mitigation measures in Northeast India.

SUMMARY

- A young elephant died after a train collision in Assam, drawing attention to frequent wildlife fatalities along railway lines passing through elephant habitats.
- The tragedy underscores persistent challenges in managing human-wildlife coexistence, particularly in biodiversity-sensitive zones.
- Conservationists argue for stronger enforcement of speed controls, technological surveillance, and scientific corridor management.
- The event reopens debate on balancing infrastructure expansion with ecological security.

BACKGROUND / CONTEXT

- I. Railway and highway expansion intersect multiple **elephant migration routes** in Assam.
- II. Northeast India includes key habitats of the **Asian Elephant**, protected under Schedule I of the Wildlife Protection Act.
- III. India has **~31,000 elephants**, with Assam being one of the strongest populations.

- IV. Train-elephant collisions are recurring, raising concerns over **corridor management and enforcement**.

KEY HIGHLIGHTS

1 High-Risk Railway Segments

- Tracks cutting through forests like **Kaziranga-Karbi Anglong, Hojai-Lumding**.
- Night and early-morning traffic poses higher fatality risk.

2 Corridor Fragmentation

- Habitat loss due to plantations, settlements, and fencing obstructs movement.
- Elephants are forced to cross rail lines more frequently.

3 Speed Control Gaps

- Mandatory speed restrictions are often not adhered to consistently.
- Lack of automated alert systems for approaching wildlife.

4 Technology Deficit

- Limited installation of **thermal cameras, AI sensors, geo-fencing**, and radar-based alerts.
- Data sharing between forest and railway departments remains weak.

5 Policy & Enforcement Issues

- Need for strict implementation of **High-Risk Corridor Guidelines**.



- Insufficient ground-level monitoring & patrolling staff.

PRELIMS BOOSTER BOX

- **Asian Elephant:** Endangered, Schedule I of WPA, Appendix I of CITES.
- **Elephant Corridor:** Natural path connecting habitats for seasonal movement.
- **Human-Wildlife Conflict (HWC):** Competition for space/resources causing harm.
- **Project Elephant:** Govt. scheme for conservation & habitat security.
- **Eco-Sensitive Zones:** Areas near protected areas to regulate activities.

PadhAI PYQ BOOSTER SECTION

“Evaluate how expanding infrastructure projects influence wildlife movement and biodiversity. Suggest policy interventions for mitigation.”

PadhAI MAINS PRACTICE QUESTION

“Railway expansion through biodiversity-sensitive regions has intensified wildlife mortality. Using the recent case of Assam, suggest technological and policy measures to reduce train-wildlife collisions.” (250 words)

PadhAI-GENERATED UPSC MCQ

Consider the following statements regarding elephant conservation in India:

1. Asian Elephants are protected under Schedule I of the Wildlife Protection Act.

2. Elephant corridors are legally recognised boundaries notified under the Forest Conservation Act.
3. Train collisions are a documented form of human-wildlife conflict.

Which of the statements given above are correct?

- A. 1 and 3 only
- B. 2 only
- C. 1 only
- D. 1, 2 and 3

Answer: A

(Statement 2 is incorrect – corridors are ecological pathways; not all are legally notified under the FCA.)

11.Southern Ocean Carbon Anomaly: Disrupted Carbon Sink Dynamics Raise Climate Concerns

WHY IN THE NEWS?

- Recent observations indicate a **carbon absorption anomaly** in the Southern Ocean, historically one of Earth’s largest carbon sinks.
- Scientists report fluctuations in carbon uptake capacity, linked to **ocean warming, changing currents, and biological shifts**.
- The anomaly has triggered global climate concern due to its role in buffering atmospheric CO₂.

SUMMARY

- The Southern Ocean has shown unexpected variability in its carbon sequestration ability, termed the **Southern Ocean Carbon Anomaly**.



- Long considered a major carbon sink, it is now displaying inconsistent CO₂ absorption, driven by changes in water temperature, stratification, winds, and biological productivity.
- This anomaly impacts global carbon budgets and complicates climate projections, raising questions about the long-term stability of ocean-based climate mitigation.

BACKGROUND / CONTEXT

- I. The Southern Ocean moderates global climate by absorbing large volumes of heat and CO₂.
- II. Carbon sinks rely on **deep water mixing** that traps carbon in the ocean interior.
- III. Changes in wind systems like the **Westerlies** influence carbon transport.
- IV. Disruptions affect the **global carbon cycle**, sea-level rise, and climate stability.

KEY HIGHLIGHTS

1 Weakening of Natural Carbon Sink

- Lowered efficiency in CO₂ absorption than historical model predictions.
- Seasonal fluctuations becoming unpredictable.

2 Role of Ocean Warming

- Warmer waters hold less CO₂ → dissolution capacity weakens.
- Stratification prevents carbon transfer to deeper waters.

3 Phytoplankton Decline

- Decline in biological pump efficiency.
- Reduces carbon capture via photosynthesis.

4 Wind & Current Anomalies

- Stronger westerlies mix deeper carbon to surface → re-release into the atmosphere.
- Interaction with the **Antarctic Circumpolar Current** disrupted.

5 Global Climate Implications

- Increased atmospheric CO₂ retention.
- Amplifies warming feedback loop “climate penalty”.

PRELIMS BOOSTER BOX

- **Biological Pump:** Carbon transfer from surface to deep ocean.
- **Westerlies:** Winds influencing Southern Ocean mixing.
- **Thermohaline Circulation:** Heat-salt driven global ocean conveyor belt.
- **Carbon Sink:** Natural system absorbing more CO₂ than it emits.
- **Antarctic Circumpolar Current:** Largest ocean current, stabilises climate.

PadhAI PYQ BOOSTER SECTION

“How do ocean circulation processes influence global climate regulation? Explain with reference to carbon sinks and warming trends.”

PadhAI MAINS PRACTICE QUESTION

“The Southern Ocean Carbon Anomaly challenges the assumption that oceans will remain stable carbon buffers for the planet.



Discuss its causes and implications for global climate policy.” (250 words)

PadhAI-GENERATED UPSC MCQ

Consider the following statements regarding the Southern Ocean Carbon Anomaly:

1. It refers to irregular carbon absorption trends in the ocean surrounding Antarctica.
2. Rising ocean temperatures and reduced mixing are contributing factors.
3. The anomaly increases carbon sequestration, strengthening global carbon sinks.

Which of the statements given above are correct?

- A. 1 and 2 only
- B. 2 and 3 only
- C. 1 only
- D. 1, 2 and 3

Answer: A

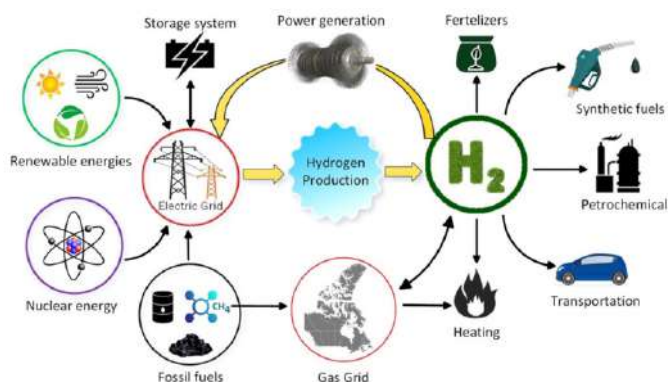
(Statement 3 is incorrect – the anomaly indicates weakening, not strengthening, of sequestration.)



SCIENCE & TECHNOLOGY



1. Scientists Supercharge Promising Material to Catalyze Clean Hydrogen Production



WHY IN THE NEWS?

- Indian and international researchers recently enhanced the catalytic performance of a **novel transition-metal-based material** for efficient green hydrogen production.
- The breakthrough offers a **low-cost alternative to expensive platinum-based catalysts** used in electrolyzers.
- The development aligns with India's **National Green Hydrogen Mission** and global efforts to scale up clean hydrogen technologies.

SUMMARY

- Scientists have engineered a high-efficiency catalyst by modifying a promising transition-metal compound (such as nickel-iron, cobalt phosphide, or MXenes) to accelerate water-splitting reactions for green hydrogen production.
- The improved catalyst demonstrates superior activity, durability, and

reduced energy requirements compared to conventional materials.

- This breakthrough strengthens the technological foundation for large-scale, cost-effective hydrogen generation, supporting India's National Green Hydrogen Mission and global net-zero ambitions.

KEY HIGHLIGHTS

1. Improved Catalyst Architecture

- Nano-engineered surface area for faster electron transfer.
- Transition-metal doping enhances active sites.
- Reduced overpotential for both HER and OER.

2. Enhanced Stability & Longevity

- The catalyst remains stable for thousands of electrolysis cycles.
- Resistive to corrosion in alkaline and acidic media.

3. Significant Energy Savings

- Requires **lower voltage** to split water, reducing electricity consumption.
- Can be integrated with renewable energy sources like solar and wind.

4. Potential Replacement for Precious Metals

- Cost-effective alternative to platinum, iridium, and ruthenium.
- Scalable synthesis processes suitable for Indian manufacturing.



5. Industrial Relevance

- Supports steel, ammonia, and refinery decarbonisation.
- Reduces India's import dependence on fossil-based hydrogen (grey hydrogen).

PRELIMS BOOSTER BOX

- **HER:** Hydrogen Evolution Reaction (cathode)
- **OER:** Oxygen Evolution Reaction (anode)
- **Green Hydrogen Mission Target:** 5 MMT annual production by 2030
- **PGMs:** Platinum Group Metals
- **Electrolyser Types:** PEM, Alkaline, SOEC
- **SIGHT Programme:** Incentivises electrolyser manufacturing & hydrogen production

PadhAI PYQ BOOSTER SECTION

Q. (UPSC GS3 – 2023 Mains)

“Discuss the potential of green hydrogen as a clean energy source for India's energy transition.”

Q. (Prelims – Recurring Theme)

Questions on fuel cells, electrolyzers, renewable energy targets, and catalytic reactions.

PadhAI MAINS PRACTICE QUESTION

“Breakthroughs in catalyst engineering are crucial for making green hydrogen commercially viable.” Discuss the recent advancements and their implications for

India's National Green Hydrogen Mission. (250 words)

PadhAI-GENERATED UPSC MCQ

Q. With reference to recent advances in hydrogen production technology, consider the following statements:

1. Transition-metal-based catalysts can replace platinum in water electrolysis.
2. Enhanced catalysts reduce the overpotential required for hydrogen evolution.
3. Green hydrogen is produced through electrolysis using renewable energy sources.

Which of the statements given above is/are correct?

- A. 1 and 2 only
- B. 2 and 3 only
- C. 1 and 3 only
- D. 1, 2 and 3

Answer: D (All statements are correct.)

2. India–AI Impact Summit 2026 Reflects India's Rising Leadership in Global AI Governance

WHY IN THE NEWS?

- India announced the agenda and global partnerships for the **India–AI Impact Summit 2026**, showcasing its expanding leadership in AI ethics, governance, and innovation.
- Major global tech companies, policymakers, and research institutions confirmed participation,



highlighting India's influence in shaping AI norms.

- The Summit follows India's recent initiatives on **safe & trusted AI**, the **IndiaAI Mission**, and global diplomatic efforts on digital public infrastructure.

SUMMARY

- The India–AI Impact Summit 2026 underscores India's growing role in global AI discourse by hosting the world's leading policymakers, researchers, and technology companies to deliberate on safe, trusted, inclusive, and responsible AI.
- Anchored by the IndiaAI Mission, the summit focuses on AI governance frameworks, ethical deployment, compute capacity expansion, digital public infrastructure, and AI for social good.
- India seeks to influence global AI standards while strengthening domestic innovation ecosystems.

BACKGROUND / CONTEXT

- I. Artificial intelligence is central to global technological competition and governance.
- II. India has emerged as a major AI hub with:
 - ✓ World's largest digital public infrastructure (UPI, Aadhaar, Co-WIN)
 - ✓ Expanding startup ecosystem
 - ✓ Growing demand for AI in health, agriculture, fintech, mobility
- III. India launched the **IndiaAI Mission (2024)** to strengthen compute

capacity, foundational models, datasets, and ethical AI frameworks.

- IV. The **G7 Hiroshima AI Principles**, **EU AI Act**, and **UN AI Advisory Body** have elevated global AI governance debates—India is now shaping these discussions.

KEY HIGHLIGHTS

1. Themes of India–AI Impact Summit 2026

- Safe & trusted AI systems
- AI alignment, transparency, fairness
- Global frameworks for AI regulation
- Compute infrastructure & sovereign AI models
- AI for social sectors: health, agriculture, education, disaster management
- Responsible development of foundation models
- Combating misinformation, deepfakes, and security threats

2. India's Priority Agenda

- Promote **open, interoperable, DPI-linked AI ecosystems**.
- Create global benchmarks for safe AI certification.
- Strengthen AI talent, skilling, and research capacity.
- Encourage global investments in India's AI manufacturing.
- Integrate AI ethics into governance and legal frameworks.

3. Partnerships & Participation



- Collaboration with global tech companies, research bodies, and multilateral organisations.
- Participation from countries focusing on responsible digital transformation.
- Engagement with IITs, AI startups, think tanks, and academia.

4. Expected Outcomes

- Roadmap for standardising global AI safety norms.
- Blueprint for India's sovereign compute ecosystem.
- Cross-country research & development partnerships.
- Policy framework for AI accountability and risk mitigation.

PRELIMS BOOSTER BOX

- **IndiaAI Mission:** National programme to strengthen AI innovation.
- **Trusted AI:** Systems that are secure, explainable, unbiased.
- **Digital Public Infrastructure (DPI):** UPI, Aadhaar, DigiLocker, Co-WIN.
- **G7 Hiroshima Process:** Global AI governance principles.
- **UN AI Advisory Body:** Multilateral platform for AI safety & ethics.
- **AI Risks:** Deepfakes, algorithmic bias, privacy violation, autonomous harms.

PadhAI PYQ BOOSTER SECTION

Q. (UPSC 2023 – GS3 Mains)

“Artificial Intelligence poses both opportunities and threats. Discuss the need for regulatory frameworks.”

Q. (UPSC Prelims – Theme-Based)

Questions on Digital India, AI frameworks, DPI, and emerging tech governance.

PadhAI MAINS PRACTICE QUESTION

“India–AI Impact Summit 2026 is not just a technology conference but a geopolitical milestone.” Examine how India's leadership in AI governance shapes global digital politics. (250 words)

PadhAI-GENERATED UPSC MCQ

Q. With reference to the India–AI Impact Summit 2026, consider the following statements:

1. The summit aims to promote global collaboration on safe and trusted AI systems.
2. It is hosted under the IndiaAI Mission led by the Ministry of Electronics & IT.
3. The summit focuses exclusively on industrial AI applications.

Which of the statements given above is/are correct?

