



UPSC MONTHLY MAGAZINE

AI Powered Magazine for Smarter UPSC Prep'



From the Editor's Desk

Welcome to the January 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 January 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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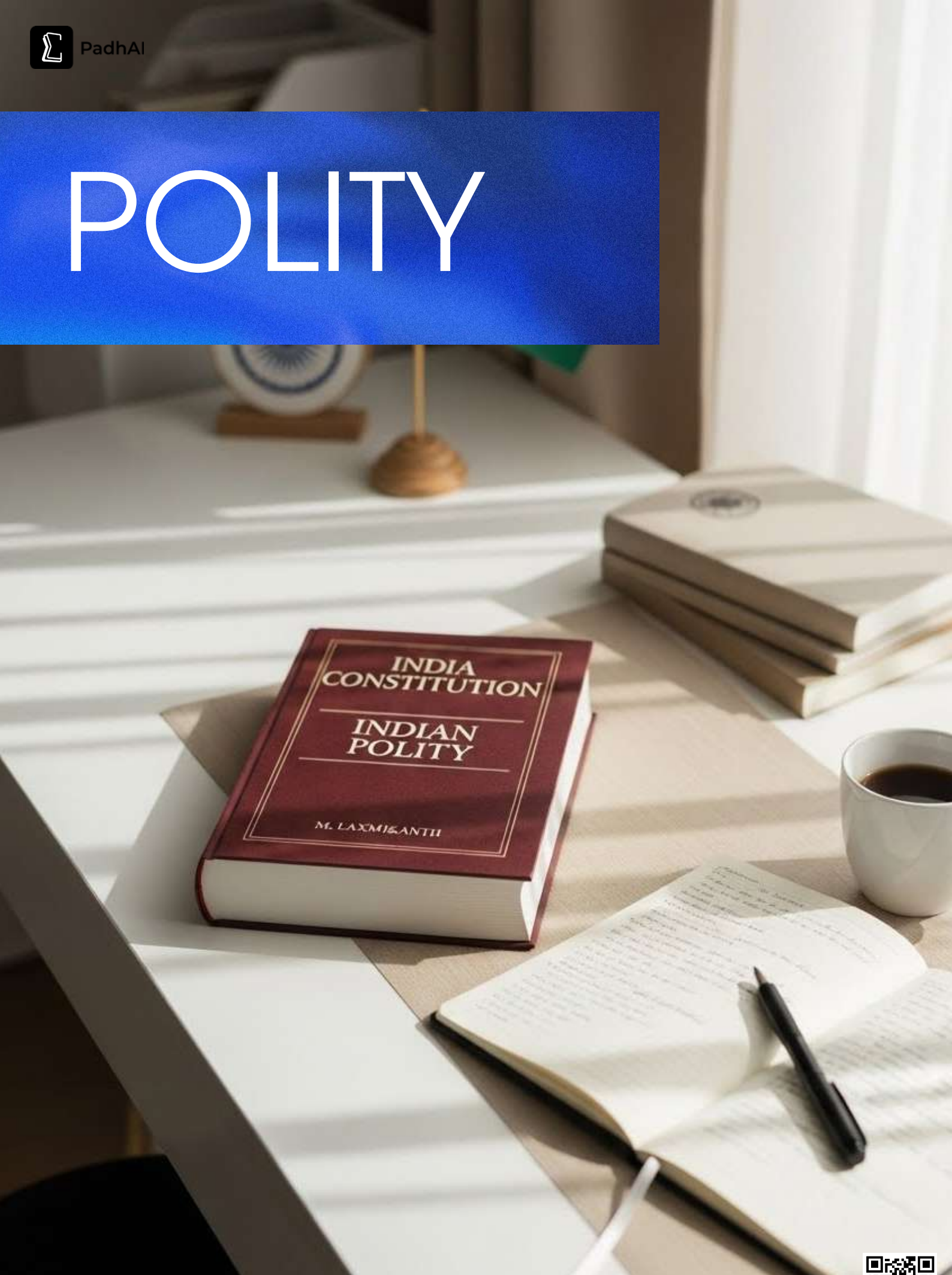
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POLITY



1.Split Verdict on Section 17A of the Prevention of Corruption Act

WHY IN NEWS?

- A split verdict by the Supreme Court on the applicability of prior approval under Section 17A has revived debate on accountability versus bureaucratic protection.

SUMMARY

- Section 17A of the Prevention of Corruption Act mandates prior government approval before investigating public servants for decisions taken in official capacity.
- The recent split verdict highlights judicial disagreement on whether the provision safeguards honest decision-making or obstructs anti-corruption enforcement.

BACKGROUND / CONTEXT

- I. The Prevention of Corruption Act was amended in 2018 to address concerns over harassment of honest officials through frivolous investigations.
- II. Section 17A was introduced to ensure fearless administrative decision-making.
- III. However, critics argue that it weakens vigilance mechanisms and enables executive interference in anti-corruption processes.

KEY HIGHLIGHTS

- **Scope:** Applies only to acts related to official decision-making
- **Exclusion:** Does not apply to trap cases involving bribery

- **Approval Authority:** Prior sanction required from competent government authority
- **Institutional Impact:** Directly affects CBI and vigilance agencies
- **Constitutional Issue:** Raises concerns regarding separation of powers
- **Judicial Status:** Interpretation of Section 17A remains unsettled
- **Governance Effect:** Influences effectiveness of anti-corruption enforcement

PRELIMS BOOSTER BOX

- **Amendment Year:** PC Act amended in 2018
- **Stage Covered:** Section 17A relates to investigation stage
- **Distinct Provision:** Section 19 deals with sanction for prosecution
- **Institutional Overlap:** Lokpal jurisdiction overlaps PC Act offences
- **Approval Nature:** Section 17A approval differs from departmental sanction

PadhAI PYQ BOOSTER SECTION

- **GS II Mains 2019:** Institutional mechanisms to combat corruption

PadhAI MAINS PRACTICE QUESTION

Q. Discuss the constitutional and governance implications of Section 17A of the Prevention of Corruption Act. (250 words)

PadhAI-GENERATED UPSC MCQ

Section 17A of the Prevention of Corruption Act primarily relates to:

- a) Sanction for prosecution
- b) Prior approval for investigation
- c) Judicial review of corruption cases
- d) Departmental disciplinary proceedings

Answer: b



2.Abortion, Article 21 and Bodily Integrity

WHY IN NEWS?

- The Delhi High Court reaffirmed that reproductive autonomy and bodily integrity are integral to the Right to Life and Personal Liberty under Article 21.

SUMMARY

- The Delhi High Court reiterated that a woman's reproductive choice, including the decision to terminate pregnancy, flows from bodily integrity and decisional autonomy under Article 21.
- The ruling strengthens constitutional jurisprudence on gender justice and reinforces the privacy-based interpretation of fundamental rights.

BACKGROUND / CONTEXT

- I. Judicial interpretation of Article 21 has evolved from protection of mere existence to assurance of a dignified life.
- II. Privacy jurisprudence and amendments to the Medical Termination of Pregnancy law have progressively recognised reproductive rights as fundamental, restricting state interference except in compelling circumstances.

KEY HIGHLIGHTS

- **Constitutional Value:** Bodily integrity recognised as a core element of Article 21
- **Autonomy Principle:** Consent is central to reproductive decisions
- **Universal Application:** Rights apply irrespective of marital status

- **State Duty:** Positive obligation on State to ensure access to services
- **Rights Priority:** Moral or social objections cannot override constitutional rights
- **Gender Lens:** Strengthens gender-sensitive interpretation of fundamental rights
- **Global Alignment:** Aligns Indian jurisprudence with international human rights norms

PRELIMS BOOSTER BOX

- **Constitutional Source:** Bodily integrity flows from Article 21
- **Judicial Recognition:** Reproductive autonomy recognised through court rulings
- **Statutory Law:** MTP Act provides the legal framework for abortion
- **Privacy Link:** Right to privacy strengthens decisional autonomy
- **Dynamic Interpretation:** Article 21 expanded through judicial interpretation

PadhAI PYQ BOOSTER SECTION

- **GS II Mains 2020:** Right to privacy, dignity, and autonomy

PadhAI MAINS PRACTICE QUESTION

Q.Explain how the Indian judiciary has interpreted reproductive autonomy as an integral component of Article 21. (250 words)

PadhAI-GENERATED UPSC MCQ

The constitutional basis of bodily integrity in India is primarily derived from:

- a) Article 14
- b) Article 19
- c) Article 21
- d) Article 25

Answer: c



3.BHASHINI and “Samudaye” Governance Model

WHY IN NEWS?

- The National Language Translation Mission highlighted its “Samudaye” collaboration model to scale AI-based multilingual digital services across India.

SUMMARY

- BHASHINI seeks to overcome language barriers in digital governance through AI-based translation and speech tools.
- Its Samudaye model promotes collaboration among government, academia, startups, and communities to build open language datasets, enabling inclusive access to digital public services.

BACKGROUND / CONTEXT

- I. India’s linguistic diversity has historically restricted access to e-governance and digital services.
- II. Under the Digital India programme, BHASHINI was launched to enable vernacular access to technology and public services, aligning digital transformation with constitutional ideals of inclusivity.

KEY HIGHLIGHTS

- **Language Focus:** Emphasis on low-resource and under-represented Indian languages
- **Technology Base:** Use of AI-driven translation and speech recognition
- **Collaboration Model:** Community-led data creation under Samudaye framework
- **Ecosystem Approach:**

Public-private-academic participation encouraged

- **Governance Reach:** Enhances accessibility of e-governance platforms
- **Innovation Push:** Supports startups and indigenous AI development
- **Equity Goal:** Reduces digital and linguistic divide

PRELIMS BOOSTER BOX

- **Mission Name:** BHASHINI is the National Language Translation Mission
- **DPI Status:** Part of India’s Digital Public Infrastructure ecosystem
- **Governance Role:** Enables multilingual delivery of public services
- **Samudaye Meaning:** Refers to community-driven collaboration model
- **Core Tools:** Uses AI for translation and speech services

PadhAI PYQ BOOSTER SECTION

- **GS II Mains 2021:** Digital governance and inclusion

PadhAI MAINS PRACTICE QUESTION

Q. Discuss the role of BHASHINI in promoting inclusive and multilingual digital governance in India. (250 words)

PadhAI-GENERATED UPSC MCQ

The “Samudaye” model under BHASHINI primarily emphasises:

- a) Centralised control of languages
- b) Community-driven collaboration
- c) Manual translation mechanisms
- d) Private monopoly over datasets

Answer: b



4.Delay in Constituting the Arbitration Council of India

WHY IN NEWS?

- The Union Government is yet to constitute the Arbitration Council of India (ACI), despite statutory provisions under the Arbitration and Conciliation (Amendment) Act, raising concerns over delays in strengthening India's arbitration ecosystem.

SUMMARY

- The Arbitration Council of India was envisioned as a statutory body to promote institutional arbitration, accredit arbitrators, and grade arbitration institutions.
- However, its non-constitution has stalled key reforms aimed at improving contract enforcement and dispute resolution efficiency, undermining India's ambition to become a global arbitration hub.

BACKGROUND / CONTEXT

- I. India amended the Arbitration and Conciliation Act in 2019 to institutionalise arbitration and reduce judicial intervention.
- II. The ACI was designed to standardise arbitration practices, enhance professional capacity, and build investor confidence.
- III. Efficient alternative dispute resolution is critical for improving India's ease of doing business and reducing court backlogs.

KEY HIGHLIGHTS

- **Statutory Mandate:** ACI provided for under the 2019 amendment to Arbitration and Conciliation Act
- **Core Functions:** Accreditation of arbitrators and grading of arbitral institutions
- **Reform Objective:** Promote institutional over ad-hoc arbitration
- **Business Climate:** Faster dispute resolution supports investment confidence
- **Judicial Burden:** Arbitration intended to reduce pendency in courts
- **Implementation Gap:** Absence of ACI delays operational reforms
- **Global Ambition:** Part of India's plan to emerge as an arbitration hub

PRELIMS BOOSTER BOX

- **Arbitration and Conciliation Act was originally enacted in 1996**
- **2019 amendment introduced the Arbitration Council of India**
- **ACI is envisioned as an autonomous statutory body**
- **Institutional arbitration differs from ad-hoc arbitration**
- **Contract enforcement is a key Ease of Doing Business indicator**
- **Alternative Dispute Resolution includes arbitration, mediation, and conciliation**

PadhAI PYQ BOOSTER SECTION

- **GS II Mains 2021:** Judicial reforms and access to justice
- **GS III Mains 2019:** Ease of doing business and legal infrastructure

PadhAI MAINS PRACTICE QUESTION

Q. Discuss the role of the Arbitration Council of India in strengthening India's dispute



resolution framework and improving the business environment. (250 words)

PadhAI-GENERATED UPSC MCQ

The Arbitration Council of India is primarily intended to:

- a) Replace civil courts
- b) Regulate criminal proceedings
- c) Promote institutional arbitration and accredit arbitrators
- d) Frame commercial laws

Answer: c

5. Bill to Lower Juvenile Age Threshold

WHY IN NEWS?

- A proposed Bill seeking to lower the juvenile age threshold has triggered debate on criminal justice reform, child rights, and the balance between accountability and rehabilitation.

SUMMARY

- The Bill aims to reduce the age at which minors can be tried as adults for certain serious offences.
- Proponents argue it enhances deterrence and justice for victims, while critics warn it undermines child rights frameworks and rehabilitative principles.
- The proposal has reopened discussions on juvenile justice philosophy, constitutional protections, and international commitments.

BACKGROUND / CONTEXT

- I. India's Juvenile Justice (Care and Protection of Children) Act, 2015 allows

children aged 16–18 to be tried as adults for heinous offences after assessment by the Juvenile Justice Board.

- II. The current Bill seeks further lowering of age thresholds, raising concerns regarding psychological maturity, reformatory justice, and compliance with the UN Convention on the Rights of the Child.

KEY HIGHLIGHTS

- **Legal Change:** Proposal to reduce age threshold for adult trial in serious crimes
- **Existing Framework:** JJ Act, 2015 already permits adult trials for 16–18 age group in heinous offences
- **Assessment Process:** Juvenile Justice Boards conduct preliminary mental and physical capacity evaluation
- **Rights Debate:** Raises questions on child rights and proportional punishment
- **Deterrence Argument:** Supporters cite rising youth involvement in violent crimes
- **Rehabilitation Concern:** Critics stress reform over retribution
- **International Norms:** UNCRC advocates child-centric justice systems

PRELIMS BOOSTER BOX

- **Juvenile Justice Act was enacted in 2015**
- **Heinous offences attract punishment of seven years or more**
- **Juvenile Justice Boards conduct preliminary assessments**
- **India is a signatory to the UN Convention on the Rights of the Child**
- **Juvenile justice emphasises rehabilitation over punishment**
- **Child-friendly procedures are mandated under JJ law**



PadhAI PYQ BOOSTER SECTION

- **GS II Mains 2017:** Child protection laws and institutional mechanisms
- **GS IV Mains 2018:** Ethics of punishment and reform

PadhAI MAINS PRACTICE QUESTION

Q. Critically examine the proposal to lower the juvenile age threshold in India. Discuss its implications for child rights and criminal justice reform. (250 words)

PadhAI-GENERATED UPSC MCQ

Under the Juvenile Justice (Care and Protection of Children) Act, 2015, children aged 16–18 may be tried as adults for:

- a) All offences
- b) Petty offences only
- c) Heinous offences after preliminary assessment
- d) Economic offences exclusively

Answer: c

6.Rajasthan's Disturbed Areas Bill, 2026

WHY IN NEWS?

- The Rajasthan government introduced the Disturbed Areas Bill, 2026 to regulate property transactions in notified zones, citing concerns over demographic change, illegal land transfers, and social tensions.

SUMMARY

- Rajasthan's Disturbed Areas Bill, 2026 seeks to require prior district-level approval for property sales in designated areas to prevent distress

sales, protect vulnerable communities, and maintain public order.

- While the government argues it will curb unlawful land transfers and preserve social harmony, critics raise concerns about property rights, selective application, and constitutional validity.

BACKGROUND / CONTEXT

- I. Similar legislation exists in Gujarat, allowing state authorities to notify "disturbed areas" where property transactions require official clearance.
- II. Rajasthan's proposal draws from this model, invoking public order and social stability.
- III. The move comes amid debates on urban demographic shifts, migration, and communal sensitivities, placing the Bill at the intersection of governance, constitutional rights, and federal legislative powers.

KEY HIGHLIGHTS

- **Regulatory Mechanism:** Mandatory permission from District Collector for property transactions in notified areas
- **Objective Stated:** Prevent distress sales and illegal transfers
- **Geographical Scope:** Applies only to government-declared disturbed areas
- **Administrative Power:** Collector empowered to approve or reject transfers
- **Public Order Basis:** Justified under law and order considerations
- **Rights Debate:** Raises questions over freedom to dispose property
- **Comparative Model:** Similar framework exists in Gujarat



PRELIMS BOOSTER BOX

- **Property rights are protected under Article 300A**

- **Law and order falls under State List**

- **District Collector acts as approving authority**

- **Gujarat has an existing Disturbed Areas Act**

- **Right to property is a legal, not fundamental, right**

- **States can regulate land under constitutional scheme**

PadhAI PYQ BOOSTER SECTION

- **GS II Mains 2020:** Federalism and state legislative powers

- **GS II Mains 2018:** Rights under Article 300A

PadhAI MAINS PRACTICE QUESTION

Q. Examine the constitutional and governance implications of Rajasthan's Disturbed Areas Bill, 2026. (250 words)

PadhAI-GENERATED UPSC MCQ

The Right to Property in India is currently protected under:

- a) Article 19
- b) Article 21
- c) Article 300A
- d) Article 32

Answer: c

7. Responsible Nations Index (RNI) 2026

WHY IN NEWS?

- The Responsible Nations Index (RNI) 2026 was released, assessing countries on their contribution to

global well-being, sustainability, peace, and responsible governance.

SUMMARY

- The Responsible Nations Index evaluates how nations contribute beyond their borders across environmental stewardship, peacekeeping, development cooperation, and global public goods.
- Unlike GDP-centric rankings, RNI focuses on responsibility-driven performance, highlighting the role of states in addressing shared global challenges such as climate change, inequality, and conflict.

BACKGROUND / CONTEXT

- I. Traditional global rankings prioritise economic output and competitiveness, often ignoring external impacts of national policies.
- II. The RNI was developed to fill this gap by measuring international responsibility, aligning with Sustainable Development Goals and principles of multilateral cooperation.
- III. The index draws on cross-country datasets related to emissions, aid, security contributions, and institutional accountability.

KEY HIGHLIGHTS

- **Assessment Scope:** Measures environmental, social, peace, and governance responsibilities
- **Beyond GDP:** Evaluates outward impact, not just domestic performance
- **Climate Metrics:** Considers emissions footprint and climate action
- **Peace Contribution:** Accounts for peacekeeping and conflict engagement



- **Development Support:** Includes foreign aid and humanitarian assistance
- **Governance Lens:** Examines transparency and global cooperation
- **Policy Signal:** Encourages responsibility-based global leadership

PRELIMS BOOSTER BOX

- **RNI focuses on countries' external global impact**
- **Aligned with Sustainable Development Goals framework**
- **Includes indicators on climate, peace, and development cooperation**
- **Differs from HDI and GDP rankings**
- **Promotes accountability in global governance**

PadhAI PYQ BOOSTER SECTION

- **GS II Mains 2019:** Global governance institutions
- **GS III Mains 2020:** Climate responsibility of nations
- **Prelims 2022:** International indices and rankings

Q. PadhAI MAINS PRACTICE QUESTION

How does the Responsible Nations Index differ from traditional development rankings? Discuss its relevance in contemporary global governance. (250 words)

PadhAI-GENERATED UPSC MCQ

The Responsible Nations Index primarily evaluates countries based on:

- Military strength
- GDP growth rates
- Contribution to global public goods
- Population size

Answer: c

8.CAG Releases Second Edition of State Finances Report 2023–24

WHY IN NEWS?

- The Comptroller and Auditor General of India released the second edition of the *State Finances 2023–24* report, providing a consolidated fiscal assessment of all Indian States.

SUMMARY

- The CAG's *State Finances 2023–24* report evaluates revenue, expenditure, debt, and fiscal sustainability across States.
- It highlights persistent structural challenges such as rising debt burdens, dependence on central transfers, and uneven capital expenditure.
- The report serves as a diagnostic tool for cooperative federalism, offering evidence-based inputs for strengthening State-level fiscal governance and long-term macroeconomic stability.

BACKGROUND / CONTEXT

- The Comptroller and Auditor General is India's constitutional authority for auditing public finances under Article 148.
- The State Finances report aggregates audited accounts of States to analyse fiscal performance, quality of spending, and debt sustainability.
- With States responsible for key social sectors and infrastructure, their fiscal health directly affects India's overall economic resilience.

KEY HIGHLIGHTS



- **Fiscal Position:** Reviews revenue deficit, fiscal deficit, and debt trends of States
- **Expenditure Quality:** Examines balance between revenue and capital spending
- **Debt Sustainability:** Flags rising liabilities and interest burdens
- **Revenue Sources:** Highlights reliance on GST compensation and central transfers
- **Capex Focus:** Tracks infrastructure-oriented expenditure patterns
- **Governance Tool:** Supports evidence-based fiscal planning
- **Federal Dimension:** Strengthens transparency in Centre–State financial relations

PRELIMS BOOSTER BOX

- **CAG is a constitutional authority under Article 148**
- **State Finances report consolidates audited accounts of all States**
- **Fiscal deficit measures excess of total expenditure over receipts excluding borrowings**
- **Revenue deficit indicates consumption-driven borrowing**
- **Capital expenditure creates long-term productive assets**
- **Debt sustainability depends on growth-interest differential**

PadhAI PYQ BOOSTER SECTION

- **GS III Mains 2019:** Fiscal federalism and State finances
- **GS II Mains 2020:** Role of constitutional bodies
- **Prelims 2017:** CAG and constitutional provisions

PadhAI MAINS PRACTICE QUESTION

Q. Discuss the significance of the CAG's State Finances report in strengthening fiscal

federalism and State-level economic governance in India. (250 words)

PadhAI-GENERATED UPSC MCQ

The Comptroller and Auditor General of India derives constitutional authority from:

- Article 112
- Article 148
- Article 266
- Article 280

Answer: b



INTERNATIONAL RELATIONS



1.U.S. Invitation to India to Join a “Board of Peace” on Gaza

WHY IN NEWS?

- The United States invited India to join a proposed “Board of Peace” on Gaza, signalling a diplomatic initiative amid the ongoing West Asia conflict.

SUMMARY

- The U.S. invitation to India to participate in a “Board of Peace” on Gaza reflects Washington’s recognition of India’s growing diplomatic stature and credibility as a balanced actor in West Asia.
- India’s cautious response underscores its preference for strategic autonomy, humanitarian diplomacy, and avoidance of overt alignment in a highly polarised regional conflict.

BACKGROUND / CONTEXT

- I. West Asia has remained volatile due to the prolonged Israel–Palestine conflict, with Gaza emerging as a humanitarian and geopolitical flashpoint.
- II. India has historically maintained a balanced West Asia policy, supporting Palestinian statehood while deepening strategic ties with Israel and Gulf countries.
- III. The proposed “Board of Peace” appears to be a diplomatic signalling mechanism rather than a formal institutional arrangement.

KEY HIGHLIGHTS

- **Strategic Signalling:** The invitation reflects U.S. intent to involve India as a responsible stakeholder
- **Diplomatic Balancing:** India continues to maintain relations with Israel, Palestine, Iran, and Arab states
- **Autonomy Principle:** India avoids joining issue-specific blocs that may constrain independent diplomacy
- **Humanitarian Focus:** India has consistently emphasised ceasefire, aid delivery, and civilian protection
- **Global South Role:** India projects itself as a voice for moderation and dialogue
- **Conflict Sensitivity:** Gaza remains a deeply polarised issue with limited diplomatic space

PRELIMS BOOSTER BOX

- **India supports a two-State solution** to the Israel–Palestine conflict
- **Gaza Strip is administered by Hamas** and faces severe humanitarian stress
- **West Asia is central to India’s energy security and diaspora interests**
- **India does not participate in military alliances in the region**
- **Strategic autonomy guides India’s West Asia diplomacy**

PadhAI PYQ BOOSTER SECTION

- **GS II Mains 2018:** India’s relations with West Asian countries
- **GS II Mains 2023:** India as a balancing power in global conflicts

PadhAI MAINS PRACTICE QUESTION

Q. The U.S. invitation to India to join a “Board of Peace” on Gaza reflects evolving power equations in West Asia. Analyse India’s



response in light of its strategic autonomy.
(250 words)

PadhAI-GENERATED UPSC MCQ

India's approach to the Israel–Palestine conflict is best characterised by:

- a) Strategic alignment with Israel
- b) Complete neutrality without engagement
- c) Balanced diplomacy with support for a two-State solution
- d) Mediation through military presence

Answer: c

2.China's Activities in Shaksgam Valley Declared Illegal

WHY IN NEWS?

- The Lieutenant Governor of Ladakh declared China's infrastructure activities in the Shaksgam Valley illegal, reaffirming India's territorial claims.

SUMMARY

- India has reiterated that China's activities in the Shaksgam Valley are illegal, as the territory is part of the erstwhile princely state of Jammu and Kashmir.
- The statement highlights India's consistent position on territorial sovereignty and raises concerns about China–Pakistan collusion in disputed regions.

BACKGROUND / CONTEXT

- I. The Shaksgam Valley lies in the trans-Karakoram tract, illegally ceded by Pakistan to China under the 1963

Sino–Pakistan Agreement, which India has never recognised.

- II. The area holds strategic significance due to its proximity to the Siachen Glacier and China–Pakistan Economic Corridor alignments.

KEY HIGHLIGHTS

- **Territorial Claim:** India considers Shaksgam Valley part of Jammu and Kashmir
- **Illegality Assertion:** India does not recognise the 1963 China–Pakistan agreement
- **Strategic Geography:** Region lies near Siachen and Karakoram Pass
- **China–Pakistan Nexus:** Highlights strategic coordination between Beijing and Islamabad
- **Infrastructure Concern:** Roads and projects may have military implications
- **Diplomatic Signal:** Statement reinforces India's red lines on sovereignty

PRELIMS BOOSTER BOX

- Shaksgam Valley is also known as the Trans-Karakoram Tract
- Pakistan ceded the area to China in 1963
- India considers the agreement illegal and void
- The region lies north of the Siachen Glacier
- Ladakh was made a Union Territory in 2019

PadhAI PYQ BOOSTER SECTION

- **GS II Mains 2020:** India–China border issues
- **Prelims 2016:** Geography of border regions

PadhAI MAINS PRACTICE QUESTION

Q. Discuss the strategic significance of the Shaksgam Valley and its implications for India–China–Pakistan relations. (250 words)



PadhAI-GENERATED UPSC MCQ

The Shaksgam Valley is significant for India because it:

- a) Lies within India's recognised international boundary
- b) Was legally transferred to China by Pakistan
- c) Is part of the territory claimed by India as Jammu and Kashmir
- d) Forms part of the McMahon Line

Answer: c

3.India-Oman CEPA Highlighted for Enhanced Bilateral Trade

WHY IN NEWS?

- The India-Oman Comprehensive Economic Partnership Agreement (CEPA) was highlighted in a PIB release for boosting bilateral trade and investment.

SUMMARY

- India and Oman are negotiating a CEPA to deepen economic engagement, enhance trade flows, and strengthen investment linkages.
- The agreement aligns with India's broader Gulf outreach strategy and Oman's role as a stable maritime and energy partner in the Indian Ocean region.

BACKGROUND / CONTEXT

- I. India and Oman share civilisational ties and strong defence cooperation.
- II. Oman is strategically located near the Strait of Hormuz and hosts Indian naval logistics access at Duqm port.

