

Plutus IAS

Current Affairs Monthly

UPSC & State PCS

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Editor's Note

This monthly current-affairs compilation is designed to holistically cover all the relevant and important topics for the Civil Services Examination, to make aspirants exam-ready. It is a secondary source; the newspaper remains your primary source.

Current affairs are no longer merely 'current' — they are Contemporary Affairs. Questions in both Prelims and Mains assess conceptual clarity. This issue is prepared to help you internalise the interlinkages of static and dynamic news events.

— Aanya, your Current Affairs teacher, Plutus IAS

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Upcoming Exam Calendar

Updated till 2026-07-19. Dates are indicative — always confirm on the official commission website.

UPSC Civil Services (CSE) 2026

Mains preparation

Notification Feb 2026 (out)

Apply by Closed

Prelims 24 May 2026 (result 15 Jun)

Mains 21-30 Aug 2026

Interview Nov-Dec 2026 (tent.)

Fee Rs 100 (Gen); SC/ST/PwBD/Women exempt

[Official notification](#) · [Syllabus & prep](#)

UPSC Civil Services (CSE) 2027

Notification Jan 2027

Notification 13 Jan 2027

Apply by 2 Feb 2027

Prelims 23 May 2027

Mains from 20 Aug 2027 (5 days)

Interview 2028 (tent.)

Fee Rs 100 (Gen); SC/ST/PwBD/Women exempt

[Official notification](#) · [Syllabus & prep](#)

UPSC Indian Forest Service (IFoS) 2027

Notification Jan 2027

Notification 13 Jan 2027 (with CSE)

Apply by 2 Feb 2027

Prelims 23 May 2027 (CSE paper)

Mains from 21 Nov 2027

Interview 2028 (tent.)

Fee Rs 100 (Gen); SC/ST/PwBD/Women exempt

[Official notification](#) · [Syllabus & prep](#)

UPSC Engineering Services (ESE) 2027

Prelims Jan 2027

Notification Sep 2026 (tent.)

Apply by Oct 2026 (tent.)

Prelims 31 Jan 2027

Mains Jun 2027 (tent.)

Interview 2027 (tent.)

Fee Rs 200 (Gen); SC/ST/PwBD/Women exempt

[Official notification](#) · [Syllabus & prep](#)

UPSC CDS (I) 2027

Exam Apr 2027

Notification Dec 2026 (tent.)

Apply by Jan 2027 (tent.)

Prelims 11 Apr 2027 (written)

Interview SSB interview after result

Fee Rs 200 (Gen); SC/ST/Women exempt

[Official notification](#) · [Syllabus & prep](#)

UPSC NDA & NA (I) 2027

Exam Apr 2027

Notification Dec 2026 (tent.)

Apply by Jan 2027 (tent.)

Prelims 11 Apr 2027 (written)

Interview SSB interview after result

Fee Rs 100 (Gen); SC/ST exempt

[Official notification](#) · [Syllabus & prep](#)

UPSC CAPF (AC) 2027**Exam Jul 2027**

Notification Mar 2027 (tent.)

Apply by Apr 2027 (tent.)

Prelims 4 Jul 2027 (written)

Interview Physical + Interview after result

Fee Rs 200 (Gen); SC/ST/Women exempt

[Official notification](#) · [Syllabus & prep](#)**UPPSC PCS 2026 (Uttar Pradesh)****Prelims Dec 2026**

Notification Out (2158 posts)

Apply by 22 Jan 2026 (closed)

Prelims 6 Dec 2026

Mains To be announced

Interview After Mains

Fee Rs 125 (Gen/OBC); Rs 65 (SC/ST)

[Official notification](#) · [Syllabus & prep](#)**MPPSC State Service 2026 (Madhya Pradesh)****Mains Sep 2026**

Notification 31 Dec 2025 (155 posts)

Apply by 9 Feb 2026 (closed)

Prelims 26 Apr 2026 (done)

Mains 7–12 Sep 2026

Interview After Mains

Fee Rs 250 (Gen); Rs 150 (MP reserved)

[Official notification](#) · [Syllabus & prep](#)**RPSC RAS 2026 (Rajasthan)****Prelims (check official)**

Notification 27 May 2026 (607 posts)

Apply by Check official

Prelims To be announced

Mains To be announced

Interview After Mains

Fee Rs 600 (Gen); Rs 400 (Raj. reserved)

[Official notification](#) · [Syllabus & prep](#)**BPSC CCE (Bihar)****Prelims postponed**

Notification Latest cycle out; verify on official site

Apply by Check official

Prelims End of July 2026 (expected)

Mains After Prelims result

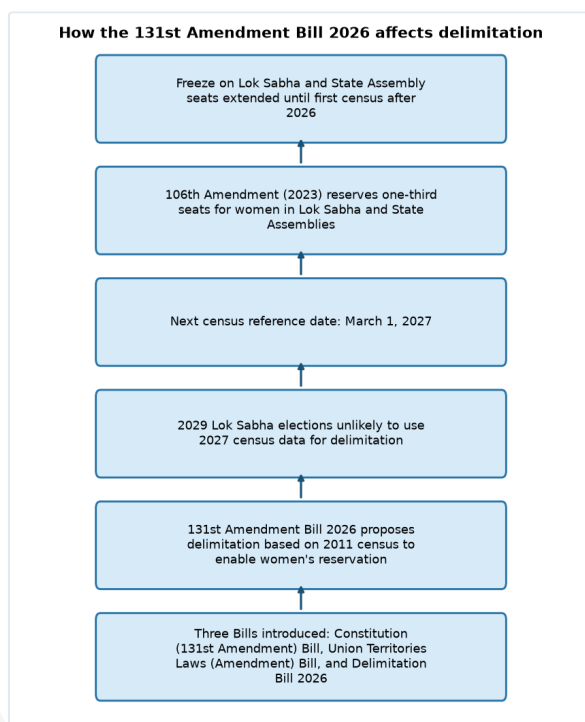
Interview A few interviews of the current cycle awaited

Fee Rs 600 (Gen); Rs 150 (Bihar SC/ST/PwD/Women)

[Official notification](#) · [Syllabus & prep](#)

Polity

Constitutional and Legislative Developments in Delimitation: The Constitution (131st Amendment) Bill, 2026 and Related Bills



How the 131st Amendment Bill 2026 affects delimitation

SUBJECT RELEVANCE — WHERE THIS TOPIC FITS

- GS Paper II — Polity and Governance | GS Paper III — Indian Economy and Issues Relating to Planning
- **Prelims:** Delimitation Commission, 42nd Constitutional Amendment, 84th Constitutional Amendment, 106th Constitutional Amendment, Reservation of seats for women, Union Territories (Amendment) Bill, Lok Sabha seat allocation
- **Essay:** The interplay between demographic representation and constitutional amendments in India's electoral democracy, Women's reservation in Parliament: Progress, challenges, and the role of census-based delimitation

Quick Revision: The Constitution (131st Amendment) Bill, 2026, and related bills seek to resume delimitation based on the 2011 census, increase Lok Sabha seats, and align women's reservation with the delimitation process, but were negated in the Lok Sabha, necessitating further legislative scrutiny.

WHY IS THIS IN THE NEWS?

The Constitution (131st Amendment) Bill, 2026, along with the Union Territories Laws (Amendment) Bill, 2026, and the Delimitation Bill, 2026, were introduced in the Lok Sabha on April 16, 2026, to address critical electoral reforms, including the resumption of delimitation based on the 2011

census, the increase in the maximum number of seats in the Lok Sabha, and the alignment of women's reservation with the delimitation process. These bills are significant as they seek to operationalise the 106th Constitutional Amendment (2023) on women's reservation, which is contingent on the delimitation exercise. The bills were negatived in the Lok Sabha on April 17, 2026, making them a pivotal subject for understanding the constitutional and legislative framework governing electoral representation in India.

BACKGROUND

- The Constitution of India mandates that seats in the Lok Sabha and State Legislative Assemblies be allocated in proportion to the population of states, with periodic delimitation to ensure equitable representation.
- The 42nd Constitutional Amendment (1976) froze the allocation of Lok Sabha seats and State Legislative Assembly seats based on the 1971 census, initially until the first census after 2000, to incentivise population stabilisation efforts by states.
- The 84th Constitutional Amendment (2001) extended the freeze on seat allocation until the first census after 2026, maintaining the status quo until the 2027 census.
- The 106th Constitutional Amendment (2023) introduced a 33% reservation for women in the Lok Sabha and State Legislative Assemblies, with the reservation to be implemented based on the first census after the commencement of the Act, i.e., the 2027 census.
- The last Delimitation Commission was constituted in 2002 and finalised its orders in 2008, as the freeze on delimitation was in effect.

WHAT ARE THE CONSTITUTION (131ST AMENDMENT) BILL, 2026, AND THE RELATED DELIMITATION BILLS?

- The Constitution (131st Amendment) Bill, 2026, seeks to amend the Constitution to revert to the principle of proportional representation in the Lok Sabha based on the latest published census, thereby enabling delimitation based on the 2011 census.
- The Bill authorises Parliament to determine the census to be used for delimitation and the timing of the delimitation exercise, overriding the previous constitutional freeze on seat allocation.
- The Delimitation Bill, 2026, provides the operational framework for conducting the delimitation exercise, specifying that the latest published census as on the date of the constitution of the Delimitation Commission will be used, implying the use of the 2011 census for the next delimitation.
- The Union Territories Laws (Amendment) Bill, 2026, extends similar provisions to Union Territories, including Puducherry, Delhi, and Jammu & Kashmir, ensuring uniformity in electoral representation across all legislative bodies.
- The Bills propose an increase in the size of Lok Sabha, though the exact number is not specified in the provided context.
- The Bills aim to align the implementation of the 106th Constitutional Amendment (2023) on women's reservation with the delimitation process, ensuring that the reservation is based on the most recent delimitation exercise.
- The Bills were negatived in the Lok Sabha on April 17, 2026, indicating potential legislative challenges or the need for further deliberation before their passage.

- The Bills underscore the constitutional and statutory framework governing electoral representation, highlighting the interplay between demographic data, constitutional amendments, and legislative processes.

KEY FEATURES

Feature	Significance
Reversion to population-based seat allocation	Restores the constitutional principle that Lok Sabha seats are distributed among states in proportion to their population, reversing the 1976 freeze based on the 1971 census.
Use of 2011 census for delimitation	Authorises delimitation based on the 2011 census, overriding the 42nd and 84th Amendments' freeze, to enable timely electoral adjustments.
Increase in maximum Lok Sabha seats	Proposes an increase in the maximum permissible seats in the Lok Sabha, reflecting demographic shifts and ensuring proportional representation.
Reservation for women based on delimited constituencies	Links the reservation of one-third of seats for women (106th Amendment, 2023) to the delimitation exercise, ensuring equitable distribution.
Union Territories (UTs) included in delimitation	Extends delimitation provisions to Union Territories like Puducherry, Delhi, and Jammu & Kashmir, ensuring uniform electoral representation.

WHY IT MATTERS

Constitutional and Legal

- Reinforces the principle of 'one person, one vote, one value' by ensuring seat allocation aligns with population distribution.
- Addresses the anomaly created by the 42nd and 84th Amendments, which froze seat distribution since 1971, leading to disproportionate representation.
- Provides legal clarity on the use of the 2011 census for delimitation, resolving ambiguity in the timing of electoral reforms.

Electoral and Democratic

- Enhances the fairness of Lok Sabha elections by ensuring constituencies reflect current demographic realities rather than outdated data.
- Facilitates the implementation of the 106th Amendment (2023) on women's reservation, which is contingent on delimitation based on the 2011 census.
- Prevents the perpetuation of unequal representation, where states with higher population growth are underrepresented.

Administrative and Governance

- Streamlines the delimitation process by linking it to the latest published census, reducing delays in electoral reforms.
- Ensures uniformity in electoral representation across states and Union Territories, including those with special status.

Policy and Governance

- Aligns with India's commitment to population stabilisation by incentivising states to pursue demographic balance through policy measures.
- Supports the goal of inclusive representation by enabling reservation policies to be implemented in a timely manner.

CHALLENGES

1. Political Opposition and Consensus

- The Bill's introduction and subsequent negating in the Lok Sabha within a day highlight potential political resistance to delimitation reforms.
- Requires broad political consensus to amend the Constitution, which may be challenging given competing electoral interests.

UPSC Link: GS-II: Constitutional Amendments

2. Timing and Implementation Lag

- The 2027 census may not be published in time for the 2029 Lok Sabha elections, delaying the implementation of delimitation and women's reservation.
- The last delimitation exercise (2002–2008) took six years; a similar timeline could push reforms beyond the 2029 elections.

UPSC Link: GS-II: Electoral Reforms

3. Demographic and Regional Disparities

- States with rapid population growth may gain more seats, potentially leading to resistance from states with slower growth.
- Ensuring equitable representation in Union Territories like Delhi and Jammu & Kashmir requires careful balancing of local and national interests.

UPSC Link: GS-II: Representation

4. Legal and Procedural Hurdles

- The Delimitation Commission's orders are subject to judicial review, which could delay or alter the implementation of reforms.
- The Constitution (131st Amendment) Bill must be ratified by at least half of the state legislatures, adding a layer of complexity.

UPSC Link: GS-II: Constitutional Framework

5. Data Accuracy and Census Challenges

- The 2021 census was delayed due to the COVID-19 pandemic, raising concerns about the accuracy and timeliness of the 2027 census data.
- Ensuring the census data is reliable and free from political interference is critical for fair delimitation.

UPSC Link: GS-II: Census and Data

Challenges — UPSC Perspective

Issue	Concern
Political Consensus	Lack of broad political support may stall the Bill's passage, given its constitutional nature and potential electoral implications.
Implementation Lag	Delays in census data and delimitation could defer reforms beyond the 2029 elections, undermining the purpose of the amendment.
Demographic Disparities	States with higher population growth may resist reforms that reduce their relative representation, leading to inter-state tensions.
Judicial Review	Orders of the Delimitation Commission are subject to judicial scrutiny, which could introduce delays or modifications.
Data Reliability	Concerns about the accuracy and timeliness of census data may undermine the legitimacy of the delimitation exercise.
Union Territories Inclusion	Extending delimitation to Union Territories like Delhi and Jammu & Kashmir requires balancing local autonomy with national representation.

WAY FORWARD

- Constitute the Delimitation Commission expeditiously once the census data is published, ensuring timely implementation of reforms.
- Engage in multi-party consultations to build consensus on the constitutional amendment, addressing concerns of states with varying demographic growth rates.
- Strengthen the census data collection process to ensure accuracy and timeliness, minimising delays in the delimitation exercise.
- Clarify the legal framework for judicial review of delimitation orders to prevent avoidable delays in implementation.
- Incorporate provisions for periodic review of seat distribution to prevent future freezes and ensure dynamic representation.
- Ensure that Union Territories are adequately represented in the delimitation process, balancing local and national interests.
- Monitor the implementation of women's reservation provisions to ensure they are applied in the next delimitation cycle.
- Educate stakeholders, including political parties and civil society, on the benefits of delimitation to foster public support.

UPSC VALUE ADDITION

Keywords for Mains Answer-Writing

Constitution (131st Amendment) Bill 2026 · Delimitation Commission · Lok Sabha seat allocation · Population-based representation · Women's reservation in Parliament · 42nd Constitutional Amendment · 84th Constitutional Amendment · 106th Constitutional Amendment · Census 2027 · Lok Sabha elections 2029 · Union Territories delimitation · Parliamentary representation norms

Constitutional & Policy Linkages

- Article 81: Composition of the Lok Sabha and seat distribution among states.
- Article 82: Readjustment of seats after each census.
- Article 170: Composition of State Legislative Assemblies and seat distribution.
- Article 330: Reservation of seats for Scheduled Castes and Scheduled Tribes in the Lok Sabha.
- Fourth Schedule: Allocation of seats in the Rajya Sabha.

Concept Flow

Population Census conducted (2027) → Census data published → Delimitation Commission constituted → Delimitation orders issued based on 2011 census → Seats in Lok Sabha and State Assemblies reallocated proportionally → Reservation for women implemented in delimited constituencies → Lok Sabha elections held with updated representation → Long-term impact on electoral fairness and demographic balance.

PRELIMS PRACTICE QUESTIONS

Q1. Which of the following Constitutional Amendments introduced the freeze on the total number of seats in Lok Sabha and State Assemblies based on the 1971 census?

1. A. 42nd Constitutional Amendment, 1976
2. B. 44th Constitutional Amendment, 1978
3. C. 73rd Constitutional Amendment, 1992
4. D. 84th Constitutional Amendment, 2001

Answer: A. 42nd Constitutional Amendment, 1976 — The 42nd Constitutional Amendment in 1976 froze the total number of seats in Lok Sabha and State Assemblies based on the 1971 census to encourage population stabilisation.

Q2. The Constitution (131st Amendment) Bill, 2026 seeks to enable delimitation based on which census?

1. A. Census 2021
2. B. Census 2011
3. C. Census 2001
4. D. Census 1991

Answer: B. Census 2011 — The Bill authorises the use of the latest published census as on the date of the constitution of the Delimitation Commission, which is the 2011 census.

Q3. What is the primary objective of the Constitution (131st Amendment) Bill, 2026?

1. A. To increase the number of seats in Rajya Sabha
2. B. To enable delimitation based on population and introduce women's reservation
3. C. To abolish the Delimitation Commission
4. D. To reduce the size of Lok Sabha

Answer: B. To enable delimitation based on population and introduce women's reservation — The Bill aims to revert to population-based representation in Lok Sabha and State Assemblies and enable women's reservation based on the delimitation exercise.

Q4. The 106th Constitutional Amendment, 2023 introduced reservation for women in Lok Sabha and State Assemblies. When will this reservation be applicable?

1. A. Immediately after the enactment of the Amendment
2. B. Based on the first census after the commencement of the Act
3. C. After the next delimitation exercise
4. D. Only after the 2029 Lok Sabha elections

Answer: B. Based on the first census after the commencement of the Act — The reservation for women will be based on the first census conducted after the commencement of the 106th Amendment, which is the 2027 census.

MAINS PRACTICE QUESTION

✍️ Analyse the constitutional and political implications of the Constitution (131st Amendment) Bill, 2026, particularly in the context of delimitation, women's reservation, and the freeze on Lok Sabha and State Assembly seats. How does this Bill address the challenges posed by the pending delimitation exercise and its impact on the 2029 Lok Sabha elections?

Approach: The answer must critically examine the constitutional provisions related to delimitation (Articles 81, 82, 170, 330A), the historical context of the freeze on seats (42nd and 84th Amendments), and the 106th Amendment's women's reservation. Discuss the procedural challenges in conducting delimitation based on the 2027 census before the 2029 elections and the Bill's attempt to circumvent this by using the 2011 census. Highlight the political implications, including the potential for demographic shifts in representation and the ethical considerations of delaying women's reservation. Conclude with the Bill's significance in balancing constitutional mandates with practical governance constraints.

Source: [PRS Legislative Research](#)

Constitutional Status of Vande Mataram: Legal Protection, Fundamental Rights, and Parliamentary Deliberations



Source: [Wikimedia Commons](#) — KannanShanmugam,Shanmugam Studio, Kollam (CC BY-SA 4.0)

SUBJECT RELEVANCE — WHERE THIS TOPIC FITS

- GS Paper II — Polity and Governance
- **Prelims:** Fundamental Duties (Article 51A), Fundamental Rights (Articles 14, 19, 21, 25), Prevention of Insults to National Honour Act, 1971, Constituent Assembly Debates, National Song vs National Anthem
- **Essay:** Secularism and Constitutional Morality in India, Balancing National Symbols with Fundamental Rights

Quick Revision: The Constituent Assembly deliberately withheld legal protection for Vande Mataram, and the Prevention of Insults to National Honour Act, 1971, currently protects only the National Anthem; any extension to Vande Mataram must align with constitutional principles of fundamental rights and secularism.

WHY IS THIS IN THE NEWS?

The Rajya Sabha is poised to introduce the Prevention of Insults to National Honour (Amendment) Bill, 2026, which seeks to grant statutory and penal protection to Vande Mataram, India's National Song. The Bill has drawn opposition from the CPI(M), which has filed a notice under Rule 67, arguing that the proposed legislation is unconstitutional and violates fundamental rights, including freedom of speech and religious freedom. The debate centres on the constitutional status of Vande Mataram, the intent of the Constituent Assembly, and the legal framework governing national symbols.

BACKGROUND

- The Constituent Assembly of India, during its deliberations from 1946 to 1950, explicitly chose not to accord Vande Mataram the same constitutional status as the National Anthem (Jana Gana Mana), despite its historical significance in the freedom struggle.

- Dr. Rajendra Prasad, the President of the Constituent Assembly, in his statement on 24 January 1950, clarified that while Vande Mataram was recognized as the National Song, no formal resolution was adopted to grant it legal protection akin to the National Anthem.
- The Prevention of Insults to National Honour Act, 1971, currently provides penal protection under Section 3 only for the National Anthem, reflecting Parliament's deliberate exclusion of the National Song from such statutory safeguards.
- In January 2026, the Ministry of Home Affairs issued protocol orders on the National Song, which were challenged in the Supreme Court. The Court declined to intervene, noting that the protocol lacked penal consequences, thereby distinguishing it from legislative action.
- The proposed amendment to the 1971 Act seeks to extend penal protection to Vande Mataram, a move that has reignited debates on the constitutional balance between national symbols and fundamental rights.
- Opposition parties, including the CPI(M), argue that such legislation infringes upon Articles 14 (Right to Equality), 19(1)(a) (Freedom of Speech), 21 (Right to Life and Personal Liberty), and 25 (Freedom of Religion) of the Constitution.

WHAT IS THE CONSTITUTIONAL AND LEGAL STATUS OF VANDE MATARAM?

- The Constituent Assembly, in its final deliberations, consciously refrained from according Vande Mataram the same legal sanctity as the National Anthem, as evidenced by the absence of a formal resolution or constitutional provision.
- The National Anthem is explicitly protected under Article 51A(a) of the Constitution, which imposes a Fundamental Duty to respect the National Flag, National Anthem, and the Constitution. Vande Mataram is not mentioned in this provision.
- The Prevention of Insults to National Honour Act, 1971, currently penalizes insults to the National Anthem (Section 3) but does not extend such protection to Vande Mataram, reflecting Parliament's long-standing position.
- The National Song is traditionally sung in its first two stanzas during official events, as per a consensus established in the Constituent Assembly, though this is not legally binding.
- The Supreme Court, in **Bijoe Emmanuel v. State of Kerala** (1986), held that the right to freedom of speech (Article 19(1)(a)) and freedom of conscience (Article 25) must be balanced with public order and morality, a principle that could be invoked in debates over the proposed Bill.
- The proposed amendment to the 1971 Act seeks to criminalize insults to Vande Mataram, a move that critics argue could lead to arbitrary enforcement and suppression of dissent, particularly in a diverse and pluralistic society.
- The debate also touches upon the principle of secularism (Article 25), as Vande Mataram contains religious imagery, raising questions about its compatibility with the constitutional guarantee of religious freedom.

KEY FEATURES

Feature	Significance
National Song vs. National Anthem	The Constitution of India distinguishes between the National Anthem (Jana Gana Mana) and the National Song (Vande Mataram), granting the former

Feature	Significance
	explicit constitutional status and penal protection, while withholding the same for the latter.
Constituent Assembly Deliberations	The Constituent Assembly, after extensive discussions, deliberately chose not to accord Vande Mataram the same constitutional status as the National Anthem, reflecting a nuanced understanding of national symbols.
Fundamental Duties (Article 51A)	Fundamental Duties under Article 51A explicitly mention respect for the Constitution, the National Flag, and the National Anthem but do not extend to the National Song, underscoring its distinct legal status.
Prevention of Insults to National Honour Act, 1971	The 1971 Act provides penal protection exclusively for the National Anthem under Section 3, leaving the National Song without statutory penal consequences for insults.
Supreme Court Precedent (Bijoe Emmanuel v. State of Kerala)	The Supreme Court's ruling in Bijoe Emmanuel (1986) established that freedom of speech and conscience cannot be curtailed unless it directly incites violence or public disorder, a principle relevant to debates on penalising insults to national symbols.

WHY IT MATTERS

Constitutional and Legal

- The proposed Bill seeks to alter the constitutional settlement on the status of Vande Mataram, which has been deliberately kept distinct from the National Anthem, raising questions about legislative overreach.
- The Bill's attempt to criminalise insults to Vande Mataram conflicts with the existing legal framework under the Prevention of Insults to National Honour Act, 1971, which confines penal protection to the National Anthem.
- The Bill's introduction challenges the principle of constitutional morality, as it seeks to impose a legal status that the Constituent Assembly consciously withheld.

Political and Social

- The opposition by CPI(M) highlights the ideological divide on the interpretation of national symbols and their legal protection, reflecting broader debates on cultural nationalism.
- The Bill's introduction may exacerbate tensions between different interpretations of patriotism and national identity, particularly in a pluralistic society.
- The debate underscores the role of Parliament in preserving the delicate balance between symbolic representation and individual freedoms.

Judicial and Institutional

- The Bill's attempt to introduce penal consequences for insults to Vande Mataram may invite judicial scrutiny, particularly in light of the Supreme Court's emphasis on proportionality in restricting fundamental rights.
- The Supreme Court's refusal to intervene in January 2026, when the Ministry of Home Affairs issued protocol orders without penal consequences, suggests a judicial preference for maintaining the status quo.

CHALLENGES

1. Constitutional Validity of the Bill

- The Bill's attempt to grant statutory status to Vande Mataram conflicts with the Constituent Assembly's deliberate decision to withhold such status, raising questions about its constitutional validity.
- The Bill may be challenged on grounds of violating Articles 14 (Right to Equality), 19(1)(a) (Freedom of Speech), 21 (Right to Life and Personal Liberty), and 25 (Freedom of Religion), as it seeks to criminalise conduct without a clear nexus to public order.