- A. 1 and 2 only
- B. 2 only
- C. 1 and 3 only
- D. 1, 2 and 3

Answer: A

(Statement 3 is incorrect – the summit includes AI governance, social impact, ethics, and R&D).



3. DRDO Hands Over Seven Indigenous Technologies to the Armed Forces Under the Technology Development Fund (TDF) Scheme



WHY IN THE NEWS?

- The Defence Research and Development Organisation (DRDO) formally handed over **seven cutting-edge indigenous defence technologies** developed under the **Technology Development Fund (TDF)** scheme to the Indian Armed Forces.
- The technologies were designed in collaboration with Indian MSMEs and start-ups to strengthen self-reliance in defence.
- The event highlights progress under Atmanirbhar Bharat and the expansion of India's domestic defence innovation ecosystem.

SUMMARY

- DRDO has transferred seven TDF-developed technologies to the Indian Armed Forces, showcasing the success of India's defence innovation ecosystem.
- These technologies include advanced surveillance systems, ruggedised

communication platforms, novel ammunition, and unmanned systems.

- Developed with MSMEs and start-ups, the innovations aim to bridge critical capability gaps and reduce dependence on foreign imports.
- The initiative advances India's Atmanirbhar Bharat vision by accelerating indigenous R&D, tech integration, and military modernisation.

BACKGROUND / CONTEXT

- I. **TDF Scheme**, launched under DRDO, supports Indian industry (especially MSMEs and start-ups) in developing defence technologies with grants up to Rs. 50 crore.
- II. The scheme targets technologies not yet available or requiring significant upgradation for defence applications.
- III. It complements **IDEX**, Make-in-India, and Defence Acquisition Procedure (DAP 2020) initiatives.
- IV. The scheme strengthens the defence manufacturing ecosystem by enabling smaller industry players to contribute to national security innovation.

KEY HIGHLIGHTS

1. Seven Technologies Handed Over

(Descriptions based on categories typically developed under TDF projects)

1. **Advanced Surveillance & Reconnaissance Systems**

Electro-optical and IR-based sensors for real-time battlefield awareness.



2. **Ruggedised Communication Equipment**
 - Secure tactical communication tools for high-altitude and high-interference zones.
3. **Next-Generation Ammunition & Warheads**
 - Smart, precision-enhanced ammunition for infantry and artillery use.
4. **Unmanned Systems Components**
 - Subsystems for UAVs/UGVs such as navigation, payload stabilisation, and control modules.
5. **AI-Enabled Threat Detection Tools**
 - Software for automated target recognition and battlefield analytics.
6. **Specialised Protective Gear Materials**
 - Lightweight ballistic materials enhancing soldier survivability.
7. **Advanced Propulsion or Power Systems**
 - Compact, high-efficiency power units for defence platforms.

2. Industry Participation

- Majority of technologies co-developed with:
 - ✓ MSMEs
 - ✓ Start-ups
 - ✓ Indian R&D firms
- Encourages private sector innovation and defence industrial growth.

3. Testing & Validation

- All technologies underwent field trials with Army, Navy, and Air Force.

- Meet key parameters: reliability, ruggedness, and operational efficiency.

4. Potential for Scale-Up

- Ready for production and integration into existing armed forces platforms.
- Support long-term indigenous supply chains.

PRELIMS BOOSTER BOX

- **TDF Scheme:** DRDO-led funding support for development of defence technologies by Indian industry.
- **Funding Limit:** Up to Rs. 50 crore per project.
- **Eligible Entities:** MSMEs, start-ups, private companies.
- **iDEX vs TDF:** iDEX focuses on innovation challenges; TDF focuses on specific technology gaps.
- **DAP 2020:** Emphasises indigenisation through Make-I, Make-II, and Strategic Partnership models.

PadhAI PYQ BOOSTER SECTION

Q. (UPSC GS3 – Mains 2021)

“Discuss the challenges in achieving self-reliance in defence manufacturing in India. How far have recent government initiatives addressed these challenges?”

Q. (UPSC Prelims – Theme-Based)

Recurring questions on DRDO, defence R&D schemes, MSME role in defence, iDEX innovations.

PadhAI MAINS PRACTICE QUESTION



“The Technology Development Fund (TDF) Scheme is emerging as a cornerstone of India’s defence innovation landscape.” Discuss the role of the TDF Scheme in strengthening defence R&D and its impact on the Armed Forces. (250 words).

PadhAI-GENERATED UPSC MCQ

Q. With reference to the DRDO’s Technology Development Fund (TDF) Scheme, consider the following statements:

1. The TDF Scheme supports Indian MSMEs and start-ups in developing defence technologies.
2. Funding under the scheme can cover up to 90% of the development cost.
3. Technologies developed under the scheme are mandatory to be produced only by DPSUs.

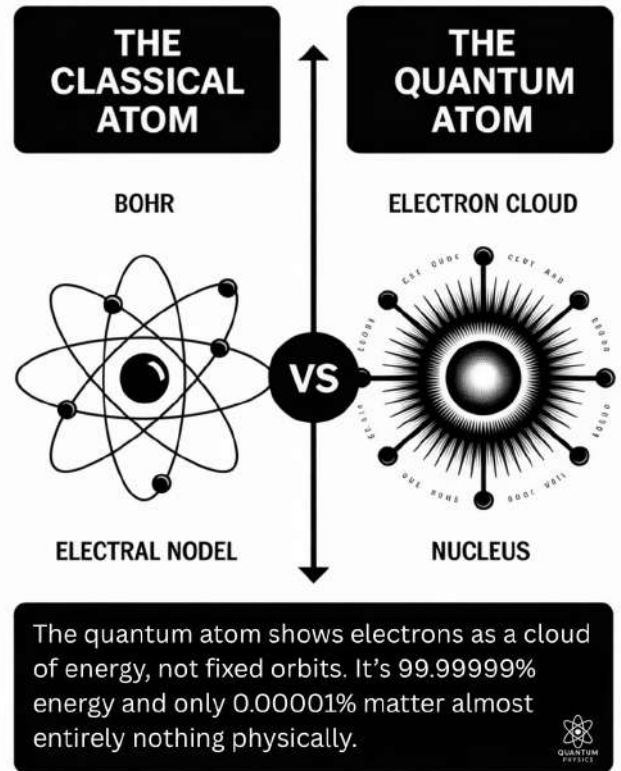
Which of the statements given above is/are correct?

- A. 1 and 2 only
- B. 2 and 3 only
- C. 1 only
- D. 1, 2 and 3

Answer: A

(Statement 3 is incorrect – private players can manufacture and commercialise the technologies.)

4. ‘One-Atom Test’ Provides New Evidence Supporting Bohr’s Quantum Model Over Einstein’s Classical Predictions



WHY IN THE NEWS?

- A groundbreaking **“one-atom experiment”** has validated predictions from **Niels Bohr’s quantum model**, contradicting Albert Einstein’s objections to quantum mechanics.
- Researchers isolated and manipulated a **single atom** to test energy quantisation, wave-particle behaviour, and discrete transitions.
- The study strengthens the quantum mechanical framework underlying atomic physics, quantum computing, and modern spectroscopy.



SUMMARY

- A cutting-edge experiment observing the behaviour of a single atom has reaffirmed Bohr's quantum postulates regarding discrete energy levels and quantum jumps.
- The results contradict Einstein's classical expectation of continuous energy changes and deterministic transitions. The findings reinforce the foundational principles of quantum mechanics—wave-particle duality, quantisation, and probabilistic transitions—while advancing technologies such as quantum simulation and atomic clocks.

BACKGROUND / CONTEXT

- I. **Bohr's Model (1913):** Proposed electrons occupy discrete energy levels and exhibit quantised transitions emitting/absorbing photons.
- II. **Einstein's Position:** Though he supported early quantum ideas, he opposed probabilistic interpretations, insisting on deterministic, continuous laws ("God does not play dice").
- III. The debate between Bohr and Einstein shaped the philosophical and mathematical evolution of quantum mechanics.
- IV. Modern experimental physics—especially ion traps, laser cooling, and atomic interferometry—now allows quantum effects to be tested at the **single-atom level**, beyond the limitations of early 20th-century observations.

KEY HIGHLIGHTS

1. The One-Atom Setup

- Researchers used:
 - ✓ Ultra-high vacuum chambers
 - ✓ Laser cooling to microkelvin temperatures
 - ✓ Optical traps to isolate a single atom
- Enabled observation of **individual quantum jumps** in real time.

2. Validation of Bohr's Predictions

- Atoms absorb/emitted energy **only in discrete quanta**, not continuously.
- Transitions occurred probabilistically, matching Schrödinger-Bohr predictions.
- Photon emission correlated with precise energy-level differences.

3. Contradiction to Einstein's Expectations

- No evidence of continuous energy variation.
- Transition timings conformed to probabilistic quantum laws, not classical determinism.

4. Quantum Jumps Observed

- Clear confirmation that electrons "jump" between energy shells rather than moving gradually.
- Matched Bohr's quantised orbital model and modern quantum electrodynamics (QED).



5. Implications for Technology

- Enhances precision in **atomic clocks**.
- Supports **qubit stability models** in quantum computing.
- Improves accuracy of **spectroscopic measurements**.

PRELIMS BOOSTER BOX

- **Bohr Model:** Electrons orbit nucleus in discrete shells; energy levels quantised.
- **Quantum Jump:** Instantaneous transition between energy levels.
- **Wave-Particle Duality:** Entities like electrons behave both as particles and waves.
- **Quantum Electrodynamics (QED):** Most accurate theory describing light-matter interaction.
- **National Quantum Mission (India):** Boosts quantum computing, sensing, communication.

PYQ BOOSTER SECTION

Q. (UPSC Prelims – Theme-Based: Quantum Physics)

Questions on Bohr's model, energy quantisation, and wave-particle duality have featured frequently.

Q. (GS3 – Mains 2022)

"How do quantum phenomena enable modern-day innovations such as quantum computing?"

PadhAI MAINS PRACTICE QUESTION

"Recent single-atom experiments reinforce Bohr's concept of quantised energy states while challenging Einstein's vision of determinism. Discuss the scientific and technological implications of this development." (250 words)

PadhAI-GENERATED UPSC MCQ

Q. With reference to the recent 'one-atom experiment', consider the following statements:

1. It provides direct evidence for discrete energy levels in atoms.
2. The findings support Einstein's deterministic model over the probabilistic quantum model.
3. Quantum jumps were observed during the experiment.

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

Answer: A

(Statement 2 is incorrect – the experiment supports Bohr's quantum framework, not Einstein's determinism.)



5. New Oral Drugs for Gonorrhoea Treatment: Addressing Antibiotic Resistance



WHY IN THE NEWS?

- Researchers and health authorities have reported **progress in the development of new oral medications** for treating gonorrhoea.
- This comes amid growing global concern over **antimicrobial resistance (AMR)**, especially resistance of *Neisseria gonorrhoeae* to existing antibiotics.
- Enhanced treatment options are needed to prevent **treatment failures** and curb the spread of resistant infections.

SUMMARY

- Gonorrhoea is a common sexually transmitted infection (STI) caused by *Neisseria gonorrhoeae*.
- Rising resistance to multiple antibiotics has made treatment increasingly difficult, raising public health alarms globally.

- Recent scientific advancements have identified promising new oral drugs or drug combinations that remain effective against resistant strains.
- If approved and deployed, these therapeutics could strengthen STI control, reduce transmission, and slow the progression of antimicrobial resistance.

BACKGROUND / CONTEXT

- I. Gonorrhoea is transmitted through **sexual contact** and can infect the genital tract, rectum, and throat.
- II. Untreated infection can lead to **pelvic inflammatory disease, infertility, ectopic pregnancy**, and increased HIV risk.
- III. *N. gonorrhoeae* has progressively developed resistance to sulphonamides, penicillins, tetracyclines, fluoroquinolones, and even cephalosporins.
- IV. The **World Health Organization (WHO)** identifies drug-resistant gonorrhoea as a **priority AMR threat**.
- V. Current WHO treatment guidelines recommend dual therapy with injectable and oral agents to delay resistance.

KEY HIGHLIGHTS

1. Antimicrobial Resistance Crisis

- Widespread resistance has led to **reduced efficacy** of standard drugs like ceftriaxone and azithromycin.



- Strains resistant to multiple drug classes have been documented globally.

2. New Oral Drug Development

- Novel oral compounds and drug combinations are under clinical evaluation.
- Some target **new bacterial pathways** to overcome existing resistance mechanisms.
- Oral formulations improve **accessibility and adherence** compared with injectable therapy.

3. Clinical Advantages

- Ease of administration enhances **patient compliance**.
- Potential to use in **primary care settings** without specialised infrastructure.

4. Public Health Impact

- Could significantly reduce the pool of untreated or inadequately treated infections.
- Lower transmission in communities and reduced sequelae of infection.

5. Challenges Ahead

- Ensuring **access, affordability, and appropriate use** to prevent rapid emergence of resistance to new drugs.
- Continued **surveillance and stewardship** are essential.

PRELIMS BOOSTER BOX

- **Gonorrhoea:** Sexually transmitted bacterial infection.
- **Neisseria gonorrhoeae:** Causative bacterium.
- **AMR:** Antimicrobial resistance—reduced effectiveness of drugs.
- **Dual Therapy:** Use of two antibiotics to delay resistance.
- **Oral Antibiotics:** Easier to administer than injectables; potential new options.

PadhAI PYQ BOOSTER SECTION

Q. (GS3 – Mains)

“Antimicrobial resistance is a major threat to global health security. Discuss the causes, consequences, and strategies to address AMR.”

PadhAI MAINS PRACTICE QUESTION

“The development of new oral drugs for gonorrhoea treatment represents a key front in combating antimicrobial resistance.” Critically examine the scientific and policy challenges in bringing these drugs into widespread use. (250 words).

PadhAI-GENERATED UPSC MCQ

Q. With reference to gonorrhoea treatment and antimicrobial resistance, consider the following statements:



1. *Neisseria gonorrhoeae* has developed resistance to multiple classes of antibiotics.
2. New oral therapies being researched aim to address resistant strains and improve treatment access.
3. Injectable therapies are universally accessible in all settings and always preferred to oral drugs.

Which of the statements given above is/are correct?

- A. 1 and 2 only
- B. 2 only
- C. 1 and 3 only
- D. 1, 2 and 3

Answer: A

(Statement 3 is incorrect—injectable therapies may not be universally accessible; oral drugs can improve reach and compliance.)

6.Dark Matter Discovery Debate: Scientific Community Remains Cautious Amid New Claims

WHY IN THE NEWS?

- Recent studies and experimental signals have renewed claims of a **potential dark matter discovery**.
- However, physicists and cosmologists remain **cautious**, stating the evidence is **inconclusive and needs replication**.
- The debate highlights challenges in detecting dark matter, which constitutes nearly **85% of the universe's matter**.