- III. The proposed CEPA follows similar agreements with UAE and Australia.

KEY HIGHLIGHTS

- **Trade Expansion:** CEPA aims to reduce tariffs and non-tariff barriers
- **Strategic Location:** Oman's proximity to Strait of Hormuz is critical
- **Energy Linkages:** Oman is an important crude oil supplier to India
- **Maritime Cooperation:** Duqm port enhances India's naval reach
- **Economic Diversification:** Aligns with Oman Vision 2040
- **Gulf Strategy:** Part of India's broader West Asia economic engagement

PRELIMS BOOSTER BOX

- **Oman is located at the mouth of the Persian Gulf**
- **Duqm port provides logistics access to the Indian Navy**
- **CEPA is a deeper trade pact than a standard FTA**
- **India already has CEPAs with UAE and Australia**
- **Oman is a key partner in the Indian Ocean region**

PadhAI PYQ BOOSTER SECTION

- **GS II Mains 2019:** India's relations with Gulf countries
- **Prelims 2022:** Trade agreements terminology

PadhAI MAINS PRACTICE QUESTION

Q. How does the proposed India-Oman CEPA fit into India's broader West Asia and Indian Ocean strategy? (250 words)



PadhAI-GENERATED UPSC MCQ

Which of the following best explains the strategic importance of Oman for India?

- a) Land border with India
- b) Control over Bab-el-Mandeb
- c) Proximity to Strait of Hormuz
- d) Membership of QUAD

Answer: c

4. India's Arctic Policy and Greenland

WHY IN NEWS?

- India's Arctic Policy and its engagement with Greenland have gained attention amid growing geopolitical and climate interest in the Arctic region.

SUMMARY

- India's Arctic Policy emphasises scientific research, climate studies, and sustainable development.
- Greenland, with its strategic location and mineral resources, has emerged as a focal point in Arctic geopolitics.
- India's engagement remains science-driven and aligned with environmental responsibility.

BACKGROUND / CONTEXT

- I. India released its Arctic Policy in 2022, focusing on science, environment, and international cooperation.
- II. Melting ice, new shipping routes, and resource access have increased global interest in the Arctic, drawing in both Arctic and non-Arctic states.

KEY HIGHLIGHTS

- **Policy Focus:** Emphasis on climate research and environmental protection
- **Scientific Presence:** India operates the Himadri research station
- **Greenland Significance:** Rich in critical minerals and strategic geography
- **Non-Militarised Approach:** India avoids security competition in Arctic
- **Multilateral Engagement:** India is an observer in the Arctic Council
- **Climate Impact:** Arctic changes affect Indian monsoon patterns

PRELIMS BOOSTER BOX

- India released its Arctic Policy in 2022
- Himadri research station is located in Svalbard
- India is an observer in the Arctic Council
- Greenland is an autonomous territory of Denmark
- Arctic warming has global climate linkages

PadhAI PYQ BOOSTER SECTION

- **GS I Mains 2020:** Climate change and polar regions
- **Prelims 2018:** Polar research stations

PadhAI MAINS PRACTICE QUESTION

Q. Explain the significance of India's Arctic Policy and assess the relevance of Greenland in India's Arctic engagement. (250 words)

PadhAI-GENERATED UPSC MCQ

- India's Arctic engagement is primarily driven by:
- a) Military presence
 - b) Territorial claims
 - c) Scientific research and climate studies
 - d) Control of shipping routes



Answer: c

5.The “Hanimaadhoo” Project

WHY IN NEWS?

- The Hanimaadhoo development project has been highlighted in India–Maldives cooperation, focusing on infrastructure and connectivity.

SUMMARY

- The Hanimaadhoo Project is a major infrastructure initiative in the Maldives supported by India to upgrade airport and connectivity facilities.
- It reflects India’s commitment to development partnership, regional stability, and its Neighbourhood First policy in the Indian Ocean region.

BACKGROUND / CONTEXT

- I. Hanimaadhoo Island is strategically located in northern Maldives.
- II. India has been actively supporting infrastructure projects in Maldives as part of capacity-building and countering strategic competition in the Indian Ocean.

KEY HIGHLIGHTS

- **Development Partnership:** Project funded through Indian assistance
- **Connectivity Boost:** Enhances regional and domestic air connectivity
- **Strategic Location:** Northern Maldives close to Indian sea lanes
- **Neighbourhood First:** Aligns with India’s regional outreach policy
- **People–Centric:** Focus on civilian infrastructure, not military use

• **IOR Stability:** Supports stability in the Indian Ocean Region

PRELIMS BOOSTER BOX

- Hanimaadhoo Island lies in northern Maldives
- India–Maldives relations are guided by Neighbourhood First Policy
- Maldives is located in the Indian Ocean south–west of India
- India provides Lines of Credit for regional infrastructure projects
- Connectivity projects are key tools of Indian diplomacy

PadhAI PYQ BOOSTER SECTION

- **GS II Mains 2019:** India’s neighbourhood policy
- **Prelims 2020:** Indian Ocean island countries

PadhAI MAINS PRACTICE QUESTION

Q. The Hanimaadhoo Project reflects India’s development-centric diplomacy in the Indian Ocean region. Examine. (250 words)

PadhAI–GENERATED UPSC MCQ

The Hanimaadhoo Project is associated with India’s relations with:

- a) Sri Lanka
- b) Maldives
- c) Seychelles
- d) Mauritius

Answer: b



6.What U.S. Annexation of Greenland Could Mean for NATO, Russia

WHY IN NEWS?

- Recent geopolitical discourse has revived the idea of the United States asserting control over Greenland — a semi-autonomous territory of Denmark — triggering international concern about the future of NATO and great-power rivalry, particularly with Russia and China.

SUMMARY

- Greenland, strategically located in the Arctic and home to key U.S. military infrastructure, has become a flashpoint in transatlantic relations.
- Any U.S. attempt to annex or assert sovereign control over the territory — despite Denmark's firm rejection — could fracture NATO, weaken collective defence norms, and benefit rival powers like Russia and China in the Arctic.
- Diplomatic efforts are now underway to address disagreements while preserving alliance cohesion and Arctic security cooperation.

BACKGROUND / CONTEXT

- I. Greenland is part of the Kingdom of Denmark and NATO territory, hosting the U.S. Pituffik Space Base under a 1951 defence agreement.
- II. Control of Greenland has been discussed historically due to its strategic position between North America and Europe and its potential

role in early warning systems and Arctic security.

- III. Recent rhetoric by U.S. political leaders about acquiring sovereign control — opposed by Greenlandic and Danish authorities — has reignited geopolitical tensions.

KEY HIGHLIGHTS

- **Strategic Value:** Greenland overlooks Arctic air and sea approaches relevant to North American and European defence; existing U.S. Pituffik Space Base monitors missiles and space domains.
- **NATO Cohesion at Risk:** Annexation could undermine Article 5 and collective defence, as NATO was not designed to handle one ally violating another's territorial integrity.
- **European Pushback:** Denmark and EU allies insist sovereignty must be respected; unified diplomatic responses are being pursued.
- **Russia's Strategic Opportunity:** A weakened NATO focus could enable Russia to expand its Arctic posture and leverage alliance divisions.
- **China's Arctic Role:** Greater alliance disruption could indirectly benefit China's Arctic economic and strategic ambitions.
- **Diplomatic Channels Active:** U.S., Denmark, and Greenland have begun technical talks to manage security concerns while respecting sovereignty.
- **Alliance Reimagining:** U.S. calls for greater European defence burden-sharing reflect broader reassessments of transatlantic security roles.

PRELIMS BOOSTER BOX

- **Greenland** is an autonomous territory of Denmark but part of NATO's area of responsibility due to Denmark's membership.
- **Pituffik Space Base** (formerly Thule Air Base) is a U.S. military and space monitoring



facility.

- **NATO Article 5** establishes that “an attack on one is an attack on all”; internal territorial violations could destabilise this principle.

- **Arctic geopolitics** involves strategic competition among U.S., Russia, China, and NATO allies.

- **Denmark’s sovereignty** over Greenland is backed by Danish law and broad political consensus in Copenhagen and Nuuk.

PadhAI PYQ BOOSTER SECTION

- **GS II Mains 2020:** NATO and contemporary alliance challenges

- **GS II Mains 2021:** Sovereignty and international law in geopolitics

- **Prelims 2019:** NATO and collective defence fundamentals

PadhAI MAINS PRACTICE QUESTION

Q. Analyse how a hypothetical U.S. move to annex Greenland could impact NATO cohesion and great-power competition in the Arctic. Discuss the implications for international law and regional security cooperation. (250 words)

PadhAI-GENERATED UPSC MCQ

Which of the following are likely consequences of a U.S. attempt to annex Greenland?

1. Undermining NATO’s collective defence norms
2. Greater strategic opportunities for Russia in the Arctic
3. Automatic inclusion of Greenland in the European Union

Select the correct answer:

- a) 1 and 2 only
- b) 2 and 3 only

c) 1 and 3 only

d) 1, 2 and 3

Answer: a

7. ‘Donroe Doctrine’ and the Broken International Order

WHY IN NEWS?

- The term “Donroe Doctrine” has surfaced in geopolitical commentary to describe a renewed phase of U.S. unilateralism and coercive diplomacy, drawing parallels with the historic Monroe Doctrine and highlighting fractures in the contemporary rules-based international order.

SUMMARY

- The so-called “Donroe Doctrine” is used by analysts to characterise an assertive, interest-first foreign policy approach that prioritises national power over multilateral norms.
- It reflects a broader global trend where major powers increasingly bypass institutions, weaken international law, and pursue transactional geopolitics—contributing to erosion of the post-World War II liberal international order.

BACKGROUND / CONTEXT

- I. The original Monroe Doctrine (1823) asserted U.S. dominance in the Western Hemisphere.
- II. The modern “Donroe Doctrine” is an informal label—blending “Donald” and “Monroe”—used to critique contemporary American strategic behaviour marked by economic



PadhAI MAINS PRACTICE QUESTION

Q. Critically analyse the legal and geopolitical implications of the U.S. military intervention in Venezuela in 2026. How does this action challenge existing norms of sovereignty and international law? (250 words)

PadhAI-GENERATED UPSC MCQ

Which of the following is a correct statement about the 2026 U.S. intervention in Venezuela?

- a) It was authorised by the UN Security Council
- b) It resulted in the capture of Nicolás Maduro by U.S. forces
- c) It was an internal Venezuelan military uprising
- d) It ended all sanctions on Venezuela

Answer: b

9.80 Years of ECOSOC (UN Economic and Social Council)

WHY IN NEWS?

- The United Nations marked **80 years of ECOSOC**, reflecting on its role in shaping global development cooperation, social progress, and multilateral economic governance since its establishment in 1945.

SUMMARY

- ECOSOC, one of the six principal organs of the UN, coordinates international efforts on development, health, education, labour, and social inclusion.
- As it completes eight decades, discussions have focused on revitalising multilateralism,

accelerating SDG implementation, and strengthening Global South participation amid growing inequality, climate stress, and fragmented global governance.

BACKGROUND / CONTEXT

- I. Established under the UN Charter in 1945, ECOSOC was designed as the central platform for economic and social coordination within the UN system.
- II. It acts as a bridge between UN agencies, member states, civil society, and the private sector.
- III. Over time, ECOSOC has evolved from policy coordination to becoming a key convenor for sustainable development, humanitarian action, and financing frameworks, especially after the adoption of the 2030 Agenda.

KEY HIGHLIGHTS

- **Institutional Role:** Principal UN body for economic, social, and development coordination
- **SDG Platform:** Oversees follow-up of the 2030 Agenda through the High-Level Political Forum (HLPF)
- **Global Bridge:** Connects governments, UN agencies, NGOs, and private sector
- **Development Financing:** Supports discussions on aid effectiveness and domestic resource mobilisation
- **Humanitarian Link:** Coordinates humanitarian-development-peace nexus
- **Global South Voice:** Increasing focus on inclusive representation and equity
- **Reform Debate:** Calls for making ECOSOC more responsive to contemporary crises



PRELIMS BOOSTER BOX

- **ECOSOC is one of the six principal organs of the United Nations**
 - It was established in 1945 under the UN Charter
- **ECOSOC has 54 member states elected by the UN General Assembly**
 - **High-Level Political Forum (HLPF) operates under ECOSOC**
 - It coordinates specialised agencies like WHO, ILO, FAO, UNESCO
 - India has served multiple terms as an ECOSOC member
 - ECOSOC promotes implementation of the Sustainable Development Goals

PadhAI PYQ BOOSTER SECTION

- **GS II Mains 2019:** Role of UN institutions in global governance
- **GS II Mains 2020:** Reform of multilateral organisations
- **Prelims 2016:** UN principal organs
- **Prelims 2022:** SDGs and UN mechanisms

PadhAI MAINS PRACTICE QUESTION

Q. At 80 years, ECOSOC faces a credibility and relevance challenge. Examine its evolving role in global development governance and the need for institutional reforms. (250 words)

PadhAI-GENERATED UPSC MCQ

Which of the following correctly describes ECOSOC?

- a) It is a judicial organ of the UN
- b) It coordinates economic and social work of the UN system
- c) It authorises peacekeeping missions
- d) It manages UN security operations

Answer: b

10.U.S. Withdrawal from the World Health Organization (WHO)

WHY IN NEWS?

- The United States announced its withdrawal from the World Health Organization (WHO), citing concerns over governance, transparency, and disproportionate financial burden-sharing—reigniting debates on global health multilateralism.

SUMMARY

- The U.S. decision to exit WHO has major implications for global health financing, pandemic preparedness, and multilateral cooperation.
- As one of WHO's largest contributors, America's withdrawal risks weakening disease surveillance, emergency response capacity, and research coordination, while accelerating fragmentation of the international health architecture.

BACKGROUND / CONTEXT

- I. WHO, established in 1948, functions as the UN's specialised agency for global public health. The U.S. has historically been its largest donor and technical partner.
- II. Previous tensions during COVID-19 highlighted concerns over institutional reform, politicisation of health governance, and accountability.
- III. The renewed withdrawal reflects broader trends of unilateralism and scepticism toward multilateral institutions.



KEY HIGHLIGHTS

- **Financial Impact:** Loss of a major funding source affects WHO programmes worldwide
- **Pandemic Preparedness:** Weakens global early-warning and coordinated response systems
- **Institutional Credibility:** Raises questions about resilience of multilateral health governance
- **Geopolitical Signal:** Reflects shift toward unilateral, interest-driven diplomacy
- **Global South Risk:** Low-income countries face reduced technical and medical support
- **Vaccine Equity:** May disrupt cooperative frameworks for access and distribution
- **Power Vacuum:** Creates space for other actors to expand influence in global health

PRELIMS BOOSTER BOX

- **WHO is a specialised agency of the United Nations**
- **Founded in 1948 and headquartered in Geneva**
- **World Health Assembly is WHO's decision-making body**
- **Member States fund WHO through assessed and voluntary contributions**
- **International Health Regulations (IHR) guide pandemic response**
- **Global health is a key pillar of human security**

PadhAI PYQ BOOSTER SECTION

- **GS II Mains 2020:** Global governance during pandemics
- **GS II Mains 2021:** Reform of multilateral institutions
- **Prelims 2016:** WHO structure and functions

PadhAI MAINS PRACTICE QUESTION

Q. Critically analyse the implications of the U.S. withdrawal from WHO for global health governance and multilateral cooperation. (250 words)

PadhAI-GENERATED UPSC MCQ

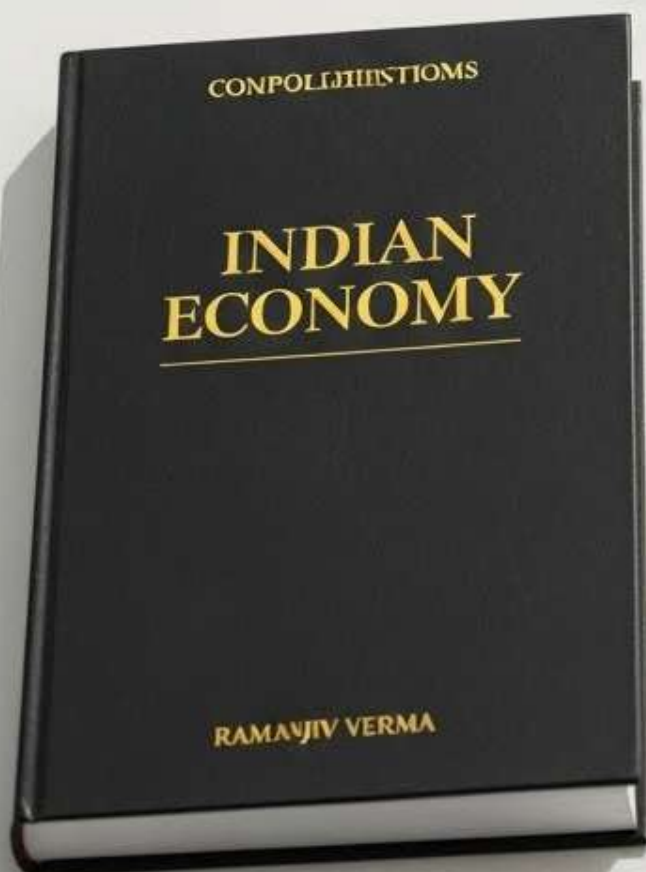
The World Health Organization primarily functions to:

- a) Regulate international trade in medicines
- b) Coordinate global public health efforts
- c) Enforce international law
- d) Provide military medical aid

Answer: b



ECONOMY



1. "Goldilocks" Macro Narrative: Growth with Low Inflation

WHY IN NEWS?

- India's macroeconomic conditions are being described as "Goldilocks", reflecting strong growth alongside moderating inflation.

SUMMARY

- The "Goldilocks" narrative refers to an economy growing at a healthy pace without triggering high inflation.
- In India's case, resilient domestic demand, stable food prices, and prudent monetary-fiscal coordination have supported this balance.
- However, sustaining such conditions remains vulnerable to global shocks and structural constraints.

BACKGROUND / CONTEXT

- I. The term "Goldilocks economy" originated in advanced economies to describe an optimal balance between growth and inflation.
- II. For India, maintaining this balance is complex due to supply-side vulnerabilities, food inflation sensitivity, and exposure to global commodity and financial cycles.

KEY HIGHLIGHTS

- **Growth Momentum:** Driven by domestic demand and services sector
- **Inflation Control:** Supported by monetary tightening and supply management
- **Policy Coordination:** Fiscal consolidation complements monetary stance
- **External Risks:** Oil prices and global

financial tightening remain threats

- **Structural Constraints:** Food inflation remains a persistent challenge
- **Sustainability Question:** Balance may be cyclical rather than structural

PRELIMS BOOSTER BOX

- Goldilocks economy implies neither overheating nor stagnation
- Inflation targeting framework guides RBI policy
- Food inflation has high weight in India's CPI
- Global crude oil prices affect India's inflation dynamics
- Services sector is less inflationary than manufacturing

PadhAI PYQ BOOSTER SECTION

- **GS III Mains 2021:** Inflation and growth trade-offs
- **Prelims 2020:** Monetary policy concepts

PadhAI MAINS PRACTICE QUESTION

Q. What is meant by a "Goldilocks" macroeconomic phase? Examine the sustainability of such a phase in the Indian context. (250 words)

PadhAI-GENERATED UPSC MCQ

A "Goldilocks" economy is best described as one with:

- a) High growth and high inflation
- b) Low growth and low inflation
- c) Moderate growth with stable inflation
- d) High growth driven by exports alone

Answer: c



2. Micro-Enterprise and Crafts Value Chain Formalisation

WHY IN NEWS?

- The PM Vishwakarma scheme has been highlighted for formalising traditional crafts and micro-enterprise value chains.

SUMMARY

- The PM Vishwakarma platform focuses on integrating traditional artisans and micro-enterprises into formal value chains through credit access, skill upgrading, digital onboarding, and market linkage.
- The initiative aims to enhance productivity, incomes, and livelihood sustainability while preserving traditional skills.

BACKGROUND / CONTEXT

- I. India's informal sector accounts for a large share of employment but suffers from low productivity and limited market access.
- II. Artisans and craftspeople often operate outside formal credit and supply chains.
- III. PM Vishwakarma addresses these gaps by combining skilling, finance, and digital integration.

KEY HIGHLIGHTS

- **Formalisation:** Brings artisans into formal financial and digital systems
- **Credit Access:** Collateral-free loans through institutional channels
- **Skill Upgradation:** Focus on modern tools and quality standards
- **Market Linkage:** Integration with

e-commerce and government procurement

- **Livelihood Security:** Enhances income stability for micro-entrepreneurs
- **Cultural Preservation:** Supports traditional crafts and occupations

PRELIMS BOOSTER BOX

- Informal sector dominates India's employment landscape
- Formalisation improves productivity and tax base
- Value chain integration raises artisan incomes
- Digital platforms reduce transaction costs
- Skill development complements credit support

PadhAI PYQ BOOSTER SECTION

- **GS III Mains 2020:** MSMEs and employment
- **GS III Mains 2022:** Formalisation of the economy

PadhAI MAINS PRACTICE QUESTION

Q. How does the PM Vishwakarma scheme contribute to value chain formalisation and livelihood security in India? (250 words)

PadhAI-GENERATED UPSC MCQ

The primary objective of value chain formalisation for micro-enterprises is to:

- a) Increase capital intensity
- b) Improve access to markets and finance
- c) Reduce employment generation
- d) Promote import substitution

Answer: b



3. World Bank Projects India's GDP Growth at 7.2% for FY26

WHY IN NEWS?

- The World Bank projected India's GDP growth at 7.2% for FY26, citing strong domestic demand and services-led expansion.

SUMMARY

- The World Bank's growth projection reflects India's macroeconomic resilience, supported by consumption demand, public capital expenditure, and a robust services sector.
- The outlook also highlights India's relative insulation from global slowdown compared to export-dependent economies.

BACKGROUND / CONTEXT

- I. International institutions periodically revise growth forecasts based on domestic fundamentals and global conditions.
- II. India's growth model has increasingly relied on domestic demand and services, reducing vulnerability to external shocks.

KEY HIGHLIGHTS

- **Growth Driver:** Services sector remains the primary engine
- **Demand Base:** Strong domestic consumption underpins expansion
- **Public Investment:** Capex supports infrastructure and crowd-in effects
- **External Position:** Lower dependence on merchandise exports
- **Comparative Advantage:** India among the fastest-growing major economies

- **Risk Factors:** Global slowdown and climate shocks remain concerns

PRELIMS BOOSTER BOX

- World Bank is a Bretton Woods institution
- GDP measures value of final goods and services
- Services contribute over half of India's GVA
- Domestic demand is more stable than export demand
- Public capex has multiplier effects

PadhAI PYQ BOOSTER SECTION

- **GS III Mains 2018:** Role of services in India's growth
- **Prelims 2019:** International financial institutions

PadhAI MAINS PRACTICE QUESTION

Q. Analyse the significance of domestic demand and services in sustaining India's growth as projected by the World Bank. (250 words)

PadhAI-GENERATED UPSC MCQ

According to recent projections, India's growth resilience is primarily driven by:

- a) Export-led manufacturing
- b) Agriculture-led expansion
- c) Services and domestic demand
- d) Remittance inflows

Answer: c



4.Shift to Net Domestic Product (NDP) from GDP under SNA 2025

WHY IN NEWS?

- The proposed System of National Accounts (SNA) 2025 recommends greater emphasis on Net Domestic Product to reflect sustainability concerns.

SUMMARY

- The shift towards NDP reflects growing recognition that GDP overstates economic well-being by ignoring depreciation of capital.
- NDP deducts capital consumption, offering a more realistic measure of income available for consumption and investment, aligning economic accounting with sustainability objectives.

BACKGROUND / CONTEXT

- I. GDP measures gross value addition without accounting for wear and tear of capital assets.
- II. As sustainability gains prominence, international accounting frameworks are exploring indicators that reflect long-term productive capacity and resource depletion.

KEY HIGHLIGHTS

- **Conceptual Shift:** NDP accounts for depreciation of capital
- **Sustainability Lens:** Reflects net income generation capacity
- **Policy Relevance:** Better indicator for long-term planning
- **Global Trend:** Part of broader move beyond GDP metrics

- **Measurement Challenge:** Depreciation estimation is complex
- **Comparative Use:** GDP will continue alongside NDP

PRELIMS BOOSTER BOX

- $NDP = GDP - \text{depreciation}$
- Depreciation reflects capital consumption
- SNA is an international statistical standard
- GDP remains dominant for cross-country comparison
- Sustainability metrics complement GDP

PadhAI PYQ BOOSTER SECTION

- **Prelims 2016:** GDP vs GNP concepts
- **GS III Mains 2020:** Sustainable development indicators

PadhAI MAINS PRACTICE QUESTION

Q. Why is Net Domestic Product considered a better indicator of sustainability than GDP? Discuss in the context of SNA 2025. (250 words)

PadhAI-GENERATED UPSC MCQ

Net Domestic Product differs from GDP because it:

- a) Includes indirect taxes
- b) Excludes depreciation
- c) Deducts depreciation
- d) Measures national income

Answer: c



5. Brain Drain vs Brain Circulation

WHY IN NEWS?

- The debate on brain drain has resurfaced amid increasing global mobility of skilled Indian professionals.

SUMMARY

- The traditional notion of brain drain is being re-evaluated as brain circulation, where skilled migration generates knowledge transfer, remittances, and global networks.
- For India, the challenge lies in leveraging diaspora linkages while strengthening domestic innovation and employment ecosystems.

BACKGROUND / CONTEXT

- I. Post-independence India witnessed large-scale migration of skilled professionals to advanced economies.
- II. Globalisation, digital connectivity, and return migration have transformed this one-way flow into a more dynamic exchange of skills and capital.

KEY HIGHLIGHTS

- **Brain Drain:** Permanent loss of skilled human capital
- **Brain Circulation:** Two-way flow of talent and knowledge
- **Remittance Channel:** Migrants contribute significantly to forex inflows
- **Innovation Linkages:** Diaspora supports startups and R&D
- **Policy Challenge:** Retaining talent through domestic opportunities
- **Global Mobility:** Skilled labour markets increasingly integrated

PRELIMS BOOSTER BOX

- India is the world's largest recipient of remittances
- Skilled migration affects human capital formation
- Diaspora networks facilitate technology transfer
- Return migration supports entrepreneurship
- Brain circulation reduces zero-sum perception

PadhAI PYQ BOOSTER SECTION

- **GS III Mains 2016:** Demographic dividend and skill development
- **GS III Mains 2021:** Migration and development

PadhAI MAINS PRACTICE QUESTION

Q. "Brain drain is increasingly being replaced by brain circulation." Critically examine this statement in the Indian context. (250 words)

PadhAI-GENERATED UPSC MCQ

Brain circulation differs from brain drain because it emphasises:

- a) Permanent migration
- b) Loss of skilled labour
- c) Two-way movement of talent and knowledge
- d) Restriction on remittances

Answer: c



6.Live Events Cell to Boost Concert Economy

WHY IN NEWS?

- The government announced the creation of a Live Events Cell to promote India's concert and live entertainment economy as part of the broader creative economy push.

SUMMARY

- The Live Events Cell aims to streamline permissions, reduce regulatory friction, and promote India as a global destination for concerts and large-scale cultural events.
- The initiative recognises the economic potential of live entertainment in generating employment, tourism revenues, and urban economic activity.

BACKGROUND / CONTEXT

- I. Globally, live events and concerts are major contributors to city economies through tourism, hospitality, logistics, and services.
- II. In India, despite rising demand and youth-driven consumption, the sector faces regulatory fragmentation, licensing delays, and infrastructure gaps.
- III. The Live Events Cell seeks to address these constraints and formalise the concert economy.