UPSC Link: GS II: Indian Constitution—Historical Underpinnings, Evolution, Features, Amendments, Significant Provisions and Basic Structure

2. Balancing National Symbols and Fundamental Rights

- The Bill risks encroaching upon the freedom of speech and expression, as well as the freedom of conscience and religion, by criminalising conduct related to Vande Mataram.
- The challenge lies in determining whether the proposed penal provisions are proportionate and necessary to achieve the stated objective of protecting national honour.

UPSC Link: GS II: Fundamental Rights—Part III of the Constitution

3. Judicial Precedents and Legal Uncertainty

- The Bill's introduction may lead to legal uncertainty, as courts may be called upon to interpret its constitutional validity in light of existing precedents, such as *Bijoe Emmanuel v. State of Kerala*.
- The Supreme Court's reluctance to intervene in the absence of penal consequences suggests that the Bill's introduction may face judicial scrutiny.

UPSC Link: GS II: Judiciary—Structure, Organisation and Functioning

4. Political Consensus and Legislative Process

- The opposition by CPI(M) highlights the lack of political consensus on the Bill, raising questions about its passage and implementation.
- The Bill's introduction may face procedural challenges, particularly if it is perceived as an attempt to alter the constitutional settlement on national symbols.

UPSC Link: GS II: Parliament and State Legislatures—Structure, Functioning, Conduct of Business, Powers & Privileges and Issues Arising out of these

5. Pluralism and Cultural Identity

- The Bill's attempt to impose a uniform interpretation of national symbols may conflict with India's pluralistic ethos, where diverse interpretations of patriotism and national identity coexist.
- The challenge lies in ensuring that the Bill does not inadvertently marginalise communities or individuals who may interpret national symbols differently.

UPSC Link: GS I: Salient Features of Indian Society, Diversity and Pluralism

Challenges — UPSC Perspective

Issue	Concern
Constitutional Validity	The Bill's attempt to grant statutory status to Vande Mataram conflicts with the Constituent Assembly's decision to withhold such status.
Freedom of Speech	The Bill risks encroaching upon Article 19(1)(a) by criminalising conduct related to Vande Mataram.
Judicial Scrutiny	The Bill may invite judicial review, particularly in light of the Supreme Court's emphasis on proportionality in restricting fundamental rights.
Political Consensus	The opposition by CPI(M) highlights the lack of political consensus on the Bill, raising questions about its passage.
Pluralism and Identity	The Bill's attempt to impose a uniform interpretation of national symbols may conflict with India's pluralistic ethos.

WAY FORWARD

- The Rajya Sabha must carefully scrutinise the Bill to ensure it does not violate constitutional principles, particularly Articles 14, 19(1)(a), 21, and 25.
- Parliament should consider referring the Bill to a Select Committee for detailed examination, particularly in light of the Constituent Assembly's deliberations.
- The government should clarify the objective of the Bill and demonstrate a clear nexus between the proposed penal provisions and the protection of national honour.
- Civil society and legal experts should be consulted to assess the Bill's impact on fundamental rights and pluralism.
- The Supreme Court's stance on the Bill, once introduced, should be closely monitored, as it may provide clarity on the constitutional validity of the proposed provisions.
- A public debate on the Bill's merits and demerits should be encouraged to foster a broader consensus on the interpretation of national symbols.
- The government should ensure that any penal provisions are proportionate and do not inadvertently restrict legitimate forms of expression or dissent.

UPSC VALUE ADDITION

Keywords for Mains Answer-Writing

Vande Mataram · National Song · Constitution of India · Fundamental Duties (Article 51A) · Prevention of Insults to National Honour Act, 1971 · Freedom of speech (Article 19(1)(a)) · Right to freedom of religion (Article 25) · Right to life and personal liberty (Article 21) · Constituent Assembly debates · *Bijoe Emmanuel v. State of Kerala* (1986) · Secularism · Parliamentary procedure

Constitutional & Policy Linkages

- Article 51A(a): Fundamental Duties—Respect for the Constitution, National Flag, and National Anthem

- Article 14: Right to Equality
- Article 19(1)(a): Freedom of Speech and Expression
- Article 21: Right to Life and Personal Liberty
- Article 25: Freedom of Conscience and Religion

Concept Flow

Introduction of the Bill in Parliament → CPI(M) opposes it under Rule 67 → Constitutional validity questioned → Fundamental Duties and Articles 14, 19(1)(a), 21, 25 invoked → Judicial precedents (Bijoe Emmanuel) cited → Supreme Court's stance on penal consequences reviewed → Debate on pluralism and national identity → Possible referral to Select Committee → Final legislative decision.

PRELIMS PRACTICE QUESTIONS

Q1. Consider the following statements regarding the status of Vande Mataram in the Constitution of India: 1. The Constitution explicitly grants the National Song the same legal protection as the National Anthem. 2. The Constituent Assembly deliberately chose not to accord statutory status to Vande Mataram. 3. Article 51A(a) of the Constitution includes the National Song among the Fundamental Duties. 4. The Prevention of Insults to National Honour Act, 1971, provides penal protection only to the National Anthem. Which of the statements given above are correct?

1. 1 and 2 only
2. 2 and 4 only
3. 1, 2, and 4 only
4. 2, 3, and 4 only

Answer: 2 and 4 only — Statement 1 is incorrect as the Constitution does not grant legal protection to Vande Mataram. Statement 2 is correct, as the Constituent Assembly did not accord statutory status to the National Song. Statement 3 is incorrect, as Article 51A(a) does not mention the National Song. Statement 4 is correct, as the 1971 Act confines penal protection to the National Anthem under Section 3.

Q2. Which of the following judicial principles is most relevant to the debate surrounding the proposed amendment to the Prevention of Insults to National Honour Act, 1971, concerning Vande Mataram?

1. Doctrine of pith and substance
2. Principle of reasonable restrictions under Article 19(2)
3. Doctrine of colourable legislation
4. Balancing of fundamental rights under Article 25(1) and public order

Answer: Balancing of fundamental rights under Article 25(1) and public order — The doctrine of colourable legislation is relevant as it examines whether a legislature has transgressed its constitutional limits by enacting a law under the guise of another. The proposed amendment seeks to alter the constitutional understanding of the National Song's status through ordinary legislation, which may be questioned under this doctrine.

MAINS PRACTICE QUESTION

✍ Critically examine the constitutional validity of the proposed amendment to the Prevention of Insults to National Honour Act, 1971, to extend penal protection to Vande Mataram. In your answer, discuss the historical context of the Constituent Assembly's deliberations, the legal status of the National Song, and the implications for fundamental rights under the Constitution of India.

Approach: The answer should begin by outlining the historical context of the Constituent Assembly's decision to withhold statutory status for Vande Mataram, citing Dr. Rajendra Prasad's statement of 24 January 1950 and the omission of the National Song from Article 51A(a). Next, analyse the legal status of the National Song, distinguishing it from the National Anthem and the National Flag, and highlight the limited scope of the Prevention of Insults to National Honour Act, 1971. Then, evaluate the proposed amendment's compatibility with fundamental rights, particularly freedom of speech (Article 19(1)(a)), right to freedom of religion (Article 25), and right to life and personal liberty (Article 21), while considering the Supreme Court's ruling in *Bijoe Emmanuel v. State of Kerala*. Conclude by assessing whether the amendment violates the doctrine of colourable legislation and the principle of secularism enshrined in the Constitution.

Source: [The Hindu](#)

Polity & Governance

NHRC's Suo Motu Action on Sewer Death in Noida: Human Rights, Occupational Safety, and Urban Governance



Source: [Wikimedia Commons](#) — Ministry of Tourism (GODL-India)

SUBJECT RELEVANCE — WHERE THIS TOPIC FITS

- GS Paper II — Governance, Constitution, Polity, Social Justice and International Relations (Human Rights) | GS Paper III — Environment, Urbanisation, and Occupational Safety
- **Prelims:** National Human Rights Commission (NHRC), Manual Scavenging Act 2013, Prohibition of Employment as Manual Scavengers and their Rehabilitation Act 2013, Occupational Safety, Health and Working Conditions Code 2020, Noida Authority, Sewer Cleaning Protocols, Hazardous Waste (Management, Handling and Transboundary Movement) Rules 2008
- **Essay:** Human dignity and occupational safety: The ethical imperative of protecting vulnerable workers, Urban governance in India: Balancing development with worker rights

Quick Revision: The NHRC's suo motu action underscores the constitutional and statutory imperative to protect sanitation workers from hazardous working conditions, as mandated by the Prohibition of Employment as Manual Scavengers Act, 2013, and the Occupational Safety, Health and Working Conditions Code, 2020.

WHY IS THIS IN THE NEWS?

The National Human Rights Commission (NHRC) has taken suo motu cognisance of media reports alleging that a 28-year-old sanitation worker died in Noida, Gautam Buddha Nagar district, Uttar

Pradesh, after inhaling toxic gases during a sewer cleaning operation conducted by the Noida Authority on 14 July 2026. The incident raises serious concerns regarding the violation of fundamental rights to life, dignity, and safe working conditions under Article 21 of the Constitution, as well as India's obligations under international human rights instruments.

BACKGROUND

- Manual scavenging, though constitutionally and statutorily prohibited, persists in India due to inadequate enforcement and systemic neglect, particularly in urban sanitation infrastructure.
- The Prohibition of Employment as Manual Scavengers and their Rehabilitation Act, 2013, and the Occupational Safety, Health and Working Conditions Code, 2020, mandate stringent safety protocols for workers engaged in hazardous occupations, including sewer cleaning.
- The National Human Rights Commission (NHRC), established under the Protection of Human Rights Act, 1993, is empowered to investigate human rights violations suo motu or on complaints, and recommend remedial measures.
- Uttar Pradesh, with significant urbanisation pressures in districts like Gautam Buddh Nagar (Noida), faces recurrent challenges in ensuring safe and dignified working conditions for sanitation workers.
- The incident reflects broader systemic failures in urban governance, where development imperatives often overshadow worker welfare and regulatory compliance.
- India's obligations under international human rights law, including the International Covenant on Economic, Social and Cultural Rights (ICESCR), require the state to ensure safe and healthy working conditions.

WHAT IS THE LEGAL AND INSTITUTIONAL FRAMEWORK GOVERNING SEWER CLEANING AND WORKER SAFETY IN INDIA?

- The Prohibition of Employment as Manual Scavengers and their Rehabilitation Act, 2013, prohibits the employment of individuals in manual scavenging and mandates the use of mechanised cleaning methods.
- The Occupational Safety, Health and Working Conditions Code, 2020, consolidates and strengthens provisions related to hazardous occupations, including sewer cleaning, by requiring employers to provide personal protective equipment (PPE), conduct risk assessments, and ensure emergency response protocols.
- The National Human Rights Commission (NHRC), under the Protection of Human Rights Act, 1993, has the mandate to investigate human rights violations suo motu or on complaints, and recommend measures for redressal, including compensation and policy reforms.
- State governments and urban local bodies are constitutionally responsible for ensuring safe working conditions under the Directive Principles of State Policy and the Fundamental Right to Life (Article 21).
- The Supreme Court, in its landmark judgment in *Safai Karamchari Andolan v. Union of India* (2014), directed the rehabilitation of manual scavengers and the use of mechanised cleaning methods, yet compliance remains inadequate.

- The National Safai Karamchari Finance and Development Corporation (NSKFDC) provides financial assistance for the rehabilitation of manual scavengers, but systemic barriers persist in accessing these benefits.

KEY FEATURES

Feature	Significance
Self-initiation by NHRC	Demonstrates NHRC's proactive role in monitoring human rights violations without awaiting formal complaints, ensuring timely intervention.
Death due to toxic gas exposure in sewer cleaning	Highlights the occupational hazard faced by sanitation workers, often working in hazardous conditions without adequate safety measures.
Alleged lack of protective equipment	Indicates systemic failure in compliance with safety protocols, violating fundamental rights to life and dignity under Article 21.
Two-week deadline for detailed report	Reflects NHRC's urgency in addressing the matter and holding authorities accountable for lapses.
Involvement of police and fire brigade in rescue	Underscores the multi-agency response required in such incidents, yet insufficient to prevent fatality.

WHY IT MATTERS

Human Rights and Constitutional Dimensions

- The incident underscores the violation of Article 21 (Right to Life and Personal Liberty) of the Constitution, which includes the right to a safe working environment.
- NHRC's suo motu cognisance reinforces the constitutional mandate under Article 32 (Right to Constitutional Remedies) to protect fundamental rights.
- The case exemplifies the intersection of occupational safety with human dignity, a core principle of the Directive Principles of State Policy (Article 39(e)).

Governance and Accountability

- The incident raises questions about the efficacy of municipal governance in urban areas, particularly in ensuring compliance with safety regulations.
- NHRC's notice to NOIDA Authority and police commissioner signals a demand for institutional accountability and transparency.
- The case highlights the need for robust monitoring mechanisms to prevent such tragedies in rapidly urbanising regions like NOIDA.

Urban Sanitation and Worker Welfare

- The death of a sanitation worker during sewer cleaning reflects the precarious conditions of manual scavenging, despite legal prohibitions under the Prohibition of Employment as Manual Scavengers and their Rehabilitation Act, 2013.
- The incident underscores the urgent need for mechanisation and automation in urban sanitation to reduce human exposure to hazardous environments.
- It also highlights the lack of awareness and enforcement of safety protocols among municipal bodies and contractors.

CHALLENGES

1. Occupational Safety and Health Risks for Sanitation Workers

- Sanitation workers face chronic exposure to toxic gases (e.g., hydrogen sulphide, methane) in sewers, leading to acute and long-term health risks.
- Inadequate provision of personal protective equipment (PPE) and training exacerbates the vulnerability of workers.
- The informal nature of employment in sanitation sectors often denies workers access to legal protections and social security benefits.

UPSC Link: GS-II: Labour and Social Security

2. Institutional Failure in Urban Governance

- Municipal bodies like NOIDA Authority often prioritise cost-efficiency over worker safety, leading to non-compliance with safety regulations.
- Lack of coordination between municipal authorities, police, and emergency services delays rescue operations and worsens outcomes.
- Weak enforcement of the Prohibition of Employment as Manual Scavengers and their Rehabilitation Act, 2013, perpetuates hazardous working conditions.

UPSC Link: GS-II: Urban Governance

3. Human Rights Violations and NHRC's Role

- NHRC's suo motu cognisance is commendable but highlights systemic gaps in proactive human rights monitoring at the ground level.
- The case reflects the challenge of translating constitutional guarantees into tangible protections for marginalised workers.
- NHRC's limited coercive powers in enforcing its directives may undermine its effectiveness in preventing such incidents.

UPSC Link: GS-II: Fundamental Rights and NHRC

4. Urbanisation and Sanitation Infrastructure Gaps

- Rapid urbanisation in regions like NOIDA outpaces the development of safe and modern sanitation infrastructure.
- Inadequate investment in mechanised sewer cleaning and waste management systems forces reliance on manual labour in hazardous conditions.
- The incident underscores the need for integrated urban planning that prioritises worker safety and sustainable infrastructure.

UPSC Link: GS-I: Urbanisation

Challenges — UPSC Perspective

Issue	Concern
Lack of PPE for sanitation workers	Direct violation of safety regulations and constitutional right to life (Article 21).

Issue	Concern
Non-compliance with safety protocols	Systemic failure in municipal governance and enforcement of labour laws.
Delayed emergency response	Inadequate coordination between agencies exacerbates the fatality.
Inadequate mechanisation of sanitation work	Over-reliance on manual labour in hazardous environments.
Weak enforcement of manual scavenging laws	Perpetuation of hazardous working conditions despite legal prohibitions.

WAY FORWARD

- Enforce mandatory provision of PPE and safety training for all sanitation workers, with regular inspections by labour authorities.
- Accelerate the mechanisation of sewer cleaning and waste management in urban areas to reduce human exposure to hazardous environments.
- Strengthen the implementation of the Prohibition of Employment as Manual Scavengers and their Rehabilitation Act, 2013, with strict penalties for non-compliance.
- Establish a multi-agency task force comprising municipal bodies, police, and health departments to monitor and respond to such incidents proactively.
- Conduct periodic audits of urban sanitation infrastructure to identify and mitigate safety risks for workers.
- Raise awareness among sanitation workers about their rights and available legal recourse in case of violations.
- Ensure rehabilitation and compensation for the families of victims of such occupational hazards, as mandated by law.

UPSC VALUE ADDITION

Keywords for Mains Answer-Writing

Manual Scavenging · Prohibition of Employment as Manual Scavengers and their Rehabilitation Act, 2013 · National Human Rights Commission (NHRC) · Right to Life and Dignity under Article 21 · Sewer Cleaning Safety Protocols · Occupational Safety and Health (OSH) Regulations · Human Rights Violations in Urban Governance · Sustainable Urban Sanitation Practices · Constitutional and Statutory Safeguards for Workers · Accountability in Municipal Corporations

Constitutional & Policy Linkages

- Article 21: Right to Life and Personal Liberty (includes safe working conditions)
- Article 39(e): Directive Principle (State to ensure workers' health and safety)

Concept Flow

Rapid urbanisation in NOIDA → Increased demand for sanitation services → Reliance on manual labour in hazardous conditions → Inadequate safety measures by municipal

authorities → Death of sanitation worker due to toxic gas exposure → NHRC's suo motu cognisance → Demand for accountability and reforms → Need for mechanisation and enforcement of safety laws.

PRELIMS PRACTICE QUESTIONS

Q1. Which constitutional provision is most directly violated when a worker dies due to inhalation of toxic gases while cleaning sewers without adequate safety equipment?

1. Article 14 (Right to Equality)
2. Article 19 (Freedom of Profession)
3. Article 21 (Right to Life and Personal Liberty)
4. Article 32 (Right to Constitutional Remedies)

Answer: Article 21 (Right to Life and Personal Liberty) — Article 21 guarantees the right to life and personal liberty, which includes the right to a safe and dignified working environment. Death due to negligence in occupational safety directly contravenes this fundamental right.

Q2. Under the Prohibition of Employment as Manual Scavengers and their Rehabilitation Act, 2013, which authority is empowered to prohibit hazardous manual cleaning of sewers?

1. State Pollution Control Boards
2. District Magistrates
3. National Human Rights Commission
4. National Safai Karamchari Commission

Answer: National Safai Karamchari Commission — The National Safai Karamchari Commission (NSKF) is mandated under the Act to monitor compliance, investigate violations, and recommend action against manual scavenging, including hazardous sewer cleaning.

Q3. Which of the following is NOT a statutory requirement for sewer cleaning operations in India?

1. Provision of gas detectors and safety harnesses
2. Mandatory medical examination of workers
3. Compulsory use of manual labour for sewer cleaning
4. Training in emergency response procedures

Answer: Compulsory use of manual labour for sewer cleaning — The Prohibition of Employment as Manual Scavengers Act, 2013, explicitly prohibits manual cleaning of sewers and requires mechanised or protective equipment-based cleaning. Medical examinations and training are required, but not manual labour.

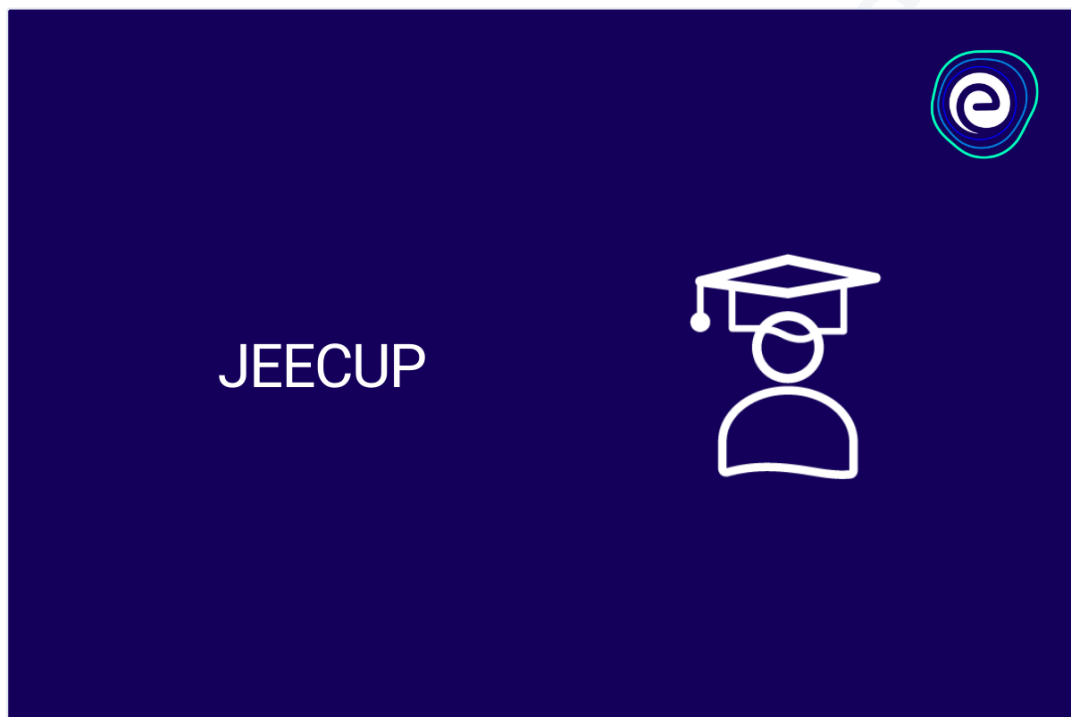
MAINS PRACTICE QUESTION

✍ The death of a sanitation worker in Noida due to toxic gas inhalation during sewer cleaning highlights systemic failures in urban governance and worker safety. Critically examine the legal, institutional, and ethical dimensions of this incident, and suggest measures to prevent such tragedies in the future.

Approach: Begin by outlining the constitutional and statutory framework governing worker safety, particularly the Right to Life under Article 21 and the Prohibition of Employment as Manual Scavengers Act, 2013. Analyse the institutional failures, including the role of municipal authorities, NHRC's suo motu cognisance, and the lack of adherence to Occupational Safety and Health (OSH) standards. Examine the ethical dimensions of human dignity and state responsibility. Conclude with actionable recommendations such as strict enforcement of safety protocols, mechanisation of sewer cleaning, rehabilitation of affected workers, and strengthening of monitoring mechanisms like the National Safai Karamchari Commission.

Source: [PIB \(Press Information Bureau\)](#)

JEECUP Round 3 Seat Allotment 2026: Critical Steps for UP Polytechnic Admissions and Implications for Technical Education Policy



Source: [Wikimedia Commons](#) — Viswanathan09 (CC BY-SA 4.0)

SUBJECT RELEVANCE — WHERE THIS TOPIC FITS

- GS Paper II — Governance, Transparency and Accountability in Public Institutions | GS Paper III — Skill Development and Employment Generation
- **Prelims:** JEECUP, UP Polytechnic e-Counselling, seat allotment, document verification, seat acceptance fee, technical education policy, polytechnic institutes, diploma admissions
- **Essay:** The Role of Skill Development in India's Demographic Dividend: A Case Study of Uttar Pradesh's Polytechnic Sector, Public-Private Partnerships in Technical Education: Balancing Access, Quality, and Equity

Quick Revision: Candidates must complete seat acceptance fee payment (July 21–23, 2026) and document verification (till July 24, 2026) to secure their provisional admission in UP Polytechnic Institutes for the 2026–27 academic session.

WHY IS THIS IN THE NEWS?

The Joint Entrance Examination Council, Uttar Pradesh (JEECUP) is scheduled to release the Round 3 seat allotment result for UP Polytechnic Admissions 2026 on July 20, 2026. The process underscores the operational efficiency of state-level technical education counselling systems and highlights the importance of timely document verification and fee payment in ensuring seamless admissions.

BACKGROUND

- The JEECUP is a state-level entrance examination conducted annually by the Uttar Pradesh Government to facilitate admissions into diploma, post-diploma, and postgraduate diploma programmes in engineering, technology, and other allied fields.
- The e-Counselling process for UP Polytechnic Admissions 2026 commenced with Round 1 seat allotment in June 2026, followed by Round 2 in July 2026, with Round 3 now being the final phase before the academic session begins on August 1, 2026.
- Uttar Pradesh, with over 1,000 polytechnic institutes, plays a critical role in India's technical education ecosystem, contributing significantly to the country's skilled workforce in sectors such as manufacturing, IT, and infrastructure.
- Document verification at district help centres is a mandatory step to prevent malpractices and ensure the authenticity of candidates' credentials.

WHAT IS JEECUP SEAT ALLOTMENT AND WHY DOES IT MATTER?

- JEECUP Seat Allotment is a multi-phase online counselling process conducted by the Joint Entrance Examination Council, Uttar Pradesh (JEECUP), to allocate seats in diploma and post-diploma programmes across polytechnic institutes in the state.
- The process is structured into multiple rounds (typically 3–4), with each round allowing candidates to either accept the allotted seat, upgrade their choice, or withdraw from the process based on their preferences and merit rank.
- Seat allotment is determined by the candidate's rank in the JEECUP entrance examination, their preferred choices of institutes and courses, and the availability of seats as per category-wise reservation policies (e.g., General, OBC, SC, ST, EWS).
- Upon seat allotment, candidates must pay a non-refundable seat acceptance fee within a stipulated timeframe to confirm their provisional admission.
- Document verification is a critical step post-seat allotment, where candidates must physically present original certificates (e.g., Class 10 mark sheet, caste certificate, domicile proof) at designated district help centres to validate their eligibility.
- Failure to complete document verification or pay the seat acceptance fee within the specified deadlines results in the forfeiture of the allotted seat, necessitating participation in subsequent rounds or alternative admission pathways.
- The final academic session for diploma courses in UP Polytechnic Colleges commences on August 1, 2026, with institutions required to adhere to the AICTE's academic calendar and curriculum guidelines.