SUMMARY

- Emerging experimental results hint at possible interactions consistent with dark matter particles, leading to excitement in the physics community.
- Despite this, experts warn that the signals may arise from ordinary matter interference, instrument noise, or statistical anomalies.
- The cautious response reflects the high evidential standard required for discovery claims in fundamental physics.
- The debate underscores the complexity of understanding dark matter and its critical role in shaping cosmic structure.

BACKGROUND / CONTEXT

- I. Dark matter is a **non-luminous, non-interacting** form of matter detected through gravitational effects.
- II. Its existence is inferred from **galactic rotation curves, gravitational lensing, and cosmic microwave background data**.
- III. No direct detection has yet been confirmed despite advanced experiments (LUX-ZEPLIN, XENONnT, DAMA/LIBRA, CERN searches).
- IV. A confirmed discovery would revolutionise **particle physics and cosmology**.

KEY HIGHLIGHTS

1 Evidence Still Preliminary

- Current results lack statistically significant confirmation (5-sigma standard not met).



- Review and peer validation ongoing.

2 Competing Explanations

- Signals could be caused by background cosmic particles or detector interference.
- Instrument sensitivity limitations remain a barrier.

3 Scientific Standard of Proof

- Independent replication across facilities required before recognition as discovery.
- Dark matter hypothesis demands exceptionally robust evidence.

4 Theoretical Uncertainty

- Multiple candidates: **WIMPs, Axions, Sterile Neutrinos, MACHOs.**
- No consensus on particle identity or interaction model.

5 Implications of Confirmation

- Would confirm physics **beyond the Standard Model.**
- New pathways for understanding gravity, cosmic evolution, and universe composition.

PRELIMS BOOSTER BOX

- **Dark Matter:** Hypothetical matter inferred through gravity, not EM radiation.
- **WIMPs:** Weakly Interacting Massive Particles – major theoretical candidates.
- **Axions:** Ultralight dark matter candidates from quantum theory.

- **Gravitational Lensing:** Light bending due to massive objects; indirect detection tool.
- **5-Sigma Threshold:** Statistical proof standard in particle physics.

PadhAI PYQ BOOSTER SECTION

“What are WIMPs and why are they central to the scientific search for dark matter? Explain their significance for modern cosmology.”

PadhAI MAINS PRACTICE QUESTION

“**Scientific breakthroughs require caution as much as innovation. In light of ongoing dark matter discovery claims, assess the challenges of validating evidence in frontier physics research.**” (250 words)

PadhAI-GENERATED UPSC MCQ

Consider the following statements regarding dark matter research:

1. Dark matter has been confirmed through direct detection in underground laboratories.
2. Its existence is inferred from gravitational effects on galaxies and cosmic structures.
3. A 5-sigma confidence level is generally required for discovery validation in particle physics.

Which of the statements given above are correct?

- A. 2 and 3 only
- B. 1 and 2 only
- C. 3 only
- D. 1, 2 and 3



Answer: A

(Statement 1 is incorrect — there is no confirmed direct detection yet.)

**7. Inside the DHRUV 64 Microprocessor:
India's Leap Toward Strategic
Semiconductor Self-Reliance****WHY IN THE NEWS?**

- India has unveiled the **DHRUV 64 microprocessor**, a domestically designed 64-bit processor for strategic and commercial applications.
- It strengthens India's **semiconductor indigenisation mission** under Make in India and Digital India.
- Positioned to reduce reliance on foreign chip ecosystems in defence, space, and critical infrastructure.

SUMMARY

- DHRUV 64 is a 64-bit Indian microprocessor developed to support defence-grade computing, space systems, embedded electronics, and critical digital infrastructure.
- Built on an indigenous architecture, it aims to enhance supply chain security, reduce import dependency,

and expand India's semiconductor ecosystem.

- With applications ranging from avionics to industrial automation, DHRUV 64 signals a shift in India's strategic tech profile and aligns with national goals of digital sovereignty.

BACKGROUND / CONTEXT

- I. India imports over **90% of high-performance chips**, creating strategic vulnerabilities.
- II. Global supply chain crises and geopolitical shocks accelerated domestic innovation.
- III. The launch follows previous indigenous processors like **SHAKTI (RISC-V)** and **VEGA series**.
- IV. DHRUV 64 represents the next step toward building a **trusted, sovereign semiconductor stack**.

KEY HIGHLIGHTS**1 Architecture & Performance**

- 64-bit micro-architectural design for high-throughput computational tasks.
- Optimised for real-time processing and mission-critical workloads.

2 Security & Trust Features

- Built-in hardware encryption readiness and tamper-resistant architecture.
- Trusted execution layers for defence and cyber-security environments.

3 Industrial & Defence Applications

- Suitable for **weapons systems, navigation modules, UAVs,**



communication systems, and satellites.

- Compatible with rugged operational conditions (thermal & radiation resilience).

4 Embedded Systems & Automation

- Adaptable to IoT, robotics, sensor grids, and smart manufacturing.
- Low power consumption models for mobile/portable systems.

5 Strategic Value

- Reduces import reliance from global chip hubs.
- Positions India as a future contributor to **global semiconductor supply chains**.

PRELIMS BOOSTER BOX

- **Microprocessor:** CPU on a chip executing program instructions.
- **64-bit:** Can process data in 64-bit chunks; enables larger memory & performance gains.
- **RISC Architecture:** Reduced instruction set computing for efficiency.
- **Trusted Computing:** Hardware-based security for secure computation.
- **India Semiconductor Mission:** National strategy for fab & design ecosystem.

PadhAI PYQ BOOSTER SECTION

“Discuss the significance of indigenous microprocessors in strengthening India’s

national security and digital sovereignty. Use examples.”

PadhAI MAINS PRACTICE QUESTION

“Indigenous processors like DHRUV 64 are more than technological milestones; they represent strategic insulation in a volatile semiconductor world. Analyse.” (250 words)

PadhAI-GENERATED UPSC MCQ

Consider the following statements regarding DHRUV 64:

1. It is a 64-bit microprocessor designed indigenously in India.
2. It is developed primarily for strategic applications in defence and space.
3. It is based on imported proprietary cores and cannot be modified domestically.

Which of the statements given above are correct?

- A. 1 and 2 only
- B. 2 and 3 only
- C. 1 only
- D. 1, 2 and 3

Answer: A

(Statement 3 is incorrect – the processor is designed for domestic modification and security.)

8. Macrophage Metabolism Identified as Key to Shortening Tuberculosis Treatment Duration



WHY IN THE NEWS?

- New research indicates that altering **macrophage metabolism** could significantly reduce TB treatment time.
- The discovery may support **host-directed therapies (HDTs)** to boost patient immunity alongside medicines.
- Holds potential to reduce reliance on prolonged antibiotic courses and improve treatment outcomes.

SUMMARY

- Scientists have identified metabolic pathways in **macrophages**, the immune cells responsible for engulfing TB bacteria, that can be targeted to enhance bacterial clearance.
- Modulating these pathways increases the cells' ability to kill *Mycobacterium tuberculosis*, enabling more effective immune response and potentially **shorter treatment durations**.
- The findings open avenues for host-directed therapies that could complement existing anti-TB drugs, especially against drug-resistant strains.

BACKGROUND / CONTEXT

- I. TB remains a leading infectious disease in India, requiring **6–24 months of treatment**.
- II. Current drugs target the pathogen, but host immunity is often weakened or slow to respond.
- III. **Macrophages** are the first responders to TB infection; bacteria can survive inside them by manipulating cellular metabolism.

- IV. Enhancing macrophage metabolic activity may improve intracellular clearance and limit bacterial persistence.

KEY HIGHLIGHTS

1 Host-Directed Therapy (HDT) Potential

- Focuses on strengthening patient immune response rather than only killing bacteria.

2 Warburg-Like Metabolic Shift

- Reprogramming cells to favour metabolic states that increase **reactive oxygen species (ROS)** and pathogen-killing activity.

3 Reduced Treatment Duration

- Faster bacterial clearance lowers risk of relapse and multidrug-resistant TB (MDR-TB).

4 Implications for Drug Resistance

- Useful against strains resistant to rifampicin and isoniazid, where traditional therapies weaken.

5 Integrated TB Management Strategy

- Combines antibiotics + metabolic targeting: **dual-approach TB therapy** for national programmes.

PRELIMS BOOSTER BOX



- **Macrophage:** Immune cell that engulfs pathogens (phagocytosis).
- **Immunometabolism:** Link between cellular metabolism & immune function.
- **HDT:** Host-directed therapy to boost immune capacity.
- **MDR-TB:** Resistant to at least isoniazid & rifampicin.
- **ROS:** Reactive molecules used by cells to destroy pathogens.

PadhAI PYQ BOOSTER SECTION

“How can host-directed therapies complement conventional drug protocols in managing tuberculosis in India?”

PadhAI MAINS PRACTICE QUESTION

“**Macrophage-targeted immunometabolic interventions may be the breakthrough India needs to reduce TB treatment duration. Evaluate the scientific and public health significance of this approach.**” (250 words)

PadhAI-GENERATED UPSC MCQ

Consider the following statements regarding macrophage metabolism in TB treatment:

1. Modifying macrophage metabolism can enhance their ability to kill TB bacteria.
2. Host-directed therapy aims to strengthen the patient's immune response to infection.
3. Macrophages are adaptive immune cells that produce antibodies to destroy bacteria.

Which of the statements given above are correct?

- A. 1 and 2 only
- B. 2 and 3 only
- C. 1 only
- D. 1, 2 and 3

Answer: A

(Statement 3 is incorrect — macrophages are part of the **innate immune system**, not antibody-producing cells.)

9. Electrons Reveal Thorium's Nuclear Tick: Breakthrough in Probing Nuclear Structure via Electron Signatures

WHY IN THE NEWS?

- Scientists have discovered that **electron behaviour around thorium atoms** can reveal internal nuclear vibrations known as a “**nuclear tick.**”
- This offers a new method to study **nuclear structure and energy states** without direct nuclear-level experiments.
- The finding holds significance for **nuclear clocks, quantum metrology, and future energy research.**

SUMMARY

- Researchers have shown that electrons orbiting thorium atoms respond to subtle nuclear vibrations, allowing measurement of nuclear transitions indirectly.
- This “nuclear tick” provides a pathway for developing **nuclear clocks**, which are significantly more precise than atomic clocks.



- The breakthrough could transform precision measurement technology, improve quantum research tools, and deepen understanding of nuclear physics.
- Thorium's unique nuclear properties make it a promising candidate for **next-generation metrology and stable energy science**.

BACKGROUND / CONTEXT

- I. Standard atomic clocks measure time based on **electron transitions** in atoms.
- II. Nuclear clocks would instead use **nuclear energy transitions**, which are more stable and less affected by environmental noise.
- III. Thorium-229 is known to possess a **low-energy nuclear state**, ideal for measurements and timekeeping.
- IV. Detecting nuclear states is usually difficult; this method offers a **non-invasive pathway** through electron behaviour.

KEY HIGHLIGHTS

1 Electron-Nucleus Interaction

- Electrons respond to nuclear vibrations → acts as a **measurement proxy**.
- Enables mapping nuclear dynamics indirectly.

2 Thorium-229 Advantage

- Possesses a rare, low-energy excited nuclear state.
- Easier to probe compared to other elements.

3 Nuclear Clocks Possibility

- Could outperform atomic clocks by several magnitudes.
- Leads to **ultra-accurate timekeeping** for satellites, GPS, & physics labs.

4 Quantum & Metrology Leap

- Enables new precision standards for science and engineering.
- Potentially refines physical constants and tests **fundamental laws**.

5 Relevance for India

- India holds **large thorium reserves**, especially in Kerala monazite sands.
- Technological breakthroughs could enhance **India's nuclear research roadmap**.

PRELIMS BOOSTER BOX

- **Thorium-229:** Isotope with low-energy nuclear transition.
- **Nuclear Clock:** Timekeeping device using nuclear excitation states.
- **Spectroscopy:** Technique to detect atomic/nuclear energy levels.
- **Electron Coupling:** Interaction between electrons & nuclear fields.
- **Monazite Sands:** Major thorium source (India's coastal regions).

PadhAI PYQ BOOSTER SECTION

“How can advancements in precision metrology transform scientific research and national security systems? Discuss with recent technological developments.”

PadhAI MAINS PRACTICE QUESTION



“Thorium’s nuclear tick represents a paradigm shift in how we measure time and study nuclear structure. Examine its implications for precision science, technology, and India’s strategic research priorities.” (250 words)

PadhAI-GENERATED UPSC MCQ

Consider the following statements:

1. Thorium-229’s nuclear state can be studied indirectly using electronic transitions.
2. Nuclear clocks are expected to be more stable and accurate than atomic clocks.
3. India has minimal thorium reserves and depends heavily on imports for research.

Which of the statements given above are correct?

- A. 1 and 2 only
- B. 2 and 3 only
- C. 1 only
- D. 1, 2 and 3

Answer: A

(Statement 3 is incorrect — India has **one of the world’s largest thorium reserves.**)

10. Superkilonova Double Whammy: Dual Cosmic Explosion Reveals New Clues on Heavy Element Creation



WHY IN THE NEWS?

- Astronomers observed an extremely rare **“Superkilonova Double Whammy”**, a dual-phase cosmic explosion following a neutron star merger.
- The event produced **two distinct high-energy outbursts**—a kilonova and an enhanced secondary explosion.
- It provides new insights into **gravitational wave astronomy, heavy element synthesis, and cosmic evolution.**

SUMMARY

- A Superkilonova Double Whammy refers to a neutron star collision producing not just a standard kilonova, but a second, stronger energy burst shortly afterward.
- This dual explosion increases the production of heavy elements like gold, platinum, and uranium, and offers clues to how matter and elements formed in the early universe.



- The observation strengthens links between **gravitational waves, gamma-ray bursts, and cosmic nucleosynthesis**.

BACKGROUND / CONTEXT

- I. A **kilonova** occurs when neutron stars merge, emitting gravitational waves and gamma radiation.
- II. These events are major sources of **r-process nucleosynthesis**, forming heavy elements.
- III. A **Superkilonova Double Whammy** adds a second stage, possibly triggered by a brief black hole formation or hypermassive neutron star collapse.
- IV. Links astrophysics with **LIGO–Virgo gravitational wave data** and space-based telescopes.

KEY HIGHLIGHTS

1 Neutron Star Merger

- Extreme gravitational collapse leads to enormous energy release.
- Creates conditions hotter and denser than stellar cores.

2 Two-Stage Explosion

- First: Classic kilonova with heavy element formation.
- Second: Extra energy burst amplifies ejecta velocity & luminosity.

3 Heavy Element Factory

- R-process nucleosynthesis boosted → higher yield of rare elements.

- Validates theories on cosmic origin of **precious metals**.

4 Gravitational Wave–Gamma Link

- Reinforces the relationship between spacetime ripples and particle jets.
- Advanced multimessenger astronomy (GW + EM signals).