KEY HIGHLIGHTS

- **Economic Rationale:** Live events generate spillovers across hospitality, transport, and MSMEs
- **Regulatory Streamlining:** Single-window

facilitation for permissions and clearances

- **Tourism Linkage:** Concerts boost city branding and destination tourism
- **Employment Impact:** Creates short-term and gig-based jobs
- **Creative Economy:** Part of India's push to monetise cultural capital
- **Urban Focus:** Likely to benefit metros and emerging tier-2 cities

PRELIMS BOOSTER BOX

- Concert economy is part of the broader creative economy
- Live events have strong multiplier effects
- Regulatory simplification improves ease of doing business
- Creative industries contribute to services-sector growth
- Tourism-led growth generates high employment elasticity

PadhAI PYQ BOOSTER SECTION

- **GS III Mains 2019:** Tourism and employment generation
- **GS III Mains 2022:** Services sector and growth

PadhAI MAINS PRACTICE QUESTION

Q. Discuss the economic significance of the concert and live events economy in India. How can regulatory reforms enhance its contribution? (250 words)

PadhAI-GENERATED UPSC MCQ

The primary economic justification for promoting the concert economy lies in its:

- a) Capital-intensive nature
- b) Strong backward and forward linkages
- c) Export-led growth potential
- d) Dependence on public subsidies



Answer: b

7. Conclusion of India–EU Free Trade Agreement (FTA)

WHY IN NEWS?

- India and the European Union concluded negotiations on a comprehensive Free Trade Agreement, marking a major milestone in bilateral economic relations after years of stalled talks.

SUMMARY

- The India–EU FTA aims to deepen trade integration by reducing tariffs, improving market access, strengthening investment flows, and enhancing cooperation in services, digital trade, sustainability, and intellectual property.
- The agreement is expected to unlock new export opportunities for India, diversify EU supply chains, and elevate the strategic partnership amid global economic fragmentation.

BACKGROUND / CONTEXT

- I. India–EU trade negotiations began in 2007 but were suspended in 2013 over differences on market access, labour standards, data protection, and environmental clauses.
- II. Talks resumed in 2022 as both sides sought resilient supply chains and trusted economic partnerships.
- III. The EU is among India's largest trading partners, while India is a key growth market for European businesses.

KEY HIGHLIGHTS

- **Market Access:** Progressive tariff reduction on goods including automobiles, pharmaceuticals, textiles, and agri-products
- **Services Trade:** Improved mobility for professionals and expanded access in IT and business services
- **Investment Framework:** Enhanced investor protection and regulatory transparency
- **Digital Trade:** Provisions on e-commerce, data flows, and digital cooperation
- **Sustainability Chapter:** Commitments on climate action, labour standards, and responsible supply chains
- **MSME Opportunities:** Easier integration into European value chains
- **Strategic Dimension:** Positions the FTA as a pillar of India–EU Strategic Partnership

PRELIMS BOOSTER BOX

- **EU is a single market of 27 member states**
- **FTA reduces tariff and non-tariff barriers between partners**
- **India–EU trade exceeds €100 billion annually (approx.)**
- **EU is a major source of FDI into India**
- **Trade agreements today include digital and sustainability chapters**
- **FTAs complement, but do not replace, WTO frameworks**

PadhAI PYQ BOOSTER SECTION

- **GS II Mains 2019:** India–EU relations
- **GS III Mains 2020:** Free trade agreements and Indian economy
- **Prelims 2022:** Regional trade groupings

PadhAI MAINS PRACTICE QUESTION

Q. Examine the economic and strategic significance of the India–EU Free Trade Agreement. What opportunities and



challenges does it present for India? (250 words)

PadhAI-GENERATED UPSC MCQ

Which of the following is a likely outcome of the India–EU FTA?

- a) Complete elimination of customs duties on all products
- b) Improved market access and deeper integration of value chains
- c) Replacement of WTO trade rules
- d) End of bilateral investment flows

Answer: b

8. World Economic Forum (WEF) Davos 2026

WHY IN NEWS?

- Global political and business leaders convened at WEF Davos 2026 to deliberate on economic recovery, geopolitical fragmentation, climate action, artificial intelligence, and reform of multilateral systems.

SUMMARY

- WEF Davos 2026 served as a high-level platform for dialogue on navigating a fractured global economy marked by slowing growth, technological disruption, and strategic competition.
- Discussions centred on responsible AI, resilient supply chains, climate financing, Global South development, and rebuilding trust in multilateral cooperation amid rising protectionism.

BACKGROUND / CONTEXT

- I. Founded in 1971, the World Economic Forum is a Swiss-based non-profit that

organises the annual Davos meeting to bring together political leaders, CEOs, academics, and civil society.

- II. Though not a decision-making body, WEF shapes global narratives by facilitating public–private dialogue on economic governance, sustainability, and emerging technologies.

KEY HIGHLIGHTS

- **Global Economy:** Focus on managing slowdown, inflation risks, and debt vulnerabilities
- **Geopolitics:** Concerns over fragmentation, conflicts, and supply-chain resilience
- **Artificial Intelligence:** Emphasis on ethical, inclusive, and regulated AI deployment
- **Climate Action:** Push for climate finance and energy transition acceleration
- **Global South:** Calls for development funding and fairer global institutions
- **Digital Transformation:** Discussion on cybersecurity and digital public infrastructure
- **India Engagement:** India highlighted growth story and digital governance models

PRELIMS BOOSTER BOX

- **WEF is headquartered in Geneva, Switzerland**
- **Founded in 1971 by Klaus Schwab**
- **Davos meeting is annual and informal**
- **Not a UN body and has no binding authority**
- **Publishes Global Risks Report annually**
- **Promotes public–private partnership model**

PadhAI PYQ BOOSTER SECTION

- **GS II Mains 2020:** Role of global forums in governance
- **GS III Mains 2021:** Global economic



challenges

- **Prelims 2018:** World Economic Forum

PadhAI MAINS PRACTICE QUESTION

Q. Critically assess the relevance of forums like WEF Davos in addressing contemporary global economic and governance challenges. (250 words)

PadhAI-GENERATED UPSC MCQ

Which of the following statements about the World Economic Forum is correct?

- a) It is a specialised agency of the UN
- b) It has binding authority over member states
- c) It facilitates dialogue between public and private stakeholders
- d) It regulates global financial markets

Answer: c

9. India Becomes the World's 4th Largest Economy

WHY IN NEWS?

- India surpassed Germany to become the world's fourth largest economy in nominal GDP terms, reflecting sustained high growth driven by domestic demand, services expansion, and public capital expenditure.

SUMMARY

- India's rise to the fourth position globally underscores its structural economic transformation.
- Strong consumption, infrastructure-led growth, digital public infrastructure, and demographic advantages have propelled output expansion.

- While this milestone highlights India's growing global economic footprint, challenges such as per capita income, employment generation, and fiscal sustainability remain central to translating size into inclusive prosperity.

BACKGROUND / CONTEXT

- I. India has steadily climbed global GDP rankings over the past decade, supported by reforms in taxation, insolvency resolution, digitalisation, and infrastructure investment.
- II. Nominal GDP rankings measure total economic output in current prices and exchange rates, differing from PPP-based comparisons that capture purchasing power.

KEY HIGHLIGHTS

- **Global Ranking:** India moves ahead of Germany in nominal GDP
- **Growth Drivers:** Domestic consumption, services sector, and public capex
- **Reform Impact:** GST, IBC, and digital platforms improved economic efficiency
- **Demographic Dividend:** Large working-age population supports long-term growth
- **Infrastructure Push:** Roads, railways, ports, and logistics boost productivity
- **Global Role:** Strengthens India's position in G20 and international forums
- **Development Gap:** High aggregate GDP contrasts with modest per capita income

PRELIMS BOOSTER BOX

- **Nominal GDP measures output at current market prices**
- **PPP GDP adjusts for cost-of-living differences**
- **India is a member of G20**



- **Services contribute over 50% to India's GDP**
- **Public capital expenditure stimulates private investment**
- **Per capita income reflects average individual prosperity**

PadhAI PYQ BOOSTER SECTION

- **GS III Mains 2020:** India's growth story and structural reforms
- **GS III Mains 2022:** Infrastructure and economic development
- **Prelims 2019:** GDP concepts and rankings

PadhAI MAINS PRACTICE QUESTION

Q. India becoming the world's fourth largest economy marks a quantitative milestone. Examine the qualitative challenges India must address to convert this growth into inclusive development. (250 words)

PadhAI-GENERATED UPSC MCQ

India's ranking as the world's fourth largest economy is based primarily on:

- PPP-adjusted GDP
- Nominal GDP
- Per capita income
- Human Development Index

Answer: b

10. "Building Bridges": International Cryptocurrency Platform

WHY IN NEWS?

- Global regulators and financial institutions are discussing a proposed "Building Bridges" international cryptocurrency platform aimed at improving cross-border coordination,

interoperability, and regulatory alignment in the digital asset ecosystem.

SUMMARY

- The "Building Bridges" initiative refers to efforts to create a cooperative international crypto framework that connects national regulators, central banks, and digital asset platforms.
- The objective is to enhance transparency, curb illicit finance, enable safer cross-border transactions, and integrate crypto markets with formal financial systems while preserving innovation.

BACKGROUND / CONTEXT

- Cryptocurrencies operate across borders but remain regulated nationally, creating gaps in supervision, consumer protection, and financial stability.
- Institutions such as BIS, IMF, FATF, and G20 have repeatedly highlighted the need for coordinated standards.
- The "Building Bridges" concept aligns with broader global moves toward interoperable digital finance, including CBDCs and harmonised AML norms.

KEY HIGHLIGHTS

- **Global Coordination:** Platform seeks regulatory cooperation across jurisdictions
- **Interoperability:** Aims to connect national crypto frameworks and payment systems
- **Risk Management:** Focus on curbing fraud, money laundering, and terror financing
- **Market Integrity:** Promotes transparency and standardised compliance
- **Cross-Border Payments:** Supports faster, cheaper international transfers



- **Innovation Balance:** Encourages fintech growth while protecting consumers
- **Policy Alignment:** Complements G20, FATF, and BIS digital finance efforts

Answer: c

PRELIMS BOOSTER BOX

- **Cryptocurrencies are decentralised digital assets using blockchain technology**
- **FATF sets global standards on AML/CFT for virtual assets**
- **BIS coordinates central bank cooperation**
- **CBDCs are sovereign digital currencies issued by central banks**
- **Interoperability allows different financial systems to communicate**
- **Crypto regulation remains primarily national, not global**

PadhAI PYQ BOOSTER SECTION

- **GS III Mains 2021:** Cryptocurrency regulation and financial stability
- **GS III Mains 2022:** Fintech and digital payments
- **Prelims 2020:** Blockchain and digital currencies

PadhAI MAINS PRACTICE QUESTION

Q. Discuss the need for an international cryptocurrency coordination platform like “Building Bridges”. How can such initiatives balance innovation with financial stability and consumer protection? (250 words)

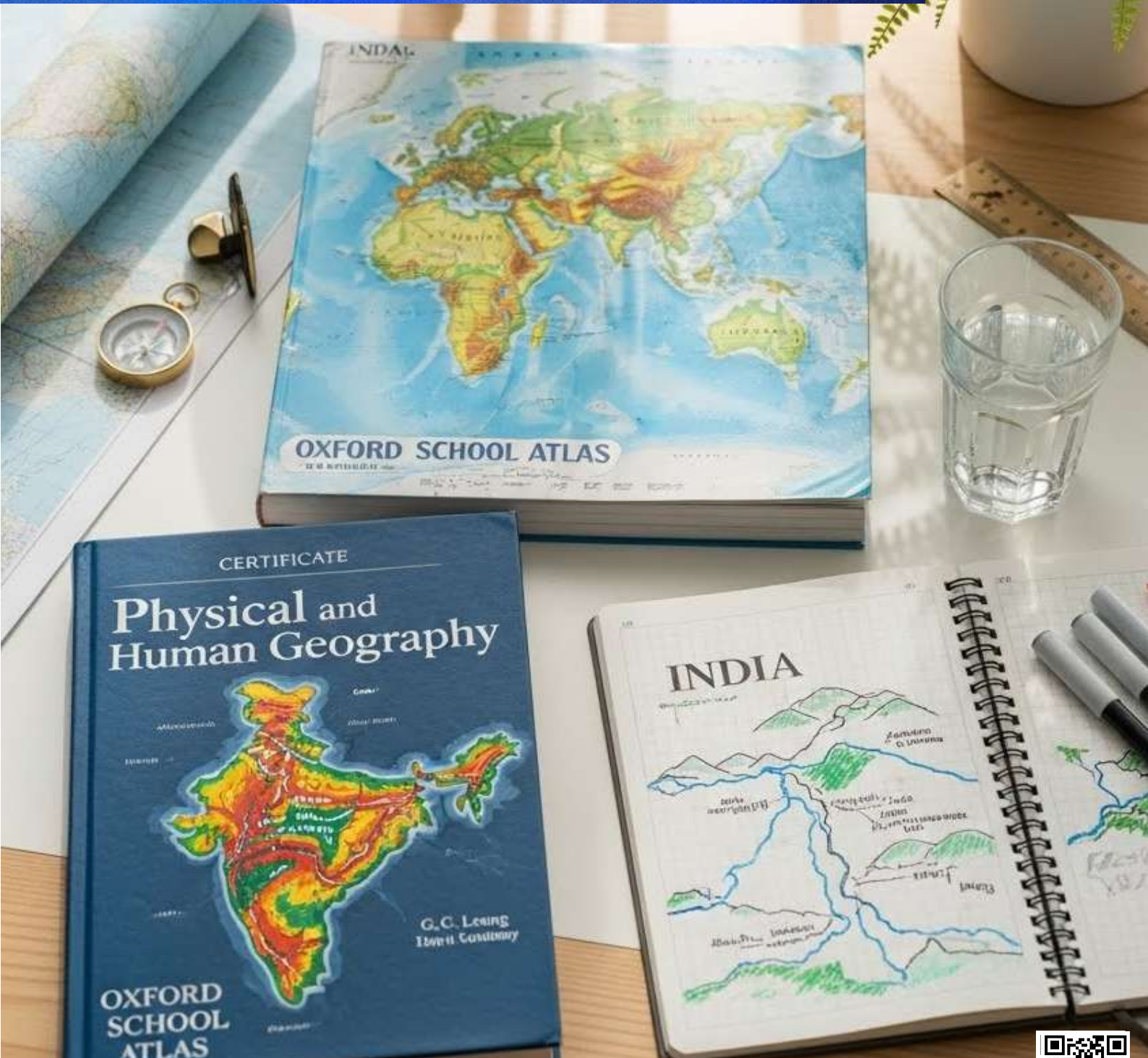
PadhAI-GENERATED UPSC MCQ

The primary objective of international crypto coordination platforms is to:

- Eliminate all cryptocurrencies
- Promote anonymous transactions
- Harmonise regulation and reduce cross-border risks
- Replace central banking systems



GEOGRAPHY



1. Western Himalaya “Snow Drought” Signals



WHY IN NEWS?

- The Western Himalaya has recorded persistent snowfall deficits, raising concerns over cryosphere stress, altered river hydrology, and downstream water security.

SUMMARY

- A “snow drought” in the Western Himalaya indicates significantly lower seasonal snowfall despite normal precipitation days.
- This phenomenon threatens glacier mass balance, reduces spring and summer meltwater flows, and increases long-term risks to river systems dependent on snowmelt, particularly in northwestern India.

BACKGROUND / CONTEXT

- I. The Western Himalaya functions as a critical cryospheric reservoir, storing winter precipitation as snow and ice.
- II. Snowmelt sustains perennial rivers during the pre-monsoon season.
- III. Rising temperatures, erratic western disturbances, and shifting precipitation from snow to rain are

disrupting this natural storage mechanism.

KEY HIGHLIGHTS

- **Cryosphere Stress:** Reduced snowpack weakens glacier nourishment and accelerates retreat
- **Hydrological Shift:** Lower snowmelt reduces lean-season river discharge
- **Western Disturbances:** Altered frequency and trajectory affect snowfall intensity
- **Temperature Rise:** Warmer winters convert snowfall into rainfall
- **Downstream Impact:** Agriculture, hydropower, and drinking water face stress
- **Hazard Risk:** Increased probability of glacial lake outburst floods in long term

PRELIMS BOOSTER BOX

- Snow drought refers to deficit snow accumulation, not absence of precipitation
- Western Himalaya is more snow-fed than monsoon-fed
- Snowmelt sustains rivers during pre-monsoon months
- Cryosphere includes snow, glaciers, ice caps, and permafrost
- Climate warming alters snow-rain partitioning

PadhAI PYQ BOOSTER SECTION

- **GS I Mains 2013:** Himalayan ecosystem and climate change
- **GS I Mains 2019:** Impact of climate change on water resources

PadhAI MAINS PRACTICE QUESTION

Q. Explain the concept of “snow drought” in the Western Himalaya and examine its implications for downstream hydrology. (250 words)



PadhAI-GENERATED UPSC MCQ

Snow drought primarily affects river systems by:

- a) Increasing monsoon rainfall
- b) Reducing pre-monsoon meltwater flow
- c) Enhancing groundwater recharge
- d) Stabilising glacier mass balance

Answer: b

2.Cold Wave Anomalies and Rare Winter Patterns Across India

WHY IN NEWS?

- India experienced unusual cold wave conditions and rare winter patterns, including extended cold spells in non-traditional regions.

SUMMARY

- Recent cold wave anomalies reflect changes in synoptic meteorology, including altered jet stream behaviour, blocking patterns, and intrusion of polar air masses.
- These events indicate increasing winter variability rather than uniform cooling, consistent with climate change-induced atmospheric instability.

BACKGROUND / CONTEXT

- I. Traditionally, cold waves in India are linked to western disturbances and cold air advection from higher latitudes.
- II. Climate change is weakening temperature gradients and destabilising the polar jet stream, leading to unusual southward

penetration of cold air and prolonged winter extremes.

KEY HIGHLIGHTS

- **Jet Stream Dynamics:** Increased meandering enables polar air intrusion
- **Blocking Systems:** Persistent high-pressure blocks prolong cold spells
- **Synoptic Scale:** Western disturbances interact with local circulation
- **Spatial Spread:** Cold waves affecting central and peninsular India
- **Climate Signal:** Extremes coexist with long-term warming trend
- **Socio-Economic Impact:** Agriculture, health, and energy demand affected

PRELIMS BOOSTER BOX

- Cold wave criteria are region-specific in India
- Jet streams are upper tropospheric westerlies
- Blocking highs slow down weather systems
- Western disturbances originate over the Mediterranean region
- Climate change increases weather variability, not uniform trends

PadhAI PYQ BOOSTER SECTION

- **GS I Mains 2017:** Factors influencing Indian weather systems
- **Prelims 2020:** Jet streams and western disturbances

PadhAI MAINS PRACTICE QUESTION

Q. How do jet stream dynamics and synoptic meteorology explain recent cold wave anomalies across India? (250 words)



PadhAI-GENERATED UPSC MCQ

Prolonged cold waves in India are often associated with:

- a) Strong monsoon trough
- b) Blocking high-pressure systems
- c) Local convection
- d) Sea surface warming

Answer: b

3.Confluence-Based Riverine Settlements and Seasonal Congregation Pressures

WHY IN NEWS?

- The Magh/Magh Mela at Prayagraj has highlighted the pressures faced by river confluence zones during large seasonal congregations.

SUMMARY

- River confluences attract dense human settlements due to religious, cultural, and economic factors.
- Seasonal events like the Magh Mela intensify pressure on fragile floodplains, affecting river morphology, water quality, and urban management, necessitating integrated river basin planning.

BACKGROUND / CONTEXT

- I. Confluences have historically supported settlements due to fertile alluvium, navigability, and cultural significance.
- II. However, floodplain encroachment, temporary infrastructure, and waste generation during mass gatherings increase environmental vulnerability.

KEY HIGHLIGHTS

- **Settlement Geography:** Confluences act as cultural and economic nodes
- **Seasonal Surge:** Temporary population multiplies manifold during melas
- **Floodplain Stress:** Construction alters natural flow and sediment dynamics
- **Water Quality:** High pollution load from waste and ritual activities
- **Disaster Risk:** Flooding risk heightened during peak congregation
- **Governance Challenge:** Requires coordination between urban and river authorities

PRELIMS BOOSTER BOX

- Prayagraj lies at the confluence of Ganga, Yamuna, and mythical Saraswati
- Floodplains are natural buffers against floods
- Confluences are zones of high sediment deposition
- River regulation alters channel morphology
- Seasonal migration impacts urban carrying capacity

PadhAI PYQ BOOSTER SECTION

- **GS I Mains 2014:** River systems and human settlements
- **GS I Mains 2018:** Urbanisation and environmental challenges

PadhAI MAINS PRACTICE QUESTION

Q. Examine the geographical and environmental challenges of confluence-based riverine settlements during seasonal mass congregations. (250 words)



PadhAI-GENERATED UPSC MCQ

River confluences are preferred settlement sites primarily due to:

- a) Steep gradients
- b) Fertile alluvial deposits and cultural importance
- c) Low flood risk
- d) Absence of sedimentation

Answer: b

4.New Pamban Bridge: Vertical-Lift Sea Railway Bridge



WHY IN NEWS?

- India inaugurated the new Pamban Bridge, the country's first vertical-lift sea railway bridge, enhancing rail connectivity to Rameswaram Island.

SUMMARY

- The new Pamban Bridge replaces the old cantilever structure with a modern vertical-lift design, allowing ships to pass beneath while ensuring uninterrupted rail connectivity.
- The project demonstrates engineering adaptation to marine geography and extreme coastal conditions.

BACKGROUND / CONTEXT

- I. The Pamban Strait separates mainland India from Rameswaram Island.
- II. The original bridge, built in 1914, faced corrosion due to saline conditions.
- III. Increasing traffic and maritime activity necessitated a technologically advanced replacement.

KEY HIGHLIGHTS

- **Bridge Type:** Vertical-lift mechanism for ship clearance
- **Marine Environment:** Designed to withstand corrosion and cyclonic forces
- **Connectivity Role:** Strengthens rail access to island geography
- **Economic Impact:** Boosts tourism and regional integration
- **Engineering Adaptation:** Use of modern materials and automation
- **Coastal Planning:** Aligns infrastructure with maritime navigation needs

PRELIMS BOOSTER BOX

- Pamban Strait lies between mainland India and Rameswaram Island
- Vertical-lift bridges raise spans vertically
- Marine corrosion accelerates infrastructure decay
- Coastal infrastructure must account for cyclones and salinity
- Bridges influence regional accessibility and economic geography

PadhAI PYQ BOOSTER SECTION

- **GS I Mains 2016:** Infrastructure and regional development
- **Prelims 2019:** Indian coastal geography



PadhAI MAINS PRACTICE QUESTION

Q. How does the new Pamban Bridge reflect the interaction between engineering design and coastal geography? (250 words)

PadhAI-GENERATED UPSC MCQ

The primary advantage of a vertical-lift bridge in a marine setting is that it:

- a) Reduces construction cost
- b) Allows uninterrupted ship movement
- c) Eliminates corrosion
- d) Requires no maintenance

Answer: b

5. Banni Grasslands of Gujarat

WHY IN NEWS?

- Conservation efforts in the Banni Grasslands have gained attention due to ecological degradation and challenges faced by the Maldhari pastoral community.

SUMMARY

- Banni Grasslands, Asia's largest tropical grassland, are a unique arid ecosystem supporting pastoral livelihoods.
- Invasive species, altered hydrology, and land-use changes have degraded the landscape, necessitating ecologically sensitive conservation aligned with traditional grazing practices.

BACKGROUND / CONTEXT

- I. Located in the Kachchh region, Banni was formed through alluvial deposits of the Indus system.

- II. Historically managed by Maldhari pastoralists, state-led afforestation and invasive species introduction disrupted grassland ecology.

KEY HIGHLIGHTS

- **Ecosystem Type:** Tropical grassland with seasonal wetlands
- **Community Role:** Maldharis practice sustainable pastoralism
- **Invasive Threat:** *Prosopis juliflora* has reduced native grasses
- **Hydrological Change:** Altered drainage affects grass productivity
- **Biodiversity Value:** Habitat for migratory birds and wildlife
- **Conservation Approach:** Community-led and landscape-based strategies needed

PRELIMS BOOSTER BOX

- Banni lies in the Kachchh region of Gujarat
- Grasslands are distinct from forests ecologically
- *Prosopis juliflora* is an invasive species
- Pastoralism is adapted to arid environments
- Wetland-grassland interaction defines Banni ecology

PadhAI PYQ BOOSTER SECTION

- **GS I Mains 2018:** Grassland ecosystems in India
- **Prelims 2022:** Biodiversity and ecosystems

PadhAI MAINS PRACTICE QUESTION

Q. Discuss the ecological significance of the Banni Grasslands and the role of pastoral communities in their conservation. (250 words)



PadhAI-GENERATED UPSC MCQ

Banni Grasslands are best described as:

- a) Alpine meadows
- b) Tropical grasslands with seasonal wetlands
- c) Mangrove ecosystems
- d) Evergreen forests

Answer: b

6. Senkaku Islands Dispute



WHY IN NEWS?

- Renewed tensions between China and Japan over the Senkaku Islands have heightened strategic concerns in the East China Sea.

SUMMARY

- The Senkaku Islands dispute reflects overlapping territorial claims and strategic rivalry in the East China Sea.
- The region is geopolitically sensitive due to maritime trade routes, fishing grounds, and potential hydrocarbon resources, with implications for regional stability.

BACKGROUND / CONTEXT

- I. The uninhabited Senkaku Islands are administered by Japan but claimed by China.

- II. The dispute intensified after Japan nationalised the islands in 2012. The East China Sea remains a critical maritime corridor linking East Asian economies.

KEY HIGHLIGHTS

- **Location:** Situated in the East China Sea
- **Competing Claims:** Japan administers; China asserts sovereignty
- **Strategic Value:** Proximity to sea lanes and resources
- **Military Presence:** Increased patrols and airspace intrusions
- **Regional Security:** Linked to broader Indo-Pacific tensions
- **International Law:** UNCLOS principles invoked by both sides

PRELIMS BOOSTER BOX

- Senkaku Islands are uninhabited
- East China Sea is a major global shipping route
- Maritime disputes often involve EEZ claims
- UNCLOS governs maritime boundaries
- Island disputes influence regional geopolitics

PadhAI PYQ BOOSTER SECTION

- **GS II Mains 2020:** Maritime disputes in East Asia
- **Prelims 2016:** World geography and strategic locations

PadhAI MAINS PRACTICE QUESTION

Q. Explain the geographical and strategic significance of the Senkaku Islands dispute in the East China Sea. (250 words)



PadhAI-GENERATED UPSC MCQ

The Senkaku Islands dispute is located in the:

- a) South China Sea
- b) East China Sea
- c) Yellow Sea
- d) Sea of Japan

Answer: b

7. A Dangerous March Towards a Himalayan Ecocide

WHY IN NEWS?

- Growing concerns have emerged over accelerating environmental degradation in the Himalayan region due to infrastructure expansion, climate change, unregulated tourism, and fragile governance mechanisms.

SUMMARY

- The Himalayas are facing a mounting ecological crisis marked by deforestation, landslides, glacial retreat, river disruption, and biodiversity loss.
- Rapid development without adequate carrying-capacity assessment is destabilising one of the world's youngest mountain systems.
- Experts warn that continued exploitation may push the region toward an irreversible "ecocide," threatening water security, livelihoods, and disaster resilience for millions downstream.

BACKGROUND / CONTEXT

- I. The Himalayan ecosystem functions as Asia's water tower, feeding major

river systems like the Ganga, Brahmaputra, and Indus.

- II. Traditionally governed by low-impact livelihoods, the region has witnessed intensive road building, hydropower projects, urbanisation, and tourism pressure over recent decades.
- III. Climate warming is compounding these stresses by accelerating glacier melt and altering precipitation patterns, making slopes increasingly unstable.