UPSC VALUE ADDITION

Keywords for Mains Answer-Writing

JEECUP · UP Polytechnic Admissions 2026 · Joint Entrance Examination Council Uttar Pradesh · e-Counselling · Diploma Admissions · Seat Allotment Process · Document Verification · Polytechnic Institutes · Vocational Education · Technical Education Policy · State-Level Entrance Examinations · Counselling Rounds

PRELIMS PRACTICE QUESTIONS

Q1. Which of the following is NOT a step in the JEECUP Round 3 seat allotment process for UP Polytechnic Admissions 2026?

1. A. Online payment of seat acceptance fee
2. B. Physical document verification at district help centres
3. C. Submission of NEET UG scorecard
4. D. Withdrawal of allocated seat on July 25, 2026

Answer: C. Submission of NEET UG scorecard — The JEECUP seat allotment process involves online seat acceptance fee payment, physical document verification, and seat withdrawal, but does not require submission of NEET UG scorecards, as JEECUP is a separate examination for polytechnic admissions.

Q2. The JEECUP Round 3 seat allotment result for UP Polytechnic Admissions 2026 is expected to be declared on:

1. A. July 15, 2026
2. B. July 20, 2026
3. C. July 25, 2026
4. D. August 1, 2026

Answer: B. July 20, 2026 — According to the official announcement, the JEECUP Round 3 seat allotment result is likely to be declared on July 20, 2026.

Q3. Which of the following is a mandatory requirement for candidates allotted seats in JEECUP Round 3 to confirm their provisional admission?

1. A. Submission of caste certificate
2. B. Payment of seat acceptance fee
3. C. Appearance in NEET UG
4. D. Registration in CUET

Answer: B. Payment of seat acceptance fee — Candidates allotted seats in JEECUP Round 3 must pay the seat acceptance fee online within the specified dates to validate their provisional admission.

MAINS PRACTICE QUESTION

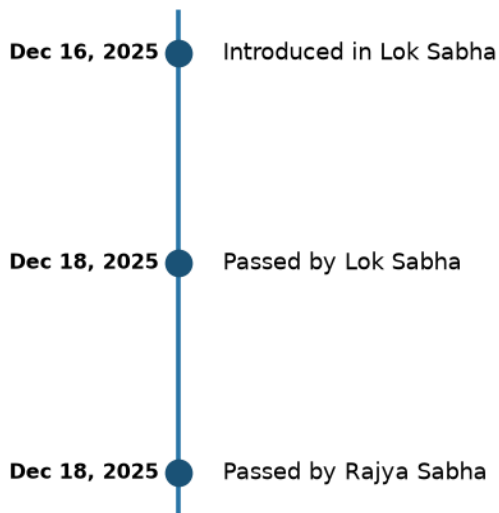
✍️ Examine the significance of state-level entrance examinations like JEECUP in fostering vocational and technical education in India. How does the e-counselling process enhance accessibility and transparency in admissions? Suggest measures to further improve the efficiency of such systems.

Approach: Begin by highlighting the role of JEECUP in providing equitable access to polytechnic education in Uttar Pradesh. Discuss how e-counselling streamlines the admission process, reduces paperwork, and ensures transparency through real-time seat allotment. Then, evaluate the challenges such as digital divide, last-minute seat withdrawals, and document verification bottlenecks. Conclude with actionable recommendations like expanding digital infrastructure, integrating AI-driven counselling support, and decentralising verification centres to improve efficiency and inclusivity.

Source: [Times of India](#)

VB-GRAM G Bill, 2025: Evolution of Rural Employment Guarantee Framework and Its Implications for India's Development Trajectory

VB-G RAM G Bill 2025 Legislative Journey



VB-G RAM G Bill 2025 Legislative Journey

SUBJECT RELEVANCE — WHERE THIS TOPIC FITS

- GS Paper II — Governance, Constitution, Polity, Social Justice and International Relations | GS Paper III — Agriculture, Rural Development, Employment, Infrastructure, and Inclusive Growth
- **Prelims:** MGNREGA, Viksit Bharat Mission, Guaranteed Employment, Unemployment Allowance, Centrally Sponsored Scheme, PM Gati Shakti, Gram Panchayat, Water Security, Rural Infrastructure, Climate Resilience

- **Essay:** The Role of Rural Employment Guarantee Schemes in India's Socio-Economic Transformation, Balancing Economic Growth with Inclusive Development: Lessons from India's Employment Policies

Quick Revision: The VB-GRAM G Bill, 2025, replaces MGNREGA with a 125-day employment guarantee, shifts to a 60:40 (90:10 for NE/Himalayan states) fund-sharing model, mandates a 60-day agricultural pause, and aligns works with PM Gati Shakti and climate resilience priorities.

WHY IS THIS IN THE NEWS?

The Viksit Bharat—Guarantee for Rozgar and Aajeevika Mission (Gramin) (VB-GRAM G) Bill, 2025, introduced in the Lok Sabha on December 16, 2025, and passed by both Houses on December 18, 2025, represents a significant legislative overhaul of India's flagship rural employment guarantee scheme. By replacing the Mahatma Gandhi National Rural Employment Guarantee Act, 2005 (MGNREGA), the Bill introduces structural changes in employment guarantees, fund-sharing mechanisms, thematic priorities, and implementation frameworks, thereby warranting critical analysis for its potential impact on rural livelihoods, fiscal federalism, and sustainable development.

BACKGROUND

- The Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA), enacted in 2005, was a landmark legislation aimed at enhancing livelihood security in rural areas through guaranteed wage employment for at least 100 days per household in a financial year.
- MGNREGA has been instrumental in reducing rural distress, improving asset creation, and empowering gram panchayats through decentralised planning and implementation.
- Over the years, MGNREGA has faced challenges such as delays in wage payments, underutilisation of funds, and limited convergence with other development schemes, necessitating reforms.
- The Bill's introduction aligns with the broader policy thrust of the Viksit Bharat 2047 vision, which emphasises employment generation, rural transformation, and climate-resilient development.
- The Bill reflects a shift towards integrating employment guarantees with broader national infrastructure and climate adaptation goals, including the PM Gati Shakti National Master Plan.
- The proposed amendments also address fiscal imbalances in the existing fund-sharing mechanism, particularly the burden on state governments for administrative and material costs.

WHAT IS THE VIKSIT BHARAT—GUARANTEE FOR ROZGAR AND AJEEVIKA MISSION (GRAMIN) (VB-GRAM G) BILL, 2025?

- The VB-GRAM G Bill, 2025, is a legislative proposal to replace the Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA), 2005, with a new framework for guaranteed rural employment and livelihood support.
- The Bill increases the guaranteed days of employment from 100 to 125 days per rural household per financial year, enhancing the scope of wage employment opportunities.

- It mandates the provision of an unemployment allowance if employment is not provided within 15 days of application, retaining a key feature of MGNREGA to ensure accountability.
- The Bill amends the fund-sharing to provide that the scheme will be implemented as a centrally sponsored scheme, and the fund-sharing pattern will be 60:40 for all states other than the North-eastern and the Himalayan.
- State governments are required to notify a scheme consistent with the Bill within six months of its commencement, ensuring alignment with local priorities while adhering to national guidelines.
- The Bill introduces a mandatory pause in works during peak agricultural seasons, up to 60 days per financial year, to prevent labour diversion from agricultural activities and ensure seasonal food security.
- The Bill retains gram panchayats as the nodal agencies for project identification and planning but integrates these plans with the PM Gati Shakti National Master Plan for multi-modal connectivity and infrastructure development.
- State governments are required to bear any expenditure exceeding the normative allocation determined by the central government, incentivising efficient planning and utilisation of resources.

KEY FEATURES

Feature	Significance
Increased employment guarantee	Raises the guaranteed days of unskilled manual work from 100 to 125 per rural household per financial year, enhancing income security for rural labourers.
Unemployment allowance provision	Retains the MGNREGA mechanism of unemployment allowance if employment is not provided within 15 days, ensuring accountability in implementation.
Centrally sponsored scheme framework	Shifts the scheme to a centrally sponsored model with a revised fund-sharing ratio of 60:40 (90:10 for North-eastern and Himalayan states), reducing state fiscal burden for wage and material costs.
State-wise normative allocation	Central government determines state-wise allocations based on prescribed parameters, ensuring equitable distribution and preventing arbitrary fund utilisation.
Agricultural season pause	Mandates a 60-day annual pause in works during peak agricultural seasons (sowing/harvesting), aligning rural employment schemes with agricultural cycles to avoid labour shortages.
Thematic focus domains	Projects under the scheme must align with four domains: water security, rural infrastructure, livelihood-related infrastructure, and extreme weather mitigation, ensuring sustainable rural development.

WHY IT MATTERS

Economic Implications

- Enhances rural purchasing power by guaranteeing additional 25 days of employment, potentially boosting local economies and reducing distress migration.

- Increases state participation in funding while maintaining central oversight, balancing fiscal federalism and ensuring uniform implementation standards.
- Thematic focus on water security and climate resilience aligns with India's commitment to Sustainable Development Goals (SDGs), particularly SDG 6 (Clean Water and Sanitation) and SDG 13 (Climate Action).

Social Development

- Strengthens social safety nets for rural households, particularly marginalised groups, by expanding employment guarantees and reducing vulnerability to economic shocks.
- Integrates livelihood infrastructure with PM Gati Shakti National Master Plan, fostering multi-modal connectivity and reducing rural-urban disparities.
- Mandated agricultural season pause prevents labour diversion during critical farming phases, safeguarding agricultural productivity and food security.

Institutional Reforms

- Shifts from a demand-driven to a centrally sponsored scheme, enhancing predictability in fund flows and reducing implementation delays.
- Centralised normative allocations and thematic project domains standardise outcomes across states, improving transparency and accountability.
- Integration with PM Gati Shakti ensures alignment with national infrastructure priorities, avoiding duplication of efforts.

Environmental Sustainability

- Focus on water security and extreme weather mitigation supports climate-resilient agriculture, aligning with India's Nationally Determined Contributions (NDCs) under the Paris Agreement.
- Projects under the scheme can include afforestation, soil conservation, and drought-proofing measures, contributing to environmental sustainability.

CHALLENGES

1. Fiscal Federalism and State Capacity

- Revised fund-sharing ratios may strain state finances, particularly for non-special-category states, necessitating robust fiscal planning and resource mobilisation.
- State governments must notify schemes within six months, requiring administrative agility and capacity-building to avoid implementation gaps.

UPSC Link: GS-II: Centre-State Relations

2. Implementation and Monitoring Gaps

- Historical challenges under MGNREGA, such as delayed wage payments and corruption, require strengthened grievance redressal and digital monitoring mechanisms.
- Thematic focus on four domains may lead to arbitrary project selection if not backed by rigorous technical assessments and community participation.

UPSC Link: GS-II: Government Policies and Interventions

3. Agricultural Season Pause and Labour Dynamics

- Defining 'peak agricultural seasons' uniformly across states is complex due to regional agro-climatic variations, risking misalignment with local labour demands.
- A 60-day pause may not suffice for all agricultural activities, particularly in regions with multiple cropping seasons or extended harvest periods.

UPSC Link: GS-III: Agriculture

4. Equity and Inclusion

- Ensuring that marginalised groups (SC/ST, women, landless labourers) benefit proportionally from the expanded employment guarantee requires targeted interventions and monitoring.
- Normative allocations based on central parameters may not account for local socio-economic disparities, risking underfunding in backward districts.

UPSC Link: GS-II: Welfare Schemes

5. Sustainability of Funding

- The scheme's long-term fiscal sustainability depends on economic growth and tax buoyancy, particularly if central allocations are not indexed to inflation or GDP growth.
- State governments may face pressure to divert funds from other rural development schemes to meet their share, leading to unintended trade-offs.

UPSC Link: GS-III: Indian Economy

Challenges — UPSC Perspective

Issue	Concern
Delayed wage payments	Undermines the scheme's objective of providing timely income support, eroding trust among beneficiaries.
Arbitrary project selection	Risk of prioritising quantity over quality, leading to suboptimal outcomes in water security or rural infrastructure.
State fiscal constraints	Non-special-category states may struggle to meet their 40% share, delaying scheme rollout or reducing coverage.
Administrative capacity gaps	State governments may lack the institutional framework to notify schemes or monitor progress within the six-month deadline.
Regional agro-climatic mismatches	Uniform 60-day pause may not align with local agricultural calendars, causing labour shortages or underutilisation of funds.
Monitoring and grievance redressal	Weak digital infrastructure in rural areas may hinder real-time tracking of works and timely resolution of disputes.

GOVERNMENT INITIATIVES — MUST-MEMORISE FOR PRELIMS

- Mahatma Gandhi National Rural Employment Guarantee Act, 2005 (MGNREGA)
- PM Gati Shakti National Master Plan

WAY FORWARD

- Constitute a high-level inter-ministerial committee to finalise state-wise normative allocations and thematic project guidelines within three months.
- Strengthen the National Rural Employment Guarantee Council (NREGC) with enhanced monitoring powers and digital tools for real-time data tracking.
- Launch a capacity-building programme for state officials on scheme implementation, fund utilisation, and grievance redressal mechanisms.
- Integrate the scheme with existing rural development programmes (e.g., PM-KISAN, PMGSY) to avoid duplication and maximise synergies.
- Establish a transparent public dashboard to display fund flows, project status, and beneficiary data, ensuring accountability and citizen oversight.
- Pilot the scheme in 10 districts with high rural unemployment and agrarian distress to refine implementation before nationwide rollout.
- Conduct periodic impact assessments to evaluate employment generation, asset creation, and socio-economic outcomes, feeding findings into policy revisions.
- Align state-level schemes with local agro-climatic calendars to ensure the 60-day pause does not disrupt agricultural labour markets.

UPSC VALUE ADDITION

Keywords for Mains Answer-Writing

Viksit Bharat – Guarantee for Rozgar and Aajeevika Mission (Gramin) · VB-G RAM G Bill 2025 · MGNREGA replacement · rural employment guarantee · centrally sponsored scheme · rural infrastructure development · water security · PM Gati Shakti National Master Plan · unemployment allowance · agricultural season pause in MGNREGA · fund-sharing pattern in rural schemes · mitigation of extreme weather events

Constitutional & Policy Linkages

- Article 243G: Empowers Panchayats to prepare plans for economic development and social justice, aligning with the scheme's grassroots planning framework.

Concept Flow

Rural unemployment and agrarian distress → MGNREGA's limitations (100-day guarantee) → Introduction of VB-G RAM G Bill (125-day guarantee) → Shift to centrally sponsored scheme (60:40 funding) → Thematic focus (water security, infrastructure, climate resilience) → Integration with PM Gati Shakti → State-wise normative allocations → Agricultural season pause → Enhanced monitoring and grievance redressal → Sustainable rural development and climate adaptation.

PRELIMS PRACTICE QUESTIONS

Q1. Which of the following provisions is NOT a feature of the Viksit Bharat – Guarantee for Rozgar and Aajeevika Mission (Gramin) Bill, 2025?

1. A. Increase in guaranteed days of employment from 100 to 125
2. B. Implementation as a centrally sponsored scheme with a 60:40 fund-sharing ratio for general states
3. C. Mandatory provision of unemployment allowance if employment is not provided within 15 days
4. D. Complete centralisation of fund allocation without state participation

Answer: D. Complete centralisation of fund allocation without state participation — The Bill retains state participation in funding and administration, including payment of unemployment allowance and compensation. Option D incorrectly suggests complete centralisation, which contradicts the Bill's provisions.

Q2. Under the VB-G RAM G Bill, 2025, the fund-sharing pattern between the central government and state governments for general states is:

1. A. 50:50
2. B. 60:40
3. C. 75:25
4. D. 90:10

Answer: B. 60:40 — The Bill specifies a 60:40 fund-sharing ratio for general states, with 90:10 for North-eastern and Himalayan states. This is a key amendment to the existing MGNREGA funding structure.

Q3. The VB-G RAM G Bill, 2025 mandates a pause in works during agricultural seasons for a maximum period of:

1. A. 30 days
2. B. 45 days
3. C. 60 days
4. D. 90 days

Answer: C. 60 days — The Bill requires state governments to announce a period of up to 60 days during peak agricultural seasons when works under the scheme will not be undertaken.

MAINS PRACTICE QUESTION

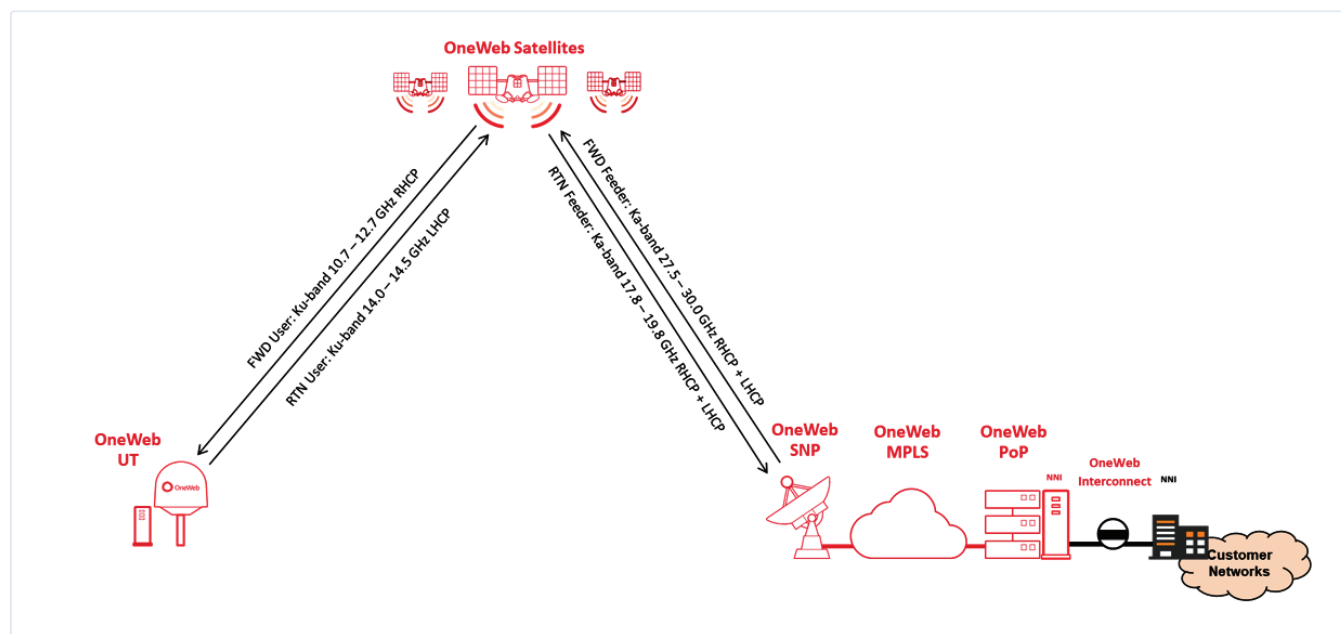
✍ Critically examine the significance of the Viksit Bharat – Guarantee for Rozgar and Aajeevika Mission (Gramin) Bill, 2025, in the context of rural employment and agricultural productivity. How does it address the limitations of MGNREGA while aligning with broader developmental goals such as the PM Gati Shakti National Master Plan?

Approach: Begin by outlining the key provisions of the Bill, such as the increase in guaranteed employment days, fund-sharing structure, and thematic focus on water security and rural infrastructure. Highlight how these provisions aim to enhance rural livelihoods and reduce unemployment. Critically analyse the Bill's

approach to agricultural season pauses, assessing its potential impact on both employment and agricultural productivity. Finally, discuss the Bill's integration with the PM Gati Shakti National Master Plan, evaluating its role in fostering sustainable rural development and aligning with national infrastructure priorities.

Source: [PRS Legislative Research](#)

ISRO's LVM3 M3/OneWeb India-2 Mission: Strategic Significance and Technological Advancements in India's Space Sector



Source: [Wikimedia Commons](#) — Indian Space Research Organisation (ISRO-India)

SUBJECT RELEVANCE — WHERE THIS TOPIC FITS

- GS Paper III — Science and Technology — Developments and their Applications and Effects in Everyday Life | GS Paper III — Economy — Infrastructure: Energy, Ports, Roads, Airports, Railways etc. | GS Paper III — Economy — Investment Models
- **Prelims:** LVM3, OneWeb, NSIL, LEO constellation, Gaganyaan, S200 motors, SDSC-SHAR, orbital inclination
- **Essay:** India's emergence as a global space power: From cost-effective launches to strategic partnerships, The role of public-private partnerships in advancing India's space economy

Quick Revision: The LVM3 M3/OneWeb India-2 mission underscores India's strategic capability in executing high-precision commercial satellite launches, with the upgraded S200 motors serving as a critical technology demonstrator for the Gaganyaan mission.

WHY IS THIS IN THE NEWS?

The successful launch of ISRO's LVM3 M3/OneWeb India-2 mission on March 26, 2023, marks a critical milestone in India's commercial space sector, demonstrating the operational readiness of the LVM3 launch vehicle for multi-satellite deployments to Low Earth Orbit (LEO). This mission, executed by NewSpace India Limited (NSIL) under a commercial contract with OneWeb, underscores India's growing prominence in the global satellite launch market and its capacity to

support international constellations. The mission also highlights technological refinements in the LVM3, particularly the upgraded S200 solid rocket boosters, which are integral to future human spaceflight missions like Gaganyaan.

BACKGROUND

- The Launch Vehicle Mark-3 (LVM3), formerly known as the Geosynchronous Satellite Launch Vehicle Mark III (GSLV Mk III), is ISRO's heaviest operational launch vehicle, designed to carry payloads up to 10 tonnes to LEO and 4 tonnes to Geosynchronous Transfer Orbit (GTO).
- OneWeb, a London-headquartered company, is deploying a LEO constellation of 648 satellites to provide global broadband internet services, with 618 satellites already launched as of this mission.
- NSIL, ISRO's commercial arm, was established in 2019 to promote and commercially exploit space technologies, including launch services, satellite building, and data products.
- India's space sector has seen a strategic shift towards commercialization, with policies like the Space Activities Bill (2017) and the creation of IN-SPACe (Indian National Space Promotion and Authorisation Centre) to facilitate private sector participation.
- The Gaganyaan mission, India's first human spaceflight program, relies on the LVM3's upgraded capabilities, including the S200 motors, for crewed missions.

WHAT IS THE LVM3 M3/ONEWEB INDIA-2 MISSION?

- The LVM3 M3/OneWeb India-2 mission was a commercial launch conducted by ISRO's commercial arm, NewSpace India Limited (NSIL), under a contract with OneWeb to deploy 36 satellites into LEO.
- The mission utilized the LVM3 launch vehicle, India's heaviest operational rocket, to place 36 OneWeb satellites into a 450 km circular orbit with an inclination of 87.4 degrees.
- The total payload mass for this mission was 5,805 kg, consisting of 36 OneWeb satellites, each weighing approximately 150 kg.
- The mission involved a sophisticated orbital maneuver by the C25 cryogenic upper stage, which oriented itself in orthogonal directions to inject satellites in batches of four over nine phases, ensuring collision avoidance.
- The satellites were injected into orbit in the twentieth minute of flight.
- The upgraded S200 solid rocket boosters, with enhanced performance margins, were used in this mission, aligning with the requirements for the upcoming Gaganyaan human spaceflight mission.
- This mission marked OneWeb's second satellite deployment from India, following the LVM3 M2/OneWeb India-1 mission in October 2022, highlighting the strengthening of India's role in the global space economy.
- The successful execution of this mission reinforced ISRO's and NSIL's credibility in executing complex commercial launches, particularly for international clients.

KEY FEATURES

Feature	Significance
LVM3 (Launch Vehicle Mark-3)	A three-stage heavy-lift launch vehicle of ISRO, designed for GTO and LEO missions, with a proven track record in consecutive successful flights.
OneWeb India-2 Mission	The sixth consecutive successful flight of LVM3, demonstrating ISRO's reliability in commercial satellite deployment for global clients.
36-Satellite Deployment	A complex orbital injection sequence executed with precision to avoid collision, showcasing advanced maneuverability of the C25 cryogenic stage.
450 km Circular Orbit	The designated Low Earth Orbit for OneWeb's constellation, optimised for global broadband connectivity with minimal latency.
NSIL-ISRO Partnership	A commercial model where NSIL, ISRO's commercial arm, executes contracts for foreign satellite launches, enhancing India's space economy.
Upgraded S200 Motors	Enhanced solid rocket boosters with higher performance margins, critical for future missions including Gaganyaan, ensuring safety and reliability.

WHY IT MATTERS

Economic

- Demonstrates India's growing role in the global space economy by executing commercial satellite launches for international clients like OneWeb.

Technological

- Validates the operational readiness of LVM3 for complex multi-satellite deployments, reinforcing ISRO's position as a reliable launch service provider.

Strategic

- Enhances India's strategic autonomy in space by expanding launch capabilities for foreign payloads, reducing dependence on other space agencies.

Diplomatic

- Strengthens international partnerships in space, particularly with OneWeb, a UK-based satellite communications company, underlining India's credibility in global space collaboration.

Industrial

- Showcases the commercial viability of India's space sector, with NSIL's role in executing foreign contracts, contributing to the Make in India and Atmanirbhar Bharat initiatives.

CHALLENGES

1. Precision Orbital Injection

- Achieving simultaneous deployment of 36 satellites into a 450 km circular orbit with an inclination of 87.4 degrees requires precise timing and spatial separation to avoid collisions.

UPSC Link: [Satellite Launch Vehicles](#)

2. Maneuverability of Cryogenic Stage

- The C25 stage must perform complex reorientation maneuvers to inject satellites in batches, demanding advanced guidance, navigation, and control systems.