5 Implications for Cosmology

- Helps estimate neutron star population & merger rates.
- Supports dark matter & dark energy research through cosmic background mapping.

PRELIMS BOOSTER BOX

- **Neutron Star:** Extremely dense remnant of a supernova.
- **Kilonova:** Merger explosion of neutron stars.
- **R-process:** Rapid neutron capture process forming heavy elements.
- **Gravitational Waves:** Ripples in spacetime predicted by Einstein.
- **Multimessenger Astronomy:** Studying events via light + particles + gravitational waves.

PadhAI PYQ BOOSTER SECTION

“How do gravitational wave observations enhance our understanding of the origin of heavy elements and the evolution of the universe?”



PadhAI MAINS PRACTICE QUESTION

“The Superkilonova Double Whammy phenomenon challenges traditional models of element synthesis and cosmic energy distribution. Examine its implications for cosmology and multimessenger astronomy.” (250 words)

PadhAI-GENERATED UPSC MCQ

Consider the following statements regarding a Superkilonova Double Whammy:

1. It results from the merger of two neutron stars.
2. It involves two successive cosmic explosions, increasing heavy element formation.
3. It has no connection to gravitational wave emissions.

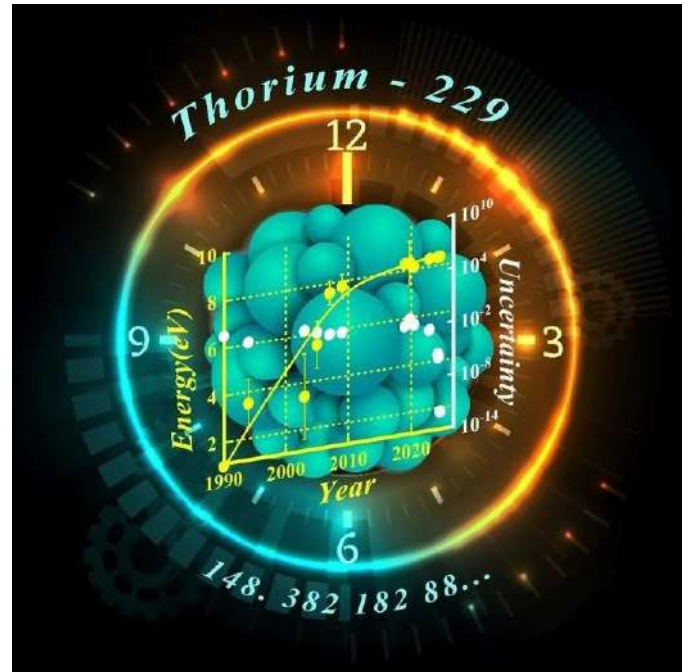
Which of the statements given above are correct?

- A. 1 and 2 only
B. 2 and 3 only
C. 1 only
D. 1, 2 and 3

Answer: A

(Statement 3 is incorrect – these events are major sources of gravitational waves.)

11.Thorium-229 Solid-State Nuclear Clock: A Breakthrough in Ultra-Precise Timekeeping Technology



WHY IN THE NEWS?

- Scientists have demonstrated progress toward building a **solid-state nuclear clock** using **Thorium-229**, known for its uniquely low-energy nuclear transition.
- The clock promises accuracy far beyond present-day atomic clocks used in GPS and satellite systems.
- Marks a shift in quantum timekeeping, metrology, and strategic technologies.

SUMMARY

- The Thorium-229 solid-state nuclear clock leverages a special nuclear state that oscillates at a highly stable frequency, enabling time measurement more precisely than electron-based atomic clocks.



- Because nuclear transitions are less affected by environmental noise, this innovation could revolutionise navigation, quantum computing, and space-time research.
- The technology opens new scientific and strategic avenues, especially for countries with strong thorium reserves like India.

BACKGROUND / CONTEXT

- I. **Atomic clocks** measure time via electron energy transitions; widely used in GPS satellites and telecommunications.
- II. **Nuclear clocks** use **nuclear energy levels**, making them more stable and resistant to thermal, magnetic, and electric interference.
- III. Thorium-229's isomeric state has the **lowest-known nuclear excitation energy**, ideal for solid-state timekeeping.
- IV. Embedding Th-229 in crystals or optical materials stabilises the signal for practical clock design.

KEY HIGHLIGHTS

1 Thorium-229 Isomer Advantage

- The unique nuclear state allows energy transition measurable with laser systems.
- Creates a time-keeping "tick" with minimal environmental disturbance.

2 Solid-State Integration

- More compact and rugged than atomic fountain clocks.

- Enables clock development in chip-scale or satellite-grade formats.

3 Quantum Stability

- Resistant to electromagnetic noise → improved reliability for space missions.
- Potential standard for defining **future SI second**.

4 Strategic Applications

- Defence targeting systems, autonomous navigation, encrypted communications.
- Fundamental physics tests: relativity, gravitational waves, dark matter.

5 Relevance for India

- India holds **large thorium reserves** along the coasts; synergy with nuclear tech roadmap.
- Fits within India's **three-stage nuclear programme** and precision science capability building.

PRELIMS BOOSTER BOX

- **Nuclear Clock:** Timekeeping device based on nuclear transitions.
- **Th-229 Isomer:** Low-energy nuclear excitation ideal for spectroscopy.
- **Metrology:** Study of measurement standards and precision.
- **Time Dilation:** Relativity phenomenon measurable via precise clocks.
- **Indigenous Navigation:** NavIC – India's regional satellite navigation system.



PadhAI PYQ BOOSTER SECTION

“How can advancements in quantum-based timekeeping redefine strategic navigation, defence communication, and scientific research in India?”

PadhAI MAINS PRACTICE QUESTION

“Thorium-229 based nuclear clocks represent a paradigm shift from electron-level to nucleus-level timekeeping. Discuss their scientific advantages and strategic relevance for India.” (250 words)

PadhAI-GENERATED UPSC MCQ

Consider the following statements:

1. Thorium-229 is used in nuclear clocks due to its uniquely low-energy nuclear state.
2. Nuclear clocks are more susceptible to electromagnetic interference than atomic clocks.
3. Solid-state nuclear clocks may enhance satellite navigation accuracy.

Which of the statements given above are correct?

- A. 1 and 3 only
B. 1 only
C. 2 and 3 only
D. 1, 2 and 3

Answer: A

(Statement 2 is incorrect – nuclear clocks are **less** susceptible to interference.)

12.LVM3-M6 Mission: ISRO Launches Heaviest Satellite BlueBird Block-2

WHY IN THE NEWS?

- ISRO successfully conducted the **LVM3-M6 mission**, placing the **BlueBird Block-2 satellite** into its designated orbit.
- This mission marked the launch of the **heaviest satellite carried by an Indian launch vehicle**, demonstrating enhanced heavy-lift capability.
- The launch strengthens India’s position as a reliable global launch service provider for next-generation communication satellites.

SUMMARY

- ISRO’s LVM3-M6 mission successfully launched the BlueBird Block-2 satellite, the heaviest satellite deployed by an Indian rocket to date.
- The mission validated the LVM3’s upgraded performance, precision guidance, and reliability for heavy commercial payloads.
- BlueBird Block-2 is designed to enable advanced space-based mobile broadband connectivity.
- This milestone reinforces India’s growing role in the global space economy and its capability to support complex, high-mass satellite missions.

BACKGROUND / CONTEXT

- LVM3 is ISRO’s most powerful operational launch vehicle, originally developed for human spaceflight and heavy payload missions.
- With multiple successful missions, LVM3 is now positioned for



commercial heavy-satellite launches alongside strategic national missions.

- BlueBird Block-2 belongs to a new class of satellites designed to deliver **direct-to-device broadband connectivity**, especially in remote and underserved regions.
- The mission reflects India's transition from primarily national launches to a competitive global launch services ecosystem.

KEY HIGHLIGHTS

1 Heavy-Lift Capability Demonstrated

LVM3 successfully carried and deployed the heaviest satellite launched from Indian soil.

2 Precision Mission Execution

All flight stages, guidance systems, and separation events performed nominally.

3 Commercial Space Milestone

The mission underscores India's growing credibility in launching large, high-value commercial satellites.

4 Technology Maturity

Validated propulsion, avionics, and structural systems critical for future deep-space and human missions.

PRELIMS BOOSTER BOX

- **LVM3:** ISRO's heavy-lift launch vehicle capable of carrying large payloads.
- **Heavy-Lift Launch Vehicle:** Rocket designed to place high-mass satellites into orbit.
- **Commercial Launch:** Satellite launch service provided for domestic or foreign clients.
- **Direct-to-Device Connectivity:** Satellite communication enabling

direct mobile network access without ground towers.

PYQ BOOSTER SECTION

"Discuss the importance of heavy-lift launch vehicles in expanding a country's commercial and strategic space capabilities."

PadhAIMAINS PRACTICE QUESTION

"Analyse the significance of the LVM3-M6 mission in strengthening India's heavy-lift launch capability and its implications for the global space economy." (250 words)

PadhAI-GENERATED UPSC MCQ

Consider the following statements:

1. LVM3 is ISRO's most powerful operational launch vehicle.
2. Heavy-lift launch vehicles are primarily meant only for human spaceflight missions.
3. Launching high-mass commercial satellites enhances a country's position in the global space market.

Which of the statements given above are correct?

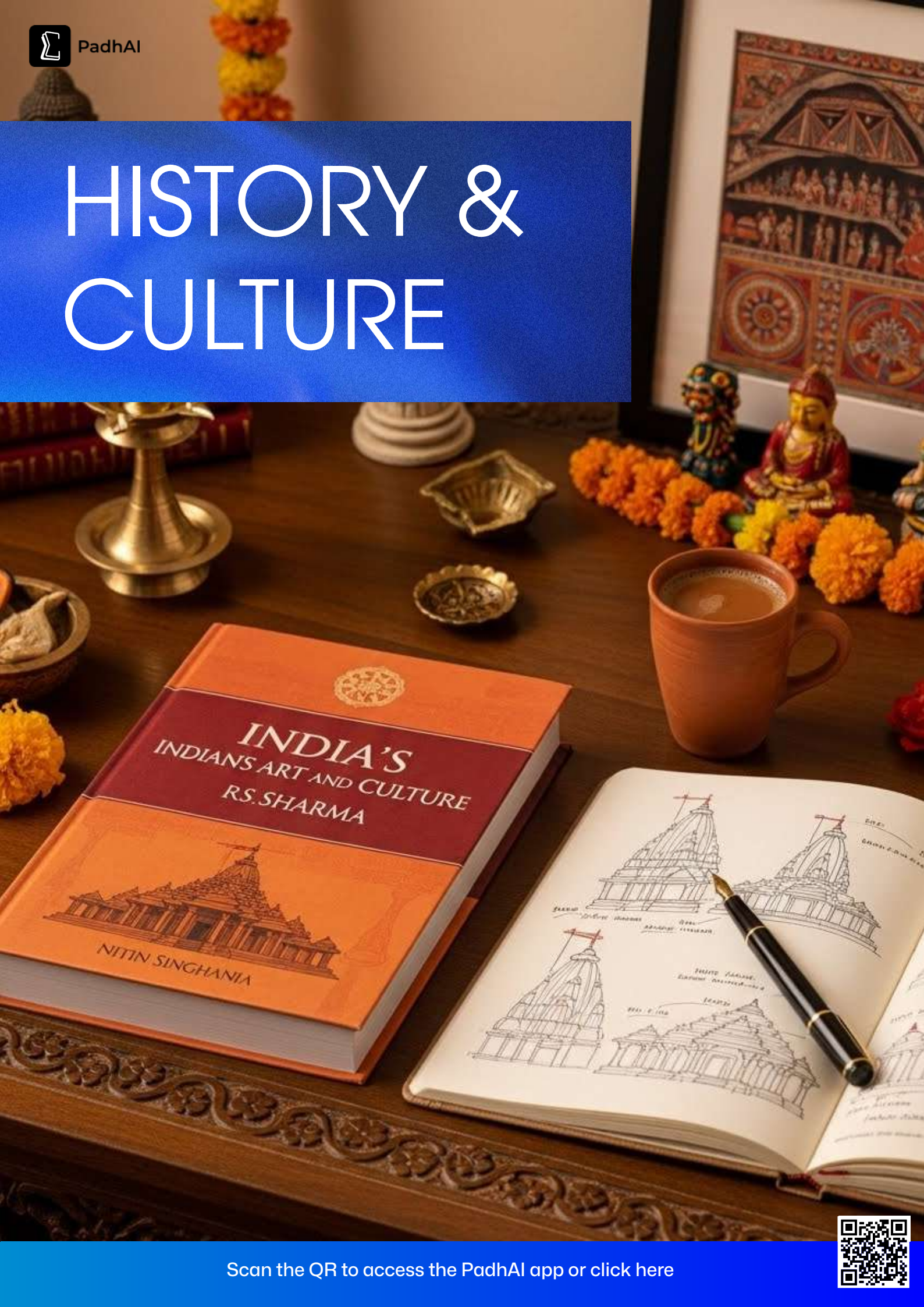
- A. 1 and 3 only
- B. 1 and 2 only
- C. 2 and 3 only
- D. 1, 2 and 3

Answer: A

(Statement 2 is incorrect; heavy-lift vehicles are used for both human and large commercial payload missions.)



HISTORY & CULTURE



1. Historical Importance of Sittanavasal: A Classical Jain Heritage Site of Tamil Nadu



WHY IN THE NEWS?

- Recently highlighted by the Archaeological Survey of India (ASI) under its heritage conservation initiatives.
- Tourism Department of Tamil Nadu announced renewed efforts to promote Sittanavasal as a major heritage-tourism circuit.
- Scholars revisited the cave art to assess its historical linkages with early Jain settlements in South India.

SUMMARY

- Sittanavasal, located in Pudukottai district of Tamil Nadu, is an ancient Jain heritage site known for its rock-cut cave temple, megalithic burial sites, and vibrant 7th-century mural paintings.
- The site reflects the continuity of Jain traditions under the Pandya rulers and stands as an important example of early Indian fresco art, predating even the later Chola murals.

- The unique depiction of lotus ponds, dancers, monks, and flora makes Sittanavasal a culturally and artistically significant monument.

BACKGROUND / CONTEXT

- I. Sittanavasal means “**the abode of great saints**” (Siddhanam vazhal).
- II. It was a major **Jain monk settlement** from the **2nd century BCE**, flourishing under the **Pandya dynasty**.
- III. The site includes:
 - ✓ A rock-cut cave temple (Arivar Koil)
 - ✓ Megalithic burial sites
 - ✓ Jain beds (Ezhadippattam)
 - ✓ Early medieval mural paintings
- IV. The murals represent the **Panduvarpalli** style, one of the earliest surviving Indian mural traditions, created using the **fresco-secco** technique.
- V. It forms an important node in the chain of South Indian Jain heritage sites like Kalugumalai and Arittapatti.