KEY HIGHLIGHTS

- **Geological Fragility:** Himalayas are young fold mountains prone to seismicity and landslides
- **Infrastructure Push:** Roads, tunnels, dams, and urban expansion exceed ecological carrying capacity
- **Cryosphere Loss:** Rapid glacier retreat threatens long-term river flows
- **Hydrological Disruption:** River channelisation and damming alter sediment and flood regimes
- **Biodiversity Decline:** Habitat fragmentation impacts endemic species
- **Disaster Frequency:** Rising incidence of floods, landslides, and subsidence
- **Governance Gaps:** Weak enforcement of environmental clearances and cumulative impact assessments

PRELIMS BOOSTER BOX

- **Himalayas are young fold mountains formed by Indo-Eurasian plate collision**
- **Region feeds major perennial rivers of South Asia**
- **Carrying capacity defines sustainable human load on ecosystems**
- **Glacier retreat affects pre-monsoon river discharge**
- **Environmental Impact Assessment (EIA) is**



mandatory for large projects

- **Mountain ecosystems amplify climate risks**
- **Downstream plains depend on Himalayan hydrology**

PadhAI PYQ BOOSTER SECTION

- **GS I Mains 2019:** Climate change and Himalayan ecology
- **GS III Mains 2018:** Environmental degradation and disasters
- **Prelims 2020:** Himalayan geography and river systems

PadhAI MAINS PRACTICE QUESTION

Q. Critically examine how unplanned development and climate change are pushing the Himalayan ecosystem towards ecological collapse. Suggest policy measures for sustainable mountain governance. (250 words)

PadhAI-GENERATED UPSC MCQ

Which of the following factors most directly increases ecological vulnerability in the Himalayas?

- a) Plateau uplift
- b) Young fold mountain geology combined with infrastructure overload
- c) High forest density
- d) Stable rainfall regimes

Answer: b

8.Arctic Amplification Phenomenon

WHY IN NEWS?

- Scientists have reported accelerated warming in the Arctic region, intensifying concerns over Arctic

Amplification and its cascading impacts on global climate systems, mid-latitude weather extremes, and cryosphere stability.

SUMMARY

- Arctic Amplification refers to the phenomenon where the Arctic warms at more than twice the global average rate.
- This rapid heating is driven by feedback mechanisms such as sea-ice loss, reduced albedo, and increased atmospheric heat transport.
- The process disrupts jet stream patterns, amplifies extreme weather events, and accelerates permafrost thaw, influencing climate dynamics far beyond polar regions.

BACKGROUND / CONTEXT

- I. The Arctic acts as a planetary cooling system due to its high reflectivity and ice cover.
- II. However, rising greenhouse gas concentrations have triggered widespread ice melt, exposing darker ocean surfaces that absorb more heat.
- III. This creates a positive feedback loop, reinforcing warming. Arctic Amplification has emerged as a central concept in climate science due to its role in altering global circulation patterns.

KEY HIGHLIGHTS

- **Warming Rate:** Arctic temperatures rising over twice the global average
- **Albedo Feedback:** Ice loss exposes darker surfaces, increasing heat absorption
- **Jet Stream Impact:** Weakens polar vortex



and increases weather variability

- **Permafrost Thaw:** Releases methane and carbon dioxide
- **Sea Level Link:** Accelerates Greenland ice sheet melt
- **Extreme Events:** Connected to heatwaves, cold spells, and erratic rainfall
- **Global Teleconnections:** Polar changes influence mid-latitude climates

PRELIMS BOOSTER BOX

- **Albedo refers to surface reflectivity**
- **Arctic Amplification is a positive feedback climate process**
- **Jet streams are high-altitude westerly winds**
- **Permafrost stores large amounts of organic carbon**
- **Greenland ice sheet contributes to global sea level rise**
- **Methane is a potent greenhouse gas**
- **Polar warming affects monsoon variability**

PadhAI PYQ BOOSTER SECTION

- **GS I Mains 2019:** Climate change and cryosphere
- **GS III Mains 2020:** Environmental feedback mechanisms
- **Prelims 2018:** Jet streams and climate dynamics

PadhAI MAINS PRACTICE QUESTION

Q. Explain the phenomenon of Arctic Amplification and examine its implications for global climate systems and weather extremes. (250 words)

PadhAI-GENERATED UPSC MCQ

Arctic Amplification primarily results from:
a) Increased volcanic activity

- b) Enhanced solar radiation
- c) Loss of sea ice reducing surface albedo
- d) Ocean salinity changes

Answer: c

9.AI-Based 3D Imaging of Popocatepetl Volcano's Interior

WHY IN NEWS?

- Scientists from Mexico's National Autonomous University (UNAM) used 22 seismographs and artificial intelligence over five years to generate the first three-dimensional image of Popocatepetl volcano's internal structure.

SUMMARY

- Using seismic tomography enhanced by AI, researchers mapped magma chambers and internal conduits of Popocatepetl, one of Mexico's most active volcanoes.
- The breakthrough improves understanding of eruption dynamics and strengthens early warning systems, demonstrating how machine learning can transform volcano monitoring and disaster preparedness.

BACKGROUND / CONTEXT

- I. Popocatepetl lies near Mexico City and poses significant risk to surrounding populations.
- II. Traditional volcanology relies on seismic waves to infer underground structures.
- III. By integrating long-term seismic datasets with AI algorithms, scientists achieved unprecedented resolution,



marking a shift toward data-driven geohazard assessment.

KEY HIGHLIGHTS

- **Research Method:** Combination of seismic tomography and artificial intelligence
- **Instrumentation:** Network of 22 seismographs deployed over five years
- **Scientific Output:** First detailed 3D model of volcano's interior
- **Magma Mapping:** Identification of magma reservoirs and conduits
- **Risk Reduction:** Enhances eruption forecasting capability
- **Disaster Preparedness:** Supports early warning and evacuation planning
- **Tech Integration:** Shows growing role of AI in earth sciences

PRELIMS BOOSTER BOX

- **Seismic tomography uses earthquake waves to image Earth's interior**
- **Popocatépetl is one of Mexico's most active stratovolcanoes**
- **UNAM is Mexico's National Autonomous University**
- **AI aids pattern recognition in large geophysical datasets**
- **Volcano monitoring uses seismographs, gas sensors, and satellite data**
- **3D subsurface imaging improves hazard modelling**

PadhAI PYQ BOOSTER SECTION

- **GS I Mains 2018:** Volcanism and associated hazards
- **GS III Mains 2020:** Technology in disaster management
- **Prelims 2019:** Types of volcanoes

PadhAI MAINS PRACTICE QUESTION

Q. How can AI-assisted seismic imaging improve volcanic hazard assessment? Discuss with reference to recent advances in Popocatépetl volcano studies. (250 words)

PadhAI-GENERATED UPSC MCQ

Seismic tomography is primarily used to:

- a) Measure atmospheric pressure
- b) Image subsurface geological structures using seismic waves
- c) Predict monsoon rainfall
- d) Track ocean currents

Answer: b





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1. Drinking Water Contamination in India (SOE 2026 Build-Up)

WHY IN NEWS?

- Concerns over drinking water quality have intensified ahead of the State of Environment (SOE) 2026 assessment, highlighting contaminants and governance gaps.

SUMMARY

- Drinking water contamination in India arises from geogenic, industrial, agricultural, and urban sources.
- Issues such as arsenic, fluoride, nitrates, and microbial pollution pose public health risks, underscoring the need for robust monitoring systems and governance reforms.

BACKGROUND / CONTEXT

- India's groundwater-dependent water supply makes it vulnerable to both natural and anthropogenic contamination.
- While schemes like Jal Jeevan Mission focus on access, quality monitoring and institutional coordination remain uneven across states.

KEY HIGHLIGHTS

- Chemical Contaminants:** Arsenic, fluoride, iron, and nitrates exceed safe limits
- Biological Pollution:** Pathogens from sewage and poor sanitation contaminate sources
- Agricultural Runoff:** Excess fertiliser use raises nitrate levels
- Monitoring Gaps:** Limited real-time and decentralised testing

- Health Impact:** Linked to fluorosis, arsenicosis, and waterborne diseases
- Governance Challenge:** Fragmented responsibility across agencies

PRELIMS BOOSTER BOX

- Arsenic contamination is prominent in the Ganga–Brahmaputra plains
- Fluoride contamination affects parts of peninsular India
- BIS sets drinking water quality standards
- Groundwater is the primary source of rural drinking water
- Water quality is as critical as water access

PadhAI PYQ BOOSTER SECTION

- GS III Mains 2019:** Water resource management
- Prelims 2021:** Groundwater contamination

PadhAI MAINS PRACTICE QUESTION

Q. Examine the major causes of drinking water contamination in India and the governance challenges in addressing them. (250 words)

PadhAI-GENERATED UPSC MCQ

Which of the following contaminants is primarily geogenic in origin in India?

- Nitrate
- Arsenic
- Pesticide residue
- Microbial pathogens

Answer: b



2.Global South Conservation Practices and Indigenous Rights

WHY IN NEWS?

- Researchers have highlighted that certain conservation practices in the Global South undermine indigenous and local community rights.

SUMMARY

- Conservation models that prioritise exclusionary protected areas often marginalise indigenous communities, disrupting livelihoods and traditional ecological knowledge.
- The debate calls for rights-based, community-led conservation approaches that balance biodiversity protection with social justice.

BACKGROUND / CONTEXT

- I. Colonial conservation models emphasised strict protection through exclusion.
- II. In the Global South, these approaches continue to affect forest-dwelling and indigenous communities, despite evidence that community-managed landscapes often show better ecological outcomes.

KEY HIGHLIGHTS

- **Exclusionary Models:** Restrict access to traditional lands and resources
- **Rights Conflict:** Displacement and livelihood loss for indigenous groups
- **Knowledge Systems:** Traditional practices support biodiversity conservation
- **Governance Shift:** Growing push for community-based conservation
- **Equity Dimension:** Conservation linked to

human rights

- **Global Debate:** Aligns with CBD and UNDRIP principles

PRELIMS BOOSTER BOX

- Indigenous peoples manage a significant share of global biodiversity
- UNDRIP protects indigenous land and cultural rights
- Community forestry can enhance conservation outcomes
- Protected areas vary in levels of access restriction
- Social equity is integral to sustainable conservation

PadhAI PYQ BOOSTER SECTION

- **GS III Mains 2018:** Conservation and livelihoods
- **GS I Mains 2019:** Tribal issues and rights

PadhAI MAINS PRACTICE QUESTION

Q. Critically analyse how exclusionary conservation practices can undermine indigenous rights in the Global South. (250 words)

PadhAI-GENERATED UPSC MCQ

Which approach best aligns biodiversity conservation with indigenous rights?

- a) Strict exclusionary protected areas
- b) Militarised conservation
- c) Community-based conservation
- d) Privatised forest management

Answer: c



3. Weed Threat to Mustard Crops

WHY IN NEWS?

- The increasing impact of invasive and resistant weeds on mustard crops has raised concerns over productivity and farm incomes.

SUMMARY

- Weed infestation in mustard fields reduces yields by competing for nutrients, water, and light.
- Traditional chemical control methods face limitations due to resistance and environmental risks, necessitating integrated and innovative weed management strategies.

BACKGROUND / CONTEXT

- I. Mustard is a major rabi oilseed crop in India.
- II. Changing climate conditions, monocropping, and overuse of herbicides have altered weed ecology, making control more challenging for farmers.

KEY HIGHLIGHTS

- **Yield Loss:** Weeds significantly reduce mustard productivity
- **Resistance Issue:** Repeated herbicide use leads to resistant weeds
- **Ecological Impact:** Chemical overuse affects soil and biodiversity
- **Integrated Management:** Combines mechanical, biological, and chemical methods
- **Innovation Need:** Precision agriculture and crop rotation
- **Food Security:** Oilseed productivity critical for import reduction

PRELIMS BOOSTER BOX

- Mustard is a key rabi oilseed crop
- Weeds compete with crops for limited resources
- Herbicide resistance is an emerging agricultural challenge
- Integrated Weed Management reduces chemical dependence
- Oilseed self-sufficiency is a policy priority

PadhAI PYQ BOOSTER SECTION

- **GS III Mains 2017:** Oilseed production challenges
- **Prelims 2020:** Sustainable agriculture practices

PadhAI MAINS PRACTICE QUESTION

Q. Discuss the emerging weed threat to mustard cultivation and suggest sustainable management strategies. (250 words)

PadhAI-GENERATED UPSC MCQ

Integrated Weed Management primarily aims to:

- a) Eliminate all weeds permanently
- b) Rely exclusively on herbicides
- c) Combine multiple control methods sustainably
- d) Increase monocropping intensity

Answer: c



4. Rangelands and Pastoralists: IPBES Report

WHY IN NEWS?

- The IPBES report highlighted large-scale degradation of global rangelands and its impact on pastoral communities.

SUMMARY

- Rangelands are among the most degraded ecosystems globally, threatening biodiversity, carbon storage, and pastoral livelihoods.
- The IPBES report stresses sustainable grazing, land tenure security, and indigenous knowledge as key to restoration.

BACKGROUND / CONTEXT

- I. Rangelands cover vast areas of the Earth and support millions of pastoralists.
- II. Policy neglect, land conversion, and climate stress have degraded these systems, despite their ecological and socio-economic importance.

KEY HIGHLIGHTS

- **Ecosystem Role:** Rangelands support biodiversity and carbon sequestration
- **Livelihood Base:** Pastoralism depends on healthy grazing systems
- **Degradation Drivers:** Overgrazing, land-use change, climate variability
- **Policy Gap:** Rangelands often excluded from conservation focus
- **Knowledge Value:** Traditional grazing practices enhance resilience
- **Restoration Path:** Adaptive management and community involvement

PRELIMS BOOSTER BOX

- Rangelands include grasslands, savannas, and shrublands
- Pastoralism is adapted to variable climates
- IPBES assesses biodiversity and ecosystem services
- Grazing systems influence soil carbon
- Land tenure security improves conservation outcomes

PadhAI PYQ BOOSTER SECTION

- **GS III Mains 2018:** Grassland and pastoral ecosystems
- **Prelims 2022:** IPBES and biodiversity reports

PadhAI MAINS PRACTICE QUESTION

Q. Explain the ecological importance of rangelands and assess the challenges faced by pastoral communities. (250 words)

PadhAI-GENERATED UPSC MCQ

Rangelands are best characterised by:

- a) Dense tree cover
- b) Permanent cultivation
- c) Grazing-based ecosystems
- d) Urban land use

Answer: c

5. UN High Seas Treaty (BBNJ) and the 2026 Deadline

WHY IN NEWS?

- As the 2026 implementation deadline approaches, gaps in operationalising the UN High Seas Treaty (BBNJ) have come under scrutiny.



SUMMARY

- The BBNJ Treaty seeks to conserve and sustainably use marine biodiversity in areas beyond national jurisdiction.
- While it marks a major step in ocean governance, challenges remain in capacity building, funding, compliance, and benefit-sharing ahead of its full implementation.

BACKGROUND / CONTEXT

- I. Areas beyond national jurisdiction cover nearly half of the Earth's surface but lack comprehensive governance.
- II. The BBNJ Treaty complements UNCLOS by addressing marine genetic resources, area-based management tools, environmental impact assessments, and capacity building.

KEY HIGHLIGHTS

- **Geographic Scope:** Applies to high seas beyond EEZs
- **Core Pillars:** Marine genetic resources, MPAs, EIAs, capacity building
- **Equity Issue:** Benefit-sharing between developed and developing states
- **Implementation Gap:** Institutional and financial mechanisms evolving
- **Developing Countries:** Capacity constraints remain significant
- **Ocean Health:** Critical for climate regulation and biodiversity

PRELIMS BOOSTER BOX

- BBNJ stands for Biodiversity Beyond National Jurisdiction
- High seas lie beyond 200 nautical miles
- UNCLOS is the legal framework for oceans
- Marine genetic resources have pharmaceutical value

- Environmental Impact Assessments are mandatory under the treaty

PadhAI PYQ BOOSTER SECTION

- **GS III Mains 2022:** Marine biodiversity and global governance
- **Prelims 2023:** International environmental agreements

PadhAI MAINS PRACTICE QUESTION

Q. Assess the significance of the UN High Seas Treaty and the challenges in its implementation before 2026. (250 words)

PadhAI-GENERATED UPSC MCQ

The UN High Seas Treaty primarily addresses biodiversity in:

- a) Territorial waters
- b) Exclusive Economic Zones
- c) Areas beyond national jurisdiction
- d) Continental shelves only

Answer: c

6.Centre Notifies Rules for Utilisation of Environmental Protection Fund

WHY IN NEWS?

- The Union Government notified rules governing the utilisation of the Environmental Protection Fund (EPF), which pools penalties and compensation collected for environmental violations, to ensure transparent and targeted ecological restoration.



SUMMARY

- The newly notified rules operationalise the Environmental Protection Fund by defining its sources, governance framework, and spending priorities.
- The fund will channel money collected from environmental penalties toward remediation, pollution abatement, biodiversity conservation, and monitoring infrastructure, reinforcing the “polluter pays” principle and strengthening India’s environmental compliance ecosystem.

BACKGROUND / CONTEXT

- I. Environmental penalties imposed by courts and regulatory authorities were earlier deposited in multiple accounts without a unified utilisation mechanism.
- II. The EPF framework seeks to centralise these proceeds and direct them toward environmental restoration.
- III. The move aligns with Supreme Court directives and provisions under the Environment (Protection) Act, 1986, aiming to close governance gaps in environmental compensation management.

KEY HIGHLIGHTS

- **Fund Objective:** Dedicated corpus for environmental restoration and protection
- **Revenue Source:** Penalties, fines, and compensation from environmental violations
- **Legal Basis:** Rules framed under Environment (Protection) Act, 1986
- **Spending Areas:** Pollution control, remediation, biodiversity conservation, and monitoring systems
- **Governance Framework:** Centralised management with defined approval

mechanisms

- **Polluter Pays:** Reinforces accountability for environmental damage
- **Transparency Goal:** Structured utilisation to avoid ad-hoc disbursement

PRELIMS BOOSTER BOX

- **Environment (Protection) Act enacted in 1986**
- **Polluter Pays Principle assigns cost of damage to violators**
- **Environmental compensation differs from criminal fines**
- **Funds will support remediation and preventive infrastructure**
- **Central rules govern utilisation of EPF**
- **Environmental penalties can be imposed by courts and regulators**

PadhAI PYQ BOOSTER SECTION

- **GS III Mains 2017:** Environmental governance mechanisms
- **GS III Mains 2020:** Regulatory frameworks for pollution control
- **Prelims 2018:** Environmental laws and principles

PadhAI MAINS PRACTICE QUESTION

Q. Examine how the Environmental Protection Fund operationalises the “polluter pays” principle. Discuss its potential role in strengthening environmental governance in India. (250 words)

PadhAI-GENERATED UPSC MCQ

The Environmental Protection Fund primarily utilises money collected from:

- a) General taxation
- b) International climate finance
- c) Environmental penalties and



compensation

d) Corporate social responsibility funds

Answer: c

7. Asia–Pacific Malaria Elimination by 2030?

WHY IN NEWS?

- Health experts and regional bodies have reiterated the goal of eliminating malaria from the Asia–Pacific region by 2030, amid mixed progress across countries and emerging challenges such as drug resistance and climate variability.

SUMMARY

- The Asia–Pacific region has committed to malaria elimination by 2030 through coordinated surveillance, vector control, diagnostics, and treatment strategies.
- While several countries have achieved zero indigenous cases, others continue to face transmission due to weak health systems, cross-border movement, and changing climate patterns.
- Achieving the target will require sustained financing, regional cooperation, and last-mile delivery in hard-to-reach populations.

BACKGROUND / CONTEXT

- I. The Asia–Pacific carries a significant share of the global malaria burden, with diverse transmission settings ranging from forested border areas to urban pockets.
- II. The regional goal aligns with WHO's Global Technical Strategy for Malaria

and is supported by platforms such as APLMA (Asia Pacific Leaders Malaria Alliance).

- III. India plays a central role, having adopted a National Framework for Malaria Elimination (2016–2030) with phased district-level targets.

KEY HIGHLIGHTS

- **Regional Target:** Asia–Pacific aims for malaria elimination by 2030
- **Country Progress:** Several nations have achieved zero indigenous malaria cases
- **India's Commitment:** National Framework targets malaria-free status by 2030
- **Core Interventions:** Early diagnosis, complete treatment, vector control, and surveillance
- **Border Challenges:** Cross-border migration sustains residual transmission
- **Drug Resistance:** Artemisinin resistance threatens treatment effectiveness
- **Climate Factor:** Changing rainfall and temperature patterns expand mosquito habitats

PRELIMS BOOSTER BOX

- **Malaria is caused by Plasmodium parasites transmitted by female Anopheles mosquitoes**
- **WHO's Global Technical Strategy targets malaria elimination by 2030**
- **India launched National Framework for Malaria Elimination (2016–2030)**
- **Artemisinin-based Combination Therapy (ACT) is standard malaria treatment**
- **APLMA stands for Asia Pacific Leaders Malaria Alliance**
- **Vector control includes indoor residual spraying and insecticide-treated nets**
- **Elimination differs from eradication (global permanent reduction to zero)**



PadhAI PYQ BOOSTER SECTION

- **GS III Mains 2015:** Communicable diseases and public health systems
- **GS II Mains 2020:** Global health cooperation
- **Prelims 2019:** Vector-borne diseases

PadhAI MAINS PRACTICE QUESTION

Q. Assess the feasibility of achieving malaria elimination in the Asia-Pacific region by 2030. Highlight the role of India and the major implementation challenges. (250 words)

PadhAI-GENERATED UPSC MCQ

Which of the following correctly distinguishes malaria elimination from eradication?

- a) Elimination is global; eradication is national
- b) Elimination is permanent; eradication is temporary
- c) Elimination is regional reduction to zero; eradication is global zero transmission
- d) Both mean the same

Answer: c

8. Gandak River Emerges as Second Major Habitat for Gharials After Chambal



WHY IN NEWS?

- Recent wildlife monitoring data shows that the **Gandak River** now hosts the **second highest population of gharials**

in India after the Chambal River, marking a significant conservation milestone.

SUMMARY

- The Gandak River's rise as a key gharial habitat reflects the success of riverine conservation measures, habitat protection, and species reintroduction efforts.
- The critically endangered gharial, once on the brink of extinction, is gradually recovering in select river systems, highlighting the importance of clean rivers, undisturbed sandbanks, and coordinated inter-state wildlife management.

BACKGROUND / CONTEXT

- I. Gharials (*Gavialis gangeticus*) are river-dependent crocodilians native to the Indian subcontinent.
- II. Historically widespread across northern rivers, their populations collapsed due to dam construction, sand mining, fishing pressures, and habitat fragmentation.
- III. Conservation initiatives under India's Crocodile Conservation Project and state-led programmes focus on captive breeding, release, and river habitat restoration.
- IV. The Chambal has long been the primary stronghold; Gandak's emergence signals expanding recovery.

KEY HIGHLIGHTS

- **Species Status:** Gharial is listed as Critically Endangered on IUCN Red List
- **New Stronghold:** Gandak becomes second-largest gharial habitat after



Chambal

- **River Ecology:** Clean flowing water and sandbanks support breeding
- **Conservation Impact:** Result of reintroduction and habitat protection
- **Inter-State Role:** Gandak flows through Bihar and Uttar Pradesh, requiring coordinated governance
- **Indicator Species:** Gharial presence reflects river ecosystem health
- **Threats Remain:** Fishing nets, sand mining, and river regulation continue to pose risks

PRELIMS BOOSTER BOX

- **Scientific name of gharial is *Gavialis gangeticus***
- **Gharial is endemic to the Indian subcontinent**
- **Prefers deep, fast-flowing rivers with sandy banks**
- **Chambal River hosts India's largest gharial population**
- **Gandak is a tributary of the Ganga originating in Nepal**
- **Protected under Schedule I of Wildlife Protection Act, 1972**
- **Part of India's Crocodile Conservation Programme**

PadhAI PYQ BOOSTER SECTION

- **GS III Mains 2018:** Conservation of endangered species
- **Prelims 2017:** Gharial and crocodilian species

PadhAI MAINS PRACTICE QUESTION

Q. Discuss the ecological significance of gharials as indicator species and evaluate the factors behind their recent recovery in rivers like the Gandak. (250 words)

PadhAI-GENERATED UPSC MCQ

Which of the following statements about gharials is correct?

- a) They inhabit mangrove ecosystems
- b) They are marine crocodilians
- c) They prefer fast-flowing freshwater rivers with sandy banks
- d) They are found across all Indian rivers

Answer: c

9.Secondary Pollutants Account for One-Third of Delhi's Annual PM2.5 Load

WHY IN NEWS?

- Recent air quality studies reveal that nearly **one-third of Delhi's annual PM2.5 pollution** comes from **secondary pollutants**, particularly **ammonium sulphate**, shifting focus from only direct emission sources to atmospheric chemical formation.

SUMMARY

- Delhi's air pollution is not driven solely by primary emissions like vehicles or dust.
- A substantial share of PM2.5 forms in the atmosphere through chemical reactions between precursor gases such as sulphur dioxide, nitrogen oxides, and ammonia.
- Ammonium sulphate has emerged as a major secondary component, highlighting the need for integrated regional strategies targeting agricultural ammonia, industrial sulphur emissions, and urban NOx sources.



BACKGROUND / CONTEXT

- I. PM2.5 refers to fine particulate matter smaller than 2.5 micrometres capable of penetrating deep into lungs and bloodstream.
- II. While policy traditionally targets visible primary sources, secondary aerosols form when gaseous pollutants react under sunlight and humidity.
- III. In north India, ammonia from fertilisers and livestock combines with sulphates and nitrates from coal power plants, industries, and vehicles, producing persistent fine particles.

KEY HIGHLIGHTS

- **Pollution Composition:** Around one-third of Delhi's PM2.5 originates from secondary formation
- **Key Component:** Ammonium sulphate identified as dominant secondary aerosol
- **Chemical Pathway:** Formed from sulphur dioxide reacting with atmospheric ammonia
- **Regional Link:** Agricultural ammonia from neighbouring states contributes significantly
- **Health Impact:** Secondary PM2.5 penetrates deep lungs causing cardiovascular and respiratory diseases
- **Policy Gap:** Current control measures focus mainly on primary emissions
- **Integrated Approach:** Requires coordination across agriculture, industry, and transport sectors

PRELIMS BOOSTER BOX

- **PM2.5 refers to particles smaller than 2.5 micrometres**
- **Secondary pollutants form in the atmosphere, not emitted directly**
- **Ammonium sulphate is produced from SO₂ and ammonia reactions**
- **Ammonia largely comes from fertilisers**

and livestock

- **NO_x originates mainly from vehicles and power plants**
- **Secondary aerosols increase during winter due to stagnant air**
- **PM2.5 is linked to stroke, heart disease, and asthma**

PadhAI PYQ BOOSTER SECTION

- **GS III Mains 2017:** Air pollution and health impacts
- **GS III Mains 2020:** Urban environmental challenges
- **Prelims 2019:** Particulate matter concepts

PadhAI MAINS PRACTICE QUESTION

Q. Secondary pollutants now constitute a significant share of Delhi's PM2.5 burden. Discuss the formation of secondary aerosols and suggest policy interventions to address this emerging dimension of air pollution. (250 words)

PadhAI-GENERATED UPSC MCQ

Ammonium sulphate in urban PM2.5 is primarily formed due to reaction between:

- a) Carbon monoxide and ozone
- b) Sulphur dioxide and ammonia
- c) Nitrogen dioxide and methane
- d) Lead and particulate dust

Answer: b

10.Landmark Aquatic Biodiversity Conservation Initiatives under the Namami Gange Mission

WHY IN NEWS?