UPSC Link: Cryogenic Technology

3. Payload Capacity Management

- Balancing the total payload mass (5,805 kg) while ensuring structural integrity and mission success under varying orbital conditions.

UPSC Link: Launch Vehicle Design

4. Commercial Execution Risks

- Managing contractual obligations with international clients such as OneWeb, including timelines, cost, and reliability, to sustain India's commercial launch market share.

UPSC Link: Space Commercialisation

5. Regulatory and Approval Hurdles

- Navigating domestic and international regulatory frameworks for satellite launches, including spectrum allocation and orbital slot coordination.

UPSC Link: Space Law

Challenges — UPSC Perspective

Issue	Concern
Orbital Collision Risk	Ensuring safe separation of 36 satellites in batches to prevent mutual interference or collision in a congested orbital plane.
Thermal Management	Maintaining optimal temperatures for satellite components during ascent and deployment phases to prevent damage.
Guidance System Precision	Achieving sub-degree accuracy in orbital insertion to meet OneWeb's constellation requirements.
Launch Window Constraints	Adhering to precise launch timings to align with orbital mechanics and client-specific deployment schedules.
Post-Launch Tracking	Continuous monitoring of satellite health and signal acquisition to confirm mission success and operational readiness.

WAY FORWARD

- Enhance the payload capacity of LVM3 to accommodate larger constellations or heavier satellites, aligning with global demand trends.
- Expand NSIL's commercial launch portfolio by securing more contracts for foreign satellite deployments, diversifying revenue streams.
- Invest in advanced guidance and navigation systems for LVM3 to improve orbital insertion precision for complex missions.

- Strengthen international collaborations in space, including joint missions and technology transfers, to bolster India's space diplomacy.
- Develop indigenous satellite components and subsystems to reduce dependency on foreign suppliers and enhance self-reliance.
- Streamline regulatory approvals for commercial launches to reduce lead times and improve competitiveness in the global space market.
- Promote R&D in reusable launch vehicle technology to lower launch costs and improve sustainability in space missions.
- Establish a dedicated spaceport for commercial launches to increase launch frequency and operational efficiency.

UPSC VALUE ADDITION

Keywords for Mains Answer-Writing

ISRO · Launch Vehicle Mark-III (LVM3) · NewSpace India Limited (NSIL) · OneWeb satellites · Low Earth Orbit (LEO) · Gaganyaan mission · Department of Space · commercial satellite launches · satellite constellation · space sector reforms · orbital injection · payload capacity · orbital maneuverability · public-private partnership in space · satellite deployment · space policy and governance

Concept Flow

ISRO's LVM3 achieves sixth consecutive successful flight → Demonstrates reliability and operational readiness for commercial missions. → NSIL executes contract with OneWeb for 72-satellite deployment → Expands India's role in the global space economy. → LVM3 places 36 OneWeb satellites into 450 km circular orbit → Validates advanced orbital injection and maneuverability. → C25 cryogenic stage performs complex reorientation maneuvers → Ensures precise satellite separation and collision avoidance. → OneWeb confirms signal acquisition from all 36 satellites → Mission success confirms operational readiness of India's launch services. → Upgraded S200 motors perform optimally → Enhances confidence in LVM3 for future missions, including Gaganyaan.

PRELIMS PRACTICE QUESTIONS

Q1. Which of the following statements about the LVM3 M3/OneWeb India-2 mission is/are correct?

1. The mission placed 36 OneWeb satellites into a 450 km circular orbit with an inclination of 87.4 degrees. 2. The total payload mass for this mission was 5,805 kg. 3. The C25 stage performed a single-point orbital injection to deploy all satellites simultaneously. 4. This was the first satellite deployment from India for OneWeb.

1. 1 and 2 only
2. 2 and 3 only
3. 1, 2, and 4 only
4. All of the above

Answer: 1 and 2 only — Statements 1 and 2 are correct as per the mission report. Statement 3 is incorrect because the C25 stage performed multiple phases of satellite injection to avoid collisions. Statement 4 is incorrect as this was the second satellite deployment from India for OneWeb.

Q2. Which of the following organisations is responsible for executing commercial satellite launch contracts on behalf of ISRO?

1. Indian Space Research Organisation (ISRO)
2. NewSpace India Limited (NSIL)
3. Department of Space (DoS)
4. Antrix Corporation Limited

Answer: NewSpace India Limited (NSIL) — NewSpace India Limited (NSIL), a public sector enterprise under the Department of Space, is the commercial arm of ISRO and executes launch service contracts for satellite deployment.

MAINS PRACTICE QUESTION

✍ Critically analyse the significance of the LVM3 M3/OneWeb India-2 mission for India's space sector, with particular reference to its implications for commercial satellite launches, indigenous launch vehicle capabilities, and future missions such as Gaganyaan.

Approach: The answer should begin by contextualising the mission within India's broader space programme, highlighting the role of LVM3 as a heavy-lift launch vehicle and its sixth consecutive success. Discuss the commercial significance of the mission, including NSIL's role in executing international contracts and enhancing India's position in the global space economy. Examine the technological advancements demonstrated, such as the C25 stage's orbital maneuverability and payload capacity of 5,805 kg, which are critical for future missions like Gaganyaan. Conclude by linking these achievements to India's space policy reforms, public-private partnerships, and the strategic importance of LEO satellite constellations for global connectivity.

Source: [ISRO](#)

Chandrayaan-3: Lunar Orbit Insertion and the Path to Soft Landing on the Moon



Source: [Wikimedia Commons](#) — Indian Space Research Organisation (ISRO-India)

SUBJECT RELEVANCE — WHERE THIS TOPIC FITS

- GS Paper III — Science and Technology — Developments and their Applications and Effects in Everyday Life
- **Prelims:** Lunar Orbit Insertion (LOI), Perilune, Retro-burning, Soft landing, Lunar South Pole, Chandrayaan-3, ISRO, ISTRAC, IDSN, ESA, JPL
- **Essay:** India's Space Odyssey: From Aryabhata to Chandrayaan-3, The Role of Space Technology in National Development

Quick Revision: Chandrayaan-3's Lunar Orbit Insertion (LOI) was achieved through a retro-burning maneuver at the Perilune, reducing its velocity to enter a stable lunar orbit, a critical step preceding the soft landing scheduled for August 23, 2023.

WHY IS THIS IN THE NEWS?

The successful Lunar Orbit Insertion (LOI) of the Chandrayaan-3 mission marks a critical milestone in India's lunar exploration programme, demonstrating ISRO's technical prowess in precision navigation and orbital mechanics. This achievement underscores the mission's strategic importance in advancing India's capabilities in deep-space missions and positions the country for a historic soft landing near the lunar south pole, a region of significant scientific interest due to the presence of permanently shadowed craters and potential water ice deposits.

BACKGROUND

- Chandrayaan-3 is India's third lunar exploration mission, launched by the Indian Space Research Organisation (ISRO) on July 14, 2023, using the Launch Vehicle Mark-III (LVM3) from the Satish Dhawan Space Centre, Sriharikota.
- The mission follows the Chandrayaan-2 mission, which successfully entered lunar orbit but encountered a hard landing during its final descent phase in September 2019.

- Chandrayaan-3 is designed to demonstrate end-to-end capability in safe landing and roving on the lunar surface, with a focus on the lunar south polar region, a target of global interest due to its scientific and resource potential.
- This mission is part of ISRO's broader strategy to enhance India's presence in deep-space exploration, building on the successes of Chandrayaan-1 (2008) and Chandrayaan-2 (2019).
- The mission's success is being monitored from ISRO's Mission Operations Complex (MOX) at ISTRAC, Bengaluru, with support from the Indian Deep Space Network (IDSN) and international deep-space antenna networks operated by ESA.
- The lunar south pole is of particular interest due to the presence of permanently shadowed regions that may contain water ice, which could support future human missions and provide insights into the solar system's early history.

WHAT IS THE CHANDRAYAAN-3 MISSION?

- Chandrayaan-3 is a follow-on mission to Chandrayaan-2, designed to demonstrate India's capability for safe and soft landing on the lunar surface, as well as roving on the Moon.
- The mission consists of three primary components: a propulsion module, a lander (Vikram), and a rover (Pragyan), collectively aimed at conducting in-situ scientific experiments and mapping the lunar surface.
- The propulsion module will carry the lander and rover to lunar orbit, where it will separate and perform a series of braking maneuvers to achieve a soft landing near the lunar south pole.
- The lander is equipped with advanced sensors and instruments, including a seismometer, thermal probe, and laser retroreflector array, to study lunar seismicity, thermal properties, and surface composition.
- The rover, Pragyan, is designed to traverse the lunar surface, analyse soil samples, and conduct experiments to determine the elemental composition of the lunar regolith.
- The mission's scientific objectives include studying the lunar surface, subsurface, and exosphere, as well as validating technologies required for future interplanetary missions.
- Chandrayaan-3's landing site is located near the lunar south pole at approximately 69.37°S latitude and 32.35°E longitude, an area chosen for its scientific potential and challenging terrain.
- The mission's success will position India as the fourth country to achieve a soft landing on the Moon, following the Soviet Union, the United States, and China.

KEY FEATURES

Feature	Significance
Lunar Orbit Insertion (LOI)	Demonstrates ISRO's capability to precisely navigate and insert spacecraft into lunar orbit, a critical step for soft landing missions.
Retro-burning at Perilune	Ensures controlled deceleration to achieve the desired lunar orbit, reducing orbital energy for subsequent maneuvers.
Orbit of 164 km x 18074 km	Facilitates gradual reduction of orbital altitude through subsequent maneuvers, enabling closer proximity to the lunar surface.

Feature	Significance
Health Monitoring from ISTRAC/IDSN	Real-time tracking and telemetry ensure spacecraft functionality, data integrity, and mission safety through global deep-space networks.
Planned Lunar Bound Maneuvers	Systematic orbital adjustments are essential to position the lander for a soft touchdown in the South Polar region.

WHY IT MATTERS

Scientific Advancement

- Validates ISRO's indigenous capability in lunar orbital mechanics and soft landing technologies, enhancing India's standing in global space exploration.
- Enables high-resolution remote sensing and in-situ analysis of the lunar South Pole, a region of scientific interest due to potential water ice deposits.
- Supports India's participation in future international lunar missions, including Artemis Accords and collaborations with NASA/ESA.

Technological Prowess

- Reinforces India's status as a leading spacefaring nation with cost-effective, high-precision missions, contrasting with traditional space agencies.
- Demonstrates mastery of autonomous navigation, propulsion, and thermal management in deep-space environments.
- Provides a platform for testing indigenous technologies, such as the Vikram lander and Pragyan rover, for future planetary missions.

Strategic Implications

- Bolsters national security by advancing dual-use space technologies, including satellite navigation and surveillance capabilities.
- Strengthens India's geopolitical influence in space diplomacy, particularly in the Indo-Pacific and among Global South nations.
- Reduces dependence on foreign launch services for lunar and deep-space missions, enhancing self-reliance (Atmanirbhar Bharat).

Economic Impact

- Stimulates growth in India's space sector, attracting private investment and fostering innovation in aerospace engineering and manufacturing.
- Creates high-skilled employment opportunities in STEM fields, contributing to India's demographic dividend.
- Enhances India's commercial space capabilities, enabling future participation in the global space economy (e.g., lunar resource utilization).

CHALLENGES

1. Precision Landing in South Polar Region

- The South Pole's rugged terrain and permanently shadowed craters pose significant risks to the lander's structural integrity and mobility.

- Limited sunlight in polar regions challenges solar-powered systems, necessitating robust energy storage and thermal management.
- Real-time communication delays (due to distance) require autonomous hazard detection and avoidance systems.

UPSC Link: GS Paper 3: Science and Technology - Space Technology

2. Autonomous Navigation and Control

- The lander must perform autonomous de-orbiting, braking, and hazard avoidance maneuvers without ground intervention.
- Precision in orbital adjustments is critical to avoid collision with lunar surface features or previous missions' debris.
- Failure in retro-rocketry or guidance systems could result in mission loss, as seen in Chandrayaan-2.

UPSC Link: GS Paper 3: Science and Technology - Space Technology

3. Thermal and Radiation Management

- Extreme temperature variations (from -173°C to 127°C) demand advanced thermal shielding and insulation for spacecraft components.
- High radiation levels in deep space require radiation-hardened electronics to prevent system failures.
- Long mission duration (42 days) increases the risk of cumulative degradation in materials and power systems.

UPSC Link: GS Paper 3: Science and Technology - Space Technology

4. Global Deep-Space Network Coordination

- Reliance on international deep-space antennas (ESA, JPL) introduces dependencies and potential communication bottlenecks.
- Time delays in signal transmission (up to 2.5 seconds) necessitate pre-programmed autonomous operations.
- Coordination with multiple agencies requires robust protocols to avoid interference or data corruption.

UPSC Link: GS Paper 2: International Relations - Space Diplomacy

5. Public and Political Expectations

- High stakes following Chandrayaan-2's partial failure amplify scrutiny and pressure on ISRO's mission success.
- Balancing scientific objectives with national prestige demands meticulous planning and risk mitigation.
- Ensuring transparency and public engagement without compromising mission confidentiality is a diplomatic challenge.

UPSC Link: GS Paper 4: Ethics - Accountability in Science

Challenges — UPSC Perspective

Issue	Concern
Lunar Terrain Ruggedness	Risk of lander damage during touchdown in uncharted South Polar region.
Communication Latency	2.5-second delay in Earth-Moon signal transmission complicates real-time control.
Thermal Extremes	Extensive temperature fluctuations threaten spacecraft electronics and structural integrity.
Autonomous Systems Reliability	Failure in hazard detection or retro-rocketry could lead to mission loss.
International Collaboration Dependencies	Potential delays or conflicts in using ESA/JPL deep-space networks.
Public and Political Pressure	High expectations post-Chandrayaan-2 failure increase operational stress.

WAY FORWARD

- Execute scheduled Lunar Bound Maneuvers (LBN) to progressively lower Chandrayaan-3's orbit to 100 km x 100 km.
- Conduct detailed hazard mapping of the South Polar region using high-resolution orbiter data to identify safe landing zones.
- Test and validate the lander's autonomous hazard avoidance and soft-landing algorithms through ground simulations.
- Optimize the lander's thermal and power systems to withstand prolonged exposure to lunar night conditions.
- Enhance real-time telemetry and command capabilities by leveraging ISRO's upgraded deep-space communication infrastructure.
- Prepare contingency plans for off-nominal scenarios, including alternate landing sites and extended mission durations.
- Engage in proactive public outreach to manage expectations and highlight the mission's scientific and technological objectives.
- Collaborate with international partners (NASA, ESA) for data sharing and post-mission analysis to maximize scientific returns.

UPSC VALUE ADDITION

Keywords for Mains Answer-Writing

Chandrayaan-3 · Lunar Orbit Insertion (LOI) · ISRO · Lander-Rover configuration · South Polar region of the Moon · Deep Space Network (DSN) · Retro-burning · Perilune · Soft landing · Lunar Polar Exploration · Mission Operations Complex (MOX) · Propulsion module separation · Braking

maneuvers · International cooperation in space missions · ISTRAC · Lunar surface science payloads

Concept Flow

Chandrayaan-3's launch into Earth orbit → Trans-lunar injection (TLI) → Lunar Orbit Insertion (LOI) → Orbital maneuvers to reduce altitude → Lander separation from propulsion module → Autonomous de-orbiting and braking → Hazard detection and avoidance → Soft landing in South Polar region → Rover deployment and in-situ analysis → Data transmission to Earth via deep-space networks.

PRELIMS PRACTICE QUESTIONS

Q1. Which of the following correctly describes the Lunar Orbit Insertion (LOI) maneuver performed by Chandrayaan-3?

1. A) It involved a direct landing on the lunar surface without orbital insertion.
2. B) It was executed by retro-burning at the Perilune for 1835 seconds to achieve an orbit of 164 km x 18074 km.
3. C) The maneuver was conducted using the propulsion module alone, without the lander.
4. D) The LOI was performed to place the spacecraft in a geostationary orbit around the Moon.

Answer: B) It was executed by retro-burning at the Perilune for 1835 seconds to achieve an orbit of 164 km x 18074 km. — The LOI maneuver for Chandrayaan-3 involved retro-burning at the Perilune (closest point to the Moon) for 1835 seconds, successfully placing the spacecraft in an elliptical orbit of 164 km x 18074 km. This is a critical step to gradually reduce the orbit for a soft landing.

Q2. Which of the following statements about the Chandrayaan-3 mission is NOT correct?

1. A) The mission aims for a soft landing in the South Polar region of the Moon.
2. B) The propulsion module will separate from the lander while in lunar orbit.
3. C) The mission is being monitored exclusively by ISRO's ground stations.
4. D) The next Lunar bound orbit maneuver is scheduled for August 6, 2023.

Answer: C) The mission is being monitored exclusively by ISRO's ground stations. — The health and operations of Chandrayaan-3 are monitored not only by ISRO's ground stations but also with support from ESA and JPL Deep Space antennas, making the statement incorrect.

Q3. The South Polar region of the Moon is of particular interest to scientists due to:

1. A) The presence of extensive lunar maria (seas) suitable for human habitation.
2. B) The potential for water ice deposits in permanently shadowed craters.
3. C) The absence of any significant topographical features.
4. D) The high solar radiation exposure, making it ideal for solar power generation.

Answer: B) The potential for water ice deposits in permanently shadowed craters. — The South Polar region of the Moon is scientifically significant because it contains permanently shadowed craters where

water ice deposits are likely to exist, which could be crucial for future lunar missions and resource utilization.

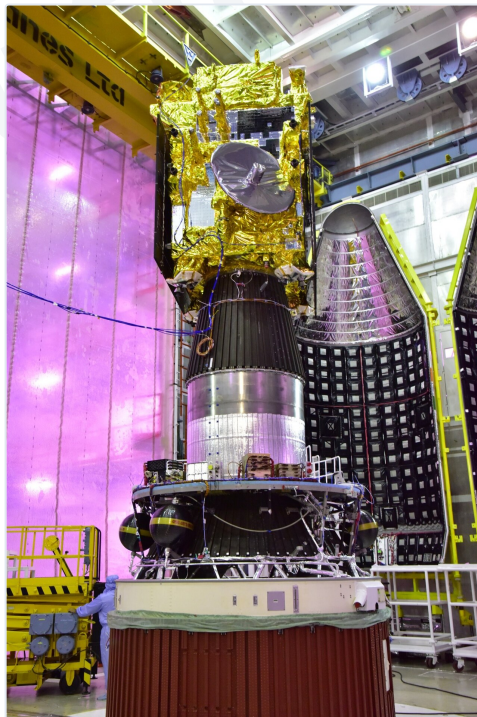
MAINS PRACTICE QUESTION

✍️ Analyze the significance of the Lunar Orbit Insertion (LOI) maneuver in the Chandrayaan-3 mission. How does this maneuver contribute to the mission's objective of achieving a soft landing in the South Polar region of the Moon? Discuss the technical challenges involved and the role of international cooperation in ensuring mission success.

Approach: Begin by explaining the purpose and mechanics of the LOI maneuver, including the role of retro-burning at the Perilune and the resulting elliptical orbit. Discuss how this maneuver is a critical step in gradually reducing the spacecraft's orbit to prepare for a soft landing. Highlight the technical challenges, such as precise navigation, fuel efficiency, and the complexity of braking maneuvers. Finally, emphasize the importance of international cooperation, including the support from ESA and JPL Deep Space antennas, in monitoring and executing the mission.

Source: [ISRO](#)

Aditya-L1 Mission: India's Pioneering Solar Observatory and Its Strategic Significance



Source: [Wikimedia Commons](#) — Indian Space Research Organisation (ISRO-India)

SUBJECT RELEVANCE — WHERE THIS TOPIC FITS

- GS Paper III — Science and Technology — Developments and their Applications and Effects in Everyday Life | GS Paper III — Space Technology — Achievements of Indians in Science & Technology

- **Prelims:** Aditya-L1, Lagrangian point L1, PSLV-C57, ISRO, Solar corona, Halo orbit, Solar wind, Space-based observatory, Indian Institute of Astrophysics (IIA), Inter-University Centre for Astronomy and Astrophysics (IUCAA)

Quick Revision: Aditya-L1 is India's first solar observatory positioned at the Sun-Earth L1 point, equipped with seven indigenous payloads to study solar dynamics and space weather, launched aboard PSLV-C57 on September 2, 2023.

WHY IS THIS IN THE NEWS?

The successful launch of the Aditya-L1 mission on September 2, 2023, marks a historic milestone for India's space programme, as it is the country's first dedicated solar observatory. Positioned at the Sun-Earth Lagrangian point L1, the spacecraft will conduct continuous observations of the Sun's outermost layers, providing unprecedented data on solar dynamics, space weather, and their terrestrial impacts. This mission underscores India's growing capabilities in space-based scientific research and aligns with global efforts to enhance solar observation infrastructure.

BACKGROUND

- The Sun is the primary driver of space weather, influencing phenomena such as solar flares, coronal mass ejections (CMEs), and solar wind, which can disrupt satellite operations, communication systems, and power grids on Earth.
- India's space programme, spearheaded by ISRO, has progressively advanced from Earth observation and communication satellites to deep-space missions, including Chandrayaan-1, Mangalyaan, and Chandrayaan-2.
- The concept of Lagrangian points—positions in space where the gravitational forces of two large bodies (e.g., the Sun and Earth) balance the orbital motion of a smaller object—was first theorised by Joseph-Louis Lagrange in the 18th century.
- The L1 point, located approximately 1.5 million km from Earth, offers a vantage point for uninterrupted solar observations without the interference of Earth's shadow or atmospheric distortions.
- Aditya-L1 is India's third major space science mission, following the Chandrayaan and Mangalyaan missions, and represents a significant leap in solar physics research.
- The mission is a collaborative effort involving ISRO, the Indian Institute of Astrophysics (IIA), Bengaluru, and the Inter-University Centre for Astronomy & Astrophysics (IUCAA), Pune, highlighting India's indigenous scientific and technological capabilities.

WHAT IS THE ADITYA-L1 MISSION?

- Aditya-L1 is India's first dedicated space-based solar observatory, designed to study the Sun's outermost layers, including the photosphere, chromosphere, and corona.
- The spacecraft is placed in a halo orbit around the Sun-Earth Lagrangian point L1, approximately 1.5 million km from Earth, ensuring continuous solar observations without eclipses or occultations.
- The mission utilises the Polar Satellite Launch Vehicle (PSLV-C57) for its launch.

- Aditya-L1 carries seven indigenous scientific payloads, including the Visible Emission Line Coronagraph (VELC), Solar Ultraviolet Imaging Telescope (SUIT), and Aditya Solar Wind Particle Experiment (ASPEX), to study solar dynamics and space weather.
- The payloads are developed by ISRO in collaboration with national research institutions such as the Indian Institute of Astrophysics (IIA) and the Inter-University Centre for Astronomy & Astrophysics (IUCAA).
- The mission aims to enhance understanding of solar wind acceleration, coronal heating, and the initiation of solar eruptive events like flares and CMEs, which have direct implications for space weather forecasting.
- Data from Aditya-L1 will contribute to global efforts in predicting solar storms, mitigating their impact on satellites, aviation, and terrestrial infrastructure, and advancing solar physics research.
- The spacecraft will undergo four Earth-bound orbital manoeuvres before being placed in the transfer orbit towards L1, with an expected arrival at the halo orbit after approximately 127 days.

KEY FEATURES

Feature	Significance
First Indian solar observatory	Establishes India as a leading space-faring nation with indigenous capability to study the Sun from space.
Halo orbit around L1 point	Provides uninterrupted, continuous observation of the Sun without eclipses, enabling real-time solar activity monitoring.
Seven indigenous payloads	Facilitates multi-wavelength observation of solar phenomena, including corona, photosphere, and chromosphere.
Elliptical Earth-bound orbit (235x19500 km)	Enables gradual orbital maneuvers before trans-Lagrange injection, ensuring fuel efficiency and trajectory precision.
127-day transit to L1	Demonstrates ISRO's capability in long-duration deep-space mission planning and execution.

WHY IT MATTERS

Scientific Advancement

- Advances India's expertise in solar physics, complementing ground-based observations and global space missions.
- Enables study of coronal mass ejections (CMEs) and solar wind, critical for space weather prediction.
- Supports international collaboration in solar research through data sharing with global observatories.

Technological Innovation

- Demonstrates indigenous development of complex payloads, including the Visible Emission Line Coronagraph (VELC) and Solar Ultraviolet Imaging Telescope (SUIT).

- Validates ISRO's deep-space navigation and propulsion systems for future interplanetary missions.
- Showcases cost-effective mission design with reusable launch vehicle (PSLV) and minimal fuel expenditure via gravity assists.

Strategic Autonomy

- Reduces dependence on foreign solar observatories for critical space weather data, enhancing national security.
- Strengthens India's position in the global space economy, fostering self-reliance in high-tech sectors.
- Encourages private sector participation in space technology through ISRO's collaborative research model.

Economic Implications

- Boosts India's space industry, creating high-skilled jobs in aerospace engineering and astrophysics.
- Attracts foreign investment in satellite manufacturing and launch services, expanding the space economy.
- Supports downstream applications in agriculture, aviation, and power grids through improved space weather forecasts.

CHALLENGES

1. Trajectory Precision

- Achieving the L1 halo orbit requires precise orbital maneuvers, with minimal margin for error in trans-Lagrange injection.
- Long transit duration (127 days) increases exposure to cosmic radiation, demanding robust spacecraft shielding.
- Real-time communication delays (1.5 million km) necessitate autonomous fault detection and correction systems.