KEY HIGHLIGHTS

- **Arivar Koil (Cave Temple):** Carved during the 7th century by Pallava king Mahendravarman I before his conversion to Shaivism.
- **Mural Paintings:** Depict lotus ponds, monks harvesting lotus, animals, dancers, and mythical creatures – showing rare mastery in colour and composition.
- **Inscriptions:** Tamil-Brahmi inscriptions revealing the presence of Jain monks and donors.
- **Jain Beds (Ezhadippattam):** 17 stone beds used by monks for meditation.



- **Architecture:** Combines elements of rock-cut architecture similar to Ajanta but with distinct Tamil-Jain features.
- **Cultural Linkages:** Reflects how Jainism influenced Tamil social and artistic life.

PRELIMS BOOSTER BOX

High-yield facts:

- Location: Pudukottai district, Tamil Nadu
- Religion: Jainism (Digambara influence)
- Important site features: Arivar Koil, Ezhadippattam, Megalithic tombs
- Technique: Fresco-secco mural painting
- Dynasty involvement: Early Pandya, later Pallavas
- Inscriptions: Tamil-Brahmi
- Rock-cut features: Similar to Kalugumalai Jain beds

PadhAI PYQ BOOSTER SECTION

Q. (UPSC 2020 – Art & Culture)

With reference to ancient Indian paintings, which of the following sites contain evidence of mural traditions prior to the emergence of Chola murals? (Similar theme)

Q. (UPSC 2017 – Culture)

Discuss how Jainism influenced art and architecture in ancient India. (Mains-style PYQ connected to theme)

PadhAI MAINS PRACTICE QUESTION

“Sittanavasal murals represent a unique blend of Jain philosophy, Tamil cultural

expression, and early medieval art traditions.” Elaborate. (250 words)

PadhAI-GENERATED UPSC MCQ

Q. Consider the following statements regarding Sittanavasal:

1. The cave temple at Sittanavasal was commissioned during the Pallava period.
2. The mural paintings found here follow the fresco-secco technique.
3. Sittanavasal primarily represents early Buddhist monastic traditions.

Which of the above statements is/are correct?

- A. 1 and 2 only
- B. 2 only
- C. 1 and 3 only
- D. 1, 2 and 3

Answer: A (Statements 1 and 2 are correct; Statement 3 is incorrect as the site is Jain, not Buddhist).

2. “Adi Sanskriti” Digital Learning Platform Launched to Preserve and Promote Tribal Heritage



WHY IN THE NEWS?

- The Government of India launched the **“Adi Sanskriti” Digital Learning Platform** to digitise, preserve, and disseminate India’s rich tribal heritage.
- The platform provides structured learning modules on tribal art, culture, languages, crafts, and indigenous knowledge systems.
- It aligns with national efforts under the Ministry of Tribal Affairs to strengthen cultural preservation, digital inclusion, and livelihood enhancement.

SUMMARY

- “Adi Sanskriti” is a digital learning platform designed to promote and protect tribal cultural heritage through interactive modules, multimedia resources, and community-led knowledge-sharing.
- Developed by the Ministry of Tribal Affairs, it offers curated content on tribal languages, art forms, folklore, traditional knowledge, and crafts.
- The platform aims to digitally empower tribal communities, support cultural preservation, promote skill development, and foster nationwide awareness about India’s indigenous heritage.

BACKGROUND / CONTEXT

- I. India is home to **705 Scheduled Tribes**, each with unique cultural, linguistic, and artistic traditions.

- II. Rapid modernisation and migration have placed many tribal knowledge systems at risk.
- III. Digital platforms ensure **preservation of intangible heritage** and provide access to younger generations.
- IV. The initiative complements policy efforts like PM-JANMAN and the Tribal Talent Pool to bridge socio-economic and digital gaps.
- V. “Adi Sanskriti” represents a cultural technology model combining education, documentation, and community engagement.

KEY HIGHLIGHTS

1. Curated Digital Content

- Modules on tribal folklore, mythology, festivals, lifestyle, and oral traditions.
- High-quality videos, e-books, audio recordings, and interactive illustrations.

2. Preservation of Tribal Languages

- Language-learning tools for endangered tribal languages.
- Digital dictionaries and pronunciation guides developed with local speakers.

3. Promotion of Tribal Art and Craft

- Tutorials on Warli art, Pithora painting, Dokra metalwork, bamboo crafts, textiles, and beadwork.
- Direct linkages with TRIFED and artisans for skill development and marketing.



4. Indigenous Knowledge Systems

- Content on traditional medicine, ecological knowledge, sustainable forestry, agriculture, and cultural rituals.

5. Education & Capacity Building

- Teachers' resources and student activity kits.
- Certification modules for tribal youth to support livelihoods.

6. Community Ownership

- Local tribal experts, women's groups, artisans, and youth participate in content creation.
- Ensures authenticity and community-driven representation.

PRELIMS BOOSTER BOX

- **TRIFED:** Tribal Cooperative Marketing Development Federation.
- **VDVK:** Van Dhan Vikas Kendra for MFP-based livelihood promotion.
- **UNDRIP:** UN framework protecting indigenous rights.
- **PVTGs:** 75 Particularly Vulnerable Tribal Groups in India.
- **Notable Tribal Art Forms:** Warli (Maharashtra), Saura (Odisha), Pithora (Gujarat-MP), Dokra (metallurgy).

PadhAI PYQ BOOSTER SECTION

Q. (UPSC GS1 – 2015 Mains)

“Discuss the challenges faced by tribal communities in preserving their cultural identity.”

Q. (UPSC Prelims – Theme-Based)

Questions on tribal art, PVTGs, forest-based livelihoods, TRIFED.

PadhAI MAINS PRACTICE QUESTION

“Digital platforms like ‘Adi Sanskriti’ can transform tribal cultural preservation and livelihood generation.” Examine key features and discuss their implications for tribal empowerment. (250 words).

PadhAI-GENERATED UPSC MCQ

Q. With reference to the ‘Adi Sanskriti’ Digital Learning Platform, consider the following statements:

1. The platform aims to digitise and promote tribal languages and indigenous knowledge systems.
2. It is implemented solely by TRIFED under the Ministry of Commerce.
3. It focuses on skill training and cultural documentation for tribal communities.

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

Answer: A

(Statement 2 is incorrect – the platform is led by the Ministry of Tribal Affairs, not TRIFED alone.)



3. Kashi–Tamil Sangamam: Reaffirming India’s Civilisational and Cultural Unity



WHY IN THE NEWS?

- The Government recently reviewed progress under **Kashi–Tamil Sangamam**, an initiative celebrating the civilisational bond between Varanasi (Kashi) and Tamil Nadu.
- New cultural exchanges, academic dialogues, and tourism activities were announced as part of the ongoing *Ek Bharat Shreshtha Bharat* effort.
- The programme continues to promote cultural integration, linguistic appreciation, and historical linkages.

SUMMARY

- Kashi–Tamil Sangamam is a cultural outreach programme highlighting the deep historical, spiritual, and cultural connection between Kashi and Tamil Nadu.
- The initiative facilitates academic exchanges, pilgrimages, exhibitions, classical performances, and cross-cultural interactions.
- It aims to strengthen India’s civilisational continuity and national

unity under the *Ek Bharat Shreshtha Bharat* framework.

- The event promotes mutual understanding of traditions, knowledge systems, literature, and temple heritage from both regions.

BACKGROUND / CONTEXT

- I. Kashi (Varanasi) is one of India’s oldest living cities; Tamil Nadu has a continuous tradition of classical literature, Bhakti culture, and temple heritage.
- II. Historical links:
 - ✓ Shaiva & Vaishnava traditions flourished in both regions.
 - ✓ Tamil saints like Appar, Sambandar, and others referenced Kashi in devotional literature.
 - ✓ Scholars, pilgrims, and traders historically moved between Kashi and Tamil regions.
- III. The initiative strengthens cultural ties through people-to-people connections and inter-state understanding under *Ek Bharat Shreshtha Bharat*.

KEY HIGHLIGHTS

1. Cultural Engagement

- Festivals showcasing Tamil classical music, Bharatanatyam, folk arts, and Kashi cultural traditions.
- Temple heritage discussions, Yatras, and sacred geography tours.



2. Academic and Knowledge Exchanges

- Joint seminars between BHU, IIT Madras, and Tamil universities.
- Sessions on ancient sciences, philosophy, literature, architecture, and traditional crafts.
- Documentation of shared knowledge systems (Ayurveda–Siddha links).

3. Pilgrimage and Tourism Boost

- Special railway and travel packages for visitors from Tamil Nadu.
- Heritage walks, Ganga aarti events, temple visits, and river–culture experiences.

4. Community & Youth Participation

- Artisans, weavers, students, farmers, and cultural experts integrated into the programme.
- Showcases handicrafts like Kanchipuram silk, Banarasi silk, metalwork, and woodcraft.

5. Economic Dimensions

- Promotion of traditional products through exhibitions and buyer–seller meets.
- Strengthening crafts–based livelihoods.

PRELIMS BOOSTER BOX

- **Ek Bharat Shreshtha Bharat:** Initiative promoting inter–state cultural exchange.

- **Kashi (Varanasi):** One of the oldest continuously inhabited cities; seat of Hindu learning.
- **Tamil Bhakti Movement:** Saints such as Appar, Sambandar, Sundarar contributed to Shaiva traditions.
- **BHU (Banaras Hindu University):** Major centre for Sanskrit, philosophy, Indology.
- **Classical Languages of India:** Tamil is the oldest recognised classical language.

PadhAI PYQ BOOSTER SECTION

Q. (UPSC GSI – Mains 2014)

“Discuss the significance of Bhakti literature in promoting cultural unity in India.”

Q. (UPSC Prelims – Theme–Based)

Questions on classical languages, temple architecture, and cultural programs.

PadhAI MAINS PRACTICE QUESTION

“Kashi–Tamil Sangamam strengthens India’s cultural unity by rediscovering shared civilisational linkages.” Discuss the historical roots and contemporary relevance of this initiative. (250 words)

PadhAI–GENERATED UPSC MCQ

Q. With reference to the Kashi–Tamil Sangamam initiative, consider the following statements:

1. It is implemented under the framework of Ek Bharat Shreshtha Bharat.
2. It focuses exclusively on religious activities without academic components.



3. It highlights historical connections between Kashi and Tamil Nadu.

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

Answer: A

(Statement 2 is incorrect – academic exchanges are a major component.)



1. National Task Force on Student Mental Health & Suicide Prevention Submits Interim Report to the Supreme Court (6 November 2025)

WHY IN THE NEWS?

- The **National Task Force (NTF)** constituted by the Supreme Court submitted its **interim report** on student mental health and suicide prevention on **6 November 2025**.
- The report highlights urgent interventions required in educational institutions amid rising student suicides, especially in competitive exam hubs.
- It proposes structural reforms in counselling systems, academic pressure management, and institutional accountability.

SUMMARY

- On 6 November 2025, the National Task Force on Student Mental Health and Suicide Prevention submitted its interim findings to the Supreme Court.
- The report identifies systemic stressors—academic pressure, unsafe hostel environments, lack of counsellors, and unregulated coaching practices—as major contributors to student distress.
- It recommends a national mental health framework, mandatory counsellors, peer support groups, standardised grievance redressal, and measures to reduce academic toxicity.
- The Court will review recommendations for nationwide implementation.

BACKGROUND / CONTEXT

- I. India faces a rising mental health crisis among students, with thousands of suicides reported annually—highest globally in student category.
- II. Academic pressure in coaching hubs like Kota, Hyderabad, and Delhi NCR has triggered national concern.
- III. In early 2024, the Supreme Court initiated suo motu proceedings and set up the National Task Force comprising psychiatrists, education experts, psychologists, child-rights activists, and government representatives.
- IV. The interim report focuses on **systemic reforms**, not merely individual counselling.
- V. National Mental Health Programmes (NMHP), Tele-MANAS, and MANODARPAN provide partial support but lack institutional integration.

KEY HIGHLIGHTS

1. Mandatory Mental Health Infrastructure

- At least **one trained counsellor per 300 students**.
- Establishment of **Student Well-being Cells** in all institutions.
- Regular psychological screening and early identification of at-risk students.

2. Regulation of Coaching Centres

- Licensing and academic pressure guidelines.
- Restrictions on excessive tests, ranking displays, and public shaming.



- Mandatory parent orientation and mental health support.

3. Safe Hostel & Institutional Environment

- 24×7 wardens trained in mental health first aid.
- Anti-bullying, anti-discrimination, and anti-harassment protocols.
- Preventive monitoring for first-year and migrant students.

4. Academic Reforms

- Reduced weightage on high-stakes exams.
- Flexible assessment structures.
- Integration of socio-emotional learning (SEL) curriculum.

5. Strengthening Digital and Community Support

- Expansion of **Tele-MANAS** helplines specific to students.
- Peer-support groups, buddy systems, and crisis intervention teams.
- Collaboration with district mental health programmes.

6. Institutional Accountability

- Mandatory reporting of self-harm attempts and mental health emergencies.
- Annual mental health audits of educational institutions.
- Penalties for coaching centres violating safety guidelines.

7. Recommendations for National Framework

- A unified **National Student Mental Health Policy**.
- Clear protocols for suicide prevention, post-vention, and emergency response.
- Database on student mental health indicators.

PRELIMS BOOSTER BOX

- **Mental Healthcare Act 2017:** Guarantees right to mental healthcare.
- **Tele-MANAS:** National tele-mental health helpline (24×7).
- **MANODARPAN:** MoE initiative for student psychological support.
- **Suicide Prevention Strategies:** WHO LIVE LIFE framework.
- **National Task Force:** Expert body formed by Supreme Court.
- **Key Term:** Psychosocial First Aid (PFA).

PadhAI PYQ BOOSTER SECTION

Q. (UPSC 2021 – GS2 Mains)

“Discuss the challenges related to mental health in India and evaluate government initiatives addressing them.”

Q. (UPSC Prelims – Theme-Based)

Questions on Mental Healthcare Act, suicide data, and health schemes.

PadhAI MAINS PRACTICE QUESTION

“The rising rate of student suicides in India signals systemic failures in educational and



mental health governance.” Examine the key recommendations of the National Task Force and their potential impact. (250 words)

PadhAI-GENERATED UPSC MCQ

Q. With reference to the National Task Force on Student Mental Health and Suicide Prevention, consider the following statements:

1. It was constituted by the Supreme Court of India to examine systemic reforms in education-related mental health.
2. The Task Force recommended mandatory presence of counsellors in all schools and colleges.
3. Tele-MANAS is a community mental health initiative under the Ministry of Education.

Which of the statements given above is/are correct?

- A. 1 and 2 only
- B. 2 only
- C. 1 and 3 only
- D. 1, 2 and 3

Answer: A

(Statement 3 is incorrect – Tele-MANAS is under the Ministry of Health & Family Welfare.)