- The National Mission for Clean Ganga (NMCG) highlighted major achievements in aquatic biodiversity



conservation under the **Namami Gange Mission**, showcasing recovery trends in flagship species and strengthened riverine ecosystem management.

SUMMARY

- Beyond pollution abatement, Namami Gange has evolved into a comprehensive river rejuvenation programme integrating aquatic biodiversity conservation.
- Targeted initiatives for species like the Gangetic dolphin, gharial, turtles, and native fish are restoring ecological balance in the Ganga basin.
- These efforts combine habitat protection, scientific monitoring, community participation, and policy integration, marking a shift from engineering-led cleaning to ecosystem-based river governance.

BACKGROUND / CONTEXT

- I. Launched in 2014, Namami Gange originally focused on sewage treatment and riverfront development.
- II. Over time, biodiversity loss emerged as a critical concern, prompting NMCG to incorporate conservation of keystone aquatic species.
- III. The Ganga basin supports over 140 fish species and multiple endangered fauna, but faced severe degradation from pollution, sand mining, and flow alteration.

KEY HIGHLIGHTS

- **Flagship Species Protection:** Dedicated programmes for Gangetic dolphin, gharial, turtles, and otters
- **Scientific Monitoring:** Use of eDNA,

hydro-acoustic surveys, and biodiversity mapping

- **Community Engagement:** Ganga Praharis mobilised for conservation awareness
- **Habitat Restoration:** Protection of breeding grounds and riverine wetlands
- **Policy Integration:** Alignment with Wildlife Protection Act and national biodiversity goals
- **Rescue Networks:** Dolphin and turtle rescue and rehabilitation mechanisms
- **Ecosystem Shift:** Transition from pollution-only focus to river ecosystem rejuvenation

PRELIMS BOOSTER BOX

- **Namami Gange launched in 2014**
- **Implemented by National Mission for Clean Ganga (NMCG)**
- **Gangetic dolphin is India's National Aquatic Animal**
- **eDNA helps detect aquatic species from water samples**
- **Gharial is Critically Endangered (IUCN)**
- **Ganga Praharis are community river guardians**
- **Mission integrates biodiversity with water quality restoration**

PadhAI PYQ BOOSTER SECTION

- **GS III Mains 2018:** Conservation of endangered species
- **GS III Mains 2020:** River rejuvenation programmes
- **Prelims 2017:** National Aquatic Animal

PadhAI MAINS PRACTICE QUESTION

Q. Namami Gange has moved beyond pollution control to ecosystem restoration. Examine its aquatic biodiversity initiatives and their significance for sustainable river governance. (250 words)



PadhAI-GENERATED UPSC MCQ

Which species is officially recognised as India's National Aquatic Animal and actively protected under Namami Gange initiatives?

- a) Gharial
- b) Olive ridley turtle
- c) Gangetic river dolphin
- d) Smooth-coated otter

Answer: c



SPECIES IN NEWS



1. Gee's Golden Langur (*Trachypithecus geei*)



01. **Range:** Endemic to a small region of **Western Assam** (India) and the **Black Mountains of Bhutan**.
02. **IUCN Status:** **Endangered**.
03. **Key Threats:** Habitat fragmentation (NH-27 divides the population), electrocution by power lines, and hybridization with Capped Langurs.
04. **High-Yield Facts:**
 - a. **River Boundaries:** Its range is strictly bounded by the **Sankosh** (West), **Manas** (East), and **Brahmaputra** (South) rivers.
 - b. **National Parks:** Prime habitat includes **Raimona NP**, **Chakrashila WLS**, and the western part of **Manas NP**.
 - c. **Biology:** Diurnal and primarily herbivorous (folivorous), spending 60% of time feeding on leaves.
 - d. **Legal Protection:** Schedule I of the Wildlife Protection Act (WPA), 1972; CITES Appendix I.
 - e. **Hybridization News:** Construction of bridges in Bhutan has led to interbreeding with Capped Langurs, threatening its genetic purity.
 - f. **Social Structure:** Typically lives in small groups (average 8

members) with a uni-male, multi-female structure.

2. Himalayan Brown Bear (*Ursus arctos isabellinus*)



01. **Range:** High altitudes of the **Western Himalayas** (J&K, Himachal, Uttarakhand) extending into Pakistan and Nepal.
02. **IUCN Status:** **Critically Endangered** (specifically the Himalayan subspecies).
03. **Key Threats:** Habitat loss due to tourism, human-wildlife conflict (retaliatory killing by shepherds), and **plastic ingestion** from garbage dumps.
04. **High-Yield Facts:**
 - a. **Altitudinal Range:** Found at extreme elevations between **3,000m to 5,500m**, above the tree line.
 - b. **Hibernation:** They are the only bears in India that undergo true winter hibernation in self-dug dens.
 - c. **Dietary Shift:** Recent 2026 data shows up to **75% of their diet** in certain regions (like Kugti WLS) now consists of scavenged human waste.



- d. **Largest Predator:** It is the largest terrestrial carnivore in the Himalayan region.
- e. **Protected Areas:** Key populations are in **Kugti WLS**, **Tundah WLS**, and the **Deosai Plateau** (Pakistan).
- f. **Legal Protection:** Schedule I (WPA 1972) and CITES Appendix I.
- d. **Diet:** Primarily frugivorous; depends on perennially fruiting trees in dense rainforests.
- e. **Diurnal Behavior:** Active only during the day; shy and avoids human settlements.
- f. **Conservation News:** The 2026 survey highlights critical fragmentation in the **Agasthyamalai landscape**, making it a focal point for corridors.

3. Lion-Tailed Macaque (*Macaca silenus*)



- 01. **Range:** Endemic to the evergreen forests of the **Western Ghats** (Kerala, Karnataka, Tamil Nadu).
- 02. **IUCN Status:** **Endangered**.
- 03. **Key Threats:** Habitat fragmentation due to tea/coffee plantations and linear infrastructure (roads/railways) in the **Shencottah Gap**.
- 04. **High-Yield Facts:**
 - a. **Flagship Species:** It is the enduring symbol of the **Silent Valley National Park** in Kerala.
 - b. **Appearance:** Distinguished by its silver-white mane and black "lion-like" tufted tail.
 - c. **Arboreal Nature:** Unlike many other macaques, it is strictly arboreal and rarely descends to the ground.

4. Red-Eared Slider Turtle (*Trachemys scripta elegans*)



- 01. **Range:** Native to the **Southeastern USA and Mexico**; now globally invasive including India.
- 02. **IUCN Status:** **Least Concern** (but listed among the **World's 100 Most Invasive Species**).
- 03. **Key Threats:** Outcompetes native Indian turtles for food and nesting space; spreads **Salmonella** bacteria to humans and wildlife.
- 04. **High-Yield Facts:**
 - a. **Invasive Biology:** Characterized by rapid growth, early maturity, and high fecundity (reproducibility).
 - b. **Thermal Regulation:** Poikilothermic (cold-blooded)



- and requires frequent sunbathing (basking) on rocks.
- c. **Identification:** Notable red stripe located behind each eye.
- d. **Habitat:** Thrives in still, warm water bodies like urban ponds, lakes, and slow-moving rivers.
- e. **Ecological Impact:** Decimates local aquatic vegetation and preys on small native vertebrates/insects.

5. Pygmy Hog (*Porcula salvania*)



01. **Range:** Restricted solely to the **Manas National Park** in Assam.
02. **IUCN Status:** **Endangered** (recently downlisted from Critically Endangered due to successful reintroductions).
03. **Key Threats:** Habitat loss through grass burning, livestock grazing, and commercial forestry.
04. **High-Yield Facts:**
 - a. **Unique Genus:** It is the only species in the genus *Porcula*, making it evolutionarily distinct from the common wild boar (*Sus scrofa*).
 - b. **World's Smallest:** It is the smallest and rarest wild suid (pig) in the world.
 - c. **Specialized Nesting:** One of the few mammals that build **thatch-roofed nests** for year-round shelter.

- d. **Indicator Species:** Its presence is a primary indicator of the health of the **Tall Alluvial Grasslands** (Terai ecosystem).
- e. **Breeding Program:** The **Pygmy Hog Conservation Programme (PHCP)** is a global model for successful captive breeding and release.

6. Bactrian Camel (*Camelus ferus/bactrianus*)



01. **Range:** Wild population in the **Gobi Desert** (Mongolia/China); Domesticated population in **Nubra Valley** (Ladakh, India).
02. **IUCN Status:** **Critically Endangered** (Wild *C. ferus*); Domesticated (*C. bactrianus*) is not categorized but rare in India.
03. **Key Threats:** Hybridization with domestic camels, illegal mining, and water scarcity in arid regions.
04. **High-Yield Facts:**
 - a. **Double Hump:** Stores fat in two humps, which can be converted into water and energy.
 - b. **Adaptation:** Can consume **saltwater slush** that other camels cannot tolerate.
 - c. **Extreme Tolerance:** Survives temperatures



- d. **Ladakh Legacy:** In India, they are remnants of the **Ancient Silk Route** trade.
- e. **Legal Protection:** Wild version is on CITES Appendix I and CMS (Convention on Migratory Species).

7. Grey Slender Loris (*Loris lydekkerianus*)



- 01. **Range:** Tropical forests and scrub of **Southern India** and **Sri Lanka**.
- 02. **IUCN Status:** **Near Threatened** (Note: Some sources say Least Concern, but the Indian population is under severe stress).
- 03. **Key Threats:** Habitat loss of **Acacia** trees, electrocution, and illegal poaching for "love potions" and traditional medicine.
- 04. **High-Yield Facts:**
 - a. **Nocturnal:** Strictly active at night; has extremely large, forward-facing eyes for night vision.
 - b. **Pest Control:** Primarily **insectivorous** (e.g., eats termites/ants), making it a friend to farmers.
 - c. **Sanctuary:** India's first slender loris sanctuary is in **Kadavur, Tamil Nadu**.

- d. **Biology:** Lacks a tail; has a vestigial second digit for a specialized "pincer grip" on branches.
- e. **Legal Protection:** Schedule I of WPA 1972 (highest protection).

8. Amazonian Stingless Bees (*Meliponini*)



- 01. **Range:** Native to tropical/subtropical regions of the **Amazon Rainforest** (Peru, Brazil).
- 02. **IUCN Status:** Not evaluated globally, but many sub-species are declining locally.
- 03. **Key Threats:** Deforestation, climate change (forcing migration to higher altitudes), and competition with invasive honeybees.
- 04. **High-Yield Facts:**
 - a. **Legal Rights 2026:** In **January 2026**, two municipalities in Peru granted these bees **legal rights** to exist and thrive—the first for an insect globally.
 - b. **Pollination Power:** They pollinate over **80% of Amazonian flora** and key crops like cocoa and coffee.
 - c. **Meliponiculture:** The traditional practice of rearing these bees for "medicinal honey" (slightly acidic/sour).



- d. **Defense Mechanism:** They have vestigial stingers; they defend hives by **biting** or secreting resins.
- e. **Jurisprudence:** Represents the **"Rights of Nature"** movement, allowing humans to file lawsuits on the bees' behalf.



SCIENCE & TECHNOLOGY



1. India's Space Programme as a People's Space Journey



WHY IN NEWS?

- India's space programme is increasingly being described as a "people-centric" mission model, focusing on societal applications and inclusive development.

SUMMARY

- India's space programme has evolved from strategic and scientific objectives to a people-oriented development model.
- Applications in agriculture, disaster management, navigation, education, health, and digital governance demonstrate how space technology is directly integrated into everyday life, making it a mass-impact development instrument.

BACKGROUND / CONTEXT

- I. Since its inception, ISRO has followed a developmental space philosophy, prioritising societal benefits alongside scientific progress.
- II. Programmes like INSAT, NavIC, and Earth observation missions reflect India's commitment to inclusive technology deployment rather than

purely militarised or commercial space models.

KEY HIGHLIGHTS

- **Developmental Focus:** Space missions designed for social and economic applications
- **Service Delivery:** Satellite services support governance, weather, and connectivity
- **Disaster Management:** Real-time data aids early warning and response systems
- **Digital Integration:** Space data supports digital public infrastructure
- **Affordable Innovation:** Low-cost mission design increases access
- **Global Outreach:** India provides space services to developing countries
- **Public Trust:** Space missions seen as national development assets

PRELIMS BOOSTER BOX

- **ISRO follows a civilian space programme model**
- **NavIC is India's indigenous navigation system**
- **INSAT supports telecom, broadcasting, and meteorology**
- **Earth observation satellites aid agriculture and water management**
- **India promotes South-South space cooperation**

PadhAI PYQ BOOSTER SECTION

- **GS III Mains 2019:** Role of science and technology in development
- **Prelims 2020:** Indian space missions

PadhAI MAINS PRACTICE QUESTION

Q. Explain how India's space programme has evolved into a people-centric development model. (250 words)



PadhAI-GENERATED UPSC MCQ

India's space programme is best described as:

- a) Militarised space development
- b) Purely commercial space exploration
- c) Development-oriented civilian space model
- d) Export-driven space industry

Answer: c

2. Ban on Oral Formulations of Nimesulide Over 100 mg



WHY IN NEWS?

- Regulatory authorities banned oral formulations of nimesulide exceeding 100 mg due to safety and pharmacological risk concerns.

SUMMARY

- The ban reflects increasing regulatory focus on drug safety, rational dosage, and pharmacovigilance.

- High-dose nimesulide has been associated with liver toxicity risks, prompting stricter control to protect public health and ensure evidence-based medicine use.

BACKGROUND / CONTEXT

- I. Nimesulide is a non-steroidal anti-inflammatory drug (NSAID) widely used in India.
- II. Global concerns over hepatotoxicity led to restrictions in several countries.
- III. India's drug regulation system increasingly emphasises post-marketing surveillance and rational drug use.

KEY HIGHLIGHTS

- **Drug Safety:** High doses linked to hepatotoxicity risk
- **Regulatory Action:** Dosage-based restriction rather than total ban
- **Pharmacovigilance:** Strengthening adverse drug reaction monitoring
- **Rational Medicine:** Promotes evidence-based prescription practices
- **Public Health:** Focus on patient safety over market access
- **Regulatory Evolution:** Stronger role of CDSCO and drug authorities

PRELIMS BOOSTER BOX

- **Nimesulide is an NSAID**
- **Hepatotoxicity refers to liver damage**
- **CDSCO regulates drugs in India**
- **Pharmacovigilance monitors adverse drug reactions**
- **Drug regulation is part of public health governance**



PadhAI PYQ BOOSTER SECTION

- **GS III Mains 2020:** Public health regulation
- **Prelims 2021:** Drug regulation institutions

PadhAI MAINS PRACTICE QUESTION

Q. Discuss the role of pharmacovigilance and regulatory oversight in ensuring drug safety in India. (250 words)

PadhAI-GENERATED UPSC MCQ

Nimesulide belongs to which category of drugs?

- a) Antibiotics
- b) NSAIDs
- c) Antivirals
- d) Vaccines

Answer: b

3. Antarctic Microbes and Discovery of Rare Amino Acids



WHY IN NEWS?

- Genetic analysis of Antarctic microbes has revealed rare amino acids with potential biotechnological applications.

SUMMARY

- Extreme-environment microbes possess unique genetic codes

enabling the synthesis of rare amino acids.

- These discoveries expand understanding of extremophile biology and open new pathways for industrial enzymes, pharmaceuticals, and synthetic biology applications.

BACKGROUND / CONTEXT

- I. Antarctica hosts extremophiles adapted to low temperatures, high UV radiation, and nutrient scarcity.
- II. Their unique metabolic pathways make them valuable for biotechnology, astrobiology, and origin-of-life research.

KEY HIGHLIGHTS

- **Extremophiles:** Microbes adapted to extreme cold environments
- **Genetic Novelty:** Unique codon usage and metabolic pathways
- **Biotech Value:** Potential for industrial enzymes and drug development
- **Synthetic Biology:** Applications in engineered biological systems
- **Astrobiology Link:** Insights into life in extreme planetary conditions
- **Research Frontier:** Polar biology as emerging scientific domain

PRELIMS BOOSTER BOX

- **Extremophiles survive in extreme conditions**
- **Amino acids are building blocks of proteins**
- **Genetic code determines protein synthesis**
- **Antarctica is a natural laboratory for extremophile studies**
- **Biotechnology uses biological systems for industrial applications**



PadhAI PYQ BOOSTER SECTION

- **GS III Mains 2018:** Biotechnology applications
- **Prelims 2019:** Extremophiles and biology

PadhAI MAINS PRACTICE QUESTION

Q. How do extremophile microbes contribute to advances in biotechnology and synthetic biology? (250 words)

PadhAI-GENERATED UPSC MCQ

Extremophiles are organisms that:

- Live only in forests
- Survive extreme environmental conditions
- Exist only in oceans
- Are genetically modified

Answer: b

4.ISRO PSLV-C62 Anomaly and Mission Assurance



WHY IN NEWS?

- Reports of an anomaly in the PSLV-C62 mission triggered discussions on mission assurance, quality control, and investigation protocols.

SUMMARY

- Mission anomalies are addressed through structured failure analysis, quality audits, and design reviews.
- ISRO's mission assurance framework focuses on systemic learning, reliability engineering, and institutional accountability to maintain launch vehicle credibility.

BACKGROUND / CONTEXT

- Space missions involve high-risk, complex engineering systems.
- ISRO follows rigorous mission assurance protocols involving independent reviews, redundancy design, and post-flight investigations to ensure continuous improvement.

KEY HIGHLIGHTS

- **Mission Assurance:** Systematic risk management framework
- **Quality Systems:** Multi-layered inspection and testing protocols
- **Failure Analysis:** Root-cause investigation methodology
- **Reliability Engineering:** Design redundancy and fault tolerance
- **Institutional Learning:** Feedback integration into future missions
- **Global Standard:** Comparable to international space agencies

PRELIMS BOOSTER BOX

- **PSLV is India's primary launch vehicle**
- **Mission assurance ensures reliability and safety**
- **Root cause analysis is standard in aerospace engineering**
- **Redundancy improves system reliability**
- **Quality systems prevent systemic failures**



PadhAI PYQ BOOSTER SECTION

- **GS III Mains 2020:** Space technology and national capability
- **Prelims 2018:** ISRO launch vehicles

PadhAI MAINS PRACTICE QUESTION

Q. Explain the importance of mission assurance and quality systems in sustaining the credibility of national space programmes. (250 words)

PadhAI-GENERATED UPSC MCQ

Mission assurance in space programmes primarily aims to:

- a) Increase mission costs
- b) Ensure reliability and safety
- c) Reduce scientific output
- d) Promote secrecy

Answer: b

5. Marine and Space Biotechnology



WHY IN NEWS?

- Advances in marine and space biotechnology are enabling the use of deep-sea organisms for industrial enzymes and space-based food production systems.

SUMMARY

- Marine and space biotechnology harness extremophiles for industrial applications such as bio-catalysts,

pharmaceuticals, and sustainable food systems.

- These fields integrate biology with space science to support long-duration missions and sustainable industrial innovation.

BACKGROUND / CONTEXT

- I. Deep-sea organisms and space experiments operate in extreme environments, making them valuable for developing resilient biological systems.
- II. Space agencies and research institutions increasingly invest in bio-regenerative life-support and synthetic food production technologies.

KEY HIGHLIGHTS

- **Deep-Sea Biology:** Enzymes adapted to pressure and temperature extremes
- **Industrial Use:** Bio-catalysts for chemicals, food, and pharmaceuticals
- **Space Agriculture:** Closed-loop food production systems
- **Life-Support Systems:** Bio-regenerative technologies for missions
- **Sustainability Link:** Low-energy industrial processes
- **Innovation Frontier:** Convergence of biotech and space science

PRELIMS BOOSTER BOX

- **Extremozymes are enzymes from extremophiles**
- **Space farming supports long-duration missions**
- **Marine biotechnology uses ocean organisms**
- **Biocatalysts reduce industrial energy use**



- **Synthetic biology integrates biology and engineering**

PadhAI PYQ BOOSTER SECTION

- **GS III Mains 2018:** Biotechnology in industry
- **Prelims 2020:** Synthetic biology concepts

PadhAI MAINS PRACTICE QUESTION

Q. Discuss the emerging role of marine and space biotechnology in sustainable industrial and space systems. (250 words)

PadhAI-GENERATED UPSC MCQ

Extremozymes are best defined as:

- Enzymes used only in medicine
- Enzymes derived from extremophiles
- Artificially synthesised enzymes
- Plant-based enzymes

Answer: b

6.DRDO Showcases Long Range Anti-Ship Hypersonic Missile (LR-AShM) at 77th Republic Day Parade



WHY IN NEWS?

- At the 77th Republic Day Parade on Kartavya Path, DRDO publicly showcased the **Long Range Anti-Ship**

Hypersonic Missile (LR-AShM) for the first time, signalling a major leap in India's indigenous strike and maritime deterrence capabilities.

SUMMARY

- The unveiling of LR-AShM marks India's entry into the elite group of nations possessing hypersonic anti-ship strike capability.
- Designed for rapid, long-range precision attacks against high-value naval targets, the missile strengthens India's maritime dominance and complements its growing focus on deterrence in the Indo-Pacific.
- The system reflects advances in propulsion, guidance, and manoeuvrability under India's indigenous defence R&D ecosystem.

BACKGROUND / CONTEXT

- Hypersonic weapons—travelling at speeds above Mach 5—are redefining modern warfare due to their speed, manoeuvrability, and ability to evade conventional missile defence systems.
- India has been developing hypersonic technologies through programmes such as HSTDV and advanced cruise missile platforms under DRDO. The LR-AShM is aligned with India's maritime security doctrine, especially amid rising strategic competition in the Indian Ocean Region.

KEY HIGHLIGHTS

- **Weapon Class:** Hypersonic anti-ship missile capable of Mach-5+ speeds
- **Operational Role:** Precision strike against enemy naval assets and carrier groups
- **Indigenous Development:** Designed and



developed by DRDO

- **Maritime Deterrence:** Enhances India's sea-denial and power-projection capabilities
- **Advanced Guidance:** High manoeuvrability to defeat air-defence systems
- **Strategic Signalling:** Demonstrates India's growing high-end military technology base
- **Force Integration:** Expected to complement Navy and joint-forces operations

PRELIMS BOOSTER BOX

- **Hypersonic weapons travel at speeds greater than Mach 5**
- **LR-AShM stands for Long Range Anti-Ship Hypersonic Missile**
- **Developed by Defence Research and Development Organisation (DRDO)**
- **Anti-ship missiles are designed to neutralise naval vessels**
- **Hypersonic systems combine speed with manoeuvrability**
- **India is among few countries developing hypersonic strike platforms**
- **Kartavya Path is the ceremonial avenue for Republic Day parade**

PadhAI PYQ BOOSTER SECTION

- **GS III Mains 2022:** Defence indigenisation and strategic capability
- **GS III Mains 2020:** Role of technology in national security
- **Prelims 2019:** DRDO and missile systems

PadhAI MAINS PRACTICE QUESTION

Q. Discuss the strategic significance of India's Long Range Anti-Ship Hypersonic Missile (LR-AShM). How does hypersonic technology reshape maritime security dynamics? (250 words)

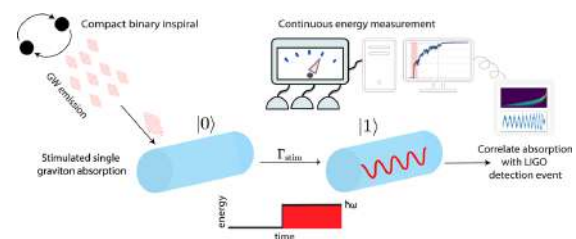
PadhAI-GENERATED UPSC MCQ

Hypersonic missiles like LR-AShM are distinct because they:

- a) Travel only underwater
- b) Operate below Mach 1
- c) Combine very high speed with manoeuvrability to evade defences
- d) Are exclusively nuclear-armed

Answer: c

7.Scientists Aim to Build Graviton Detector



WHY IN NEWS?

- Physicists have proposed experimental designs to detect **gravitons**—the hypothetical quantum particles of gravity—marking a potential breakthrough in unifying quantum mechanics with general relativity.

SUMMARY

- The effort to build a graviton detector represents a frontier challenge in fundamental physics.
- Gravitons, if detected, would confirm gravity's quantum nature, similar to photons for light.
- Scientists are exploring ultra-sensitive quantum sensors and resonant detectors to capture extremely weak gravitational signals, though immense technical hurdles remain due to gravity's intrinsic weakness.



BACKGROUND / CONTEXT

- I. Modern physics rests on two pillars: Einstein's general relativity (describing gravity at cosmic scales) and quantum mechanics (governing subatomic particles).
- II. While other forces have known force-carrier particles, gravity lacks experimental confirmation of its quantum counterpart.
- III. Gravitational waves detected by LIGO validate classical gravity ripples, but gravitons would represent individual quantum units.

KEY HIGHLIGHTS

- **Theoretical Particle:** Graviton proposed as carrier of gravitational force
- **Quantum Gravity:** Detection would bridge quantum mechanics and relativity
- **Experimental Ideas:** Use of ultra-cold atoms, quantum resonators, and nanoscale sensors
- **Signal Challenge:** Gravitons interact extremely weakly with matter
- **Scientific Impact:** Would redefine understanding of spacetime
- **Complementarity:** Builds on gravitational wave astronomy
- **Long-Term Goal:** Part of broader search for unified physical theories

PRELIMS BOOSTER BOX

- **Graviton is a hypothetical elementary particle**
- **Photon is carrier of electromagnetic force**
- **Gravitational waves were detected by LIGO**
- **Quantum sensors enhance measurement sensitivity**
- **General relativity explains gravity macroscopically**

- **Quantum mechanics governs microscopic phenomena**
- **Unification of forces remains an open problem**

PadhAI PYQ BOOSTER SECTION

- **GS III Mains 2019:** Frontiers of science and technology
- **Prelims 2016:** Gravitational waves

PadhAI MAINS PRACTICE QUESTION

Q. Explain the significance of detecting gravitons for fundamental physics. What challenges do scientists face in attempting such experiments? (250 words)

PadhAI-GENERATED UPSC MCQ

The graviton, if detected, would most directly confirm:

- a) Nuclear fusion processes
- b) Quantum nature of gravity
- c) Dark matter composition
- d) Expansion of the universe

Answer: b

8.Artemis II: Preparation for Lunar Orbit



WHY IN NEWS?

- NASA is advancing preparations for **Artemis II**, the first crewed mission of the Artemis programme, which will



carry astronauts around the Moon, marking a major step toward sustained human presence in deep space.

SUMMARY

- Artemis II will be the first mission to fly humans aboard NASA's Space Launch System (SLS) and Orion spacecraft, performing a lunar flyby to validate life-support systems, navigation, and crew operations in deep space.
- The mission is a critical precursor to Artemis III's planned lunar landing and forms the backbone of international efforts to establish a long-term Moon-to-Mars exploration architecture.

BACKGROUND / CONTEXT

- The Artemis programme represents NASA's return-to-the-Moon initiative after Apollo, aimed at building sustainable lunar exploration.
- Artemis I (2022) successfully completed an uncrewed lunar mission.
- Artemis II will test crewed deep-space flight, paving the way for Artemis III, which plans to land astronauts near the Moon's south pole.
- The programme also integrates international partners through the Artemis Accords.