UPSC Link: GS3: Space Technology - Mission Planning

2. Payload Integration

- Developing seven high-precision payloads within budget constraints while ensuring compatibility with launch vehicle dynamics.
- Calibrating instruments for multi-wavelength observation to avoid interference between payloads.
- Ensuring thermal stability of payloads in the harsh thermal environment of space.

UPSC Link: GS3: Science & Technology - Indigenous Innovation

3. Data Transmission

- Transmitting large volumes of solar data (e.g., high-resolution images) over vast distances with minimal latency.
- Managing data processing and storage onboard the spacecraft to handle solar flare events.
- Ensuring secure and reliable downlink to ground stations for real-time analysis.

UPSC Link: GS3: Communication Technology - Deep Space Networks

4. International Competition

- Competing with established solar observatories like NASA's SDO and ESA's Solar Orbiter in data quality and coverage.
- Ensuring India's mission contributes uniquely to global solar research, avoiding duplication of efforts.
- Navigating geopolitical sensitivities in data sharing with allied space agencies.

UPSC Link: GS2: International Relations - Space Diplomacy

5. Operational Longevity

- Extending mission lifespan beyond the planned 5 years to maximize scientific return.
- Mitigating risks of solar particle events damaging onboard electronics.
- Ensuring continuous power supply via solar panels in the absence of Earth's shadow.

UPSC Link: GS3: Space Technology - Mission Sustainability

Challenges — UPSC Perspective

Issue	Concern
Orbital Insertion Accuracy	Risk of missing the L1 halo orbit due to minor trajectory deviations.
Thermal Management	Payloads must withstand temperatures ranging from -100°C to 100°C in space.
Data Latency	1.5 million km distance causes a 5-second communication delay, complicating real-time control.
Radiation Hardening	Cosmic rays and solar flares may degrade electronic components over time.
Power Supply Stability	Solar panels must operate efficiently without interruption during eclipses.
Cost Overruns	Indigenous development of payloads may exceed initial budget allocations.

WAY FORWARD

- Enhance collaboration between ISRO, IIA, and IUCAA to refine payload calibration and data interpretation.
- Develop indigenous deep-space communication networks to reduce reliance on foreign ground stations.
- Establish a dedicated space weather forecasting center in India using Aditya-L1 data.
- Promote STEM education initiatives to build a talent pipeline for future space missions.
- Encourage private sector participation in satellite component manufacturing to boost cost efficiency.
- Integrate Aditya-L1 data with global solar observatories for comprehensive multi-point observations.
- Conduct post-mission reviews to identify lessons learned for future interplanetary missions.
- Expand international partnerships to share solar data and leverage global expertise in space weather prediction.

UPSC VALUE ADDITION

Keywords for Mains Answer-Writing

Aditya-L1 Mission · Sun-Earth Lagrangian Point L1 · Halo orbit · PSLV-C57 · ISRO's solar observatory · Space-based solar studies · Elliptical Earth orbit · Earth-bound orbital maneuvers · Indigenous scientific payloads · Indian Institute of Astrophysics · Inter University Centre for Astronomy & Astrophysics · Sun's corona and solar wind

Concept Flow

India's space program (INSAT, Chandrayaan, Mangalyaan) → Aditya-L1 mission (PSLV-C57 launch) → Earth-bound orbital maneuvers (235x19500 km) → Trans-Lagrange injection → Halo orbit around L1 point → Continuous solar observation → Real-time space weather data → Enhanced predictive models for solar storms → Improved disaster preparedness for power grids and aviation.

PRELIMS PRACTICE QUESTIONS

Q1. Which of the following statements about the Aditya-L1 mission is/are correct? 1. It is India's first space-based observatory to study the Sun. 2. It will be placed in a halo orbit around the Sun-Earth Lagrangian Point L1. 3. The mission was launched using the GSLV Mk-III launch vehicle. 4. The spacecraft will study the Sun's corona and solar wind.

1. 1, 2 and 4 only
2. 1 and 3 only
3. 2 and 4 only
4. All of the above

Answer: 1, 2 and 4 only — Statement 1 is correct as Aditya-L1 is India's first dedicated solar observatory. Statement 2 is correct as it will be placed in a halo orbit around L1. Statement 3 is incorrect as it was launched using PSLV-C57, not GSLV Mk-III. Statement 4 is correct as the mission aims to study the Sun's corona and solar wind.

Q2. The Aditya-L1 spacecraft will undergo four Earth-bound orbital maneuvers primarily to:

1. Increase its velocity to escape Earth's gravity
2. Stabilize its orbit for scientific observations
3. Adjust its trajectory towards the L1 point
4. Test its onboard propulsion system

Answer: Adjust its trajectory towards the L1 point — The four Earth-bound orbital maneuvers are designed to incrementally adjust the spacecraft's trajectory and velocity to place it on a transfer orbit towards the Sun-Earth Lagrangian Point L1, approximately 1.5 million km from Earth.

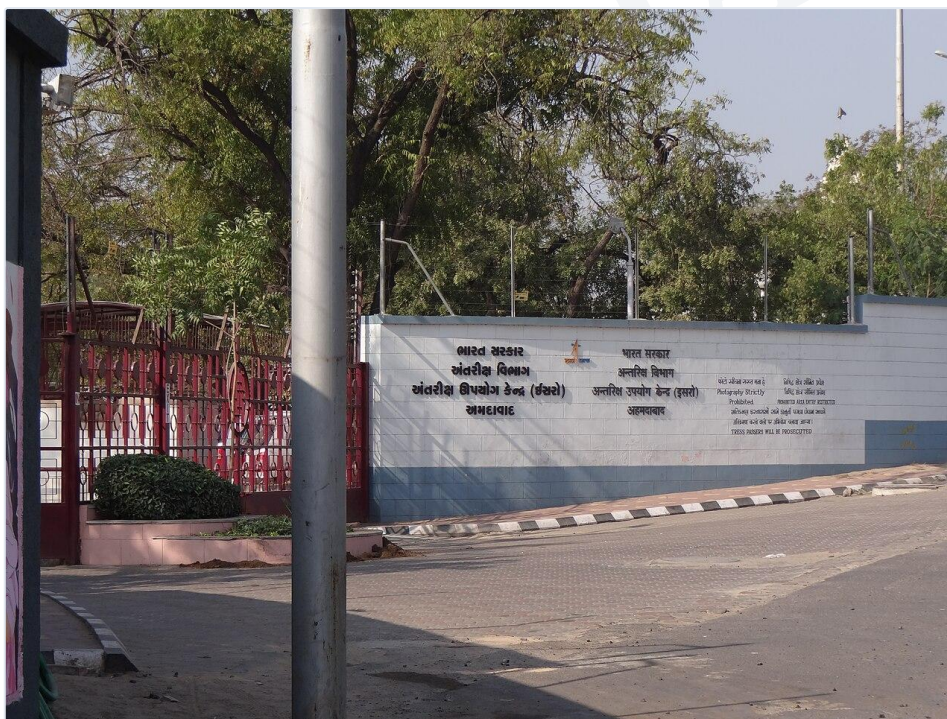
MAINS PRACTICE QUESTION

✍ Explain the significance of the Aditya-L1 mission for India's space programme and global solar research. Discuss its scientific objectives and the technological challenges involved in placing a spacecraft in a halo orbit around the Sun-Earth Lagrangian Point L1.

Approach: The answer should begin by highlighting Aditya-L1 as India's first dedicated solar observatory, emphasizing its role in advancing India's space capabilities and contributing to global solar research. Discuss its scientific objectives, including the study of the Sun's corona, solar wind, and magnetic field dynamics. Address the technological challenges, such as precise orbital maneuvers, maintaining a halo orbit, and ensuring long-term operational stability at L1. Conclude by linking the mission's success to India's growing expertise in space-based scientific research and its potential impact on solar weather prediction.

Source: [ISRO](#)

India's Debris-Free Space Missions Initiative (DFSMI): A Strategic Framework for Sustainable Outer Space Activities by 2030



Source: [Wikimedia Commons](#) — Yash Y. Vadiwala (CC BY-SA 3.0)

SUBJECT RELEVANCE — WHERE THIS TOPIC FITS

- GS Paper III — Science and Technology — Developments and their Applications and Effects in Everyday Life | GS Paper III — Environment and Disaster Management — Environmental Pollution and Degradation
- **Prelims:** Space debris, Inter-Agency Space Debris Coordination Committee (IADC), Post-Mission Disposal (PMD), ISRO System for Safe and Sustainable Space Operations Management (IS4OM), Outer Space Treaty 1967

- **Essay:** Sustainable development in the context of space exploration: Balancing technological advancement with environmental stewardship, The role of international cooperation in preserving global commons: A case study of outer space

Quick Revision: The Debris-Free Space Missions (DFSM) initiative, launched by ISRO in April 2024, aims to achieve debris-free space missions for all Indian space actors by 2030 through stringent operational guidelines, post-mission disposal protocols, and global collaboration.

WHY IS THIS IN THE NEWS?

On 16 April 2024, during the inaugural plenary of the 42nd Annual Meet of the Inter-Agency Space Debris Coordination Committee (IADC) in Bengaluru, the Chairman of ISRO and Secretary of the Department of Space (DOS), Shri S. Somanath, formally announced India's Debris-Free Space Missions (DFSM) initiative. This declaration underscores India's proactive stance on ensuring the long-term sustainability of outer space activities by mandating debris-free missions for all Indian space actors—both governmental and non-governmental—by 2030, while also encouraging global participation in this endeavour.

BACKGROUND

- The proliferation of space debris poses a critical threat to the sustainability of outer space activities, with over 36,500 pieces of trackable debris and millions of smaller fragments currently orbiting Earth, as per the European Space Agency's Space Debris Office (2024).
- The Inter-Agency Space Debris Coordination Committee (IADC), established in 1993, is an international governmental forum for the worldwide coordination of activities related to the issues of man-made and natural debris in space, with 13 member agencies including ISRO.
- The United Nations Committee on the Peaceful Uses of Outer Space (UNCOPUOS) adopted the Space Debris Mitigation Guidelines in 2007, which provide a voluntary framework for reducing the creation of space debris, though compliance remains non-binding.
- India's space programme has witnessed exponential growth, with over 50 operational satellites and multiple successful missions, including Chandrayaan-3 and Aditya-L1, necessitating robust measures to mitigate space debris.
- The Kessler Syndrome, a theoretical scenario where the density of objects in low Earth orbit (LEO) becomes high enough to cause a cascade of collisions, underscores the urgency of debris mitigation to prevent irreversible damage to space infrastructure.
- India's DFSM initiative aligns with global efforts such as the UN's Long-term Sustainability (LTS) Guidelines and the Artemis Accords, which emphasize the preservation of the space environment for future generations.

WHAT IS THE DEBRIS-FREE SPACE MISSIONS (DFSM) INITIATIVE?

- The DFSM initiative is a strategic framework announced by ISRO/DOS to ensure that all space missions—both governmental and non-governmental—conducted by Indian entities are debris-free by 2030, thereby mitigating the risks posed by space debris to operational satellites and future space activities.

- The initiative mandates adherence to a set of stringent guidelines across the lifecycle of space missions, including design, operational, and post-mission phases, to prevent debris generation, on-orbit collisions, and intentional break-ups.
- Key operational guidelines include: (a) Avoiding debris generation during satellite and launch vehicle operations; (b) Ensuring post-mission disposal (PMD) of spent stages and satellites with a success probability exceeding 99%; (c) Prioritizing controlled re-entry or de-orbiting to minimize orbital lifetime; and (d) Implementing failure mode studies and redundant systems to prevent on-orbit break-ups.
- The initiative introduces special considerations for human spaceflight safety, particularly by avoiding orbital transfers within the 400 km $\pm$ 30 km band to reduce collision risks for crewed missions.
- DFSM emphasizes the importance of trackability, identifiability, and maneuverability of all satellites throughout their operational phases, enabling proactive collision avoidance and debris mitigation.
- The initiative includes provisions for capacity building in space object tracking and monitoring, as well as fostering research into innovative debris mitigation techniques to enhance the long-term sustainability of outer space activities.
- Implementation of DFSM will commence in 2025, with the ISRO System for Safe and Sustainable Space Operations Management (IS4OM) serving as the nodal agency for coordination, monitoring, and annual progress evaluation.
- By aligning with global frameworks such as the UN's LTS Guidelines and the Artemis Accords, DFSM positions India as a responsible spacefaring nation committed to preserving the outer space environment for future generations.

KEY FEATURES

Feature	Significance
Zero Debris Target by 2030	Demonstrates India's commitment to long-term sustainability of outer space activities by eliminating debris from all Indian space missions.
Post-Mission Disposal (PMD) Compliance (>99% success)	Ensures controlled re-entry or de-orbiting of spent orbital stages and satellites, reducing long-lived debris in critical orbital bands.
Collision Avoidance Measures	Incorporates failure mode studies, redundant systems, and high-reliability mission design to prevent on-orbit break-ups and collisions.
Human Spaceflight Safety Considerations	Explicitly avoids orbital transfers in the 400 km $\pm$ 30 km band to safeguard future human space missions.
Trackability, Identifiability, and Maneuverability	Mandates enhancements in satellite tracking and maneuvering capabilities to enable active debris mitigation and collision avoidance.

WHY IT MATTERS

Strategic/Space Diplomacy

- Positions India as a global leader in responsible space operations, aligning with international efforts such as the UN Space Debris Mitigation Guidelines.

- Encourages global adoption of debris-free space missions, fostering multilateral cooperation for the long-term sustainability of outer space.
- Demonstrates India's technological maturity and ethical approach to space exploration, enhancing its credibility in international forums like the IADC and COPUOS.

Technological Advancement

- Accelerates indigenous development of debris mitigation technologies, including controlled re-entry systems, de-orbiting mechanisms, and collision avoidance algorithms.
- Drives innovation in space object tracking and monitoring, leveraging ISRO's IS4OM system for real-time debris assessment and mitigation.
- Promotes research in space debris research, including novel techniques for debris capture, removal, and in-situ resource utilization for sustainable space operations.

Economic Implications

- Reduces long-term costs associated with debris collision risks, satellite damage, and operational disruptions in high-traffic orbital bands.
- Enhances the commercial viability of India's space sector by ensuring compliance with global debris mitigation standards, attracting international partnerships and investments.
- Supports the growth of India's private space industry by mandating adherence to debris-free mission protocols, fostering a sustainable ecosystem.

Environmental Stewardship

- Contributes to the preservation of the space environment for future generations by preventing the accumulation of hazardous debris in Earth's orbital bands.
- Aligns with the principle of 'common heritage of humankind,' ensuring that outer space remains accessible and safe for all nations.
- Supports the global effort to mitigate the Kessler Syndrome, a cascading collision scenario that could render certain orbital regions unusable.

Scientific and Research Impact

- Strengthens India's role in international space research by advancing the understanding of space debris dynamics and mitigation strategies.
- Facilitates collaboration with global space agencies and institutions, enabling data sharing and joint missions focused on debris reduction.
- Encourages interdisciplinary research, integrating engineering, physics, and policy to address the complex challenges of space sustainability.

CHALLENGES

1. Technological and Engineering Challenges

- Achieving >99% success in post-mission disposal requires robust propulsion systems, precise trajectory planning, and fail-safe mechanisms, which demand significant technological advancements.
- Ensuring trackability and maneuverability of all satellites, including legacy and non-cooperative objects, necessitates upgrades to ground-based tracking infrastructure and satellite design.

- Developing cost-effective and scalable debris removal technologies (e.g., active debris removal, laser-based mitigation) remains a critical hurdle.

UPSC Link: Science and Technology: Space Debris Mitigation

2. Operational and Mission Planning Constraints

- Balancing mission objectives with debris mitigation requirements may increase fuel consumption and operational complexity, particularly for high-altitude or long-duration missions.
- Selecting orbital slots with minimal collision risks while optimizing mission parameters requires advanced modeling and real-time data integration.
- Coordinating with international space actors for debris-free mission planning may face delays due to differing national priorities and technical capabilities.

UPSC Link: Space Debris: Operational Constraints

3. Regulatory and Policy Implementation

- Enforcing compliance among non-governmental and international space actors requires robust regulatory frameworks and international agreements.
- Ensuring accountability for mission failures or non-compliance with debris mitigation protocols poses legal and diplomatic challenges.
- Harmonizing India's DFSM initiative with existing global guidelines (e.g., UN Space Debris Mitigation Guidelines, IADC best practices) demands sustained diplomatic efforts.

UPSC Link: International Space Law: Compliance Mechanisms

4. Resource Allocation and Capacity Building

- Allocating sufficient financial and human resources for R&D, infrastructure upgrades, and capacity building is essential but may strain the Department of Space's budget.
- Training and upskilling personnel in debris tracking, collision avoidance, and mitigation technologies require long-term investment in education and workforce development.
- Developing indigenous tracking systems and debris mitigation technologies may face delays due to reliance on imported components or expertise.

UPSC Link: Space Sector: Resource Optimization

5. Human Spaceflight Safety Risks

- Avoiding the 400 km $\pm$ 30 km orbital band for non-human missions may limit flexibility in mission planning and increase operational costs.
- Ensuring the safety of future human spaceflight missions (e.g., Gaganyaan) requires continuous monitoring of debris in adjacent orbital bands and rapid collision avoidance maneuvers.
- The initiative's success depends on the timely deployment of advanced tracking systems capable of detecting micro-debris and non-cooperative objects.

UPSC Link: Human Spaceflight: Orbital Safety Protocols

Challenges — UPSC Perspective

Issue	Concern
High Success Rate in PMD (>99%)	Requires fail-safe propulsion systems, precise trajectory planning, and real-time monitoring to avoid mission failures.
Trackability of Legacy Satellites	Non-cooperative or defunct satellites pose challenges for tracking, identification, and maneuverability.
Collision Risk in High-Traffic Orbits	Geostationary and Low Earth Orbit (LEO) bands are congested, increasing the likelihood of accidental collisions.
Cost of Debris Mitigation Technologies	Advanced propulsion, de-orbiting systems, and tracking infrastructure require significant financial investment.
International Coordination for Compliance	Diverse national priorities and technical capabilities may hinder uniform adoption of debris-free mission protocols.
Human Spaceflight Safety in Adjacent Orbits	Avoiding the 400 km $\pm$ 30 km band may limit mission flexibility and increase operational complexity.

WAY FORWARD

- Accelerate R&D in indigenous debris mitigation technologies, including controlled re-entry systems, de-orbiting mechanisms, and active debris removal techniques.
- Upgrade ground-based tracking infrastructure and satellite design to enhance trackability, identifiability, and maneuverability of all space objects.
- Develop a national framework for enforcing compliance with DFSM guidelines, including penalties for non-compliance and incentives for early adoption.
- Strengthen international collaborations through data sharing, joint missions, and participation in global forums (e.g., IADC, COPUOS) to promote uniform adoption of debris-free missions.
- Invest in capacity building programs to train personnel in debris tracking, collision avoidance, and mitigation technologies, ensuring a skilled workforce for sustainable space operations.
- Integrate DFSM protocols into the mission planning and design phase of all future space missions, including commercial and international partnerships.
- Establish a dedicated fund for space debris research and mitigation, supporting innovative solutions and pilot projects in debris removal and in-situ resource utilization.
- Monitor and evaluate annual progress through the IS40M system, ensuring transparency and accountability in the implementation of DFSM guidelines.

UPSC VALUE ADDITION

Keywords for Mains Answer-Writing

Space Debris Mitigation · Long-term Sustainability of Outer Space · Inter-Agency Space Debris Coordination Committee (IADC) · Post-Mission Disposal (PMD) · Controlled Re-entry of Spacecraft · Debris-Free Space Missions (DFSM) · Orbital Collision Avoidance · Human Spaceflight Safety in

Low Earth Orbit (LEO) · Capacity Building for Space Object Tracking · Space Debris Research and Innovation · Department of Space (DOS) Initiatives · Global Space Governance

Concept Flow

India's space missions generate orbital debris → Accumulation of debris threatens long-term sustainability of outer space → DFSM initiative launched to achieve zero debris by 2030 → Implementation requires PMD compliance, collision avoidance, and trackability enhancements → Technological advancements in propulsion, tracking, and debris removal are accelerated → Global adoption of debris-free missions is encouraged through diplomacy and collaboration → Long-term sustainability of outer space is preserved for future generations.

PRELIMS PRACTICE QUESTIONS

Q1. Which of the following is NOT a stated objective of India's Debris-Free Space Missions (DFSM) initiative?

1. A. Achieving debris-free space missions by all Indian space actors by 2030
2. B. Ensuring post-mission disposal of satellites with a success probability of over 99%
3. C. Mandating all space missions to operate exclusively in geostationary orbit
4. D. Avoiding intentional break-ups that generate long-lived debris

Answer: C. Mandating all space missions to operate exclusively in geostationary orbit — The DFSM initiative focuses on debris mitigation in all orbital regimes, not exclusively on geostationary orbit. Options A, B, and D are explicitly mentioned in the initiative.

Q2. The Department of Space's 'IS4OM' system is primarily designed to:

1. A. Facilitate commercial satellite launches for private entities
2. B. Monitor and manage safe and sustainable space operations
3. C. Develop propulsion systems for interplanetary missions
4. D. Conduct atmospheric re-entry experiments

Answer: B. Monitor and manage safe and sustainable space operations — IS4OM (ISRO System for Safe and Sustainable Space Operations Management) is the nodal point for implementing the DFSM initiative, focusing on safety and sustainability.

MAINS PRACTICE QUESTION

✍ Analyse the significance of India's Debris-Free Space Missions (DFSM) initiative in the context of global space governance. How does this initiative align with India's broader objectives in space diplomacy and sustainable development? (250 words)

Approach: Begin by defining the DFSM initiative and its core objectives, including debris mitigation, post-mission disposal, and collision avoidance. Highlight India's commitment to global space sustainability by aligning with the IADC and UN guidelines. Discuss the diplomatic implications, such as India's leadership in encouraging other space actors to adopt similar measures. Conclude by linking this initiative to India's broader

space diplomacy goals, including promoting equitable access to space and preserving the outer space environment for future generations.

Source: [ISRO](#)

Gaganyatris' Training Completion: A Strategic Milestone in ISRO-NASA's Joint ISS Mission for India's Spacefaring Ambitions

SUBJECT RELEVANCE — WHERE THIS TOPIC FITS

- GS Paper III — Science and Technology — Developments and their Applications and Effects in Everyday Life | GS Paper III — Awareness in the fields of Space
- **Prelims:** Gaganyaan Mission, Axiom Mission 4 (Ax-4), International Space Station (ISS), ISRO-NASA collaboration, SpaceX Dragon spacecraft, Microgravity experiments, Space suit fit checks, Emergency scenario training in space
- **Essay:** India's Space Odyssey: From Gaganyaan to the Stars, Global Space Collaboration: A New Paradigm for Scientific and Diplomatic Synergy

Quick Revision: The ISRO-NASA joint ISS mission is a strategic endeavour to enhance India's human spaceflight capabilities, with the Gaganyatris' training serving as a critical step toward India's participation in low-Earth orbit missions and its long-term spacefaring ambitions.

WHY IS THIS IN THE NEWS?

The successful completion of the initial phase of training for the two Indian astronauts—Group Captain Shubhanshu Shukla (Prime) and Group Captain Prasanth Balakrishnan Nair (Backup)—for the joint ISRO-NASA mission to the International Space Station (ISS) marks a critical advancement in India's human spaceflight programme. This milestone underscores India's growing role in international space exploration, technological preparedness, and strategic partnerships in low-Earth orbit missions. The training, conducted in the U.S., aligns with India's Gaganyaan programme and the broader objective of establishing a sustained human presence in space.

BACKGROUND

- The Government of India approved the Gaganyaan programme in 2018, aiming to demonstrate India's capability to undertake human spaceflight missions by 2025.
- The ISRO-NASA joint mission to the ISS, facilitated under the Axiom Mission 4 (Ax-4), represents India's first human spaceflight collaboration with a foreign agency to the International Space Station.
- The Ax-4 mission is part of Axiom Space's commercial spaceflight programme, which partners with NASA to transport private astronauts to the ISS using SpaceX's Dragon spacecraft.
- India's participation in the ISS mission is a strategic step to leverage international expertise, accelerate technology transfer, and enhance the operational readiness of its astronaut corps.
- The training phase included exposure to SpaceX's operational protocols, emergency response systems, and scientific research methodologies, aligning with global best practices in human spaceflight.

- The mission is expected to contribute to India's long-term goals of establishing an independent space station by 2035 and fostering international collaborations in space exploration.

WHAT IS THE ISRO-NASA JOINT MISSION TO THE INTERNATIONAL SPACE STATION (ISS)?

- A collaborative human spaceflight mission between ISRO and NASA, aimed at sending two Indian astronauts to the ISS aboard the SpaceX Dragon spacecraft as part of Axiom Mission 4 (Ax-4).
- The selected Gaganyatris—Group Captain Shubhanshu Shukla (Prime) and Group Captain Prasanth Balakrishnan Nair (Backup)—are undergoing rigorous training in the U.S. to prepare for the mission's operational and scientific demands.
- The mission will involve conducting microgravity experiments, performing daily ISS operations, and participating in emergency response drills, including medical emergencies.
- The training includes familiarisation with SpaceX Dragon spacecraft systems, ISS onboard systems, communication protocols, and photography techniques in space.
- The mission aligns with India's broader space diplomacy, enhancing its credentials as a reliable partner in global space exploration and fostering technological exchanges with international agencies.
- The collaboration with NASA and Axiom Space provides India with access to advanced training facilities, spacecraft systems, and operational protocols, accelerating the readiness of its astronaut corps.
- The mission is expected to contribute to India's long-term goal of establishing an independent space station and advancing its capabilities in human spaceflight and scientific research in microgravity environments.