2. Carceral Culture: Punishment, Power and the Crisis of Human Dignity

WHY IN THE NEWS?

- Rising debates around **undertrial incarceration**, custodial violence, and

prison overcrowding have brought attention to India’s **carceral culture**.

- Judicial observations and rights reports have flagged **excessive reliance on incarceration** over reformatory justice.
- The issue has gained prominence amid concerns about **civil liberties, police excesses, and access to justice**.

SUMMARY

- Carceral culture refers to a system that prioritises punishment, surveillance, and incarceration over rehabilitation and justice.
- In India, this manifests in overcrowded prisons, prolonged undertrial detention, custodial violence, and systemic neglect of prisoner rights.
- Despite constitutional safeguards, the carceral mindset disproportionately affects the poor and marginalised.
- Reforming this culture requires shifting from punitive control to rights-based, reformatory, and humane criminal justice practices.

BACKGROUND / CONTEXT

- **Carceral culture** originates from criminological thought describing societies that rely excessively on prisons and coercive policing.
- India’s criminal justice system inherited **colonial-era laws and policing models**, designed for control rather than rights.



- As per NCRB data, **over 75% of prisoners are undertrials**, many jailed for minor offences.
- Structural issues include slow trials, bail as exception, and criminalisation of poverty.
- Constitutional protections (Articles 14, 20, 21, 22) aim to limit arbitrary detention but face weak enforcement.

KEY HIGHLIGHTS

1. Undertrial Dominance

- The majority of prisoners are awaiting trial, not convicted.
- Bail denial due to poverty, lack of legal aid, and procedural delays.

2. Prison Overcrowding

- Occupancy far exceeds capacity, worsening hygiene, health, and safety.
- Violates the right to life with dignity (Article 21).

3. Custodial Violence & Abuse

- Reports of torture, deaths in custody, and coercive interrogation.
- Weak accountability mechanisms and poor oversight.

4. Criminalisation of Poverty

- Petty offences, vagrancy-like laws, and inability to furnish surety lead to incarceration.
- Disproportionate impact on migrants, Dalits, Adivasis, and minorities.

5. Gendered and Social Dimensions

- Women prisoners face inadequate healthcare and custodial neglect.
- Children of prisoners suffer intergenerational trauma.

6. Colonial Legacy in Policing

- The police-centric investigation model emphasises confession over evidence.
- Limited adoption of community policing and restorative practices.

PRELIMS BOOSTER BOX

- **Undertrial:** Person detained while trial is pending.
- **Article 21:** Right to life and personal liberty.
- **Bail Principle:** "Bail is the rule, jail is the exception."
- **Custodial Violence:** Abuse by law enforcement during detention.
- **Restorative Justice:** Focus on repair, reconciliation, and rehabilitation.

PadhAI PYQ BOOSTER SECTION

Q. (GS2 – Mains, UPSC)

"Judicial delays and the high number of undertrials undermine the criminal justice system. Discuss."

Essay Theme:

"Justice without humanity is injustice."

PadhAI MAINS PRACTICE QUESTION

"India's criminal justice system reflects a deep-rooted carceral culture." Critically analyse its causes, consequences, and the



reforms needed to move towards a rights-based justice system. (250 words)

PadhAI-GENERATED UPSC MCQ

Q. With reference to carceral culture in India, consider the following statements:

1. A majority of India's prison population consists of undertrial prisoners.
2. Prison overcrowding has implications for the right to life with dignity.
3. Restorative justice emphasises punishment as the primary objective.

Which of the statements given above is/are correct?

- A. 1 and 2 only
- B. 2 only
- C. 1 and 3 only
- D. 1, 2 and 3

Answer: A

(Statement 3 is incorrect – restorative justice focuses on repair and rehabilitation, not punishment.)

3. Care, Justice and Dignity in Mental Health: Building a Humane and Rights-Based System

WHY IN THE NEWS?

- Rising awareness of **mental health challenges**, especially among youth, students, and vulnerable groups.
- Judicial and policy discourse increasingly emphasises **rights, dignity, and access to mental healthcare**.
- Implementation of the **Mental Healthcare Act, 2017** and national

mental health programmes remains uneven.

SUMMARY

- Mental health care in India is moving from a charity-based approach to a rights-based framework centred on care, justice, and dignity.
- While progressive laws recognise mental healthcare as a right, gaps in access, stigma, and institutional capacity persist.
- Ensuring humane treatment, legal safeguards, and community-based services is essential to uphold human dignity and translate legal intent into meaningful mental health outcomes.

BACKGROUND / CONTEXT

- I. Mental health disorders contribute significantly to **disease burden** in India.
- II. Historically, mental illness was addressed through custodial and institutional models, often violating dignity.
- III. The **Mental Healthcare Act, 2017** aligns India with the **UN Convention on the Rights of Persons with Disabilities (UNCRPD)**.
- IV. The Act guarantees **affordable, accessible, and quality mental healthcare** as a legal right.
- V. However, shortages of professionals and infrastructure limit effective implementation.



KEY HIGHLIGHTS

1. Care-Oriented Approach

- Emphasis on early intervention, counselling, and rehabilitation.
- Integration of mental health into primary healthcare.

2. Justice and Legal Safeguards

- Protection against inhuman and degrading treatment.
- Rights-based consent and review mechanisms.
- Decriminalisation of suicide attempts under Section 115.

3. Dignity and Autonomy

- Respect for patient autonomy and informed consent.
- Protection from stigma, discrimination, and social exclusion.

4. Community-Based Services

- Shift away from long-term institutionalisation.
- Role of families, NGOs, and local health systems.

5. Implementation Challenges

- Acute shortage of psychiatrists, psychologists, and social workers.
- Uneven state capacity and funding gaps.
- Persisting societal stigma and lack of awareness.

PRELIMS BOOSTER BOX

- **Mental Healthcare Act, 2017:** Rights-based mental health law.
- **UNCPRD:** UN Convention on Rights of Persons with Disabilities.
- **Section 115:** Presumption of severe stress in suicide attempts.
- **Community Care:** Non-institutional mental health support.
- **Stigma:** Social discrimination due to mental illness.

PadhAI PYQ BOOSTER SECTION

Q. (GS2 – Mains)

“Health is a state subject, but mental health requires coordinated action.” Discuss.

PadhAI MAINS PRACTICE QUESTION

“Care, justice, and dignity must form the core of India’s mental health framework.” Critically examine India’s mental health policies and suggest measures for effective implementation. (250 words)

PadhAI-GENERATED UPSC MCQ

Q. With reference to mental health governance in India, consider the following statements:

1. The Mental Healthcare Act, 2017 recognises mental healthcare as a legal right.
2. Attempt to suicide is treated as a criminal offence under the Act.
3. The Act emphasises dignity, autonomy, and non-discrimination.



Which of the statements given above is/are correct?

- A. 1 and 3 only
- B. 2 only
- C. 1 only
- D. 1, 2 and 3

Answer: A

(Statement 2 is incorrect – the Act decriminalises suicide attempts by presuming severe stress.)

4. Charting an Agenda on the Right to Health: From Policy Promise to Enforceable Reality

WHY IN THE NEWS?

- Renewed debates on recognising the **Right to Health** amid rising healthcare costs and unequal access.
- Some states have initiated **rights-based health legislations**, reviving national-level discourse.
- Judicial interpretations continue to expand **Article 21** to include health as an integral right.

SUMMARY

- The Right to Health is increasingly viewed as a foundational human right essential to dignity and equality.
- While Indian courts have read health into Article 21, the absence of a uniform statutory framework limits enforceability.
- Charting a clear agenda—covering financing, governance, accountability, and service delivery is vital to transform health from a welfare

promise into a guaranteed, justiciable right accessible to all citizens.

BACKGROUND / CONTEXT

- I. The **Constitution of India** does not explicitly mention the Right to Health as a Fundamental Right.
- II. The Supreme Court has interpreted **Article 21 (Right to Life)** to include the right to health and medical care.
- III. Directive Principles (Articles **38, 39(e), 41, 47**) impose obligations on the State to improve public health.
- IV. India's health system remains **underfunded**, with high **out-of-pocket expenditure (OOPE)**.
- V. Global frameworks like **WHO Constitution** and **SDG 3** reinforce health as a human right.

KEY HIGHLIGHTS

1. Constitutional and Legal Dimensions

- Judicial recognition without comprehensive legislation.
- Need for statutory clarity on entitlements, obligations, and remedies.

2. Equity and Access Challenges

- Regional, rural–urban, and socio-economic disparities.
- Marginalised groups face disproportionate health burdens.



3. Financing the Right to Health

- Low public health expenditure limits universality.
- Need to prioritise primary healthcare and preventive services.

4. Governance and Accountability

- Fragmented responsibilities between Centre and States.
- Weak grievance redressal and quality assurance mechanisms.

5. Role of Technology and Innovation

- Digital health records and telemedicine improve access.
- Risks of exclusion without digital literacy and safeguards.

6. Way Forward

- Enact a **national Right to Health framework law**.
- Strengthen public health infrastructure and workforce.
- Integrate insurance schemes with public provisioning.

PRELIMS BOOSTER BOX

- **Article 21:** Right to life includes health (judicial view).
- **Article 47:** Duty of the State to improve public health.
- **OOPE:** Out-of-pocket expenditure on health.
- **UHC:** Universal Health Coverage.
- **SDG 3:** Good Health and Well-being.

PadhAI PYQ BOOSTER SECTION

Q. (GS2 – Mains)

“Health is a critical component of human development. Examine the role of the State in ensuring equitable healthcare.”

PadhAI MAINS PRACTICE QUESTION

“Recognising health as a legal right is necessary but not sufficient.” Critically examine the challenges and policy measures required to operationalise the Right to Health in India. (250 words)

PadhAI-GENERATED UPSC MCQ

Q. With reference to the Right to Health in India, consider the following statements:

1. The Supreme Court has interpreted Article 21 to include the right to health.
2. Article 47 of the Constitution directs the State to improve public health.
3. The Right to Health is explicitly listed as a Fundamental Right in Part III.

Which of the statements given above is/are correct?

- A. 1 and 2 only
- B. 2 only
- C. 1 and 3 only
- D. 1, 2 and 3

Answer: A

(Statement 3 is incorrect – the Right to Health is not explicitly mentioned in Part III.)



5. Income Inequality in India: Top 10% Capture 58% of National Income, Bottom 50% Left with Just 13%

WHY IN THE NEWS?

- Recent inequality estimates reveal that the **top 10% of earners in India capture about 58% of national income**.
- In contrast, the **bottom 50% receive only around 13%**, highlighting deep income concentration.
- The data has renewed debates on **inclusive growth, taxation, and redistribution policies**.

SUMMARY

- India is witnessing a sharp rise in income inequality, with a disproportionate share of national income accruing to the top earners.
- While the top 10% capture nearly 58% of income, the bottom half of the population receives only about 13%. This imbalance raises concerns over social justice, consumption-led growth, and long-term economic sustainability, underscoring the need for policy interventions to ensure more equitable development.

BACKGROUND / CONTEXT

- I. Income inequality refers to **unequal distribution of income across population groups**.
- II. Post-liberalisation growth has expanded overall income but with **uneven distribution**.
- III. Structural drivers include:
 - ✓ Skill-biased growth

- ✓ Informal sector dominance
 - ✓ Capital income concentration
- IV. While poverty levels have declined, **relative inequality has widened**, affecting social mobility and cohesion.

KEY HIGHLIGHTS

1. Concentration at the Top

- High-income groups benefit from capital returns, financial assets, and high-skill jobs.
- Globalisation and technology favour top earners.

2. Weak Income Growth at the Bottom

- Informal workers face low wages and job insecurity.
- Limited access to quality education and healthcare constrains mobility.

3. Impact on Consumption and Demand

- High inequality suppresses mass consumption demand.
- Growth becomes less broad-based and more volatile.

4. Regional and Social Dimensions

- Inequality overlaps with caste, gender, and regional disparities.
- Urban-rural income gaps persist.

5. Fiscal and Policy Factors

- Limited progressivity in direct taxation.
- Subsidies often address poverty but not inequality.



6. Risk to Social Stability

- Persistent inequality can fuel social unrest and weaken trust in institutions.

PRELIMS BOOSTER BOX

- **Income Inequality:** Unequal income distribution.
- **Top 10% Share:** ~58% of national income.
- **Bottom 50% Share:** ~13% of national income.
- **Gini Coefficient:** Measure of inequality.
- **Inclusive Growth:** Growth benefiting all sections.

PadhAI PYQ BOOSTER SECTION

Q. (GS3 – Mains)

“Inclusive growth remains a major challenge for India despite high economic growth. Discuss.”

PadhAI MAINS PRACTICE QUESTION

“Rising income inequality threatens the sustainability of India’s growth story.”
Examine the causes of growing income concentration and suggest policy measures to address it. (250 words)

PadhAI-GENERATED UPSC MCQ

Q. With reference to income inequality in India, consider the following statements:

1. The top 10% of earners account for more than half of India’s national income.

2. The bottom 50% receive less than one-fifth of national income.
3. High income inequality has no impact on economic growth.

Which of the statements given above is/are correct?

- A. 1 and 2 only
- B. 2 only
- C. 1 and 3 only
- D. 1, 2 and 3

Answer: A

(Statement 3 is incorrect – high inequality can adversely affect growth and social stability.)

6.The Future of Governance in Post-Maoist India: Consolidation, Inclusion, and Development-Centric Statecraft

WHY IN THE NEWS?

- Over a decade of decline in Maoist (Left-Wing Extremism, LWE) strongholds has triggered discussions on **post-Maoist governance models**.
- Recent government assessments highlight significant recovery of LWE-affected districts.
- Policy focus shifting from **security-led responses to institution-building, livelihood generation, and grassroots participation**.

SUMMARY

- As Maoist influence recedes, India faces the challenge of transitioning from security-heavy governance to development-driven statecraft in previously insurgency-prone regions.



- The future of governance in post-Maoist India depends on integrating political inclusion, rights-based development, transparent administration, and socio-economic rehabilitation.
- This shift requires rooting the state in democratic legitimacy, local capacity-building, and sustained delivery of services that address historical grievances of marginalisation, land alienation, and lack of access to justice.

BACKGROUND / CONTEXT

- I. Maoist insurgency exploited **historic deprivation, land dispossession, resource conflict** and weak state presence.
- II. Security operations reduced violent incidents; next stage requires **governance deepening**.
- III. The state's legitimacy will depend on **responsive administration, dignity in welfare delivery, federal coordination**, and trust-building.
- IV. Governance must avoid relapse by addressing root causes: **poverty, inequality, exploitation, and infrastructural isolation**.

KEY HIGHLIGHTS

1 Administrative Reach & Institutional Capacity

- Strengthening district administration, panchayats, and grievance systems.
- Deploying civil servants trained in conflict-sensitive governance.

2 Land, Forest & Resource Rights

- Transparent implementation of **Forest Rights Act (FRA)** and PESA norms.
- Community-led management of forests and minor minerals.