KEY HIGHLIGHTS

- **Mission Type:** First crewed Artemis flight using SLS and Orion
- **Flight Profile:** Lunar flyby (not landing) to validate deep-space operations
- **System Testing:** Life-support, navigation, propulsion, and re-entry systems under crewed conditions

- **Gateway Link:** Supports future Lunar Gateway station planning
- **International Dimension:** Part of Artemis Accords framework
- **South Pole Focus:** Prepares groundwork for resource-oriented lunar exploration
- **Mars Pathway:** Serves as stepping stone for future human Mars missions

PRELIMS BOOSTER BOX

- **Artemis is NASA's Moon-to-Mars human exploration programme**
- **Artemis II is the first crewed mission of the programme**
- **SLS stands for Space Launch System**
- **Orion is the crew capsule designed for deep-space missions**
- **Artemis I was an uncrewed lunar mission**
- **Artemis III aims for a crewed lunar landing**
- **Artemis Accords promote peaceful and cooperative space exploration**

PadhAI PYQ BOOSTER SECTION

- **GS III Mains 2018:** India and global space programmes
- **GS III Mains 2020:** Role of space technology in development
- **Prelims 2016:** Space missions and agencies

PadhAI MAINS PRACTICE QUESTION

Q. Discuss the significance of Artemis II in the broader Moon-to-Mars exploration strategy. How does it differ from earlier lunar missions like Apollo? (250 words)

PadhAI-GENERATED UPSC MCQ

Artemis II is primarily designed to:

- a) Establish a permanent lunar base
- b) Conduct the first Mars flyby
- c) Carry astronauts on a lunar flyby to test



deep-space systems

d) Deploy satellites around the Moon

Answer: c

9.Niobium: The New “Green” Metal



WHY IN NEWS?

- Niobium is gaining global attention as a “green metal” due to its growing use in clean energy technologies, lightweight alloys, electric mobility, and infrastructure for low-carbon development.

SUMMARY

- Niobium is emerging as a strategic material for the energy transition.
- Its ability to strengthen steel, improve battery performance, and enhance efficiency in hydrogen pipelines and EV components makes it valuable for sustainable infrastructure.
- As countries seek climate-friendly industrial pathways, niobium’s role in reducing material intensity and emissions is expanding, positioning it as a key critical mineral for the green economy.

BACKGROUND / CONTEXT

- I. Traditionally used in high-strength steel for pipelines and construction, niobium is now being explored for next-generation batteries, superconductors, and renewable energy systems.
- II. Classified among critical minerals by several nations, its supply is geographically concentrated—mainly in Brazil—raising concerns over resource security.
- III. India is evaluating strategic partnerships to diversify access as part of its clean-energy material strategy.

KEY HIGHLIGHTS

- **Material Advantage:** Increases strength of steel while reducing weight and carbon footprint
- **Energy Transition:** Used in EV batteries, hydrogen infrastructure, and wind turbines
- **Superconductivity:** Enables high-performance magnets and energy-efficient systems
- **Critical Mineral:** Supply concentrated globally, prompting diversification efforts
- **Infrastructure Use:** Improves durability of bridges, railways, and pipelines
- **Emission Reduction:** Allows thinner steel designs, lowering embodied carbon
- **Strategic Importance:** Emerging input for green manufacturing ecosystems

PRELIMS BOOSTER BOX

- **Chemical symbol of niobium is Nb**
- **Atomic number: 41**
- **Primarily used as alloying element in high-strength steel**
- **Brazil holds majority of global niobium reserves**



- Used in superconducting magnets and EV components
- Listed among critical minerals by several countries
- Supports low-carbon infrastructure development

PadhAI PYQ BOOSTER SECTION

- **GS III Mains 2022:** Critical minerals and energy transition
- **GS III Mains 2020:** Resource security and sustainable development
- **Prelims 2019:** Rare and strategic minerals

PadhAI MAINS PRACTICE QUESTION

Q. Why is niobium being described as a “green metal”? Examine its role in supporting the global energy transition and low-carbon infrastructure. (250 words)

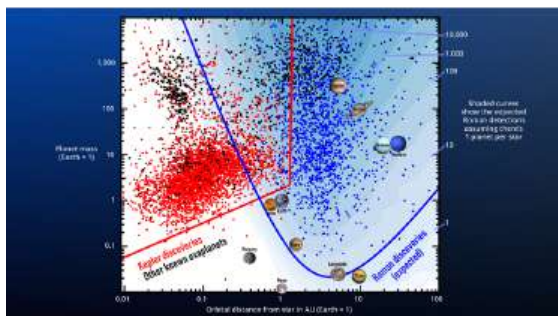
PadhAI-GENERATED UPSC MCQ

Niobium is increasingly considered strategic because it is primarily used in:

- Nuclear fuel enrichment
- High-strength steel and clean energy technologies
- Fertiliser production
- Semiconductor lithography

Answer: b

10. Microlensing Used to Measure Mass of a Rogue Planet



WHY IN NEWS?

- Scientists recently used **gravitational microlensing** to directly estimate the mass of a **rogue planet, a planet** that does not orbit any star marking a major advance in detecting and characterising free-floating worlds.

SUMMARY

- Using microlensing, astronomers measured the mass of a rogue planet by observing how its gravity briefly magnified light from a distant background star.
- The study demonstrates that even starless planets can be weighed, opening a new window into understanding planetary formation, galactic populations of free-floating planets, and the hidden mass distribution of the Milky Way.

BACKGROUND / CONTEXT

- Rogue planets are believed to form either independently from gas clouds or be ejected from planetary systems during early gravitational interactions.
- Because they emit little or no light, traditional detection methods fail.
- Gravitational microlensing—predicted by Einstein’s General Relativity allows detection when a massive object bends spacetime, temporarily amplifying light from a distant star.
- This technique is uniquely suited for discovering isolated planetary bodies.



KEY HIGHLIGHTS

- **Detection Method:** Gravitational microlensing used to estimate planet mass
- **Target Type:** Rogue planet (free-floating, no host star)
- **Scientific First:** Precise mass measurement without stellar reference
- **Formation Insight:** Supports theories of planetary ejection and independent formation
- **Observational Power:** Demonstrates sensitivity to faint, dark objects
- **Galactic Census:** Helps estimate population of rogue planets in Milky Way
- **Future Scope:** Strengthens case for space missions like Roman Telescope

PRELIMS BOOSTER BOX

- Rogue planets do not orbit stars
- Microlensing relies on gravitational bending of light
- Predicted by Einstein's General Relativity
- Does not require light from the planet itself
- Useful for detecting dark or isolated objects
- Roman Space Telescope will expand microlensing surveys
- Rogue planets may outnumber stars in the galaxy

PadhAI PYQ BOOSTER SECTION

- **GS III Mains 2019:** Frontiers in space science
- **Prelims 2016:** Gravitational waves and relativity
- **Prelims 2020:** Astronomical observation techniques

PadhAI MAINS PRACTICE QUESTION

Q. Explain gravitational microlensing and discuss its significance in studying rogue

planets and dark celestial objects. (250 words)

PadhAI-GENERATED UPSC MCQ

Gravitational microlensing is especially useful for detecting rogue planets because it:

- a) Requires reflected sunlight from planets
- b) Depends on radio emissions
- c) Measures temporary brightening of background stars due to gravity
- d) Works only within our solar system

Answer: c

11.ISRO's Dust Experiment (DEX) Detects Interplanetary Dust Entering Earth's Atmosphere



WHY IN NEWS?

- ISRO confirmed that its **Dust Experiment (DEX)**—India's first indigenous dust detector—recorded **interplanetary dust particles entering Earth's atmosphere approximately every 1,000 seconds**, marking a major milestone in space environment studies.



SUMMARY

- DEX observations reveal a continuous influx of cosmic dust into Earth's upper atmosphere. These micrometre-sized particles originate from comets, asteroids, and interplanetary debris.
- The findings improve understanding of atmospheric chemistry, satellite drag, and space weather interactions, while demonstrating India's growing capability in precision space instrumentation.

BACKGROUND / CONTEXT

- I. Interplanetary dust constantly bombards Earth but is difficult to quantify due to its tiny size and transient nature.
- II. Studying this dust helps scientists understand solar system evolution, atmospheric processes, and risks to spacecraft.
- III. DEX was developed to directly measure dust flux and particle impacts in near-Earth space an area previously dominated by foreign missions.

KEY HIGHLIGHTS

- **Indigenous Instrument:** DEX is India's first home-grown space dust detector
- **Detection Rate:** Records dust entry roughly every 1,000 seconds
- **Particle Origin:** Primarily from asteroids and cometary debris
- **Scientific Value:** Improves models of upper-atmospheric chemistry
- **Space Safety:** Data supports satellite protection and mission planning
- **Solar System Insight:** Helps trace distribution of interplanetary material

- **Technology Leap:** Demonstrates advanced sensor and impact-detection capability

PRELIMS BOOSTER BOX

- **Interplanetary dust consists of microscopic cosmic particles**
 - Dust particles originate from comets, asteroids, and planetary collisions
 - DEX stands for Dust Experiment
 - Upper atmosphere interacts continuously with space debris and dust
 - Cosmic dust influences cloud formation and ionospheric processes
 - Dust flux affects satellite surface degradation
 - Space environment monitoring is critical for long-duration missions

PadhAI PYQ BOOSTER SECTION

- **GS III Mains 2019:** Space science and technological advancement
- **GS III Mains 2020:** Role of space research in national development
- **Prelims 2016:** Near-Earth space environment

PadhAI MAINS PRACTICE QUESTION

Q. Explain the scientific importance of detecting interplanetary dust. How does ISRO's Dust Experiment (DEX) contribute to understanding Earth's upper atmosphere and space environment? (250 words)

PadhAI-GENERATED UPSC MCQ

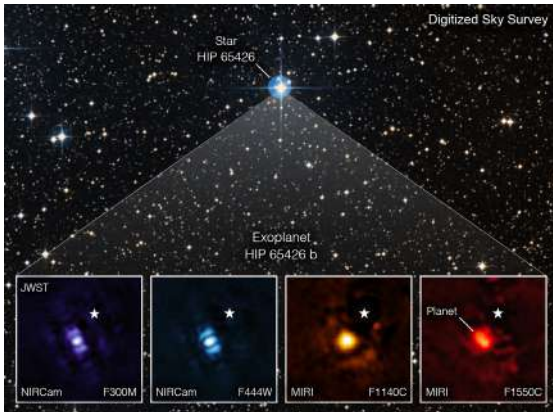
Interplanetary dust detected by DEX primarily helps scientists study:

- a) Earth's magnetic field reversals
- b) Atmospheric chemistry and space environment interactions
- c) Plate tectonics
- d) Ocean circulation patterns



Answer: b

12.NASA Open-Sources ExoMiner++ for Faster Exoplanet Discovery



WHY IN NEWS?

- NASA has open sourced **ExoMiner++**, its advanced artificial intelligence system, enabling researchers worldwide to analyse **TESS (Transiting Exoplanet Survey Satellite)** data collaboratively for faster and more transparent exoplanet discovery.

SUMMARY

- ExoMiner++ uses machine learning to distinguish genuine exoplanet signals from false positives in massive TESS datasets.
- By open-sourcing the tool, NASA aims to democratise space data analytics, accelerate global participation in planet-hunting, and improve validation accuracy.
- The move reflects a broader shift toward open science and AI-driven astronomy.

BACKGROUND / CONTEXT

- I. Traditional exoplanet detection relies on transit photometry—observing

slight dips in stellar brightness as planets pass in front of stars.

- II. With thousands of candidate signals generated by TESS, manual verification is slow and resource-intensive.
- III. ExoMiner++, originally developed for Kepler, applies deep learning to automate classification, and its release supports international scientific collaboration.

KEY HIGHLIGHTS

- **AI Platform:** ExoMiner++ applies deep learning to classify exoplanet candidates
- **Open Science:** Source code released for global research community
- **Data Source:** Analyses TESS photometric light curves
- **Accuracy Boost:** Improves identification of real planets vs false positives
- **Collaboration:** Enables cross-institutional validation and innovation
- **Discovery Speed:** Reduces human workload and accelerates confirmations
- **Future Ready:** Supports next-generation missions and citizen science

PRELIMS BOOSTER BOX

- **TESS stands for Transiting Exoplanet Survey Satellite**
- **Exoplanets are planets outside our solar system**
- **Transit method detects planets via brightness dips**
- **ExoMiner++ is a NASA-developed AI classification system**
- **Kepler mission pioneered large-scale exoplanet discovery**
- **Open-source software allows public access to code**
- **AI is increasingly used in astronomical data analysis**



PadhAI PYQ BOOSTER SECTION

- **GS III Mains 2019:** Artificial intelligence applications
- **GS III Mains 2018:** Space technology advancements
- **Prelims 2016:** Space missions

PadhAI MAINS PRACTICE QUESTION

Q. How does ExoMiner++ enhance exoplanet discovery using TESS data? Discuss the broader significance of open-source AI in space research. (250 words)

PadhAI-GENERATED UPSC MCQ

TESS primarily detects exoplanets using which technique?

- a) Direct imaging
- b) Radial velocity
- c) Transit photometry
- d) Gravitational microlensing

Answer: c

13. India to Roll Out Vehicle-to-Vehicle (V2V) Communication by End-2026



WHY IN NEWS?

- The Government of India announced plans to introduce **Vehicle-to-Vehicle (V2V) communication technology** nationwide by the end of 2026, aiming to enhance road safety, traffic efficiency, and intelligent mobility.

SUMMARY

- V2V technology enables vehicles to wirelessly share real-time data such as speed, position, and braking status, allowing drivers and onboard systems to anticipate hazards.
- India's rollout represents a shift toward connected mobility, reducing accident risks, easing congestion, and preparing the foundation for autonomous and smart transport ecosystems under the country's digital infrastructure vision.

BACKGROUND / CONTEXT

- I. India faces one of the world's highest road fatality rates, making proactive safety solutions critical.
- II. V2V is part of the broader Vehicle-to-Everything (V2X) framework, which also includes communication with traffic infrastructure (V2I) and pedestrians (V2P).
- III. Globally, V2V systems use Dedicated Short-Range Communication (DSRC) or Cellular-V2X (C-V2X) standards.
- IV. India's move aligns with smart city initiatives and intelligent transport systems.



KEY HIGHLIGHTS

- **Safety Upgrade:** Enables collision warnings, blind-spot alerts, and emergency braking coordination
- **Real-Time Sharing:** Vehicles exchange speed, direction, and location data
- **Technology Base:** Likely to use Cellular-V2X and 5G networks
- **Traffic Efficiency:** Supports smoother traffic flow and reduced congestion
- **Autonomous Readiness:** Lays groundwork for future self-driving systems
- **Policy Push:** Integrated with Intelligent Transport Systems roadmap
- **Public Benefit:** Potential reduction in accidents and fuel consumption

PRELIMS BOOSTER BOX

- **V2V stands for Vehicle-to-Vehicle communication**
- **Part of broader V2X (Vehicle-to-Everything) ecosystem**
- **Uses wireless communication for real-time data exchange**
- **Cellular-V2X operates over mobile networks**
- **DSRC is an alternative short-range communication standard**
- **India targets V2V deployment by end-2026**
- **ITS refers to Intelligent Transport Systems**

PadhAI PYQ BOOSTER SECTION

- **GS III Mains 2020:** Smart mobility and infrastructure
- **GS III Mains 2022:** Technology in public safety
- **Prelims 2018:** Intelligent transport concepts

PadhAI MAINS PRACTICE QUESTION

Q. Vehicle-to-Vehicle communication can significantly improve road safety in India.

Discuss its working mechanism and examine the challenges in implementing V2V technology at scale. (250 words)

PadhAI-GENERATED UPSC MCQ

Vehicle-to-Vehicle (V2V) communication primarily aims to:

- a) Increase vehicle speed
- b) Enable entertainment streaming
- c) Share real-time safety and traffic information between vehicles
- d) Replace traffic police

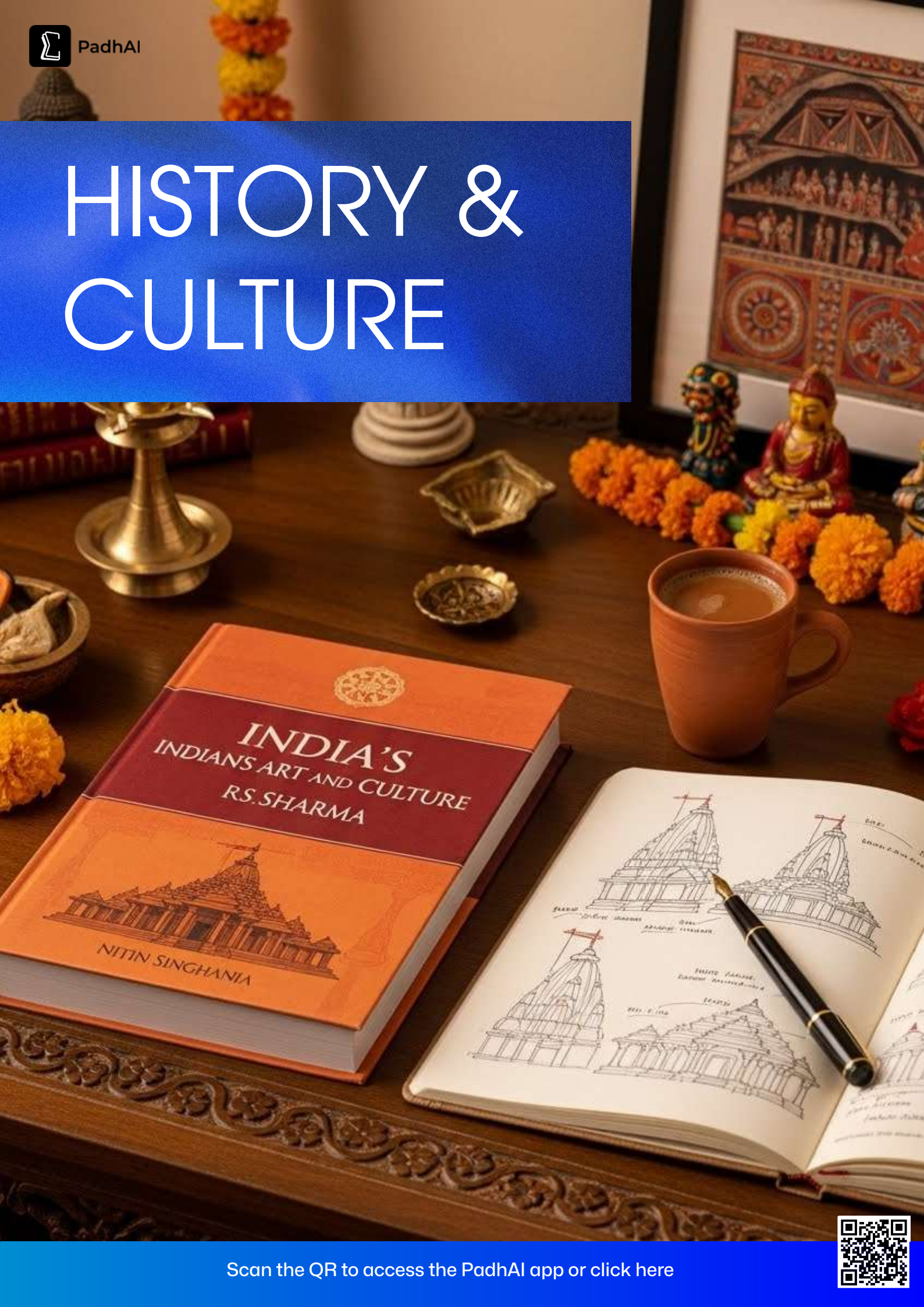
Answer: c





PadhAI

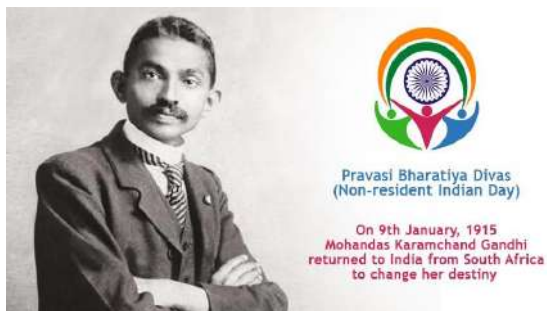
HISTORY & CULTURE



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1.Pravasi Bharatiya Divas and Gandhi's Return to India (9 January 1915)



WHY IN NEWS?

- Pravasi Bharatiya Divas is observed annually on 9 January to commemorate Mahatma Gandhi's return to India from South Africa in 1915.

SUMMARY

- Gandhi's return marked a turning point in India's national movement by integrating diaspora experiences into mass-based politics.
- Pravasi Bharatiya Divas symbolically links the Indian diaspora's historical role in freedom struggles with its contemporary contributions to nation-building.

BACKGROUND / CONTEXT

- I. Indian communities abroad played a crucial role in early nationalist mobilisation through financial support, political advocacy, and ideological influence.
- II. Gandhi's political experiments in South Africa shaped his methods of satyagraha, civil resistance, and inclusive nationalism, which later transformed India's freedom movement.

KEY HIGHLIGHTS

- **Diaspora Role:** Overseas Indians supported nationalist causes financially and ideologically
- **Gandhi's Evolution:** South African experience shaped satyagraha and non-violent resistance
- **Mass Politics:** Return enabled transition from elite to mass nationalism
- **Global Exposure:** International experiences strengthened anti-colonial discourse
- **Symbolic Date:** 9 January links diaspora history with national memory
- **Continuity:** Diaspora engagement remains part of India's soft power

PRELIMS BOOSTER BOX

- **Gandhi returned to India on 9 January 1915**
- **Pravasi Bharatiya Divas commemorates diaspora contributions**
- **Satyagraha was first practised in South Africa**
- **Indian diaspora influenced early nationalist politics**
- **Modern Indian nationalism had transnational dimensions**

PadhAI PYQ BOOSTER SECTION

- **GS I Mains 2016:** Role of Gandhian ideology
- **Prelims 2015:** Chronology of national movement events

PadhAI MAINS PRACTICE QUESTION

Q. Examine the significance of Mahatma Gandhi's return to India in 1915 in shaping the character of the Indian national movement. (250 words)



PadhAI-GENERATED UPSC MCQ

Pravasi Bharatiya Divas is observed on 9 January to commemorate:

- a) Formation of the Indian National Congress
- b) Gandhi's return from South Africa
- c) Dandi March
- d) Adoption of the Constitution

Answer: b

2.Parakram Diwas and Netaji Subhas Chandra Bose



WHY IN NEWS?

- Parakram Diwas is observed on 23 January to honour the birth anniversary of Subhas Chandra Bose.

SUMMARY

- Parakram Diwas celebrates the legacy of Subhas Chandra Bose and his revolutionary nationalist vision.
- Bose advocated militant resistance and international alliances to overthrow colonial rule, offering an alternative ideological trajectory within India's freedom struggle.

BACKGROUND / CONTEXT

- Bose emerged from the radical wing of the Indian National Congress and later broke away due to ideological differences.

- His leadership of the Indian National Army and engagement with Axis powers reflected a strategy of leveraging global conflict for national liberation.

KEY HIGHLIGHTS

- Revolutionary Nationalism:** Advocated armed struggle against colonialism
- Ideological Divergence:** Differed from Gandhian non-violence
- INA Leadership:** Mobilised Indian soldiers abroad
- International Strategy:** Sought support from anti-British powers
- Mass Appeal:** Inspired youth and soldiers
- National Memory:** Integral to plural narratives of freedom struggle

PRELIMS BOOSTER BOX

- Subhas Chandra Bose was born on 23 January 1897**
- Parakram Diwas commemorates his birth anniversary**
- INA fought alongside Axis powers during World War II**
- Bose served as Congress President twice**
- Revolutionary nationalism coexisted with constitutional nationalism**

PadhAI PYQ BOOSTER SECTION

- GS I Mains 2018:** Different strands of nationalism
- Prelims 2019:** Leaders of the freedom movement

PadhAI MAINS PRACTICE QUESTION

Q. Subhas Chandra Bose represented a distinct strand of Indian nationalism. Analyse his contribution in the context of India's freedom struggle. (250 words)



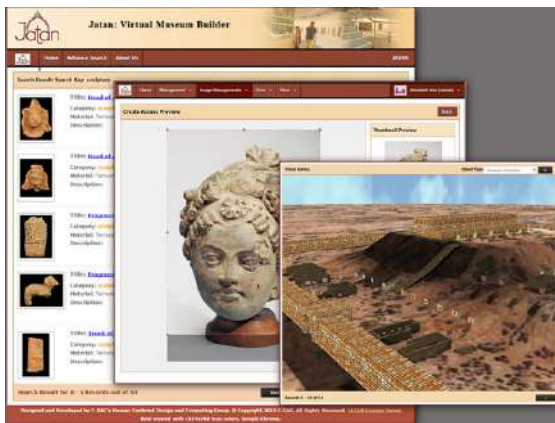
PadhAI-GENERATED UPSC MCQ

Which of the following best describes Subhas Chandra Bose's approach to freedom?

- a) Constitutional reforms within British rule
- b) Non-violent civil disobedience
- c) Revolutionary struggle with international support
- d) Passive resistance through petitions

Answer: c

3. Digitisation of National-Level Museums and Collections (JATAN Software)



WHY IN NEWS?

- The digitisation of museum collections using JATAN software has been highlighted as part of India's cultural preservation initiatives.

SUMMARY

- Digitisation through JATAN software marks an archival turn in historical preservation by enabling systematic documentation, cataloguing, and public access to museum collections.
- It strengthens conservation, research, and cultural education while safeguarding heritage from physical deterioration.

BACKGROUND / CONTEXT

- I. Traditional museum archives are vulnerable to decay, disasters, and limited accessibility.
- II. Digital archiving aligns with global best practices in heritage management, enabling wider dissemination and interdisciplinary historical research.

KEY HIGHLIGHTS

- **Archival Shift:** Transition from physical-only to digital preservation
- **Standardisation:** Uniform metadata and cataloguing practices
- **Access Expansion:** Enables virtual access for researchers and public
- **Conservation Aid:** Reduces handling of fragile artefacts
- **Research Utility:** Supports interdisciplinary historical studies
- **Cultural Governance:** Strengthens institutional capacity

PRELIMS BOOSTER BOX

- **JATAN is a digital collection management system**
- **Digitisation aids long-term heritage preservation**
- **Museums are custodians of tangible cultural heritage**
- **Digital archives complement physical conservation**
- **Heritage governance increasingly uses digital tools**

PadhAI PYQ BOOSTER SECTION

- **GS I Mains 2020:** Culture and heritage conservation
- **Prelims 2021:** Digital initiatives in culture sector



PadhAI MAINS PRACTICE QUESTION

Q. How does digitisation of museum collections contribute to historical preservation and public engagement? Discuss with reference to JATAN software. (250 words)

PadhAI-GENERATED UPSC MCQ

The primary purpose of JATAN software is to:

- a) Promote tourism marketing
- b) Digitally manage museum collections
- c) Train museum staff
- d) Regulate private antiquities

Answer: b

4. Perumbidugu Mutharaiyar II (Shatrubhayankara)



WHY IN NEWS?

- Scholarly attention has renewed focus on Perumbidugu Mutharaiyar II, an early medieval ruler known for military expansion and regional governance.

SUMMARY

- Perumbidugu Mutharaiyar II, also known as Shatrubhayankara, was a prominent ruler of the Mutharaiyar dynasty in early medieval South India.
- His reign reflects the transitional political order preceding Chola

ascendancy, marked by regional consolidation and temple patronage.

BACKGROUND / CONTEXT

- I. The Mutharaiyars were early medieval Tamil chiefs who controlled strategic river valleys and trade routes.
- II. Their rule laid administrative and military foundations later absorbed by the imperial Cholas, highlighting continuity in South Indian polity.