KEY FEATURES

Feature	Significance
Joint ISRO-NASA Mission to ISS	Demonstrates India's expanding role in international space collaboration, enhancing technological sovereignty and global partnerships in human spaceflight.
Initial Phase of Gaganyatris' Training	Includes foundational orientations, spacecraft familiarization, and emergency protocols, ensuring operational readiness for the Ax-4 mission.
SpaceX Dragon Spacecraft Training	Critical for mission execution, covering launch phases, onboard systems, and communication protocols with the ISS.
International Space Station Emergency Scenario Training	Addresses medical and technical emergencies, vital for crew survival and mission resilience in microgravity.
Scientific Research Experiment Preparation	Focuses on microgravity experiments, aligning with India's long-term objectives in space-based research and innovation.

WHY IT MATTERS

Technological Advancement

- Marks India's first human spaceflight collaboration with NASA, leveraging SpaceX's Dragon spacecraft for crewed missions.
- Enhances indigenous capabilities in human spaceflight, complementing ISRO's Gaganyaan programme.
- Demonstrates India's integration into global space exploration frameworks, fostering technological exchange and innovation.

Strategic and Diplomatic

- Strengthens India-US space cooperation, aligning with the Artemis Accords and broader strategic partnerships.
- Positions India as a reliable partner in international space missions, enhancing its geopolitical influence.
- Supports India's vision of becoming a leading spacefaring nation, with potential for future joint missions.

Scientific and Research

- Facilitates microgravity research, contributing to advancements in medicine, materials science, and biology.
- Provides Indian astronauts with hands-on experience in space-based experimentation, critical for India's future missions.
- Enhances India's data-sharing and collaborative research capabilities with global space agencies.

Economic

- Stimulates growth in India's aerospace and allied industries, with potential for commercial space ventures.
- Encourages private sector participation in space technology, aligning with India's space sector reforms.
- May lead to cost-sharing and resource optimization in future space missions.

CHALLENGES

1. Human Spaceflight Safety and Reliability

- Ensuring the highest standards of safety for crewed missions, given the inherent risks of space travel.
- Addressing potential technical failures in the SpaceX Dragon spacecraft or ISS systems during the mission.
- Managing medical emergencies in microgravity, requiring advanced training and contingency planning.

UPSC Link: GS Paper 3: Science & Tech, Space Technology

2. International Collaboration and Coordination

- Harmonizing operational protocols, communication systems, and decision-making processes between ISRO and NASA.
- Ensuring seamless integration of Indian astronauts with international crew members on the ISS.
- Navigating geopolitical sensitivities and ensuring equitable contributions in joint missions.

UPSC Link: GS Paper 2: International Relations

3. Training and Preparedness

- Maintaining rigorous training standards to prepare astronauts for all mission scenarios, including emergencies.
- Ensuring continuous skill upgradation to handle evolving technologies and mission requirements.
- Addressing language barriers and cultural differences in a multinational crew environment.

UPSC Link: GS Paper 3: Science & Tech, Human Spaceflight

4. Resource and Infrastructure Constraints

- Managing the high costs associated with human spaceflight missions and international collaborations.
- Ensuring adequate infrastructure for training, mission control, and post-mission recovery.
- Balancing resource allocation between Gaganyaan and Ax-4 missions to optimize outcomes.

UPSC Link: GS Paper 3: Science & Tech, Space Technology

5. Public Perception and Trust

- Building public confidence in India's human spaceflight programme, particularly after past setbacks.
- Ensuring transparency in mission planning and execution to maintain stakeholder trust.
- Addressing skepticism regarding the cost-effectiveness of human spaceflight versus robotic missions.

UPSC Link: GS Paper 3: Science & Tech, Space Technology

Challenges — UPSC Perspective

Issue	Concern
Safety of Crew	Risk of mission failure or loss of life due to technical or medical emergencies.
International Coordination	Potential delays or conflicts arising from differing operational protocols between ISRO and NASA.
Training Adequacy	Gaps in preparedness for unforeseen scenarios despite rigorous training modules.
Cost Management	High financial burden of human spaceflight missions, requiring efficient resource utilization.
Public Engagement	

Issue	Concern
	Need to sustain public interest and support for space programmes amid competing priorities.
Technological Dependence	Reliance on foreign partners for critical technologies, such as the SpaceX Dragon spacecraft.

WAY FORWARD

- Accelerate the completion of remaining training modules, including microgravity research protocols and advanced emergency drills.
- Strengthen collaboration with NASA and SpaceX to address technical and operational challenges in the mission timeline.
- Enhance India's indigenous capabilities in human spaceflight by advancing the Gaganyaan programme in parallel with Ax-4.
- Develop robust contingency plans for medical and technical emergencies, including real-time decision-making frameworks.
- Invest in public outreach programmes to highlight the scientific and strategic benefits of human spaceflight missions.
- Establish a dedicated research and development cell to analyze mission data and improve future spaceflight technologies.
- Foster partnerships with private sector entities to reduce costs and enhance innovation in space technology.
- Conduct post-mission reviews to identify lessons learned and apply them to future ISRO-NASA collaborations.

UPSC VALUE ADDITION

Keywords for Mains Answer-Writing

Gaganyaan Mission · ISRO-NASA collaboration · International Space Station · Axiom Mission 4 · SpaceX Dragon spacecraft · microgravity research · astronaut training protocols · space emergency scenarios · Indian Human Spaceflight Programme · space station operations · crewed space missions · space food and life support systems

Concept Flow

India's participation in international space missions (e.g., Ax-4) is driven by its strategic vision of becoming a leading spacefaring nation. → The joint ISRO-NASA mission to the ISS requires rigorous training of Gaganyatris, including emergency preparedness and spacecraft familiarization. → Successful completion of initial training phases ensures operational readiness for the mission, covering technical, medical, and communication protocols. → The mission serves as a platform for scientific research in microgravity, aligning with India's long-term goals in space-based innovation. → Post-mission outcomes will inform future collaborations, technological advancements, and policy decisions in India's space sector. →

The mission reinforces India's diplomatic and strategic partnerships, particularly with the United States, through shared space exploration goals.

PRELIMS PRACTICE QUESTIONS

Q1. Which of the following is NOT a component of the training completed by the Gaganyatris for the ISRO-NASA joint mission to the International Space Station?

1. A. SpaceX suit fit checks
2. B. Familiarization with the SpaceX Dragon spacecraft
3. C. Training for lunar surface operations
4. D. Emergency medical scenario training

Answer: C. Training for lunar surface operations — The training focused on Earth-orbit operations, including the SpaceX Dragon spacecraft and medical emergencies, but lunar surface operations are not part of the ISS-bound mission.

Q2. The Axiom Mission 4 (Ax-4) is a joint mission involving which two space agencies?

1. A. ISRO and ESA
2. B. ISRO and NASA
3. C. NASA and Roscosmos
4. D. CNSA and ISRO

Answer: B. ISRO and NASA — Ax-4 is a collaborative effort between ISRO (Indian Space Research Organisation) and NASA (National Aeronautics and Space Administration) for a crewed mission to the ISS.

Q3. Which spacecraft will be used for the Axiom Mission 4 (Ax-4) to transport the Gaganyatris to the International Space Station?

1. A. Soyuz spacecraft
2. B. SpaceX Dragon spacecraft
3. C. Orion spacecraft
4. D. Shenzhou spacecraft

Answer: B. SpaceX Dragon spacecraft — The SpaceX Dragon spacecraft has been selected as the crewed vehicle for Ax-4, as indicated in the training modules completed by the Gaganyatris.

MAINS PRACTICE QUESTION

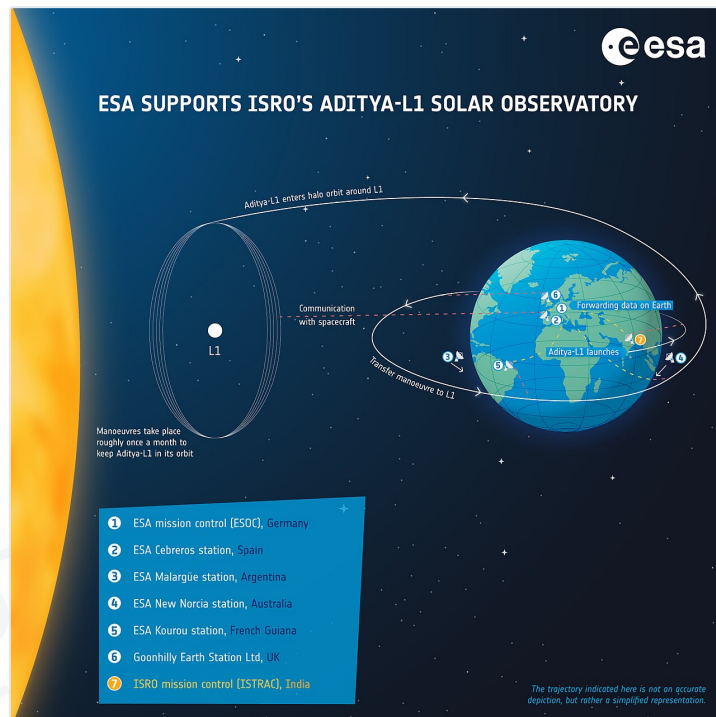
✍ Evaluate the strategic significance of the ISRO-NASA collaboration for the Axiom Mission 4 (Ax-4) in the context of India's space programme and global space exploration. (250 words)

Approach: Begin by outlining the objectives of the ISRO-NASA joint mission, including technology demonstration, scientific research, and human spaceflight capability enhancement. Discuss the role of the Gaganyaan programme in positioning India as a key player in human spaceflight. Analyse the benefits of international collaboration, such as access to advanced training facilities, exposure to international best practices, and fostering of scientific exchanges. Highlight the strategic implications for India's space diplomacy and its long-term goals in space exploration, including potential contributions to lunar and interplanetary

missions. Conclude with the broader impact on India's technological sovereignty and global standing in space sciences.

Source: [ISRO](#)

ISRO-ESA Technical Collaboration for Gaganyaan: Strategic Significance of Ground Tracking Support in Human Spaceflight Missions



Source: [Wikimedia Commons](#) — European Space Agency (CC BY-SA 3.0 igo)

SUBJECT RELEVANCE — WHERE THIS TOPIC FITS

- GS Paper III — Science and Technology — Space Technology | GS Paper II — International Relations — Bilateral and Multilateral Agreements
- **Prelims:** Gaganyaan Mission, ISTRAC, ESTEC, Ground Station Support, Orbital Module, Human Spaceflight Programme, ISRO-ESA MoU, Space Cooperation, Orbital Operations, Tracking and Data Relay
- **Essay:** India's ascent in global space diplomacy: The role of strategic partnerships in advancing indigenous space capabilities, The Gaganyaan mission and India's emergence as a leader in human spaceflight: Challenges and opportunities

Quick Revision: The Technical Implementing Plan (TIP) between ISRO and ESA ensures continuous ground tracking support for the Gaganyaan missions, enhancing communication reliability and mission safety through ESA's global ground station network.

WHY IS THIS IN THE NEWS?

The signing of the Technical Implementing Plan (TIP) between ISRO and ESA for ground tracking support for the Gaganyaan missions represents a critical milestone in India's human spaceflight programme. This collaboration ensures uninterrupted communication and data continuity between the Orbital Module and ground stations, which is essential for real-time monitoring, orbital manoeuvres, and crew safety during the mission. The agreement underscores the growing strategic partnership between ISRO and ESA, building on their long-standing cooperation in space missions, and highlights India's increasing reliance on international support for complex space endeavours.

BACKGROUND

- The Gaganyaan mission, India's maiden human spaceflight programme, aims to demonstrate indigenous capability to launch a crewed spacecraft into Low Earth Orbit (LEO) and return them safely to Earth. The mission is a flagship project under the Indian Human Spaceflight Programme, with a targeted launch window in the near future.
- ISRO's ISTRAC (ISRO Telemetry, Tracking and Command Network) is the nodal agency responsible for providing tracking, telemetry, and command support for all ISRO missions, including the Gaganyaan mission.
- The European Space Agency (ESA) has a robust network of ground stations, including facilities in Europe, Australia, and South America, which are strategically positioned to provide continuous coverage for spacecraft in LEO. ESA's ground station network has been instrumental in supporting missions such as the International Space Station (ISS) and the Hubble Space Telescope.
- India and ESA have a history of collaboration in space missions, including the Chandrayaan-1 lunar mission, where ESA provided support for tracking and data acquisition. This collaboration has been further strengthened through formal agreements such as the Memorandum of Understanding (MoU) signed in 2021.
- The Gaganyaan mission is part of India's broader strategy to enhance its global standing in space technology, including participation in international forums like the Artemis Accords and the Committee on the Peaceful Uses of Outer Space (COPUOS).
- The signing of the TIP at the Satish Dhawan Space Centre (SDSC) in the presence of senior officials from ISRO and ESA highlights the diplomatic and technical significance of the agreement.

WHAT IS THE TECHNICAL IMPLEMENTING PLAN (TIP) FOR GAGANYAAN MISSIONS?

- The Technical Implementing Plan (TIP) is a formal document signed between ISRO and ESA that outlines the technical and operational framework for ground station support during the Gaganyaan missions. It specifies the roles, responsibilities, and protocols for data flow, communication, and tracking between the Orbital Module and ground stations.
- The TIP enables ESA to provide ground tracking support, which is critical for maintaining continuous communication with the Orbital Module during all phases of the mission, including launch, orbital operations, and re-entry.

- The agreement ensures that ESA's ground stations will supplement ISRO's existing network, particularly in regions where ISRO's coverage may be limited, thereby enhancing the reliability and redundancy of the tracking system.
- The TIP includes provisions for real-time data acquisition, command transmission, and telemetry monitoring, which are essential for the safety and success of the mission. It also addresses contingency protocols for handling communication disruptions.
- The collaboration leverages ESA's advanced ground station infrastructure, including antennas and communication systems, which are designed to support high-bandwidth data transfer and precise tracking of spacecraft.
- The TIP is a legally binding document that formalises the technical and operational commitments of both ISRO and ESA, ensuring accountability and adherence to international standards for space missions.
- The agreement is a testament to the long-standing partnership between ISRO and ESA, which has been strengthened through previous collaborations in lunar and deep-space missions.
- The TIP aligns with ISRO's broader strategy to integrate international support for its human spaceflight programme, thereby accelerating the development of indigenous capabilities.

KEY FEATURES

Feature	Significance
Technical Implementing Plan (TIP)	Formalises the operational framework for ESA's ground station support, ensuring structured collaboration between ISRO and ESA for Gaganyaan missions.
Ground Tracking Support	Enables continuous data flow and communication with the Orbital Module, critical for real-time monitoring, navigation, and orbital operations during the mission.
Multi-Station Network	Leverages ESA's global ground station network (e.g., in Europe, Africa, and South America) to provide redundancy and extended coverage for Gaganyaan's orbital phases.
Data Continuity	Ensures seamless transmission of telemetry, tracking, and command (TT&C) data, reducing gaps in communication during critical mission phases like re-entry and landing.
Long-Standing Cooperation	Builds on ISRO-ESA's prior collaborations (e.g., Chandrayaan-1, Mars Orbiter Mission), reinforcing trust and institutional synergies in space exploration.
Operational Standardisation	Aligns ISRO's mission protocols with international best practices, enhancing interoperability and reliability of Gaganyaan's ground segment.

WHY IT MATTERS

Strategic Autonomy in Human Spaceflight

- Reduces India's dependence on foreign ground stations for critical phases of Gaganyaan, enhancing mission resilience and operational sovereignty.

- Demonstrates India's ability to integrate with global space networks, a prerequisite for future international collaborations in human spaceflight (e.g., Artemis Accords).
- Positions ISRO as a credible partner in global human spaceflight programmes, potentially attracting further collaborations with NASA, ESA, and other agencies.

Technological and Scientific Advancement

- Validates ISRO's indigenous capabilities in mission operations while leveraging ESA's proven ground infrastructure for high-precision tracking.
- Facilitates real-time data analysis for orbital corrections, health monitoring of the crew module, and post-mission debriefing, improving mission safety.
- Enables cross-validation of telemetry data, reducing errors and enhancing the reliability of Gaganyaan's critical systems.

Geopolitical and Diplomatic Implications

- Strengthens India's strategic partnerships in space, particularly with Europe, counterbalancing reliance on traditional partners like the USA or Russia.
- Enhances India's soft power in global space governance, aligning with its non-aligned yet pragmatic foreign policy approach.
- Provides a model for future collaborations in space exploration, including lunar and Martian missions.

Economic and Industrial Impact

- Stimulates growth in India's space industry by fostering demand for indigenous ground segment technologies and services.
- Encourages private sector participation in space operations, as ISRO's collaboration with ESA may lead to joint ventures or technology transfers.
- Creates high-skilled employment opportunities in mission operations, data analytics, and satellite communications.

CHALLENGES

1. Data Security and Sovereignty

- Sharing telemetry and tracking data with ESA raises concerns about data sovereignty, particularly during sensitive phases like crewed re-entry.
- Ensuring compliance with India's data localisation policies and international agreements (e.g., ITAR, EAR) while collaborating with foreign agencies.

UPSC Link: GS Paper 3: Space Technology

2. Interoperability and Standardisation

- Differences in mission protocols, communication frequencies, and data formats between ISRO and ESA may lead to operational inefficiencies.
- Requires rigorous testing and validation of interfaces to ensure seamless integration of ESA's ground stations with ISRO's mission control systems.

UPSC Link: GS Paper 3: Space Technology

3. Operational Reliability and Redundancy

- Dependence on ESA's ground stations introduces a single point of failure if any station malfunctions or experiences downtime.
- ISRO must maintain its own redundant ground infrastructure to mitigate risks during critical mission phases.

UPSC Link: GS Paper 3: Space Technology

4. Cost and Resource Allocation

- Collaboration with ESA may entail significant financial and logistical costs, including training, infrastructure upgrades, and operational expenses.
- Balancing these costs with the need for indigenous capabilities and self-reliance in space technology is a key challenge.

UPSC Link: GS Paper 3: Space Technology

5. Regulatory and Legal Frameworks

- The absence of a comprehensive legal framework for international space collaborations in India may lead to ambiguities in liability, intellectual property, and dispute resolution.
- Requires clear agreements on liability for mission failures, data ownership, and technology transfer.

UPSC Link: GS Paper 2: International Relations

Challenges — UPSC Perspective

Issue	Concern
Data Sovereignty	Risk of unauthorised access or sharing of sensitive mission data with foreign entities.
Interoperability Gaps	Potential delays or errors due to mismatches in communication protocols between ISRO and ESA.
Single Point of Failure	Reliance on ESA's ground stations could jeopardise mission continuity if stations fail.
High Operational Costs	Financial burden of maintaining and upgrading ground infrastructure for international collaborations.
Legal Ambiguities	Unclear liability and dispute resolution mechanisms in international space agreements.
Technology Transfer Risks	Potential for proprietary technologies to be reverse-engineered or misused by foreign partners.

WAY FORWARD

- Finalise and ratify a bilateral agreement with ESA outlining data sovereignty, liability, and intellectual property clauses to address legal ambiguities.
- Develop a phased integration plan for ISRO's ground stations with ESA's network, including rigorous testing of communication protocols and data formats.

- Establish a dedicated task force within ISRO to oversee the operational aspects of the collaboration, including real-time monitoring and contingency planning.
- Invest in indigenous ground segment technologies (e.g., phased array antennas, advanced TT&C systems) to reduce dependence on foreign infrastructure.
- Conduct joint simulations and training exercises with ESA to ensure seamless coordination during critical mission phases.
- Enhance India's legal framework for international space collaborations by drafting a dedicated Space Activities Act to govern liability, data sharing, and dispute resolution.
- Promote public-private partnerships to develop cost-effective ground segment solutions, leveraging India's growing space industry.
- Document lessons learned from the Gaganyaan-Earth observation missions to refine future international collaborations in human spaceflight.

UPSC VALUE ADDITION

Keywords for Mains Answer-Writing

Human Spaceflight Programme · Gaganyaan Mission · International Space Cooperation · Ground Station Support · Technical Implementing Plan (TIP) · ISRO-ESA Collaboration · Orbital Module Operations · Data Continuity in Space Missions · Satish Dhawan Space Centre (SDSC) · Deep Space Network (DSN) · Spacecraft Tracking and Communication · Multi-National Space Missions

Concept Flow

ISRO's Gaganyaan mission requires continuous ground tracking for crew safety and orbital operations. → ISRO signs TIP with ESA to formalise ground station support, leveraging ESA's global network. → ESA's ground stations provide redundancy and extended coverage, ensuring data continuity during critical phases. → Real-time telemetry and TT&C data are transmitted to ISRO's mission control for monitoring and decision-making. → Collaboration enhances ISRO's operational capabilities and positions India as a credible partner in global human spaceflight. → Lessons from this collaboration inform future missions, including potential participation in international programmes like Artemis.

PRELIMS PRACTICE QUESTIONS

Q1. Which of the following organisations signed a Technical Implementing Plan (TIP) with ISRO for ground station support to the Gaganyaan missions?

1. A. NASA
2. B. Roscosmos
3. C. ESA
4. D. JAXA

Answer: C. ESA — The European Space Agency (ESA) signed a Technical Implementing Plan (TIP) with ISRO to provide ground station support for the Gaganyaan missions, ensuring data continuity and communication with the orbital module.

Q2. The Technical Implementing Plan (TIP) signed between ISRO and ESA pertains to:

1. A. Launch vehicle manufacturing collaboration
2. B. Ground tracking and communication support for Gaganyaan missions
3. C. Joint development of a lunar rover
4. D. Sharing of satellite imagery for weather forecasting

Answer: B. Ground tracking and communication support for Gaganyaan missions — The TIP focuses on enabling ESA to provide ground station support for Gaganyaan missions, which includes monitoring and orbital operations through continuous data flow and communication.

Q3. The signing of the Technical Implementing Plan (TIP) between ISRO and ESA took place at:

1. A. Vikram Sarabhai Space Centre (VSSC)
2. B. Satish Dhawan Space Centre (SDSC)
3. C. Indian Institute of Space Science and Technology (IIST)
4. D. Liquid Propulsion Systems Centre (LPSC)

Answer: B. Satish Dhawan Space Centre (SDSC) — The TIP was signed at the Satish Dhawan Space Centre (SDSC), which is ISRO's primary launch site located in Sriharikota, Andhra Pradesh.

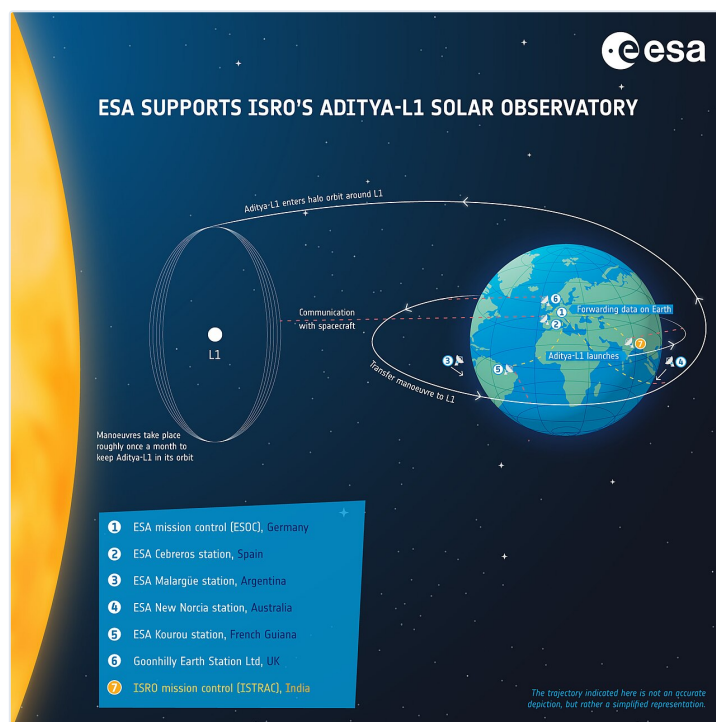
MAINS PRACTICE QUESTION

✍ Evaluate the significance of international collaborations, such as the ISRO-ESA Technical Implementing Plan (TIP), in enhancing the success and reliability of India's Gaganyaan human spaceflight programme. Substantiate your answer with relevant examples.

Approach: Begin by outlining the objectives of the Gaganyaan mission and the role of ground station support in ensuring mission success. Discuss the specific contributions of ESA's ground tracking and communication infrastructure, such as the European Space Tracking (ESTRACK) network, in providing continuous data flow and redundancy. Highlight how such collaborations reduce ISRO's dependency on indigenous infrastructure during critical phases like launch, orbit insertion, and re-entry. Conclude by emphasizing the broader implications for India's space diplomacy, technological self-reliance, and future interplanetary missions.

Source: [ISRO](#)

ISRO-ESA Strategic Partnership in Human Spaceflight: Implications for India's Space Programme and Global Collaboration



Source: [Wikimedia Commons](#) — European Space Agency (CC BY-SA 3.0 igo)

SUBJECT RELEVANCE — WHERE THIS TOPIC FITS

- GS Paper III — Science and Technology — Developments and their Applications and Effects in Everyday Life | GS Paper II — International Relations — Bilateral, Regional and Global Groupings and Agreements involving India and/or affecting India's interests
- **Prelims:** Gaganyaan Mission, Bharatiya Antariksh Station (BAS), Axiom-4 Mission, International Space Station (ISS), Human Spaceflight, ISRO-ESA MoU, Principal Investigator-led experiments, Interoperability in space platforms
- **Essay:** The Role of International Cooperation in Advancing Human Space Exploration, India's Emergence as a Leading Spacefaring Nation: Strategic and Technological Dimensions

Quick Revision: The ISRO-ESA agreement enhances India's human spaceflight capabilities through astronaut training, joint research on the ISS, and technology demonstrations, while aligning with the Gaganyaan mission and the future Bharatiya Antariksh Station.