3 Economic Diversification

- Local value chains (agro-forest industries, MSMEs, skill training hubs).
- Connectivity to markets via **roads, digital infrastructure, logistics**.

4 Justice & Rule of Law

- Fast-track courts, legal aid, human-rights compliant policing.
- Ending custodial excesses, illegal detentions & procedural delays.

5 Democratic Healing & Political Integration

- Reintegration programmes for former cadres; elections in restored areas.
- Social reconciliation mechanisms, trauma counselling, and community dialogue.

PRELIMS BOOSTER BOX

- **LWE (Left-Wing Extremism):** Insurgency claiming to represent marginalised groups; demands radical redistribution.
- **Red Corridor:** LWE-affected belt across central & eastern India.
- **FRA 2006:** Forest rights for forest-dwelling Scheduled Tribes & others.
- **PESA 1996:** Empowerment of tribal gram sabhas in Scheduled Areas.



- **Peace Dividend:** Economic & social gains after conflict decline.

PadhAI PYQ BOOSTER SECTION

“Discuss the role of inclusive governance and development in addressing the root causes of Left-Wing Extremism in India. Provide recent examples.”

PadhAI MAINS PRACTICE QUESTION

“As Maoist influence declines, India must move beyond militarised governance to constitutional and development-driven state presence. Evaluate the challenges and opportunities of building a post-Maoist governance framework in India.” (250 words)

PadhAI-GENERATED UPSC MCQ

Consider the following statements regarding post-Maoist governance in India:

1. Effective implementation of PESA and FRA is central to rebuilding democratic legitimacy in tribal areas.
2. Economic development alone is sufficient to end extremist ideologies permanently.
3. Governance must prioritise justice delivery and administrative accessibility alongside infrastructure.

Which of the statements given above are correct?

- A. 1 and 3 only
- B. 2 and 3 only
- C. 1 only
- D. 1, 2 and 3

Answer: A

(Statement 2 is incorrect – development without justice and rights may not end ideological grievances.)

7.900 Million Diabetes Cases by 2050: A Global Health Emergency Demanding Immediate Action

WHY IN THE NEWS?

- Projections indicate that **diabetes cases may reach 900 million globally by 2050**, nearly doubling current levels.
- Rising prevalence linked to **urban lifestyles, dietary transitions, genetic susceptibility, and environmental factors**.
- Governments warned to strengthen health systems and preventive frameworks to avert long-term economic shocks.

Equator and cancer lines crossing – state, city, countries, nearby river, mountain – hills, cultural sites

SUMMARY

- Recent global projections warn that diabetes cases could reach **900 million by 2050**, driven by rapid urbanisation, sedentary lifestyles, obesity, air pollution, and limited access to preventive healthcare.
- The crisis threatens to overwhelm public health systems and weaken economic productivity. Countries, especially developing economies like India, must adopt integrated strategies focusing on prevention, early screening, digital health, primary care empowerment, and community-based lifestyle interventions.



BACKGROUND / CONTEXT

- I. Diabetes is a chronic metabolic disorder caused by **insulin resistance or deficiency**; it includes Type 1, Type 2, and gestational diabetes.
- II. Developing countries face a higher burden due to **nutrition transition, income growth patterns, inadequate physical activity**, and weak preventive systems.
- III. India is among the world's largest diabetes populations due to **genetic predisposition + rapid lifestyle changes**.
- IV. The crisis threatens Sustainable Development Goal **(SDG 3.4): NCD reduction by 2030**.

KEY HIGHLIGHTS

1 Systemic Public Health Challenge

- Diabetes is linked with **cardiovascular diseases, kidney failure, blindness, amputations**.

2 Economic Impact

- High out-of-pocket expenditure; productivity losses due to chronic illness.
- Risk of pushing families below poverty line (NCD-poverty trap).

3 Urban & Rural Divide

- Urban: lifestyle-driven diabetes.
- Rural: underdiagnosis, late detection, low access to care.

4 India's Vulnerability

- Combination of genetics + high-carb diets + low physical activity.
- Requires scale-up of Ayushman Bharat HWCs for screening.

5 Need for Multi-Sector Action

- Health, food regulation, urban planning, education, and digital tracking systems must converge.

PRELIMS BOOSTER BOX

- **Type 2 Diabetes:** Insulin resistance; lifestyle-linked.
- **Insulin:** Hormone regulating blood glucose.
- **SDG Target 3.4:** Reduce premature mortality from NCDs by one-third.
- **BMI & Obesity:** Key metabolic risk indicators.
- **Preventive Healthcare:** Shift to screen-monitor-manage approach at primary level.

PadhAI PYQ BOOSTER SECTION

“How can strengthening primary healthcare and behavioural interventions reduce the long-term burden of non-communicable diseases in India?”

PadhAI MAINS PRACTICE QUESTION

“With diabetes projected to reach 900 million cases globally by 2050, India needs a preventive and digital-first public health strategy. Discuss key priority areas and governance reforms.” (250 words)

PadhAI-GENERATED UPSC MCQ

Consider the following statements:

1. Lifestyle modification and preventive screening are essential components of diabetes control.



2. India's diabetes burden is increasing partly due to genetic predisposition and rapid urbanisation.
3. SDG Target 3.4 aims to eliminate diabetes worldwide by 2050.

Which of the statements given above are correct?

- A. 1 and 2 only
- B. 2 and 3 only
- C. 1 only
- D. 1, 2 and 3

Answer: A

(Statement 3 is incorrect – SDG 3.4 aims to reduce NCD mortality, not eliminate diabetes.)

8. Child Trafficking in India: A Disturbing Reality Undermining Childhood, Safety, and Human Rights

WHY IN THE NEWS?

- Recent reports indicate a rise in **child trafficking cases**, especially for forced labour, sexual exploitation, and illegal adoption rackets.
- Post-pandemic vulnerabilities, migration distress, and digital exploitation have worsened risk factors.
- Authorities emphasise urgent need for **strengthening law enforcement, rehabilitation, and inter-state coordination**.

SUMMARY

- Child trafficking remains a critical human rights issue in India, driven by poverty, displacement, forced

migration, and organised criminal networks.

- Children are trafficked for labour, sexual exploitation, domestic servitude, begging, forced marriage, and cyber abuse.
- Despite legal protections under IPC, POCSO, and JJ Act, gaps in detection, reporting, and rehabilitation persist.
- Addressing this crisis requires systemic prevention, community vigilance, safe migration systems, and trauma-sensitive justice mechanisms.

BACKGROUND / CONTEXT

- I. Defined under the **IPC Section 370** as recruitment, transfer, harbouring, or receipt of a child for exploitation.
- II. Pandemic-induced economic distress made children more vulnerable.
- III. Trafficking networks exploit weak border surveillance, child labour demand, and digital anonymity.
- IV. National Crime Records Bureau (NCRB) records show continued **under-reporting**, revealing systematic challenges.
- V. International frameworks: **UNCRC**, **Palermo Protocol**, and SDGs (Goal 8.7 to end child labour and trafficking).

KEY HIGHLIGHTS

1 Multi-Form Exploitation

- Domestic servitude, sexual abuse, forced drug trafficking, gig-labour exploitation.



2 Digital Trafficking

- Online grooming, social media luring, dark-web exploitation, crypto-linked payments.

3 Enforcement & Reporting Gaps

- Poor FIR registration, cross-border jurisdiction issues, weak witness protection.

4 Rehabilitation Failures

- Institutional care overburdened; lack of long-term reintegration and skill support.

5 Community & Governance Role

- Panchayat vigilance, child protection committees, school-based awareness modules.

PRELIMS BOOSTER BOX

- **IPC 370/370A:** Criminalisation of human trafficking & exploitation.
- **POCSO Act 2012:** Protection of children from sexual offences.
- **JJ Act 2015:** Care, protection, and rehabilitation measures.
- **Childline 1098:** Helpline for children in distress.
- **SDG 8.7:** End forced labour, modern slavery & human trafficking.

PadhAI PYQ BOOSTER SECTION

“Discuss the structural causes and governance failures that contribute to child trafficking in India. Suggest policy and institutional reforms.”

PadhAI MAINS PRACTICE QUESTION

“Child trafficking represents a systemic collapse of protection systems and social security in India. Examine causative factors and propose a multi-tier prevention and rehabilitation model.” (250 words)

PadhAI-GENERATED UPSC MCQ

With reference to child trafficking in India, consider the following statements:

1. IPC Section 370 legally defines and criminalises trafficking.
2. Child trafficking requires proof of force or coercion for conviction.
3. India is committed to ending trafficking as part of the Sustainable Development Goals.

Which of the statements given above are correct?

- A. 1 and 3 only
- B. 2 and 3 only
- C. 1 only
- D. 1, 2 and 3

Answer: A

(Statement 2 is incorrect – for children, **proof of force/coercion is not required**; exploitation itself is enough.)

9.Mandatory SIM Binding for Messaging Platforms: India’s New Cybersecurity Mandate

WHY IN THE NEWS?

- India’s Department of Telecommunications (DoT) has issued a directive requiring all major



messaging platforms including WhatsApp, Telegram, Signal, Snapchat and others to implement **continuous SIM binding** within 90 days.

- This means messaging services must remain linked to the active SIM card used at registration, with periodic logout on web/desktop instances to improve security.

SUMMARY

- The Indian telecom regulator has mandated that messaging platforms continuously link user accounts to the active SIM card used at registration to curb cyber fraud and improve traceability.
- Apps must also automatically logout web or desktop sessions at least every six hours, requiring reauthentication.
- The directive, under the Telecommunication Cyber Security (TCS) Amendment Rules, 2025, applies to services like WhatsApp, Telegram and Signal, and must be implemented by early 2026.

BACKGROUND / CONTEXT

- I. India's digital communication landscape relies heavily on Over-The-Top (OTT) messaging platforms identified by mobile numbers.
- II. Under existing practice, users remain logged in even after SIM removal or deactivation, creating opportunities for fraud, impersonation, and cross-border misuse.
- III. To counter these risks, the DoT amended the Telecommunication Cyber Security Rules (via 2025

amendment) to classify such apps as Telecommunication Identifier User Entities (TIUEs), expanding regulatory oversight and introducing automated SIM-based authentication and session controls.

KEY HIGHLIGHTS

1 Account-SIM Synchronization Requirement

- Messaging accounts must be tied to phone number KYC identity.

2 Anti-Fraud & Safety Objective

- Enables tracking of financial scams, job fraud, and bot-operated impersonation.

3 Impact on Encryption

- Raises questions on technical feasibility with **end-to-end encrypted platforms**.

4 Compliance Responsibility

- App providers must build verification APIs and maintain compliance logs.

5 User Privacy & Data Governance

- Must follow principles of **data minimization, consent, and purpose limitation**.



PRELIMS BOOSTER BOX

- **SIM KYC:** Mandatory identity verification for SIM registration.
- **OTT Communication Platforms:** Apps providing message/call services over the internet.
- **End-to-End Encryption:** Only sender-recipient have decryption keys.
- **Traceability:** Technical mechanism to identify originator of messages.
- **Data Minimization:** Collect only what is necessary for the stated purpose.

3. It is intended to reduce digital fraud, impersonation, and cyberstalking.

Which of the statements given above are correct?

- A. 1 and 3 only
- B. 2 and 3 only
- C. 1 only
- D. 1, 2 and 3

Answer: A

(Statement 2 is incorrect – SIM binding does not inherently remove encryption; it raises implementation challenges.)

PadhAI PYQ BOOSTER SECTION

“Evaluate the challenges of regulating encrypted communication platforms in India while ensuring citizen safety and privacy protection.”

PadhAI MAINS PRACTICE QUESTION

“Mandatory SIM binding for messaging platforms seeks to strengthen digital accountability but may complicate encryption, privacy rights, and regulatory compliance. Examine the need, benefits, and challenges of such a policy for modern India.” (250 words)

PadhAI-GENERATED UPSC MCQ

With reference to mandatory SIM binding for messaging platforms, consider the following statements:

1. It links a messaging account to a SIM-based verified identity.
2. It automatically removes end-to-end encryption from all messaging platforms.



PLACES IN NEWS



Dudhwa Tiger Reserve

Terai Arc Landscape's Critical Wildlife Habitat

1. Location: Terai region, Lakhimpur Kheri & Pilibhit districts
2. Area: 1,284 sq km (Core: 812 | Buffer: 473)
3. Project Tiger: Declared 1987–88; 135+ tigers (2022)
4. Landscape: Part of Terai Arc Landscape (TAL); India–Nepal trans-boundary zone
5. Key Species: Largest Indian stronghold of Swamp Deer (Barasingha)
6. Rhino Success: One-horned rhino reintroduced (1984); stable population
7. Rivers: Sharda (W), Mohana (E), Suheli (inside); Ganga basin
8. Vegetation: Sal forests (60%), tall grasslands, wetlands
9. Wildlife Corridor: Critical elephant & tiger corridor with Nepal
10. Biodiversity: 38+ mammals, 450+ birds (Florican, Hispid Hare)
11. Administration: Uttar Pradesh Forest Dept.; HQ Lakhimpur Kheri

Cho-La & Dok-La

Strategic Himalayan Border Passes Opened for Tourism under Bharat Rannbhoomi Darshan

1. Cho La (Sikkim): Site of 1967 Indo-China clash; near Nathu La
2. Doklam Plateau: India–Bhutan–China tri-junction; critical for corridor security
3. Siliguri Corridor (Chicken's Neck): 22–24 km wide land link to Northeast India
4. Teesta Basin: Major river system fed by Sikkim glaciers & passes
5. BRO: Key agency for border roads & Himalayan infrastructure
6. Bharat Rannbhoomi Darshan: Tourism initiative highlighting border & war heritage

Bitra Island

India's Smallest Inhabited Lakshadweep Atoll

1. Area & Pop.: 0.105 sq km; ~300 people
2. Unique Feature: No lagoon (open Arabian Sea exposure)
3. Location: ~483 km west of Kerala; 11°36' N, 72°10' E
4. Archipelago: Part of Lakshadweep (36 islands, 10 inhabited)
5. Geology: Coral atoll on Chagos-Laccadive Ridge
6. Strategic Value: Extends India's EEZ (~4 lakh sq km) in Arabian Sea
7. Administration: Amini Sub-Division; UT under Presidential Administrator
8. Biodiversity: Coral reefs; tuna, dolphins, sea turtles
9. Climate Risk: Highly vulnerable to sea-level rise & coastal erosion





Tigris River

1. Tigris originates in Taurus Mountains (Turkey); flows to Persian Gulf via Shatt al-Arab
2. Major tributaries originate from Zagros Mountains (Iran) and join in Iraq
3. Mesopotamian Marshes fed by Tigris - Euphrates UNESCO World Heritage Site
4. Joins Euphrates at Al-Qurnah to form Shatt al-Arab
5. Vital to Iraq's freshwater supply (>60% dependency)
6. Ilisu Dam on Tigris (Turkey) significantly influences downstream flow
7. No unified basin treaty; management through bilateral negotiations
8. Located in Fertile Crescent center of earliest human civilizations