KEY HIGHLIGHTS

- **Dynastic Rule:** Belonged to the Mutharaiyar lineage
- **Political Role:** Controlled key territories in Tamil region
- **Military Title:** Shatrubhayankara indicates martial prowess
- **Temple Patronage:** Supported religious and cultural institutions
- **Transitional Phase:** Preceded Chola imperial expansion
- **Historical Value:** Illustrates regional state formation

PRELIMS BOOSTER BOX

- **Mutharaiyars were early medieval Tamil rulers**
- **Perumbidugu Mutharaiyar II bore the title Shatrubhayankara**
- **Early medieval period saw rise of regional powers**
- **Temple patronage legitimised political authority**
- **Cholas later absorbed Mutharaiyar territories**



PadhAI PYQ BOOSTER SECTION

- **GS I Mains 2016:** Early medieval South Indian polity
- **Prelims 2017:** Dynasties of South India

PadhAI MAINS PRACTICE QUESTION

Q. Discuss the political significance of the Mutharaiyar dynasty in early medieval South India with reference to Perumbidugu Mutharaiyar II. (250 words)

PadhAI-GENERATED UPSC MCQ

Perumbidugu Mutharaiyar II is associated with which historical phase?

- a) Mauryan period
- b) Gupta age
- c) Early medieval South India
- d) Mughal era

Answer: c

5. Piprahwa Relics Exposition: Buddhist Material Culture, Repatriation, and Cultural Diplomacy



WHY IN NEWS?

- India recently hosted an international exposition of the **Piprahwa Buddhist relics**, highlighting heritage restitution

and strengthening cultural diplomacy with Buddhist-majority nations.

SUMMARY

- The Piprahwa Relics Exposition showcased sacred artefacts believed to be associated with Gautama Buddha, reinforcing India's role as the spiritual homeland of Buddhism.
- The event reflects India's broader effort to reclaim dispersed heritage and deploy Buddhist material culture as a soft-power tool to deepen people-to-people ties across Asia while promoting historical awareness of early Buddhist practices.

BACKGROUND / CONTEXT

- I. Piprahwa, located in present-day Uttar Pradesh, was excavated in the late 19th century, revealing reliquary caskets containing bone fragments linked to the Buddha.
- II. During colonial times, parts of these relics were taken abroad and distributed to foreign institutions.
- III. In recent years, India has intensified heritage diplomacy by facilitating exhibitions and returns of cultural artefacts, aligning with its civilisational outreach through Buddhist circuits and international cultural cooperation.

KEY HIGHLIGHTS

- **Sacred Artefacts:** Relics include bone fragments and inscribed caskets linked to Gautama Buddha
- **Material Culture:** Provides insight into early Buddhist funerary and stupa traditions
- **Repatriation Effort:** Part of India's wider push to recover colonial-era dispersed heritage



- **Soft Power Tool:** Buddhism leveraged to strengthen ties with Southeast and East Asia
- **Cultural Diplomacy:** Enhances India's image as custodian of Buddhist heritage
- **Public Engagement:** Museum exhibitions increase historical literacy and cultural awareness
- **Regional Outreach:** Supports Buddhist tourism and spiritual connectivity

PRELIMS BOOSTER BOX

- **Piprahwa is located in Uttar Pradesh**
- **Relics consist of bone fragments and stone reliquaries**
- **Buddhist stupas traditionally housed corporeal remains**
- **Ashoka played a major role in relic redistribution**
- **Cultural diplomacy uses heritage to build international relations**
- **India promotes Buddhist circuits under tourism diplomacy**
- **Material culture refers to physical objects of historical societies**

PadhAI PYQ BOOSTER SECTION

- GS I Mains 2018 – Role of Buddhism in cultural integration
- Prelims 2016 – Important Buddhist sites in India

PadhAI MAINS PRACTICE QUESTION

Q. How do exhibitions of Buddhist relics like Piprahwa contribute to India's cultural diplomacy and heritage restitution efforts? (250 words)

PadhAI-GENERATED UPSC MCQ

Piprahwa relics are primarily associated with:
a) Jain Tirthankaras

- b) Mauryan coin hoards
c) Remains linked to Gautama Buddha
d) Gupta terracotta art

Answer: c

6.IGNCA "Awazon ke Jugnu": Oral History / Recorded Voices as Intangible Cultural Heritage



WHY IN NEWS?

- The Indira Gandhi National Centre for the Arts (IGNCA) launched **"Awazon ke Jugnu"**, a digital initiative to preserve recorded voices and oral narratives as part of India's intangible cultural heritage.

SUMMARY

- "Awazon ke Jugnu" seeks to archive lived memories, folk traditions, community narratives, and personal testimonies through audio recordings.
- The initiative marks a shift from monument-centric heritage to people-centric documentation, recognising voices and experiences as historical sources.
- It strengthens India's intangible heritage framework by digitally



safeguarding vulnerable oral traditions for future generations.

BACKGROUND / CONTEXT

- I. India's cultural history is deeply rooted in oral traditions, songs, stories, rituals, and collective memory especially among tribal, rural, and marginalised communities.
- II. Much of this heritage risks disappearance due to urbanisation and generational change.
- III. Globally, UNESCO promotes safeguarding intangible heritage, and IGNCA's project aligns with this approach by using digital tools to preserve cultural expressions beyond physical artefacts.

KEY HIGHLIGHTS

- **Digital Archive:** Audio documentation of community voices and lived experiences
- **Living Heritage:** Focus on memories, songs, oral narratives, and traditions
- **Inclusive History:** Captures perspectives often absent from written archives
- **Preservation Tool:** Prevents loss of fragile oral knowledge systems
- **Academic Resource:** Supports anthropology, folklore, and cultural studies
- **Community Participation:** Bottom-up documentation involving local contributors
- **Heritage Shift:** Moves from object-based to experience-based conservation

PRELIMS BOOSTER BOX

- **IGNCA stands for Indira Gandhi National Centre for the Arts**
- **Oral traditions are classified as intangible cultural heritage**
- **UNESCO safeguards non-material cultural practices**

- **Digitisation helps preserve endangered cultural expressions**
- **Intangible heritage includes songs, rituals, and oral histories**
- **Recorded voices are primary sources in oral historiography**
- **People-centric heritage focuses on lived experience**

PadhAI PYQ BOOSTER SECTION

- GS I Mains 2020 – Intangible cultural heritage
- Prelims 2021 – UNESCO conventions

PadhAI MAINS PRACTICE QUESTION

Q. Why is oral history important for preserving India's intangible cultural heritage? Examine the role of initiatives like "Awazon ke Jugnu". (250 words)

PadhAI-GENERATED UPSC MCQ

"Awazon ke Jugnu" primarily aims to preserve:

- a) Stone inscriptions
- b) Museum artefacts
- c) Recorded voices and oral traditions
- d) Temple architecture

Answer: c



7.Somnath Swabhiman Parv (1026–2026 Centenary)



WHY IN NEWS?

- India has begun commemorative activities under **Somnath Swabhiman Parv**, marking **1000 years since the 1026 CE raid on the Somnath Temple**, highlighting themes of cultural resilience and civilisational continuity.

SUMMARY

- Somnath Swabhiman Parv commemorates the millennium of the 1026 attack on the Somnath Temple and celebrates its repeated reconstruction as a symbol of India's enduring spiritual and cultural identity.
- The centenary focuses on historical remembrance, heritage awareness, and national self-respect, portraying Somnath as an emblem of resilience rather than destruction.

BACKGROUND / CONTEXT

- I. The Somnath Temple, located in Gujarat, is one of the twelve Jyotirlingas of Shiva and has been

destroyed and rebuilt multiple times across centuries.

- II. The most well-known attack occurred in 1026 CE by Mahmud of Ghazni.
- III. After Independence, the temple was reconstructed in 1951, symbolising cultural revival and sovereignty.
- IV. The Swabhiman Parv aligns with broader efforts to reassert India's civilisational narrative and heritage consciousness.

KEY HIGHLIGHTS

- **Millennial Remembrance:** Marks 1000 years since the 1026 CE invasion
- **Civilisational Symbol:** Somnath represents continuity of faith and culture
- **Post-Independence Revival:** Temple rebuilt in 1951 as an act of national resurgence
- **Heritage Outreach:** Cultural programmes promote historical awareness
- **Identity Narrative:** Emphasises resilience over victimhood
- **Public Participation:** Events encourage citizen engagement with history
- **Spiritual Importance:** One of the twelve Jyotirlinga shrines of Shaivism

PRELIMS BOOSTER BOX

- **Somnath Temple is located in Gujarat**
- **It is one of the 12 Jyotirlingas of Lord Shiva**
- **Mahmud of Ghazni attacked Somnath in 1026 CE**
- **Temple reconstruction completed in 1951**
- **Jyotirlingas are sacred Shaivite pilgrimage sites**
- **Post-Independence heritage revival reflected cultural sovereignty**
- **Somnath lies on the Arabian Sea coast**



PadhAI PYQ BOOSTER SECTION

- GS I Mains 2019 – Temple architecture and cultural heritage
- Prelims 2017 – Jyotirlinga locations

PadhAI MAINS PRACTICE QUESTION

Q. Somnath Swabhimman Parv reflects India's approach to historical memory and cultural revival. Discuss the civilisational significance of Somnath Temple. (250 words)

PadhAI-GENERATED UPSC MCQ

Somnath Temple is primarily associated with:

- a) Buddhist Mahavihara tradition
- b) Jain Basadi architecture
- c) Jyotirlinga worship of Lord Shiva
- d) Rock-cut cave temples

Answer: c

8.Centenary of the Ol Chiki Script (1925–2025/26)

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WHY IN NEWS?

- India is marking **100 years of the Ol Chiki script**, celebrating a century of written identity for the Santhal community and renewed focus on tribal linguistic heritage.

SUMMARY

- The centenary of Ol Chiki commemorates the creation of an indigenous script for the Santhali language, empowering one of India's largest tribal communities with literacy, cultural preservation, and self-representation.
- The milestone highlights the role of native scripts in safeguarding linguistic diversity and strengthening cultural autonomy within India's plural civilisational framework.

BACKGROUND / CONTEXT

- Ol Chiki was developed in 1925 by Pandit Raghunath Murmu to provide Santhali with its own writing system.
- Before this, Santhali relied on oral transmission or borrowed scripts like Bengali and Devanagari.
- The script enabled formal education, literature, and cultural revival. Santhali was later included in the Eighth Schedule of the Constitution, reinforcing institutional recognition of tribal languages.

KEY HIGHLIGHTS

- **Indigenous Script:** Created specifically for the Santhali language
- **Cultural Assertion:** Strengthened tribal identity and self-expression
- **Literacy Expansion:** Enabled formal education in mother tongue
- **Constitutional Status:** Santhali included in the Eighth Schedule
- **Geographical Spread:** Used mainly in Jharkhand, Odisha, West Bengal, and Assam
- **Literary Growth:** Encouraged publishing of Santhali texts and folklore



- **Heritage Milestone:** Centenary symbolises linguistic empowerment

PRELIMS BOOSTER BOX

- **OI Chiki was created in 1925**
- **Santhali is listed in the Eighth Schedule**
- **Script developed by Pandit Raghunath Murmu**
- **Santhals are among India's largest tribal communities**
- **Mother-tongue education improves learning outcomes**
- **Tribal scripts preserve cultural memory**
- **OI Chiki is distinct from Devanagari and Bengali scripts**

PadhAI PYQ BOOSTER SECTION

- Prelims 2018 – Languages in the Eighth Schedule
- GS I Mains 2020 – Cultural diversity and heritage

PadhAI MAINS PRACTICE QUESTION

Q. Discuss the cultural and educational significance of the OI Chiki script in preserving tribal identity in India. (250 words)

PadhAI-GENERATED UPSC MCQ

OI Chiki script is associated with which language?

- Gondi
- Santhali
- Bhili
- Kurukh

Answer: b

9.Keeladi & the “Vaigai Valley Civilization” Controversy



WHY IN NEWS?

- Fresh debates have emerged over the interpretation of findings from the **Keeladi excavations**, with scholars and policymakers discussing whether the site represents an independent **“Vaigai Valley Civilization”** comparable to early urban cultures elsewhere in India.

SUMMARY

- Excavations at Keeladi near the Vaigai river have revealed brick structures, drainage systems, pottery, graffiti, and evidence of organised habitation dated to around the early Sangam period.
- These findings challenge Indus-centric narratives of Indian urbanism and suggest the possibility of a parallel southern civilisational trajectory.
- Disagreements over chronology, reporting, and academic interpretation have turned Keeladi into both an archaeological and political flashpoint.



BACKGROUND / CONTEXT

- I. Keeladi is located near Madurai in Tamil Nadu and has been excavated since 2015.
- II. Artefacts recovered indicate planned settlements, craft activity, literacy markers, and trade links.
- III. Carbon dating places parts of the site around the 6th century BCE.
- IV. Some scholars argue this reflects a distinct southern urban culture rooted in Sangam society, while others caution against prematurely labelling it a full-fledged "civilization" without broader regional corroboration.

KEY HIGHLIGHTS

- **Urban Indicators:** Brick buildings, drainage, and street layouts suggest organised settlement
- **Early Dating:** Carbon samples point to occupation around 6th century BCE
- **Literacy Signs:** Pottery graffiti interpreted as early Tamil-Brahmi
- **Cultural Claim:** Raises possibility of autonomous southern urban tradition
- **Academic Divide:** Disagreement over scale and interpretation of findings
- **Political Dimension:** Archaeology intersects with regional identity narratives
- **Historical Impact:** Forces re-examination of Sangam-age material culture

PRELIMS BOOSTER BOX

- **Keeladi is located in Tamil Nadu near the Vaigai river**
- **Excavations began in 2015**
- **Brick structures and drainage systems found**
- **Tamil-Brahmi graffiti reported on pottery**
- **Carbon dating used to establish chronology**

- **Sangam period broadly spans 300**

BCE–300 CE

- **Site challenges north-centric models of early Indian urbanism**

PadhAI PYQ BOOSTER SECTION

- GS I Mains 2020 – Archaeology and reconstruction of history
- Prelims 2022 – South Indian archaeological sites

PadhAI MAINS PRACTICE QUESTION

Q. How do the findings from Keeladi reshape our understanding of early urbanism in South India? Discuss the academic and historiographical issues involved. (250 words)

PadhAI-GENERATED UPSC MCQ

Keeladi excavations are most closely associated with:

- a) Harappan dockyards
- b) Vaigai basin urban settlement
- c) Chalcolithic Deccan culture
- d) Mauryan administrative centres

Answer: b



SOCIETY & SOCIAL ISSUE



1. Centre Asks X to Check Misuse of Grok Chatbot

WHY IN NEWS?

- The Government of India has asked social media platform X to examine alleged misuse of its AI chatbot **Grok**, amid concerns over the spread of misleading, inappropriate, and potentially harmful content.

SUMMARY

- The Centre's intervention reflects growing regulatory scrutiny of generative AI tools hosted on social media platforms.
- Authorities have flagged instances where Grok allegedly produced objectionable or misleading responses, raising questions about platform accountability, content moderation, and algorithmic safeguards.
- The episode highlights India's evolving approach toward governing AI systems while balancing innovation with user safety.

BACKGROUND / CONTEXT

- I. Grok is an AI chatbot integrated into X that provides real-time responses using platform data and large language models.
- II. As generative AI adoption expands, governments worldwide are grappling with risks such as misinformation, bias, deepfakes, and harmful outputs.
- III. In India, intermediaries are governed under the IT Rules, 2021, which mandate due diligence, grievance

redressal, and removal of unlawful content.

- IV. The current action signals that AI-generated content is increasingly being brought within existing digital governance frameworks.

KEY HIGHLIGHTS

- **Government Action:** Centre seeks explanation from X regarding alleged misuse of Grok
- **Content Concerns:** Reports of misleading and inappropriate AI-generated responses
- **Platform Accountability:** Reinforces intermediary responsibility under IT Rules
- **AI Governance:** Reflects push for safer deployment of generative AI tools
- **User Protection:** Focus on preventing harm and misinformation
- **Regulatory Trend:** AI systems increasingly subject to digital compliance norms
- **Policy Signal:** Indicates future need for dedicated AI regulation in India

PRELIMS BOOSTER BOX

- **Grok is an AI chatbot integrated with X**
- **India regulates digital platforms under IT Rules, 2021**
 - **Intermediaries must exercise due diligence on hosted content**
 - **Generative AI can produce text, images, and code**
 - **Misinformation is a key risk of large language models**
 - **Platform liability depends on compliance with takedown norms**
 - **AI governance focuses on safety, transparency, and accountability**



PadhAI PYQ BOOSTER SECTION

- GS III Mains 2021 – Regulation of social media platforms
- GS III Mains 2022 – Artificial intelligence and ethical concerns
- Prelims 2020 – Digital governance concepts

PadhAI MAINS PRACTICE QUESTION

Q. The Centre's action on Grok reflects emerging challenges in governing generative AI. Discuss the regulatory issues associated with AI chatbots on social media platforms and suggest policy measures for responsible deployment. (250 words)

PadhAI-GENERATED UPSC MCQ

Under India's IT Rules, 2021, social media platforms are primarily required to:

- a) Promote AI innovation
- b) Exercise due diligence and remove unlawful content
- c) Host government data servers
- d) Develop indigenous chatbots

Answer: b

2.Livelihood Stress in Himalayan Regions (Crop Impacts, Orchard Stress, Migration Push Factors)

WHY IN NEWS?

- Recent field reports and climate assessments highlight rising livelihood stress across Himalayan states, with declining crop yields, stressed orchards, and increasing out-migration linked to climate variability and ecological degradation.

SUMMARY

- Mountain livelihoods in the Himalayas are under growing pressure due to erratic rainfall, warming temperatures, water scarcity, and land instability.
- Traditional farming systems and fruit orchards are witnessing productivity decline, while youth migration is accelerating.
- These trends signal a deepening socio-ecological crisis where climate change intersects with fragile mountain economies, threatening food security and demographic stability.

BACKGROUND / CONTEXT

- I. The Himalayan region supports rainfed agriculture, horticulture-based incomes, and pastoral livelihoods.
- II. Over the last decade, changing snowfall patterns, reduced winter chill hours, drying springs, and frequent extreme events have disrupted agro-ecological cycles.
- III. Apple belts are shifting upward, traditional cereals are becoming unviable, and smallholders face rising costs with falling returns.
- IV. Limited market access and weak rural infrastructure further compound vulnerability, turning environmental stress into economic displacement.

KEY HIGHLIGHTS

- **Crop Decline:** Rainfed cereals and pulses showing reduced productivity due to erratic monsoon and soil moisture loss
- **Orchard Stress:** Apple and stone fruit crops affected by warming winters and inadequate chilling hours
- **Water Scarcity:** Drying springs and



shrinking glaciers impacting irrigation availability

- **Climate Extremes:** Landslides, cloudbursts, and heat anomalies damaging farmland and habitations
- **Income Instability:** Rising input costs with declining farm output
- **Migration Push:** Youth moving to plains due to livelihood uncertainty and lack of local employment
- **Social Impact:** Feminisation of agriculture as male out-migration increases

PRELIMS BOOSTER BOX

- **Himalayan agriculture is largely rainfed**
- **Chilling hours are essential for temperate fruit crops like apple**
- **Mountain springs are primary rural water sources**
- **Climate change alters altitudinal crop zones**
- **Out-migration from hills is often distress-driven**
- **Pastoralism depends on seasonal alpine grazing**
- **Livelihood vulnerability increases with ecological fragility**

PadhAI PYQ BOOSTER SECTION

- GS I Mains 2019 – Climate change impacts on Himalayan ecology
- GS I Mains 2020 – Migration patterns in India
- GS III Mains 2018 – Agriculture under climate stress

PadhAI MAINS PRACTICE QUESTION

Q. Livelihood stress in Himalayan regions reflects the interaction of climate change and structural rural vulnerabilities. Analyse the major drivers and suggest sustainable adaptation strategies. (250 words)

PadhAI-GENERATED UPSC MCQ

Which of the following is a major factor behind declining apple productivity in Himalayan regions?

- a) Excessive snowfall
- b) Reduced winter chilling hours
- c) Soil salinity
- d) Coastal humidity

Answer: b

3. Mass Congregations and Civic Management (Magh/Magh Mela): Health, Sanitation, Crowd Governance

WHY IN NEWS?

- Administrative reviews of recent **Magh/Magh Mela** arrangements have highlighted the growing challenges of managing health services, sanitation infrastructure, and crowd movement during large seasonal religious congregations.

SUMMARY

- Mass gatherings like the Magh Mela place extraordinary pressure on urban governance systems.
- Temporary settlements hosting millions require rapid deployment of healthcare, drinking water, waste management, and crowd-control mechanisms.
- With climate variability and rising footfall, civic authorities are increasingly adopting technology-driven monitoring, decentralised sanitation models, and disaster preparedness frameworks to ensure public safety and dignity.



BACKGROUND / CONTEXT

- I. Magh Mela is a seasonal religious congregation held at river confluences, involving ritual bathing and temporary habitation.
- II. Such events create “instant cities” that must function for weeks with pop-up roads, hospitals, toilets, and security grids.
- III. Historically managed through manual policing and basic amenities, contemporary Melas now integrate GIS mapping, CCTV surveillance, mobile medical units, and real-time crowd analytics due to heightened risks of stampedes, epidemics, and environmental contamination.

KEY HIGHLIGHTS

- **Public Health Load:** Temporary clinics handle injuries, infections, dehydration, and respiratory illnesses
- **Sanitation Challenge:** Massive demand for portable toilets, solid waste removal, and river pollution control
- **Crowd Governance:** Sector-wise zoning, entry–exit corridors, and holding areas reduce congestion risk
- **Digital Monitoring:** CCTV, drones, and control rooms enable real-time crowd assessment
- **Disaster Preparedness:** Flood alerts, fire services, and emergency evacuation routes integrated into planning
- **Water Safety:** Continuous testing of drinking water and bathing zones
- **Administrative Innovation:** Creation of short-term municipal structures for Mela duration

PRELIMS BOOSTER BOX

- **Mass congregations create “temporary cities”**
- **Crowd density above critical levels increases stampede risk**
- **Public health surveillance prevents outbreak amplification**
- **Decentralised sanitation reduces faecal contamination**
- **Incident Command System used for large–event management**
- **Riverine Melas require special pollution–control measures**
- **Crowd governance combines infrastructure, policing, and technology**

PadhAI PYQ BOOSTER SECTION

- GS I Mains 2018 – Urban management and disaster preparedness
- GS II Mains 2020 – Role of administration in public service delivery
- GS III Mains 2019 – Disaster management frameworks

PadhAI MAINS PRACTICE QUESTION

Q. Large religious congregations pose complex civic challenges. Discuss how health systems, sanitation infrastructure, and crowd governance can be integrated for safer mass–event management in India. (250 words)

PadhAI-GENERATED UPSC MCQ

Which of the following is most critical for preventing stampedes during mass gatherings?

- a) Increasing ticket prices
- b) Crowd zoning and controlled entry–exit routes
- c) Expanding parking facilities
- d) Night–time lighting alone

Answer: b



4. Kill Switch and Insurance as Tools to Fight “Digital Arrests”

WHY IN NEWS?

- The government and financial regulators are promoting **device kill switches and cyber insurance mechanisms** to counter rising cases of so-called “**digital arrests**” a form of online fraud where victims are coerced into transferring money under fake law-enforcement threats.

SUMMARY

- “Digital arrest” scams exploit fear and authority by impersonating police or investigative agencies over video calls or messaging platforms.
- To combat this growing cybercrime trend, authorities are encouraging preventive tools such as mobile kill switches, account freezing protocols, and cyber insurance coverage.
- These measures aim to reduce financial losses, improve response time, and strengthen individual resilience against technology-enabled extortion.

BACKGROUND / CONTEXT

- I. Digital arrests typically involve fraudsters posing as officials who accuse victims of crimes like money laundering or parcel scams, forcing them to remain online while extracting funds.
- II. India has witnessed a sharp rise in such cyber-enabled coercion cases.
- III. Existing responses rely on helplines and bank coordination, but delayed reporting often limits recovery.

- IV. The newer approach focuses on **technical controls (kill switches)** and **financial risk transfer (insurance)** as frontline defence mechanisms.

KEY HIGHLIGHTS

- **Kill Switch:** Emergency feature to instantly block devices, SIMs, or banking access during fraud
- **Fraud Modus:** Criminals impersonate agencies and digitally “detain” victims
- **Rapid Containment:** Kill switches prevent further fund transfers in real time
- **Cyber Insurance:** Covers financial losses arising from online fraud and identity theft
- **Bank Integration:** Faster account freezing through coordinated digital alerts
- **User Awareness:** Public advisories stress verification before compliance
- **Policy Direction:** Shift from reactive policing to preventive digital safeguards

PRELIMS BOOSTER BOX

- **Digital arrest is not a legal procedure—it is a cyber fraud tactic**
- **Kill switches can disable phones, SIMs, or linked financial apps**
- **Cyber insurance mitigates losses from online financial crimes**
- **Impersonation of law agencies is a common scam technique**
- **Early reporting increases chances of fund recovery**
- **Financial fraud often uses video calls and messaging apps**
- **Cybercrime governance combines technology + legal frameworks**

PadhAI PYQ BOOSTER SECTION

- GS III Mains 2022 – Cyber security challenges
- GS III Mains 2021 – Digital fraud and



governance

- Prelims 2020 – Cyber safety concepts

PadhAI MAINS PRACTICE QUESTION

Q. "Digital arrests" reflect the evolving nature of cybercrime. Examine how tools like kill switches and cyber insurance can strengthen citizen protection in India's digital ecosystem. (250 words)

PadhAI-GENERATED UPSC MCQ

The primary purpose of a "kill switch" in cyber fraud prevention is to:

- a) Increase internet speed
- b) Block devices and financial access during emergencies
- c) Encrypt social media accounts
- d) Replace police investigation

Answer: b

5. Not Just Insurance, Indians Need Universal Healthcare

WHY IN NEWS?

- Recent policy debates and expert commentaries have stressed that expanding health insurance alone is insufficient, calling for a shift toward **universal healthcare** that guarantees accessible, affordable, and quality medical services for all Indians.

SUMMARY

- While India has made progress in expanding health insurance coverage, large gaps remain in actual access to healthcare.
- Out-of-pocket expenditure continues to burden households, especially for outpatient care and medicines.

- Experts argue that true health security requires strengthening public health infrastructure, primary care networks, and preventive services moving beyond insurance-based models toward comprehensive universal healthcare.

BACKGROUND / CONTEXT

- I. India's healthcare system is characterised by high private sector dependence and significant out-of-pocket spending.
- II. Schemes like Ayushman Bharat have improved hospitalisation coverage, but primary care, diagnostics, and chronic disease management remain under-resourced.
- III. Global experience shows that insurance without strong public provisioning often leads to inequitable outcomes.
- IV. The universal healthcare approach emphasises state responsibility for service delivery, not just financial protection.

KEY HIGHLIGHTS

- **Coverage Gap:** Insurance mainly addresses hospitalisation, not outpatient or preventive care
- **High OOP Costs:** Medicines and diagnostics remain major household expenses
- **Primary Care Deficit:** Weak frontline health systems limit early treatment
- **Equity Concern:** Rural and informal populations face access barriers
- **Public Investment:** Need for higher spending on health infrastructure and workforce
- **Preventive Focus:** Universal healthcare prioritises wellness and early intervention



- **System Shift:** Move from insurance-centric to service-centric health model

PRELIMS BOOSTER BOX

- **Out-of-pocket expenditure is a key indicator of health system burden**
- **Universal healthcare ensures access to services, not only financial cover**
- **Primary healthcare is first point of contact in health systems**
- **India's public health spending is lower than many middle-income countries**
- **Insurance does not automatically guarantee service availability**
- **Preventive care reduces long-term treatment costs**
- **Universal health coverage includes promotion, prevention, treatment, and rehabilitation**

PadhAI PYQ BOOSTER SECTION

- GS II Mains 2020 – Public health system in India
- GS II Mains 2021 – Healthcare accessibility and governance
- Prelims 2019 – Universal Health Coverage

PadhAI MAINS PRACTICE QUESTION

Q. Why is health insurance alone insufficient to ensure health security in India? Discuss the need for transitioning toward a universal healthcare system. (250 words)

PadhAI-GENERATED UPSC MCQ

Universal healthcare differs from health insurance primarily because it:

- a) Covers only hospitalisation
- b) Focuses on private hospitals
- c) Guarantees access to healthcare services, not just financial protection
- d) Eliminates preventive care

Answer: c



PLACES IN NEWS



Zehanpora (Kashmir)

- Archaeological Site: Located in the Baramulla district of North Kashmir.
- Buddhist Heritage: Recent excavations have revealed Buddhist stupas and terracotta tiles dating back to the Kushan period.
- Crossroads of Culture: Highlights Kashmir's role as a major hub for the spread of Buddhism to Central Asia and China.
- Architecture: Exhibits the Gandhara-Kashmir style of architecture, unique for its blend of Greek, Persian, and Indian influences.
- Connectivity: Situated on the old Silk Route path that once connected the valley to the world.
- UPSC Link: Ancient Indian History (Post-Mauryan/Kushan Era) and Art & Culture.