WHY IS THIS IN THE NEWS?

The agreement between the Indian Space Research Organisation (ISRO) and the European Space Agency (ESA) marks a significant milestone in India's human spaceflight programme, particularly in the context of the Gaganyaan mission and the planned Bharatiya Antariksh Station (BAS). Signed on December 21, 2024, this cooperation framework facilitates joint astronaut training, mission implementation, and research experiments, including participation in the International Space Station (ISS) through the Axiom-4 mission. This development underscores India's growing role in global space exploration and the strategic importance of international partnerships in advancing human spaceflight capabilities.

BACKGROUND

- The Indian Space Research Organisation (ISRO) has been advancing its human spaceflight programme with the Gaganyaan mission, aimed at demonstrating India's capability to send humans to Low Earth Orbit (LEO).
- The Gaganyaan mission is part of India's broader strategy to establish a sustained human presence in space, culminating in the development of the Bharatiya Antariksh Station (BAS) by 2035.
- The European Space Agency (ESA) is a leading intergovernmental organisation with 22 member states, renowned for its expertise in human spaceflight, astronaut training, and research on the International Space Station (ISS).
- Historically, ISRO and ESA have collaborated on robotic missions such as Chandrayaan-1 and Mars Orbiter Mission, but this agreement represents a deeper engagement in human spaceflight.
- The Axiom-4 mission will include an Indian astronaut (Gaganyatri) and an ESA astronaut, marking a collaborative human spaceflight endeavour.
- The agreement aligns with India's 'Make in India' and 'Atmanirbhar Bharat' initiatives, fostering indigenous development while leveraging global expertise.

WHAT IS THE ISRO-ESA AGREEMENT ON HUMAN SPACEFLIGHT COOPERATION?

- The agreement establishes a formal framework for cooperation between ISRO and ESA in the domains of astronaut training, mission implementation, and research experiments related to human spaceflight.
- It enables Indian astronauts to undergo training at ESA facilities, including those used for ISS missions, thereby enhancing their operational readiness for the Gaganyaan mission and future BAS operations.
- The agreement facilitates the integration and implementation of research experiments led by Indian Principal Investigators on the ISS, particularly during the Axiom-4 mission.
- It includes provisions for joint biomedical and human physiological research, leveraging ESA's expertise in space medicine and life-support systems.
- The collaboration extends to technology demonstration experiments, where Indian and European technologies can be tested in microgravity environments.
- The agreement also mandates joint educational and outreach activities to inspire the next generation of scientists, engineers, and astronauts in both India and Europe.
- A key objective is to develop interoperability between ISRO's human spaceflight platforms (e.g., Gaganyaan and BAS) and ESA's infrastructure, ensuring seamless collaboration in future missions.
- The agreement reflects a long-term vision for sustained cooperation in human space exploration, with potential extensions to lunar and deep-space missions.

KEY FEATURES

Feature	Significance
Astronaut Training Cooperation	Enhances ISRO's human spaceflight capabilities through access to ESA's advanced training infrastructure and methodologies.

Feature	Significance
Mission Implementation Framework	Establishes a structured approach for joint planning, execution, and integration of human spaceflight missions.
Research Experiment Collaboration	Facilitates joint development and implementation of biomedical and technological experiments on the ISS.
Utilisation of ESA Facilities	Provides ISRO access to ISS modules and ESA's human physiological research labs for experimental validation.
Joint Education and Outreach	Promotes scientific literacy and public engagement through coordinated educational initiatives.

WHY IT MATTERS

Strategic Autonomy in Space

- Strengthens India's position in global human spaceflight by leveraging ESA's technical expertise and interoperability with international platforms.
- Supports the Bharatiya Antariksh Station (BAS) initiative by fostering compatibility with ISS and future international space stations.

Scientific Advancement

- Accelerates biomedical and technological research in microgravity through shared experimental platforms and joint Principal Investigator-led studies.
- Enables ISRO to validate human spaceflight technologies in real-world conditions, reducing developmental risks.

Diplomatic and Geopolitical

- Deepens strategic partnerships with ESA, a key player in global space governance, enhancing India's diplomatic leverage.
- Demonstrates India's commitment to international cooperation in space exploration, aligning with Artemis Accords principles.

Economic and Industrial

- Facilitates technology transfer and joint R&D, potentially reducing costs and timelines for ISRO's human spaceflight programmes.
- Opens avenues for Indian industries to participate in ESA-led space missions, boosting the domestic space economy.

CHALLENGES

1. Technical Interoperability

- Ensuring seamless integration of ISRO's systems with ESA's platforms, including ISS modules and astronaut training protocols.
- Addressing differences in engineering standards, safety protocols, and operational procedures between the agencies.

UPSC Link: GS-III: Science & Technology

2. Resource Allocation and Prioritisation

- Balancing limited ISRO resources between domestic missions (e.g., BAS) and international collaborations without compromising either.
- Managing competing priorities in astronaut training, experiment development, and mission timelines.

UPSC Link: GS-III: Space Technology

3. Data Security and IPR Concerns

- Protecting proprietary technologies and research data shared during joint experiments and missions.
- Establishing clear legal frameworks for intellectual property rights in collaborative projects.

UPSC Link: GS-II: International Relations

4. Human Capital Development

- Ensuring a steady pipeline of trained astronauts and scientists to sustain long-term collaboration.
- Addressing the shortage of specialised personnel in human spaceflight disciplines within ISRO.

UPSC Link: GS-III: Human Resource Development

5. Geopolitical Constraints

- Navigating potential conflicts between India's strategic interests and ESA's partnerships with other nations (e.g., USA, Russia).
- Mitigating risks of technology denial or restrictions due to evolving global space policies.

UPSC Link: GS-II: International Organisations

Challenges — UPSC Perspective

Issue	Concern
Standardisation Gaps	Differences in technical and operational standards between ISRO and ESA may hinder seamless collaboration.
Funding Constraints	Limited budgetary allocations may delay or dilute the scope of joint activities.
Regulatory Hurdles	Complexity in aligning India's space policies with ESA's regulatory frameworks for human spaceflight.
Knowledge Asymmetry	ISRO's relatively nascent human spaceflight programme may face challenges in matching ESA's advanced capabilities.
Mission Delays	Over-reliance on international platforms (e.g., ISS) exposes ISRO to risks of mission postponements or cancellations.

WAY FORWARD

- Finalise a detailed roadmap for the Axiom-4 mission, including experiment integration, astronaut training schedules, and ISS utilisation plans.

- Establish a joint working group to address technical interoperability, data security, and IPR frameworks for collaborative projects.
- Expand ISRO's astronaut training infrastructure by incorporating ESA's methodologies and facilities into domestic programmes.
- Develop a phased approach to utilise ESA's ISS resources, prioritising experiments aligned with BAS development goals.
- Enhance public-private partnerships to leverage domestic industries for joint R&D in human spaceflight technologies.
- Conduct regular joint reviews to assess progress, identify bottlenecks, and realign priorities based on emerging challenges.
- Strengthen diplomatic engagements to ensure continuity in collaboration despite geopolitical fluctuations.

UPSC VALUE ADDITION

Keywords for Mains Answer-Writing

ISRO-ESA cooperation · Human spaceflight · Gaganyatri mission · Axiom-4 mission · International Space Station · Bharatiya Antariksh Station · Astronaut training · Biomedical research in space · Technology demonstration experiments · Interoperability in space platforms · Principal Investigator-led experiments · Joint educational outreach in space science

Concept Flow

ISRO's human spaceflight roadmap (including BAS) necessitates international collaboration for capability enhancement. → Strategic partnership with ESA is formalised through the agreement, enabling access to training and ISS facilities. → Joint astronaut training and experiment development are initiated for the Axiom-4 mission. → Technical and operational interoperability is established, ensuring seamless integration of systems. → Scientific and technological outcomes from joint missions feed into BAS development and future ISRO programmes. → Diplomatic and economic benefits accrue from sustained international cooperation in space exploration.

PRELIMS PRACTICE QUESTIONS

Q1. Which of the following is NOT a focus area of the recent ISRO-ESA agreement signed in December 2024?

1. A. Astronaut training
2. B. Mission implementation
3. C. Development of lunar rovers
4. D. Research experiments

Answer: C. Development of lunar rovers — The agreement explicitly focuses on astronaut training, mission implementation, and research experiments. Development of lunar rovers is not mentioned as a focus area.

Q2. The ISRO-ESA agreement facilitates collaboration on experiments for the upcoming Axiom-4 mission. Which of the following is a key feature of this collaboration?

1. A. Joint development of a new space station
2. B. Implementation of shortlisted experiments by Indian Principal Investigators on the ISS
3. C. Deployment of a lunar lander
4. D. Construction of a new launch vehicle

Answer: B. Implementation of shortlisted experiments by Indian Principal Investigators on the ISS — The agreement includes the implementation of shortlisted experiments by Indian Principal Investigators on the International Space Station (ISS) as part of the Axiom-4 mission collaboration.

MAINS PRACTICE QUESTION

✍️ Analyse the significance of the ISRO-ESA agreement for India's human spaceflight programme, with particular reference to the Gaganyatri mission and the proposed Bharatiya Antariksh Station (BAS). How does this cooperation align with India's broader strategic goals in space exploration?

Approach: Begin by contextualising the ISRO-ESA agreement within India's human spaceflight roadmap, including the Gaganyatri mission and the BAS. Discuss the technical and strategic advantages of collaboration with ESA, such as access to ISS facilities, joint research, and interoperability. Highlight how this cooperation enhances India's capabilities in biomedical research, technology demonstration, and educational outreach. Conclude by linking these developments to India's strategic autonomy and global leadership in space exploration.

Source: [ISRO](#)

ISRO-ESA Collaboration in Microgravity Research: Strategic Implications for India's Human Spaceflight Programme and Scientific Diplomacy

SUBJECT RELEVANCE — WHERE THIS TOPIC FITS

- GS Paper III — Science and Technology — Developments and their Applications and Effects in Everyday Life | GS Paper III — Space Technology — ISRO's Human Spaceflight Programme and International Collaborations | GS Paper II — International Relations — Bilateral and Multilateral Agreements in Science and Technology
- **Prelims:** Microgravity research, Axiom-4 Mission, Gaganyaan Programme, European Space Agency (ESA), International Space Station (ISS), ISRO-ESA MoU, Human spaceflight safety protocols, Principal Investigator (PI) driven research, Proteomics in microgravity, Food crop seed adaptation in space
- **Essay:** The role of international collaboration in advancing national scientific capabilities: A case study of ISRO-ESA partnership, Space exploration as a catalyst for interdisciplinary scientific progress and human welfare

Quick Revision: ISRO-ESA's microgravity research collaboration aboard the Axiom-4 mission exemplifies India's strategic integration into global space science, advancing Gaganyaan's objectives while fostering interdisciplinary innovation in human health, materials science, and biotechnology.

WHY IS THIS IN THE NEWS?

The collaboration between ISRO and ESA for microgravity research aboard the Axiom-4 mission represents a significant milestone in India's human spaceflight programme, Gaganyaan. This partnership not only enhances India's scientific capabilities in space biology, agriculture, and materials science but also underscores the strategic importance of international cooperation in advancing human space exploration. The joint shortlisting of experiments by Indian Principal Investigators for execution on the International Space Station (ISS) demonstrates India's growing role in global space research and aligns with the broader objectives of fostering self-reliance in space technology while leveraging international expertise.

BACKGROUND

- The International Space Station (ISS) serves as a unique laboratory for microgravity research, enabling experiments that cannot be replicated on Earth due to the absence of gravity.
- India's Human Spaceflight Programme, Gaganyaan, aims to encourage and support Indian scientific community in microgravity research activities.
- The European Space Agency (ESA) has a long-standing history of collaboration with international partners in space missions, including the ISS, and has contributed to various scientific experiments in microgravity.
- Microgravity research has applications across multiple disciplines, including human health, materials science, biotechnology, and agriculture, making it a critical area of study for future space exploration and terrestrial benefits.
- ISRO and ESA have previously collaborated on missions such as Chandrayaan-1 and have a framework for cooperation in space science and technology.
- The Axiom-4 mission, part of Axiom Space's commercial spaceflight programme, provides an opportunity for international collaboration in microgravity research aboard the ISS.

WHAT IS MICROGRAVITY RESEARCH AND ITS SIGNIFICANCE IN THE CONTEXT OF ISRO-ESA COLLABORATION?

- Microgravity research involves the study of physical, chemical, and biological processes in a reduced-gravity environment, typically aboard spacecraft or space stations like the ISS.
- In microgravity, phenomena such as fluid dynamics, combustion, and biological growth exhibit unique characteristics that differ significantly from Earth-based conditions, offering insights into fundamental scientific principles.
- The absence of gravity in microgravity environments allows for the isolation of specific variables, enabling researchers to study processes with greater precision and control.
- Microgravity research has direct applications in human health, including studies on muscle atrophy, bone density loss, and cardiovascular changes in astronauts, which are critical for long-duration space missions.

- In materials science, microgravity enables the production of high-purity alloys, crystals, and advanced materials with unique properties that are difficult or impossible to achieve on Earth.
- Biotechnology applications include the study of protein crystallization, drug development, and the growth of three-dimensional tissue cultures, which can lead to breakthroughs in medicine and pharmaceuticals.
- Agricultural research in microgravity focuses on understanding plant growth and seed adaptation in space, which is essential for future space farming and ensuring food security during long-duration missions.
- The ISRO-ESA collaboration for the Axiom-4 mission includes shortlisted experiments such as the study of cyanobacteria growth in microgravity and the impact of microgravity on food crop seeds, which align with India's scientific priorities in space biology and agriculture.

KEY FEATURES

Feature	Significance
ISRO-ESA Joint Microgravity Research Collaboration	Facilitates India's integration into global space research networks, leveraging ESA's ISS infrastructure for Indian scientific experiments.
Shortlisted Microgravity Experiments	Three experiments focus on cyanobacteria proteomics, food crop seed growth, and human health research, aligning with Gaganyaan's scientific objectives.
Safety-Driven Operational Philosophy	Ensures human-rated mission compliance, prioritising astronaut safety while enabling high-risk scientific payloads on ISS.
Human Research and Technology Demonstrations	Expands India's scope beyond traditional space science to include astronaut health monitoring and in-situ technology validation.
Integration with Gaganyaan Mission	Serves as a precursor to India's indigenous human spaceflight programme, providing flight opportunities for Indian researchers.

WHY IT MATTERS

Scientific Advancement

- Enhances India's capacity in microgravity research, a critical domain for future space exploration and terrestrial applications in biotechnology and medicine.
- Provides Indian Principal Investigators (PIs) with access to ISS facilities, enabling high-impact experiments in proteomics, agriculture, and human physiology.
- Strengthens interdisciplinary collaboration between space agencies, academia, and industry, fostering innovation in space-based research.

Strategic Autonomy and Global Positioning

- Demonstrates India's growing role in international space cooperation, reducing dependence on bilateral partnerships for critical research.
- Positions ISRO as a credible partner in human spaceflight missions, complementing its indigenous capabilities under the Gaganyaan programme.

- Facilitates technology transfer and knowledge exchange, particularly in astronaut training and mission operations.

Economic and Industrial Impact

- Stimulates demand for high-technology sectors, including biotechnology, pharmaceuticals, and advanced materials, with potential spin-offs for terrestrial industries.
- Encourages private sector participation in space research, aligning with ISRO's efforts to commercialise space activities.
- Creates opportunities for Indian startups and MSMEs in space-qualified hardware and software development.

Human Capital Development

- Exposes Indian researchers to cutting-edge space science, enhancing the quality of human resources in STEM fields.
- Provides training and exposure to astronauts and mission specialists, building a cadre of experts for future human spaceflight missions.
- Inspires students and young scientists, contributing to the long-term growth of India's space ecosystem.

Diplomatic and Geopolitical Influence

- Reinforces India's soft power in space diplomacy, particularly with European partners, while maintaining strategic autonomy.
- Strengthens India's position in multilateral forums like the United Nations Office for Outer Space Affairs (UNOOSA).
- Balances partnerships with Western agencies without compromising on indigenous technological priorities.

CHALLENGES

1. Operational and Safety Constraints

- Stringent safety protocols for human-rated missions may delay or modify experiment designs, impacting research timelines.
- Coordination complexities between ISRO, ESA, and ISS partners require meticulous planning to avoid conflicts in mission schedules.
- Limited payload capacity and power constraints on ISS may restrict the scope or number of experiments.

UPSC Link: GS-III: Space Technology (Laws, Policies & Institutions)

2. Scientific and Technological Challenges

- Microgravity effects on biological systems are not fully understood, posing risks to experimental reproducibility and data validity.
- Developing space-qualified hardware for Indian experiments requires significant investment and technical expertise.
- Data interpretation challenges arise from the lack of baseline terrestrial controls, necessitating robust experimental design.

UPSC Link: GS-III: Science & Technology (Research & Development)

3. Resource Allocation and Funding

- High costs associated with ISS payload integration, launch, and operations may strain ISRO's limited budget for human spaceflight.
- Competition for limited flight opportunities on ISS could marginalise Indian experiments if prioritisation is skewed towards larger partners.
- Sustained funding for follow-up research and post-mission analysis is critical but often overlooked in initial mission planning.

UPSC Link: GS-III: Resource Mobilisation & Budgetary Constraints

4. Regulatory and Ethical Considerations

- Compliance with international space treaties (e.g., Outer Space Treaty) and ISS partner agreements requires careful legal navigation.
- Ethical concerns in human research experiments necessitate transparent protocols and informed consent mechanisms.
- Intellectual property rights for joint research outputs must be clearly defined to avoid disputes.

UPSC Link: GS-II: International Treaties & Conventions

5. Human Resource and Institutional Capacity

- India's limited pool of trained astronauts and mission specialists may constrain the number of personnel available for joint missions.
- Institutional capacity gaps in Indian research labs could hinder the development of high-quality experiments.
- Knowledge transfer from international partners requires systematic capacity-building programmes.

UPSC Link: GS-II: Institutions & Their Performance

Challenges — UPSC Perspective

Issue	Concern
Payload Integration Delays	ISS scheduling conflicts and safety reviews may postpone experiment deployment.
Data Quality and Reproducibility	Microgravity-induced variability in biological systems challenges experimental design.
Budgetary Overruns	High costs of ISS missions may divert funds from other critical space programmes.
Legal and Compliance Risks	Non-compliance with ISS partner agreements could jeopardise future collaborations.
Human Resource Shortages	Limited number of trained astronauts restricts mission participation.
Technology Transfer Bottlenecks	Restrictions on sensitive technologies may hinder hardware development.

WAY FORWARD

- Finalise and approve the shortlisted experiments through multi-stage safety and technical reviews in coordination with ESA and ISS partners.
- Establish dedicated funding mechanisms, including public-private partnerships, to support microgravity research infrastructure and human resource development.
- Develop a national roadmap for microgravity research, aligning ISRO's missions with Gaganyaan's scientific objectives and long-term space exploration goals.
- Enhance institutional capacity by setting up dedicated centres for space biology, material sciences, and astronaut training within Indian universities and research labs.
- Strengthen international collaborations beyond ESA, including NASA, JAXA, and Roscosmos, to diversify research opportunities and technological exchanges.
- Implement a robust data management system to ensure seamless sharing and analysis of experimental results across international partners.
- Promote awareness and participation among Indian researchers through workshops, grants, and outreach programmes to maximise the utilisation of ISS facilities.
- Integrate microgravity research outcomes into Gaganyaan's astronaut training modules to enhance mission readiness and scientific output.

UPSC VALUE ADDITION

Keywords for Mains Answer-Writing

Microgravity research · International Space Station (ISS) · ISRO-ESA collaboration · Axiom-4 mission · Gaganyaan programme · Human spaceflight missions · Cyanobacteria proteomics in microgravity · Food crop seed viability under microgravity · Principal Investigator (PI) model in space research · Biotechnology applications in space science

Concept Flow

ISRO-ESA collaboration announcement → Identification of joint research priorities in microgravity → Shortlisting of Indian experiments → Technical and safety evaluations → Integration with ISS mission planning → Execution on Axiom-4 mission → Data analysis and terrestrial applications → Feedback into Gaganyaan programme.

PRELIMS PRACTICE QUESTIONS

Q1. Which of the following institutions is NOT associated with the microgravity experiments shortlisted for the Axiom-4 mission?

1. International Centre for Genetic Engineering & Biotechnology (ICGEB)
2. Indian Institute of Space Science and Technology (IIST)
3. Indian Agricultural Research Institute (IARI)
4. Kerala Agricultural University

Answer: Indian Agricultural Research Institute (IARI) — The shortlisted experiments for Axiom-4 involve ICGEB, IIST, and Kerala Agricultural University. IARI is not listed among the collaborating institutions for these specific microgravity experiments.

Q2. The Axiom-4 mission is primarily associated with which of the following objectives?

1. Lunar sample return mission
2. Microgravity research on the International Space Station (ISS)
3. Mars rover deployment
4. Asteroid deflection demonstration

Answer: Microgravity research on the International Space Station (ISS) — The Axiom-4 mission is focused on conducting microgravity research experiments aboard the International Space Station (ISS) as part of ISRO-ESA collaboration.

MAINS PRACTICE QUESTION

✍️ Analyse the significance of ISRO-ESA collaboration in microgravity research for India's Gaganyaan programme and its broader implications for space-based biotechnology and agricultural sciences.

Approach: Examine the strategic importance of international collaborations in advancing India's human spaceflight capabilities under the Gaganyaan programme. Discuss how microgravity research on the ISS, such as cyanobacteria proteomics and food crop seed viability studies, can enhance India's scientific output in biotechnology and agriculture. Highlight the role of Principal Investigators (PIs) in fostering indigenous research and the potential for translating these findings into terrestrial applications, including pharmaceutical development and sustainable food production.

Source: [ISRO](#)

Indian Microgravity Research Portfolio: Leveraging the Axiom-4 Mission for Scientific Advancement and Strategic Autonomy



Source: [Wikimedia Commons](#) — NASA Johnson Space Center (Public domain)

SUBJECT RELEVANCE — WHERE THIS TOPIC FITS

- GS Paper III — Science and Technology — Developments and their Applications and Effects in Everyday Life | GS Paper III — Space Technology — Recent Developments and International Collaborations
- **Prelims:** Microgravity research, International Space Station (ISS), Axiom-4 mission, Gaganyaan Programme, Bharatiya Antariksh Station, Paramacrobiotus sp., InStem, ICGB, IISc, IIST
- **Essay:** The Role of International Collaborations in Advancing India's Space Ambitions, Scientific Research as a Catalyst for National Development and Strategic Autonomy

Quick Revision: Microgravity research on the ISS, as part of the Axiom-4 mission, enables India to advance its scientific capabilities in human health, material sciences, and biotechnology while strengthening its strategic position in international space collaborations.

WHY IS THIS IN THE NEWS?

The upcoming Axiom-4 mission, a collaborative human spaceflight initiative between ISRO and international partners, marks a significant milestone in India's microgravity research portfolio. Scheduled for implementation onboard the International Space Station (ISS), this mission will facilitate seven shortlisted Indian microgravity experiments, underscoring the nation's growing capabilities in space sciences and its commitment to leveraging international platforms for advancing indigenous research. The inclusion of these experiments reflects ISRO's strategic vision to integrate human spaceflight missions with scientific inquiry, aligning with broader national objectives such as the establishment of the Bharatiya Antariksh Station by 2035 and a crewed lunar mission by 2040.

BACKGROUND

- ISRO has historically prioritised the utilisation of outer space for national development, with over 236 missions and 4,000 sounding rocket launches contributing to advancements in remote sensing, communication, navigation, disaster management, and space sciences.
- The Gaganyaan Programme, approved by the Government of India, aims to demonstrate human spaceflight capabilities to Low Earth Orbit (LEO) and lay the groundwork for future Indian human space exploration missions, including crewed lunar missions.
- International collaborations have been a cornerstone of India's space programme, exemplified by Rakesh Sharma's historic mission to space in 1984 and the recent agreement during Prime Minister Narendra Modi's state visit to the USA in June 2023, which facilitated the Gaganyatri mission to the ISS.
- Microgravity research, conducted in environments where gravitational forces are significantly reduced, offers unique opportunities to study phenomena that are otherwise obscured or altered under Earth's gravity, with applications spanning human health, material sciences, biotechnology, and pharmaceutical development.
- The selection of seven microgravity experiments for the Axiom-4 mission reflects ISRO's commitment to fostering a robust research ecosystem in India, involving principal investigators from leading national institutions such as ICGEB, IISc, IIST, and InStem.
- The mission's operational philosophy adheres to stringent safety protocols and mission constraints inherent to human spaceflight, ensuring rigorous ground-based evaluations and reviews prior to launch.

WHAT IS MICROGRAVITY RESEARCH AND ITS SIGNIFICANCE IN THE CONTEXT OF THE AXIOM-4 MISSION?

- Microgravity refers to an environment where the apparent weight of an object is significantly reduced, often to near-zero levels, due to the balance between gravitational force and centrifugal forces experienced in free-fall orbits such as the ISS.
- Such environments enable the study of physical, chemical, and biological processes without the interference of gravitational forces, providing insights into fundamental scientific principles and potential applications in diverse fields.
- In human health, microgravity research aids in understanding muscle atrophy, bone density loss, and fluid redistribution, which are critical for long-duration space missions and terrestrial medical advancements.
- Material sciences benefit from microgravity environments by allowing the synthesis of novel alloys, crystals, and composites with enhanced properties, free from gravitational segregation or buoyancy-driven convection.
- Biotechnology and pharmaceutical development leverage microgravity to study cellular processes, protein crystallisation, and drug interactions, potentially leading to breakthroughs in disease treatment and drug discovery.
- The Axiom-4 mission's microgravity experiments are designed to address specific national priorities, including crew nutrition, plant biology, extremophile survival, muscle regeneration, human-computer interaction, cyanobacterial growth, and food crop resilience.