Oman: Strategic Maritime

1. Strait of Hormuz: Between Oman and Iran; global chokepoint for oil shipping
2. Duqm Port: India's access for naval logistics; on Arabian Sea coast
3. Khareef Season: Monsoon-like rain in Dhofar/Salalah; unique microclimate
4. Rub' al Khali: World's largest sand desert; extends into Oman
5. Wadis: Seasonal hydrological channels; key to water recharge
6. Jebel Shams: Oman's highest peak; part of Al Hajar range
7. Endorheic Basins: Interior desert basins with no outlet to sea
8. Official Religion: Ibadli Islam (unique among Arab states; moderate form)

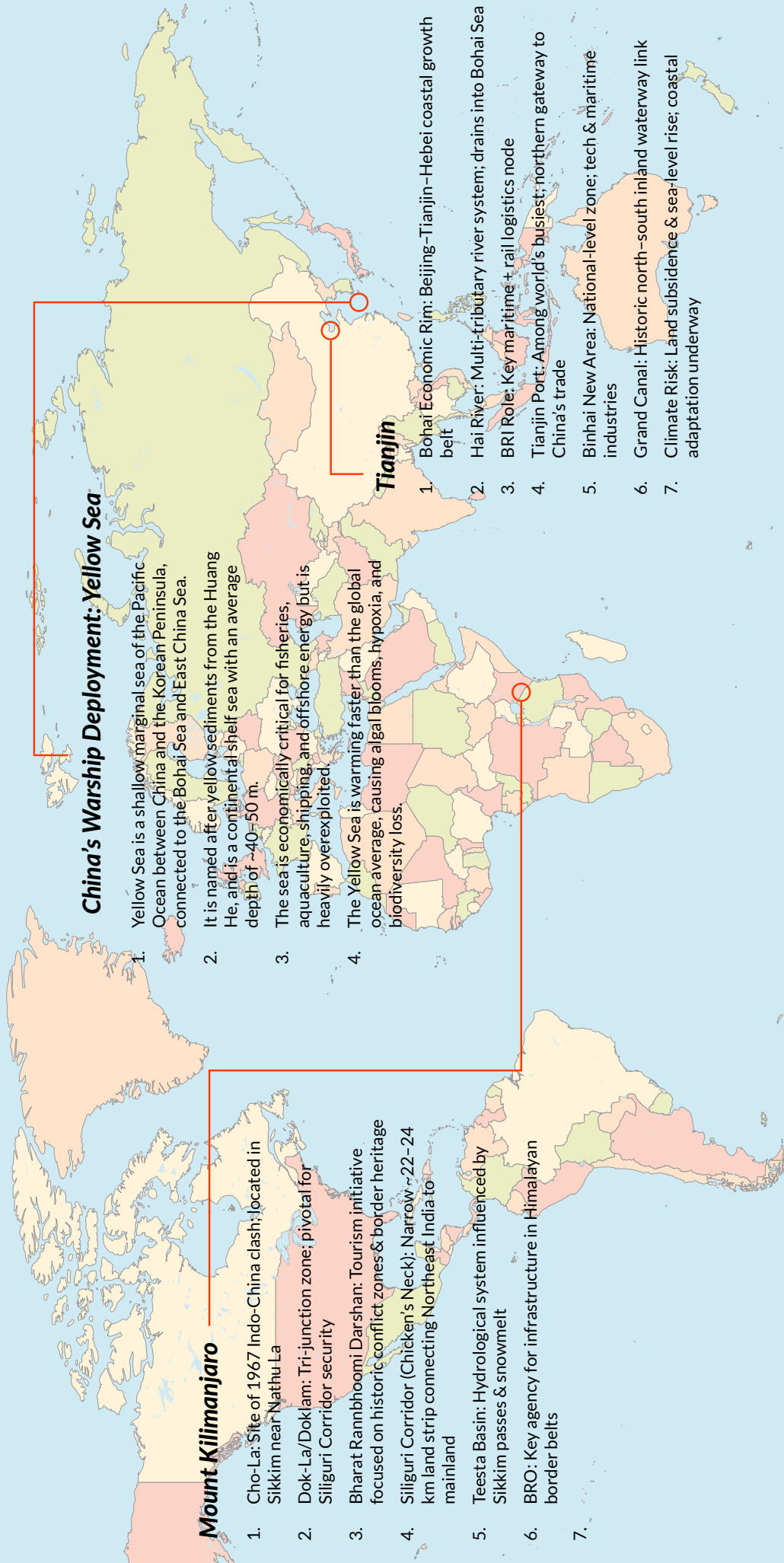
Guinea-Bissau

1. Capital & Hub: Bissau - on Geba River estuary; main port & economic center
2. Independence: 24 Sept 1974 from Portugal; led by PAIGC
3. Bijagós Archipelago: Bijagós Archipelago - UNESCO Biosphere Reserve (1996); 88+ islands; rich marine biodiversity
4. Economy: Top-10 cashew producer; ~85% export earnings from cashew; aid-dependent
5. Regional Blocs: Member of ECOWAS, African Union, CPLP
6. Currency: West African CFA franc
7. Geography: Low-lying (<100 m); extensive mangroves; sea-level rise vulnerable
8. Politics: Semi-presidential republic; history of coups & instability

Jordan River

1. Origin: Mount Hermon area; tributaries from Lebanon, Syria, Israel
2. Flows through/along: Lebanon - Syria - Israel - Jordan - West Bank
3. Sea of Galilee: Largest freshwater lake in Israel; Jordan River main inflow and outflow
4. Dead Sea: Endorheic terminal lake with extreme salinity; shrinking due to reduced inflow
5. Rift Valley: Part of Great Rift Valley; tectonic origin
6. Water Politics: Governed partly by the 1994 Israel - Jordan Peace Treaty
7. Major Tributaries: Hasbani (Lebanon), Baniyas (Syria), Dan (Israel)
8. Unique: River does not reach any sea or ocean; terminates inland





PERSON IN NEWS



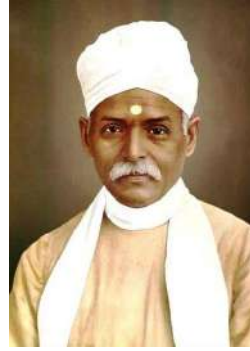
1. Dr. B.R. Ambedkar



→ IMP FACTS -

- **Constitutional Role:** He was the **Chairman of the Drafting Committee** (total 7 members) and is often called the "Modern Manu."
- **Political Parties:** He founded the **Independent Labour Party (1936)** and the **Scheduled Castes Federation (1942)**.
- **Journals/Newspapers:** He launched **Mooknayak** (1920), **Bahishkrit Bharat** (1927), and **Janata** (1930).
- **Key Movements:** Led the **Mahad Satyagraha (1927)** to assert the right of untouchables to use water from public tanks.
- **Buddhist Conversion:** He embraced Buddhism on **October 14, 1956**, at Deekshabhoomi (Nagpur), marking the "Navayana" movement.
- **Major Books:** Authored *The Annihilation of Caste*, *The Buddha and His Dhamma*, and *Who Were the Shudras?*

2. Pandit Madan Mohan Malaviya



→ IMP FACTS -

- **University Founder:** Established the **Banaras Hindu University (BHU)** in 1916 under the BHU Act 1915.
- **INC Presidency:** Served as the President of the Indian National Congress **four times** (1909, 1918, 1932, and 1933).
- **Legal Legacy:** He famously returned to legal practice to defend the accused in the **Chauri Chaura case (1922)**.
- **National Motto:** He is credited with popularizing the slogan "**Satyameva Jayate**" from the Mundaka Upanishad.
- **Newspapers:** Founded the influential English daily **The Leader** (1909) and the Hindi weekly **Abhyudaya**.
- **Organizations:** Co-founded the **Akhil Bharat Hindu Mahasabha (1915)** and founded the **Ganga Mahasabha** (1905).



3. Dr. Arvind Panagariya



→ IMP FACTS -

- **16th Finance Commission:** He is the current **Chairman** of the 16th FC, which will recommend tax devolution for the 2026–2031 period.
- **Article 280:** The Commission is a **Quasi-Judicial body** constituted by the President every 5 years under this Article.
- **NITI Aayog:** He served as the **first Vice-Chairman** of NITI Aayog (reforming from the Planning Commission).
- **Vertical vs Horizontal:** His commission must decide the percentage of central taxes shared with states (Vertical) and the formula for sharing among states (Horizontal).
- **New Terms of Reference (ToR):** The 16th FC has a specific focus on **Disaster Management financing** and augmenting the **Consolidated Fund of States** for Panchayats/Municipalities.

4. Netaji Subhas Chandra Bose



→ IMP FACTS -

- **Port Blair Declaration:** On **December 30, 1943**, he hoisted the tricolor at Port Blair, declaring the Andaman & Nicobar Islands the **first liberated Indian territory**.
- **Island Renaming:** He renamed the islands as **Shaheed** (Andaman) and **Swaraj** (Nicobar).
- **Provisional Government:** Established the **Azad Hind Government** (Provisional Government of Free India) in Singapore on October 21, 1943.
- **Forward Bloc:** Formed the **All India Forward Bloc** in 1939 after resigning from the Congress presidency (Tripuri Crisis).
- **INA Leadership:** Took command of the **Indian National Army (INA)** from Rash Behari Bose in 1943.



5. Dr. Kishore M. Paknikar



→ IMP FACTS -

- **Prime Minister Professorship:** Selected as one of the first 21 recipients of this new title under the **Anusandhan National Research Foundation (ANRF)**.
- **Host Institution:** He will be hosted at **COEP Technological University, Pune**, focusing on decentralizing research excellence.
- **ANRF Act 2023:** This is the apex body (replacing SERB) chaired by the **Prime Minister** to provide strategic direction to scientific research.
- **Research Expertise:** Known for his work in **Nanotechnology** and **Microbiology**, particularly application in medicine and environment.
- **Focus on Mentoring:** Unlike traditional fellowships, this professorship emphasizes **Institutional Capacity Building** and mentoring rather than just individual research.

6. Sangeeta Barooah Pisharoty



→ IMP FACTS

- **Historic Election:** Elected as the **first-ever woman President** of the **Press Club of India (PCI)** since its inception in 1958.
- **Fourth Estate:** This highlights the theme of **Women in Leadership** and the **Freedom of the Press** (Article 19).
- **Northeast Focus:** A veteran journalist known for her extensive documentation of the Northeast (e.g., her book *Assam: The Accord, The Discord*).
- **Awards:** Recipient of the **Ramnath Goenka Excellence in Journalism Award**.

7. Guru Teg Bahadur

→ IMP FACTS -

- **The "Shield of India":** Known as '**Hind Di Chadar**' because he sacrificed his life to protect the religious freedom of Kashmiri Pandits against forced conversions.



- **Original Name:** Born as **Tyag Mal** (Master of Renunciation), he was renamed 'Teg Bahadur' (Brave Sword) after showing immense valor in battle.
- **Spiritual Legacy:** He composed **115 hymns** which are part of the **Guru Granth Sahib** (the 9th Guru of the 10 Sikh Gurus).
- **City Founder:** He founded the city of **Chak-Nanki**, which later became the holy city of **Anandpur Sahib**.
- **Supreme Sacrifice:** Executed in **1675** in Delhi (Chandni Chowk) on the orders of Mughal Emperor **Aurangzeb**.
- **Gurudwara Sis Ganj Sahib:** Marks the site of his execution, while **Gurudwara Rakab Ganj Sahib** marks the site of his cremation.

8. Hardik Singh



→ IMP FACTS -

- **Khel Ratna Nomination:** Recommended as the **sole nominee** for the **Major Dhyan Chand Khel Ratna 2025**, India's highest sporting honor.

- **Olympic Legacy:** A vital midfielder for the Indian Men's Hockey team, winning **two consecutive Olympic bronze medals** (Tokyo 2020 and Paris 2024).
- **Global Recognition:** Previously won the **FIH Player of the Year (2023)** and back-to-back Hockey India Player of the Year awards.
- **Arjuna Awardee:** He was conferred with the Arjuna Award earlier in 2021.
- **Major Wins:** Played a key role in winning gold at the **Asian Games (2023)** and the **Asia Cup (2025)**.

9. B. Sairam



→ IMP FACTS -

- **New Role:** Appointed as the **Chairman-cum-Managing Director (CMD)** of **Coal India Limited (CIL)** effective December 15, 2025.
- **Strategic Vision:** He is leading CIL's diversification into **Solar Power, Coal Gasification, and Critical Mineral Acquisitions** (lithium, etc.).
- **Maharatna Context:** CIL is a Maharatna PSU and the **world's largest coal-producing company**, crucial for India's 24x7 power goal.



- **Academic Background:** A mining engineer from NIT Raipur with an MBA in Energy Management; formerly the CMD of Northern Coalfields Limited (NCL).

10. Praveen Kumar



→ IMP FACTS –

- **Dual Responsibility:** Currently the **Director General (DG) of ITBP**, he took over **additional charge as DG of the Border Security Force (BSF)** in December 2024/2025 cycle.
- **ITBP Focus:** Under his leadership, ITBP established **10 all-women forward posts** along the 3,488 km India-China border (LAC).
- **Vast Experience:** A 1993-batch IPS officer who served in the **Intelligence Bureau (IB)** and managed anti-Naxal operations in Midnapore.
- **Technology in Security:** Instrumental in creating the **first drone squadron** and drone training school for the BSF.
- **First-Ever Ceremony:** His appointment ceremony took place in **Raipur** (instead of Delhi) during the DG-IG

Conference—a rare administrative shift.

11. Jayshree Ullal



→ IMP FACTS –

- **Hurun Rich List 2025:** Emerged as the **wealthiest Indian-origin professional manager** globally, surpassing Sundar Pichai and Satya Nadella in personal net worth.
- **Corporate Leadership:** President and CEO of **Arista Networks** since 2008, a company critical to global **Cloud and AI infrastructure**.
- **Self-Made Woman:** Ranked as one of the top first-generation women wealth creators in India.
- **Educational Roots:** Born in London but raised in **New Delhi** (schooled at Convent of Jesus & Mary), representing the success of the Indian education system.



12. Shashwat Sharma



→ IMP FACTS -

- **Airtel Succession:** Named the **incoming MD & CEO of Bharti Airtel India**, set to take charge on January 1, 2026.
- **Institutional Shift:** He succeeds **Gopal Vittal**, who will transition to the role of Executive Vice Chairman.
- **Telecom Challenges:** His leadership will be defined by India's **5G rollout monetization** and the shift toward satellite communication (SatCom).
- **Internal Talent:** His appointment is a case study in **Internal Succession Planning** within major Indian conglomerates.