Prayagraj, Uttar Pradesh

- Triveni Sangam: The sacred confluence of three rivers: Ganga, Yamuna, and the mythical Saraswati.
- Kumbh Mela: Host to the world's largest religious gathering; the Maha Kumbh 2025 preparations are a major governance theme.
- Historical Name: Known as Allahabad during the Mughal/British era; renamed Prayagraj in 2018 to restore its ancient Vedic name.
- Judiciary: Home to the Allahabad High Court, one of the oldest and largest in India.
- Geography: Situated in the fertile Doab region; critical for the Inland Waterway 1 (NW-1) project.
- Institutional Link: Location of the North Central Railway headquarters.

Kumbhalgarh Wildlife Sanctuary, Rajasthan

- Fort Heritage: Surrounds the Kumbhalgarh Fort, which has the world's second-longest wall (after the Great Wall of China).
- Aravalli Range: Situated in the Aravalli hills, acting as a critical corridor between South and Central Rajasthan.
- Wolf Sanctuary: Famous for its population of the endangered Indian Grey Wolf.
- Project Tiger: Recently in the news for its proposal to be converted into Rajasthan's 5th Tiger Reserve.
- Hydrology: Source of several rivers like the Banas and Sabarmati through various seasonal streams.
- Flora: Dominated by Dhok (*Anogeissus pendula*) and medicinal plants

Debrigarh Wildlife Sanctuary, Odisha

- Capital City: The economic and political center of Mauritius, a key Indian Ocean partner.
- Aapravasi Ghat: A UNESCO World Heritage site where the first indentured laborers from India landed. Maritime Security: A hub for India's "SAGAR" (Security and Growth for All in the Region) policy.
- Agalega Connection: Port Louis is the base for managing the new Indian-built airstrip on Agalega Island.
- Financial Hub: A major center for Global Business Companies and a gateway for FDI into India.
- Geography: A port city surrounded by the Moka mountain range.

Sriharikota (Satish Dhawan Space Centre), AP

- Unique Location: Situated on an island in the Nellore district, it is India's only primary spaceport.
- Geographical Advantage: Its proximity to the equator and the eastern coast allows for a "velocity boost" using the Earth's rotation for eastward launches.
- Buffer Zone: Bordered by the Pulicat Lake (India's second-largest brackish water lagoon) on one side and the Bay of Bengal on the other.
- Infrastructure: Houses two active launch pads and the Solid Propellant Space Booster Plant (SPROB).
- Current News: Recently in news for the XPoSat and Axiom-4 mission support infrastructure.
- Institutional Link: Operated by ISRO; named after the former ISRO chairman Satish Dhawan in 2002.

Kailash-Mansarovar Route (Uttarakhand)

- Lipulekh Pass: The primary gateway in Uttarakhand for the pilgrimage; a tri-junction between India, Nepal, and China.
- Border Issue: Nepal disputes the region (Kalapani-Limpiyadhura-Lipulekh) as per the 1816 Sugauli Treaty.
- Connectivity: Border Roads Organization (BRO) recently completed a motorable road to Lipulekh, reducing travel time significantly.
- Rivers: Source of the Kali River (Mahakali), which marks the boundary between India and Nepal.
- Religious Significance: The route leads to Mount Kailash (Tibet) and Lake Mansarovar.
- Geography: Characterized by high-altitude trans-Himalayan terrain and glacial passes.



10. Davos, Switzerland

- World Economic Forum (WEF): Host to the annual WEF meeting (usually in January).
- Geopolitics: Known for the "Davos Manifesto" regarding stakeholder capitalism.
- Geography: The highest "town" in Europe, situated in the Swiss Alps.
- Global Health: A historical hub for tuberculosis sanatoriums (the setting of Thomas Mann's *The Magic Mountain*).
- Environmental Focus: In 2026, the focus was on "AI for Climate Action" and the "Global Cyber Resilience Score."
- UPSC Link: Major reports like the Global Risks Report are released here.

9. Greenland & Arctic Council

- Political Status: An autonomous territory within the Kingdom of Denmark.

13. Galathea, Pemmaya, & Naniappa Bays (Great Nicobar)

- Mega Project: Sites for the Rs 72,000 crore Holistic Development of Great Nicobar Island (Holistic GN).
- Galathea Bay: To be converted into an International Transshipment Terminal (ICTT) due to its proximity to the Malacca Strait.
- Indigenous Rights: Home to the Shompen (Particularly Vulnerable Tribal Group - PVTG) and the Nicobarese tribes.
- Biodiversity: A nesting site for the Giant Leatherback Turtle and home to the Nicobar Megapode.
- Legal Conflict: Tribal Council members have alleged pressure to withdraw "No Objection Certificates" for land surrender.
- Conservation: These bays are part of the Great Nicobar Biosphere Reserve (UNESCO).

11. Mayon Volcano, Philippines

- Perfect Cone: Famous for its symmetrical "perfect cone" shape.
- Classification: An active Stratovolcano (Composite volcano) located on Luzon Island.
- Pacific Ring of Fire: Situated on the boundary of the Philippine Sea Plate and the Eurasian Plate.
- Eruption Style: Known for frequent phreatic (steam-driven) and mild effusive eruptions.
- Natural Hazard: Prone to Lahars (volcanic mudflows) during heavy typhoons.
- UNESCO: A biosphere reserve and a candidate for World Heritage status.

12. Muna Island, Indonesia

- Location: Situated off the southeast coast of Sulawesi in Indonesia.
- Flora/Fauna: Famous for being a major producer of Teak wood and for its unique cave systems.
- Karst Landscape: Known for its extensive limestone (Karst) topography and underwater caves.
- Culture: Home to the Muna people; famous for traditional horse racing and intricate weaving.
- Environment: News regarding the Blue Economy and sustainable marine management in the Coral Triangle.
- Geology: Contains some of the world's oldest rock art (hand stencils) found in caves like Liangkabori.

8. Port Louis, Mauritius

- Capital City: The economic and political center of Mauritius, a key Indian Ocean partner.
- Aapravasi Ghat: A UNESCO World Heritage site where the first indentured laborers from India landed.
- Maritime Security: A hub for India's "SAGAR" (Security and Growth for All in the Region) policy.
- Agalega Connection: Port Louis is the base for managing the new Indian-built airstrip on Agalega Island.
- Financial Hub: A major center for Global Business Companies and a gateway for FDI into India.
- Geography: A port city surrounded by the Moka mountain range.

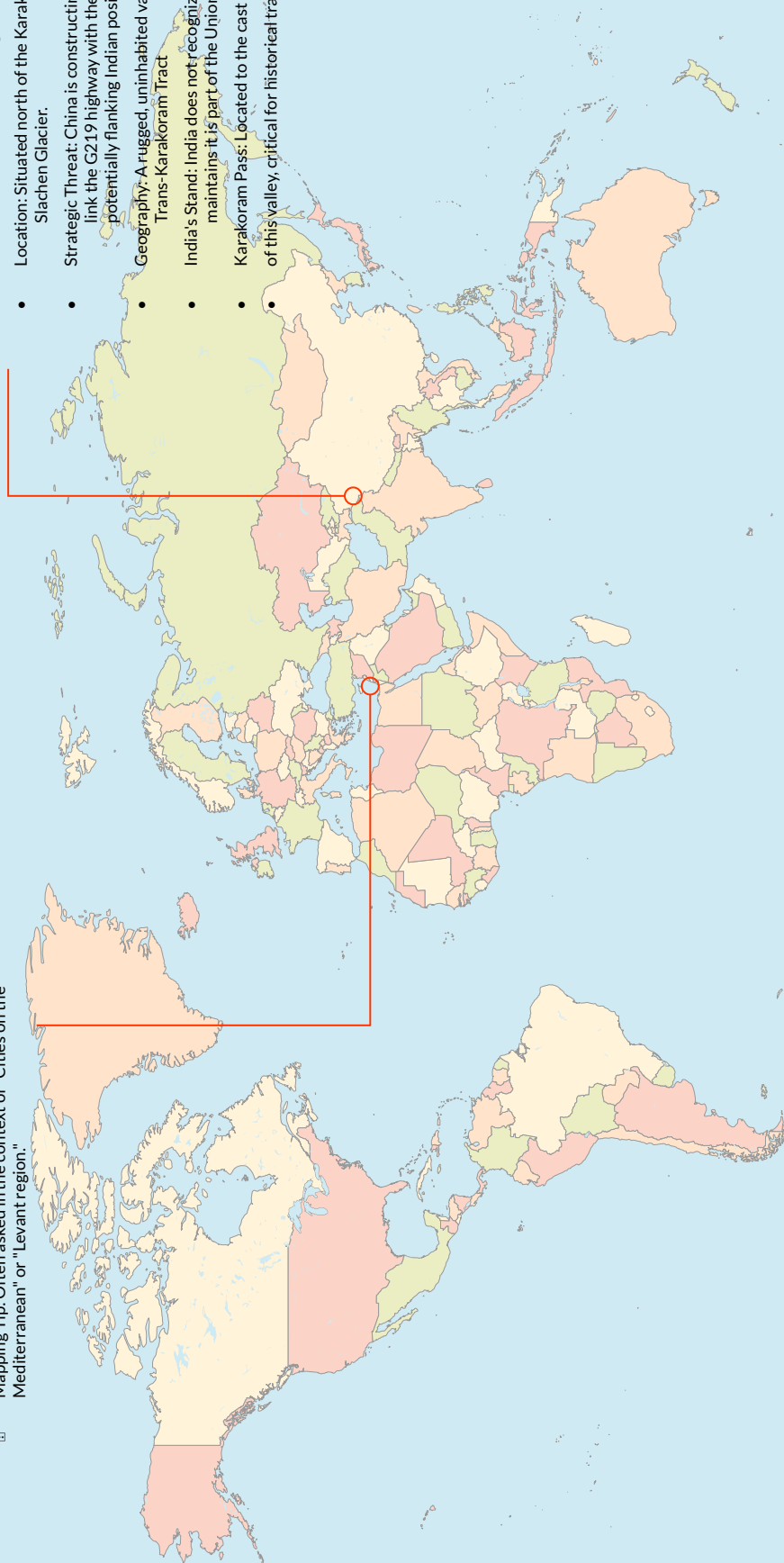


2. Gaza Strip

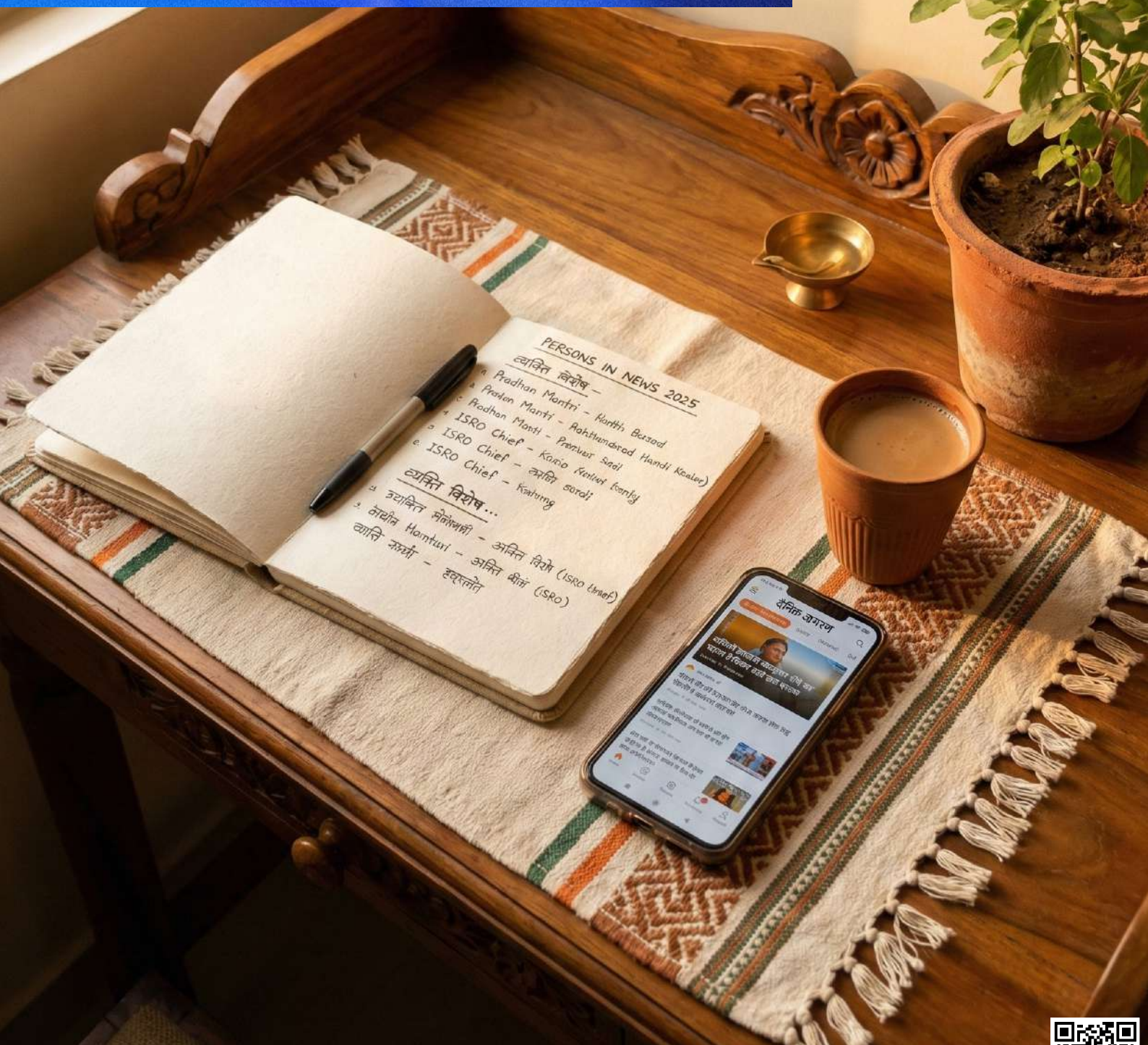
- ② Geography: A narrow territory on the eastern coast of the Mediterranean Sea, bordered by Egypt (South) and Israel (East/North).
- ② Crossings: Key points include the Rafah Crossing (controlled by Egypt) and the Erez Crossing (controlled by Israel).
- ② Philadelphi Corridor: A 14km long buffer zone along the border between Gaza and Egypt.
- ② Connectivity: Lacks an active airport or seaport due to long-standing blockades.
- ② UPSC Link: Critical for Middle East geopolitics and the "Abraham Accords" versus the current conflict.
- ② Mapping Tip: Often asked in the context of "Cities on the Mediterranean" or "Levant region."

5. Shaksgam Valley

- Territorial Dispute: Part of Pakistan occupied Kashmir (PoK) that was ceded to China by Pakistan in 1963 via the Sino-Pakistan Frontier Agreement.
- Location: Situated north of the Karakoram Range and the Slachen Glacier.
- Strategic Threat: China is constructing a road here that could link the G219 highway with the Karakoram Highway, potentially flanking Indian positions in Slachen
- Geography: A rugged, uninhabited valley within the Trans-Karakoram Tract
- India's Stand: India does not recognize the 1963 treaty and maintains it is part of the Union Territory of Ladakh.
- Karakoram Pass: Located to the east of this valley, critical for historical trade and current



PERSON IN NEWS



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1. Subhash Chandra Bose



- **INC Presidency:** Presided over the **Haripura Session (1938)**; resigned after the Tripuri Session (1939) due to differences with Gandhi.
- **Forward Bloc:** Founded this left-wing faction within the Congress in 1939.
- **INA Leadership:** Took command of the **Indian National Army** (Azad Hind Fauj) from Rash Behari Bose in Singapore (1943).
- **Provisional Govt:** Established the **Azad Hind Government** in Singapore on October 21, 1943.
- **First Liberated Land:** Hoisted the Tricolour in Port Blair (1943), renaming Andaman as **Shaheed** and Nicobar as **Swaraj**.
- **Famous Slogans:** "Give me blood, and I shall give you freedom" and "Jai Hind."
- **Literary Work:** Wrote the famous book "**The Indian Struggle**" (1920–1942).

2. Rani Velu Nachiyar



- **Title:** Known as **Veeramangai** (Brave Woman) in Tamil culture.
- **First Resistance:** Regarded as the first Indian queen to wage war against the British East India Company.
- **Kingdom:** She was the princess of Ramnad and the queen of the **Sivaganga estate**.
- **Military Innovation:** Credited with using the first recorded "**human bomb**" (suicide bomber) in history—her commander Kuyili.
- **Strategic Alliance:** Formed an alliance with **Hyder Ali** of Mysore and the Maruthu Pandiyar brothers to reclaim her kingdom in 1780.
- **Language Skills:** Proficient in multiple languages including French, English, and Urdu, which helped her in diplomacy.
- **Governance:** Ruled her kingdom for over 10 years after winning it back from the British.

3. Group Captain Shubhanshu Shukla



- **Axiom-4 Mission:** Selected as the primary astronaut for the **Indo-US joint mission** to the International Space Station (ISS).
- **Gaganyaan connection:** He is one of the four "Gaganyatris" selected for India's first human spaceflight mission.



- **Role:** Designated as the **Pilot** for the Axiom-4 mission.
- **Gallantry:** Awarded the **Ashok Chakra** (India's highest peacetime gallantry award) in January 2026 for his exceptional service and courage.
- **Background:** A seasoned fighter pilot in the Indian Air Force (IAF) with extensive flight experience.
- **Scientific Mission:** Conducted critical experiments in microgravity involving space biotechnology and materials science.
- **International Recognition:** His mission represents the highest level of space cooperation between ISRO and NASA.

4. Dr. Gladys West



- **Mathematical Geodesy:** Her work focused on the mathematical modeling of the **Earth's shape (the Geoid)**.
- **GPS Foundation:** Her algorithms and satellite data processing directly enabled the creation of the **Global Positioning System (GPS)**.
- **Project SEASAT:** She was the project manager for SEASAT, the first satellite that could sense oceans.
- **Hidden Figure:** Recognized late in life as one of the "Hidden Figures" of the US Navy for her 42-year career as a mathematician.

- **Award:** Inducted into the Air Force Space and Missile Pioneers Hall of Fame (2018).
- **Computational Lead:** Led the team that programmed the IBM 7030 "Stretch" computer for high-accuracy Earth models.
- **Education:** Overcame racial and gender barriers in the 1950s to earn a PhD in public administration.

5. V. S. Achuthanandan



- **Political Role:** Served as the **Chief Minister of Kerala** (2006–2011).
- **Founding Member:** He was the last surviving founding member of the **CPI(M)** (formed in 1964).
- **Public Affairs:** Awarded the **Padma Vibhushan 2026** (Posthumous) for his lifelong service.
- **Anti-Corruption:** Known for his aggressive stance against land encroachments and corruption (e.g., Munnar mission).
- **Social Movements:** Played a key role in the **Punnappra-Vayalar uprising** against the Travancore Diwan.
- **Governance:** Instrumental in digitizing Kerala's administration and promoting the "IT for the masses" model.
- **Opposition:** Served as the Leader of the Opposition in the Kerala Assembly for three terms.



6. Dharmendra Singh Deol



- **Cinema Legacy:** Known as the "He-Man" of Indian Cinema; starred in over 300 films.
- **Award:** Conferred with the **Padma Vibhushan 2026** (Posthumous) for Art.
- **Iconic Film:** Best remembered for his role as 'Veeru' in the legendary film **Sholay (1975)**.
- **Political Career:** Served as a **Member of Parliament (Lok Sabha)** from Bikaner, Rajasthan (2004–2009).
- **Versatility:** One of the few actors to achieve immense success across action, romance, and comedy genres.
- **Contribution:** Played a pivotal role in the "Golden Age" of Bollywood during the 1960s and 70s.
- **Soft Power:** His films were instrumental in making Indian cinema popular in the USSR and Middle East.

7. Dr. N. Rajam



- **Field:** Renowned **Hindustani Classical Violinist**.
- **Musical Style:** Famous for introducing the 'Gayaki Ang' (vocal style) on the violin.
- **Award:** Conferred with the **Padma Vibhushan 2026** for Art.
- **Institutional Role:** Served as the Dean of the Faculty of Performing Arts at **Banaras Hindu University (BHU)**.
- **Guru:** A disciple of the legendary vocalist **Pandit Omkarnath Thakur**.
- **Global Impact:** Revolutionized the violin's status in Indian classical music from a mere accompaniment to a lead solo instrument.
- **Recognition:** Previously received the Padma Shri and Padma Bhushan, along with the Sangeet Natak Akademi Fellowship.

8. Savitribai Phule



- **First Teacher:** Regarded as India's first female teacher.
- **Girls' Education:** Founded the first school for girls in India at **Bhide Wada, Pune (1848)**.
- **Social Reform:** Worked alongside her husband, **Jyotirao Phule**, in the **Satyashodhak Samaj** (Truth Seekers' Society).



- **Infanticide Prevention:** Started the **Balhatya Pratibandhak Griha** for pregnant widows and rape victims.
- **Literary Work:** Wrote "**Kavya Phule**" (1854) and "**Bavan Kashi Subodh Ratnakar**" (1892).
- **Caste Reform:** Opened their family water tank to "untouchables," a revolutionary act in the 19th century.
- **Last Sacrifice:** Died in 1897 while serving patients during the Third Pandemic of Bubonic Plague in Pune.

9. Swami Vivekananda



- **Youth Day:** His birthday, January 12, is celebrated as **National Youth Day**.
- **Chicago Speech:** Represented Hinduism at the **World Parliament of Religions (1893)**.
- **Institution:** Founded the **Ramakrishna Mission (1897)** and the Ramakrishna Math.
- **Philosophy:** Propounded the concept of "**Neo-Vedanta**" and "Practical Vedanta."
- **Books:** Authored famous works like **Raja Yoga, Karma Yoga, Bhakti Yoga,** and **Jnana Yoga**.
- **Social Message:** Famously said, "Arise, awake, and stop not until the goal is reached."

- **Patriotism:** Often referred to as the "Patriot Saint of India" for his role in modern Indian nationalism.

10. Veer Surendra Sai



- **Region:** A prominent freedom fighter from the **Sambalpur region of Odisha**.
- **1857 Revolt:** Led a massive uprising against the British during the Revolt of 1857.
- **Longest struggle:** He continued his guerrilla warfare until 1862, long after the revolt was crushed elsewhere.
- **Imprisonment:** Spent a total of **37 years in prison**, one of the longest durations for any Indian revolutionary.
- **Resistance:** Opposed the "Doctrine of Lapse" which the British applied to Sambalpur in 1849.
- **Legacy:** The Sambalpur University's medical college and the airport at Jharsuguda are named after him.
- **Death:** Died in captivity at **Asirgarh Fort** in 1884.



11. Antonio Costa & Ursula von der Leyen



- **Republic Day 2026:** They served as the **joint Chief Guests** for India's 77th Republic Day.
- **Antonio Costa:** The **President of the European Council** and former PM of Portugal (of Indian origin).
- **Ursula von der Leyen:** The **President of the European Commission**.
- **Significance:** This joint visit marks the push for the **India-EU Free Trade Agreement (FTA)**.
- **Strategic Ties:** Focused on the "India-EU Connectivity Partnership" and the "Trade and Technology Council (TTC)."
- **Global Role:** Represented the strongest alignment between India and the European Union in a decade.
- **Agenda:** Highlighted cooperation on Green Hydrogen and the India-Middle East-Europe Economic Corridor (IMEC).

12. Justice (Retd) K.T. Thomas



- **Judicial Role:** Former **Judge of the Supreme Court of India** (1996–2002).
- **Award:** Conferred with the **Padma Vibhushan 2026** for Public Affairs.
- **Landmark Case:** Presided over the three-judge bench that confirmed the death sentence in the **Rajiv Gandhi Assassination case**.
- **Legal Reforms:** Post-retirement, he headed the committee to suggest reforms in the **Police Acts**.
- **Social Advocacy:** A vocal advocate for **Prison Reforms** and the rights of the accused.
- **Previous Award:** Recipient of the Padma Bhushan in 2007.
- **Governance:** Chaired the Kerala Law Reforms Commission.

13. Gyanesh Kumar



- **Designation:** Current **Chief Election Commissioner (CEC)** of India.
- **Chairmanship:** Assumed the **Chair of International IDEA** (Institute for Democracy and Electoral Assistance) for 2026.
- **Election Management:** Overhauled the digital voting system and handled the "One Nation, One Election" pilot discussions.
- **Role in Article 370:** As a former IAS officer (Home Ministry), he played a crucial role in the administrative transition of J&K into a UT.



- **Transparency:** Introduced the "Candidate KYC" app for better voter awareness during his tenure.
- **International Diplomacy:** Hosted the "New Delhi Declaration on Electoral Integrity" in Jan 2026.

14. Dr. Ambarish Ghosh



- **Institution:** Professor at the **Indian Institute of Science (IISc), Bangalore.**
- **ANRF Honor:** Selected as one of the 21 "**Prime Minister Professors**" under the Anusandhan National Research Foundation (ANRF).
- **Research Area:** Pioneer in **Nanorobotics** and Nano-Bioengineering.
- **Invention:** Developed **magnetically driven nanobots** that can swim through human blood for targeted drug delivery.
- **Cancer Therapy:** His research is focused on killing cancer cells without damaging healthy tissue using these nanobots.
- **S&T Policy:** A key member of India's National Quantum Mission advisory board.
- **Innovation:** His lab created the world's smallest "helical nanobots" using glancing angle deposition.

15. Rohit Sharma & Harmanpreet Kaur



- **Award:** Both were conferred with the **Padma Shri 2026** for Sports.
- **Rohit Sharma:** Captained India to the **2024 T20 World Cup** and the **2025 Champions Trophy** titles.
- **Harmanpreet Kaur:** First Indian captain to win the **Women's ODI World Cup (2025).**
- **Records:** Rohit holds the record for the most centuries in T20Is; Harmanpreet holds the record for the highest individual score by an Indian in Women's World Cups.
- **Gender Parity:** Their joint recognition signals the equal status of Men's and Women's cricket in India's sports policy.
- **Inspiration:** Both have been instrumental in the success and popularity of the WPL (Women's Premier League) and IPL.



16. Sanjay Malhotra



- **Designation:** Appointed as the **26th Governor of the Reserve Bank of India (RBI)**.
- **Predecessor:** Succeeded Shaktikanta Das in December 2025.
- **Previous Role:** Served as the **Revenue Secretary** in the Ministry of Finance.
- **Focus Area:** Leading the nation-wide rollout of the **Central Bank Digital Currency (CBDC)** or 'Digital Rupee'.
- **Monetary Policy:** Tasked with maintaining the inflation target of **4% (+/- 2%)** in a post-global-slowdown economy.
- **Financial Inclusion:** Pushing the "UPI Global" initiative to make Indian payments acceptable in Europe and South America.
- **Banking Health:** Overseeing the transition of Indian banks into the "Twin Balance Sheet" advantage era.