- The experiments onboard the ISS will utilise existing research facilities, including advanced imaging systems, life support modules, and experimental payload racks, to ensure high-fidelity data collection and analysis.
- The mission serves as a precursor to India's broader ambitions in human spaceflight, including the establishment of the Bharatiya Antariksh Station and future crewed lunar missions, by demonstrating operational readiness and scientific capability.

KEY FEATURES

Feature	Significance
Collaborative Human Spaceflight Mission (Axiom-4)	Demonstrates India's participation in international space exploration, leveraging ISS infrastructure for microgravity research.
Shortlisted Microgravity Experiments (7 projects)	Covers diverse domains: biotechnology, agriculture, material sciences, and human health, aligning with ISRO's Gaganyaan Programme objectives.
Institutional Participation (10+ entities)	Involves premier Indian R&D labs (ICGEB, IISc, InStem) and academic institutions, fostering interdisciplinary research.
Safety-Driven Operational Philosophy	Ensures human spaceflight compliance through rigorous ground-based evaluations before ISS deployment.
Integration with Gaganyaan Programme	Serves as a precursor to India's indigenous human spaceflight missions, building microgravity research capabilities.

WHY IT MATTERS

Scientific Advancement

- Advances microgravity research in India, addressing critical gaps in biotechnology, agriculture, and material sciences for space and terrestrial applications.
- Provides Indian scientists with access to ISS facilities, enabling high-impact experiments in controlled microgravity environments.
- Enhances understanding of biological and physical processes under microgravity, with potential spin-offs for human health and industrial innovation.

Strategic Autonomy

- Strengthens India's position in global space exploration through collaboration with international partners (e.g., Axiom Space, NASA).
- Builds indigenous capabilities in human spaceflight, reducing reliance on foreign platforms for critical research.
- Supports ISRO's long-term vision of a Bharatiya Antariksh Station by 2035 and a crewed lunar mission by 2040.

Economic Implications

- Stimulates R&D investment in biotechnology, pharmaceuticals, and agriculture, with potential commercial applications.
- Encourages public-private partnerships in space technology, fostering innovation and job creation in STEM sectors.

- Positions India as a hub for space-based research, attracting global collaborations and funding.

Human Resource Development

- Trains Indian scientists and engineers in microgravity experimentation, building a skilled workforce for future missions.
- Inspires STEM education and research culture, aligning with the National Education Policy 2020's emphasis on interdisciplinary learning.
- Creates opportunities for Indian students and researchers to engage in cutting-edge space science.

Diplomatic Engagement

- Reinforces India's diplomatic ties through space collaboration, as seen in the 2023 US-India joint statement on human spaceflight.
- Demonstrates India's commitment to global scientific cooperation, aligning with the UN Sustainable Development Goals (SDG 4, 9, 17).
- Enhances India's soft power in the space sector, complementing its leadership in remote sensing and satellite technology.

CHALLENGES

1. Operational Constraints of Human Spaceflight

- Stringent safety protocols limit payload flexibility, necessitating rigorous ground-based testing before ISS deployment.
- Mission duration and crew time on ISS are constrained, requiring precise experiment design and execution.
- Coordinating international logistics (e.g., launch schedules, payload integration) adds complexity to mission planning.

UPSC Link: GS-III: Science & Technology

2. Scientific and Technological Gaps

- Limited prior experience in microgravity experiments for some Indian institutions, requiring capacity-building initiatives.
- Developing space-compatible experimental hardware and protocols demands specialized expertise and infrastructure.
- Ensuring data integrity and reproducibility in microgravity environments poses technical challenges.

UPSC Link: GS-III: Science & Technology

3. Resource Allocation and Funding

- High costs associated with human spaceflight missions necessitate judicious resource allocation and prioritization.
- Sustaining long-term microgravity research requires consistent funding and institutional support.

- Balancing immediate research goals with long-term strategic objectives (e.g., Gaganyaan Programme) is a challenge.

UPSC Link: GS-III: Science & Technology

4. Regulatory and Ethical Considerations

- Adhering to international space treaties (e.g., Outer Space Treaty) while pursuing national objectives requires careful navigation.
- Ensuring ethical compliance in biological and biomedical experiments, especially those involving human subjects or genetic material.
- Addressing intellectual property rights and data-sharing agreements with international partners.

UPSC Link: GS-II: International Relations

5. Knowledge Dissemination and Utilization

- Translating experimental findings into practical applications (e.g., pharmaceuticals, crop improvement) requires interdisciplinary collaboration.
- Ensuring that research outcomes are accessible to policymakers, industries, and the broader scientific community.
- Avoiding duplication of efforts with existing global microgravity research initiatives.

UPSC Link: GS-III: Science & Technology

Challenges — UPSC Perspective

Issue	Concern
Limited ISS Payload Capacity	Constraints on the number and size of experiments that can be accommodated during the mission.
Microgravity Experiment Design	Developing protocols that account for the unique challenges of microgravity environments.
International Collaboration Logistics	Coordinating with Axiom Space, NASA, and other partners for seamless mission execution.
Data Transmission and Analysis	Ensuring real-time or near-real-time data transmission from ISS to ground stations for analysis.
Post-Mission Utilization of Data	Effectively disseminating and applying research findings to maximize societal and scientific impact.
Cost of Space-Based Research	Balancing the high expenses of human spaceflight with the expected scientific and strategic benefits.

WAY FORWARD

- Establish dedicated microgravity research centers under ISRO to consolidate expertise and resources for future missions.
- Develop indigenous microgravity experimental hardware and protocols to reduce reliance on international partners.

- Strengthen collaborations between ISRO, academic institutions, and private sector entities to foster innovation.
- Create a national repository for microgravity research data to ensure accessibility and reuse across disciplines.
- Integrate microgravity experiments into the Gaganyaan Programme's training and operational frameworks.
- Enhance public outreach and STEM education initiatives to inspire the next generation of space scientists.
- Formulate a clear policy framework for intellectual property rights and data-sharing in international space missions.
- Conduct periodic reviews of mission outcomes to align future research with national strategic goals.

UPSC VALUE ADDITION

Keywords for Mains Answer-Writing

Microgravity research · International Space Station (ISS) · ISRO's Gaganyatri mission · Axiom-4 mission · Human spaceflight collaboration · Indian microgravity experiments · Space biology · Space agriculture · Radiation effects in space · Muscle regeneration in microgravity · Space pharmacology · Tardigrades in space · Space nutrition · Cyanobacteria in microgravity · Bharatiya Antariksh Station

Concept Flow

India's participation in Axiom-4 mission → Leverages ISS infrastructure for microgravity research → Aligns with Gaganyaan Programme objectives → Builds indigenous human spaceflight capabilities. → Collaboration with international partners (Axiom Space, NASA) → Facilitates access to ISS facilities → Enables high-impact scientific experiments → Strengthens India's global space diplomacy. → Shortlisted experiments (7 projects) → Covers biotechnology, agriculture, material sciences → Addresses critical gaps in microgravity research → Supports India's long-term space exploration goals. → Rigorous ground-based testing → Ensures mission safety and compliance → Mitigates risks in human spaceflight → Enhances operational readiness for Gaganyaan. → Institutional participation (IISc, ICGEB, etc.) → Fosters interdisciplinary research → Builds human resource capacity → Drives innovation in space sciences. → Microgravity research outcomes → Translates to terrestrial applications (e.g., pharmaceuticals, crop improvement) → Contributes to national economic growth → Aligns with SDG 9 (Industry, Innovation, and Infrastructure).

PRELIMS PRACTICE QUESTIONS

Q1. Which of the following institutions is NOT directly involved in the microgravity experiments shortlisted for the Axiom-4 mission?

1. Indian Institute of Sciences (IISc)
2. Indian Institute of Space Science and Technology (IIST)

3. Tata Institute of Fundamental Research (TIFR)
4. Institute of Stem Cell Science and Regenerative Medicine (InStem)

Answer: Tata Institute of Fundamental Research (TIFR) — TIFR is not listed among the institutions involved in the shortlisted microgravity experiments for the Axiom-4 mission, whereas IISc, IIST, and InStem are explicitly mentioned.

Q2. The Axiom-4 mission, involving ISRO's Gaganyatri, is significant for India primarily because it marks:

1. The first Indian mission to the Moon
2. The first Indian human spaceflight mission to the International Space Station (ISS)
3. The launch of India's indigenous space station, Bharatiya Antariksh Station
4. The deployment of India's first interplanetary probe

Answer: The first Indian human spaceflight mission to the International Space Station (ISS) — The Axiom-4 mission is notable as it involves the first Indian astronaut (Gaganyatri) visiting the ISS, representing a collaborative human spaceflight effort.

Q3. Which of the following research areas is NOT represented among the shortlisted microgravity experiments for the Axiom-4 mission?

1. Impact of microgravity on human-machine interaction
2. Growth and yield of food crops in microgravity
3. Development of new propulsion systems for spacecraft
4. Survival and reproduction of tardigrades in space

Answer: Development of new propulsion systems for spacecraft — The shortlisted experiments focus on microgravity research in biology, agriculture, pharmacology, and materials science, but not on spacecraft propulsion systems.

MAINS PRACTICE QUESTION

✍ Evaluate the strategic significance of India's participation in the Axiom-4 mission for the development of its indigenous human spaceflight programme. Discuss the potential scientific and technological benefits that such collaborations offer in the context of India's long-term space exploration goals.

Approach: Begin by contextualising India's human spaceflight ambitions, including the Gaganyaan Programme and the vision for a Bharatiya Antariksh Station by 2035. Highlight the role of international collaborations in accelerating technological readiness and scientific research. Analyse the specific microgravity experiments shortlisted for the Axiom-4 mission, categorising them into themes such as space biology, agriculture, and materials science. Emphasise how these experiments contribute to India's preparedness for sustained human presence in space and the development of indigenous capabilities in critical domains like radiation shielding, life support systems, and pharmaceutical research. Conclude by linking these efforts to India's broader goals of self-reliance and global leadership in space exploration.

Source: [ISRO](#)

Ax-04 Mission: Technical Hurdles and Collaborative Resolutions in Commercial Spaceflight Operations



Source: [Wikimedia Commons](#) — NASA Johnson Space Center (Public domain)

SUBJECT RELEVANCE — WHERE THIS TOPIC FITS

- GS Paper III — Science and Technology — Space Technology
- **Prelims:** Ax-04 mission, Falcon 9 launch vehicle, Zvezda Service Module, Axiom Space, ISRO, SpaceX, NASA, International Space Station (ISS), liquid oxygen leak, pressure anomaly
- **Essay:** The role of international cooperation in advancing space exploration, Commercialisation of space missions and its implications for global science and technology

Quick Revision: The Ax-04 mission exemplifies the integration of commercial spaceflight with international collaboration, while technical anomalies like liquid oxygen leaks and pressure discrepancies demonstrate the critical need for rigorous pre-launch testing and in-orbit diagnostics in space operations.

WHY IS THIS IN THE NEWS?

The Ax-04 mission, a collaborative commercial spaceflight endeavour involving Axiom Space, ISRO, SpaceX, and NASA, has encountered technical challenges—specifically a liquid oxygen leak in the Falcon 9 launch vehicle and a pressure anomaly in the Zvezda Service Module aboard the International Space Station. These issues necessitated coordinated corrective measures, delaying the mission's launch timeline and underscoring the complexities of modern space operations.

BACKGROUND

- The Ax-04 mission is part of Axiom Space's broader initiative to facilitate commercial human spaceflight, including missions to the International Space Station (ISS).

- Axiom Space, a private aerospace company, has partnered with NASA under the Commercial Crew Program to transport astronauts and research payloads to the ISS.
- SpaceX's Falcon 9, a reusable orbital launch vehicle, is the primary launch platform for the Ax-04 mission, leveraging its proven reliability in crewed and uncrewed missions.
- The Zvezda Service Module, a critical component of the Russian segment of the ISS, provides life support, propulsion, and docking capabilities for the station.
- ISRO's involvement in the Ax-04 mission highlights India's growing role in international space collaborations, particularly in areas like launch support and mission coordination.
- Technical anomalies in space missions are not uncommon; they require rigorous troubleshooting and interdisciplinary collaboration to ensure mission safety and success.

WHAT IS THE AX-04 MISSION?

- The Ax-04 mission is a commercial spaceflight endeavour organised by Axiom Space, aimed at transporting astronauts and payloads to the International Space Station (ISS) using SpaceX's Falcon 9 launch vehicle.
- The mission is part of Axiom Space's broader strategy to expand commercial access to low-Earth orbit, supporting scientific research, technological demonstrations, and private astronaut missions.
- Axiom Space has secured NASA's approval under the Commercial Crew Program, which facilitates private sector involvement in ISS missions, reducing reliance on government-operated spacecraft.
- The mission's payload may include scientific experiments, technology demonstrations, and educational initiatives, aligning with NASA's objectives for ISS utilisation.
- The Falcon 9 launch vehicle, developed by SpaceX, is a two-stage rocket designed for reusability, reducing the cost of space access and enhancing mission flexibility.
- The Zvezda Service Module, a key component of the Russian segment of the ISS, plays a critical role in maintaining the station's orbit, life support systems, and docking infrastructure.
- The Ax-04 mission underscores the increasing collaboration between government space agencies (NASA, ISRO) and private enterprises (Axiom Space, SpaceX) in advancing human spaceflight capabilities.
- Technical challenges such as the liquid oxygen leak and pressure anomaly highlight the inherent risks in space missions, necessitating robust contingency planning and real-time problem-solving.

KEY FEATURES

Feature	Significance
Ax-04 Mission	Represents India's growing collaboration in commercial human spaceflight under the Axiom Space-ISRO partnership, enhancing India's role in global space economy.
Falcon 9 Liquid Oxygen Leak	Demonstrates the criticality of pre-launch diagnostics in space missions, where even minor anomalies can delay multi-million-dollar projects.

Feature	Significance
Zvezda Service Module Pressure Anomaly	Highlights the operational challenges of maintaining International Space Station (ISS) infrastructure, which is vital for long-duration human spaceflight and microgravity research.
ISRO-Axiom-SpaceX Coordination	Showcases the necessity of international cooperation in space missions, where agencies with complementary expertise mitigate risks through shared data and protocols.
Commercial Spaceflight Sector	Illustrates the expanding role of private entities in space exploration, reducing government burden while accelerating technological advancements.

WHY IT MATTERS

Economic

- The Ax-04 mission underscores India's strategic entry into the commercial spaceflight market, potentially boosting revenue from space tourism and research collaborations.
- Private sector participation in space missions (e.g., Axiom Space) reduces the financial burden on national space agencies like ISRO, enabling resource allocation to other critical areas.
- The ISS pressure anomaly highlights the economic importance of maintaining orbital infrastructure, which supports commercial research and development in microgravity.

Strategic

- India's collaboration with Axiom Space and SpaceX strengthens its position in the global space economy, countering China's advancements in human spaceflight.
- The mission aligns with India's long-term goal of establishing a self-sustaining human spaceflight programme, as outlined in the Gaganyaan mission framework.
- Commercial human spaceflight missions enhance India's soft power, fostering international partnerships and technological exchange.

Scientific

- The ISS pressure anomaly investigation contributes to the broader understanding of long-term space station sustainability, critical for future lunar or Martian habitats.
- Microgravity research onboard the ISS, facilitated by such missions, is essential for advancements in medicine, materials science, and biology.
- The Ax-04 mission's payloads (if any) will likely include experiments in human physiology, fluid dynamics, or space technology, advancing India's scientific capabilities.

CHALLENGES

1. Technical Anomalies in Launch Vehicles

- Liquid oxygen leaks in Falcon 9 highlight the vulnerability of cryogenic propulsion systems, which are essential for heavy-lift missions but prone to thermal and structural stresses.
- Such anomalies necessitate rigorous pre-flight testing, increasing mission timelines and costs, which can delay critical payload deliveries or crewed missions.

- The resolution of such issues requires real-time diagnostics and adaptive engineering, demanding a highly skilled workforce and advanced infrastructure.

UPSC Link: GS3: Science and Technology - Space Technology

2. ISS Infrastructure Maintenance

- Pressure anomalies in the Zvezda Service Module underscore the challenges of maintaining aging space station infrastructure, which is subjected to extreme thermal cycling and micrometeoroid impacts.
- Unaddressed anomalies can compromise crew safety, airlock integrity, or life-support systems, necessitating immediate corrective measures.
- The ISS, a collaborative effort, requires seamless coordination among international partners to address such issues, testing diplomatic and technical resilience.

UPSC Link: GS3: Science and Technology - Space Technology

3. Mission Scheduling and Coordination

- Delays in launch schedules due to technical issues can disrupt the entire mission timeline, affecting payload delivery, crew rotations, and scientific experiments.
- Coordinating between multiple agencies (ISRO, Axiom Space, SpaceX, NASA) with differing operational priorities and time zones adds complexity to mission planning.
- Such delays can also impact downstream missions, as resources (e.g., launch pads, ground stations) may be tied up for extended periods.

UPSC Link: GS3: Science and Technology - Space Technology

4. Regulatory and Safety Compliance

- Commercial spaceflight missions must adhere to stringent safety and regulatory standards set by national and international bodies (e.g., FAA, ISRO, NASA).
- Ensuring compliance while maintaining mission timelines is a persistent challenge, particularly when anomalies require additional certifications or redesigns.
- The lack of a unified global regulatory framework for commercial spaceflight can lead to jurisdictional ambiguities and delays in approvals.

UPSC Link: GS3: Science and Technology - Space Technology

5. Human Spaceflight Risks

- Crewed missions like Ax-04 carry inherent risks, including exposure to radiation, microgravity-induced health issues, and potential system failures during launch or docking.
- Even minor technical issues (e.g., pressure anomalies) can escalate into life-threatening scenarios, necessitating robust contingency planning and redundant systems.
- The psychological and physiological well-being of astronauts during extended missions remains a critical challenge, requiring continuous monitoring and support.

UPSC Link: GS3: Science and Technology - Space Technology

Challenges — UPSC Perspective

Issue	Concern
Cryogenic Propulsion Vulnerabilities	Risk of catastrophic failure due to thermal stresses or material fatigue in liquid oxygen tanks.
ISS Aging Infrastructure	Increased likelihood of system failures in modules like Zvezda, which are over two decades old.
Multi-Agency Coordination Delays	Divergent priorities and communication gaps between ISRO, Axiom Space, SpaceX, and NASA can prolong resolution timelines.
Regulatory Hurdles	Stringent safety certifications and lack of harmonised global standards may delay mission approvals.
Crew Safety in Commercial Missions	Commercial spaceflight's profit motive may compromise safety protocols, necessitating stricter oversight.
Long-Term Mission Sustainability	Ensuring the ISS remains operational until at least 2030 requires continuous investment and technological upgrades.

WAY FORWARD

- Conduct a comprehensive post-mission analysis of the Falcon 9 liquid oxygen leak to identify root causes and implement design improvements in cryogenic propulsion systems.
- Establish a dedicated ISRO-Axiom-SpaceX working group to streamline communication protocols and reduce coordination delays in future missions.
- Develop a national framework for regulating commercial human spaceflight, aligning with international standards while addressing India's specific needs.
- Enhance India's ground-based tracking and diagnostic capabilities to enable real-time anomaly detection in launch vehicles and spacecraft.
- Prioritise research into materials science for cryogenic storage and ISS infrastructure to mitigate aging-related failures.
- Strengthen bilateral and multilateral agreements to ensure seamless collaboration on ISS maintenance and future lunar/Mars missions.
- Invest in public-private partnerships to accelerate the development of India's indigenous human-rated launch vehicles and spacecraft.
- Incorporate lessons from Ax-04 into the Gaganyaan mission planning to preemptively address similar technical and operational challenges.

UPSC VALUE ADDITION

Keywords for Mains Answer-Writing

Ax-04 Mission · International Space Station (ISS) · Axiom Space · SpaceX · Falcon 9 launch vehicle · Liquid oxygen leak · Zvezda Service Module · Pressure anomaly · Commercial spaceflight · NASA-ISRO collaboration · Space station modules · Reusable launch systems

Concept Flow

Technical anomaly (liquid oxygen leak in Falcon 9) → Pre-launch diagnostics and corrective measures → Mission delay → Coordination between ISRO, Axiom Space, and SpaceX → Rescheduling of launch date → Assessment of ISS pressure anomaly → Inter-agency collaboration to resolve anomaly → Final launch approval → Mission execution → Post-mission analysis for future improvements.

PRELIMS PRACTICE QUESTIONS

Q1. Which of the following entities is NOT directly involved in the Ax-04 mission?

1. A. ISRO
2. B. Axiom Space
3. C. NASA
4. D. Roscosmos

Answer: D. Roscosmos — The Ax-04 mission involves coordination between ISRO, Axiom Space, and NASA. Roscosmos, the Russian space agency, is not mentioned in the context of this mission.

Q2. The Zvezda Service Module, mentioned in the context of the Ax-04 mission, is a component of which space station?

1. A. Tiangong Space Station
2. B. International Space Station (ISS)
3. C. Mir Space Station
4. D. Skylab

Answer: B. International Space Station (ISS) — The Zvezda Service Module is a critical component of the International Space Station (ISS), serving as the primary living quarters and life-support system.

MAINS PRACTICE QUESTION

✍️ Analyse the significance of commercial spaceflight missions like Ax-04 in the context of India's space programme and global space exploration. Discuss the technological, economic, and strategic implications.

Approach: Examine the role of commercial entities (e.g., SpaceX, Axiom Space) in advancing space exploration, particularly in low-Earth orbit missions. Highlight India's participation (ISRO's role) and the broader implications for cost-efficiency, technological innovation, and international collaboration. Address how such missions contribute to India's strategic goals in space, including self-reliance (Atmanirbhar Bharat) and global partnerships.

Source: [ISRO](#)

Axiom-4 Mission: India's Microgravity Experiments and Return Trajectory — A Strategic Leap for Gaganyaan and Beyond



Source: [Wikimedia Commons](#) — NASA Johnson Space Center (Public domain)

SUBJECT RELEVANCE — WHERE THIS TOPIC FITS

- GS Paper III — Science and Technology — Developments and their Applications and Effects in Everyday Life | GS Paper III — Awareness in the fields of Space
- **Prelims:** Axiom-4 mission, Gaganyatri Shubhanshu Shukla, Microgravity experiments, Tardigrade survival in space, Myogenesis in space, Cyanobacteria for life support, Bhartiya Antariksha Station, Gaganyaan mission, Private Astronaut Missions (PAM), International Space Station (ISS)
- **Essay:** India's Space Odyssey: From Chandrayaan to Gaganyaan and Beyond, The Role of Private Sector in Advancing India's Space Ambitions

Quick Revision: The Axiom-4 mission exemplifies India's strategic engagement in microgravity research, directly advancing the objectives of the Gaganyaan mission and the Bhartiya Antariksha Station through validated experimental protocols and astronaut readiness.

WHY IS THIS IN THE NEWS?

The Axiom-4 mission, featuring India's Gaganyatri Shubhanshu Shukla, marks a critical milestone in India's spacefaring ambitions, particularly for the Gaganyaan mission and the proposed Bhartiya Antariksha Station. The successful completion of four microgravity experiments and the near-completion of three others underscore India's growing prowess in space science. The tentative return schedule—undocking on July 14, 2025, and splashdown on July 15, 2025—further highlights the operational readiness of India's astronauts for future missions, including private astronaut missions and long-duration space habitation.

BACKGROUND

- The Axiom-4 mission is a Private Astronaut Mission (PAM) facilitated by Axiom Space Inc., USA, in collaboration with international space agencies, including ISRO.

- India's participation in the Axiom-4 mission is a strategic step toward preparing for the Gaganyaan mission, India's first human spaceflight programme, and the future Bhartiya Antariksha Station.
- Microgravity experiments conducted in space environments provide critical insights into biological, physiological, and technological challenges posed by long-duration spaceflight.
- The International Space Station (ISS) serves as a unique laboratory for conducting microgravity experiments, enabling scientists to study phenomena that cannot be replicated on Earth.
- ISRO's involvement in the Axiom-4 mission aligns with its broader goals of advancing indigenous capabilities in human spaceflight, life support systems, and planetary exploration.
- The successful execution of these experiments will contribute to the development of life support systems, nutritional strategies, and biomedical research essential for future missions, including those to the Moon and Mars.

WHAT IS THE AXIOM-4 MISSION?

- The Axiom-4 mission is a Private Astronaut Mission (PAM) organised by Axiom Space Inc., USA, in partnership with international space agencies, including ISRO, to conduct microgravity experiments aboard the International Space Station (ISS).
- The mission features Gaganyatri Shubhanshu Shukla, an Indian astronaut, who is leading a suite of seven microgravity experiments focused on biological, physiological, and technological research.
- The experiments are designed to study the effects of microgravity on biological organisms, human physiology, plant growth, and microbial systems, with direct applications for India's Gaganyaan mission and future space habitats.
- Four of the seven experiments have been successfully completed, including studies on Tardigrade survival, Myogenesis (muscle cell development), sprouting of methi and moong seeds, and Cyanobacteria growth for life support systems.
- The remaining three experiments—Microalgae, Crop seeds, and Voyager Display—are nearing completion and will provide additional data for analysis upon return to Earth.
- The mission underscores India's growing role in international space collaborations and its commitment to advancing indigenous capabilities in human spaceflight and space science.
- The return journey, scheduled for undocking on July 14, 2025, and splashdown on July 15, 2025, will mark the successful completion of India's participation in this mission, with the Gaganyatri undergoing a rehabilitation programme to re-adapt to Earth's gravity.
- The data and insights gained from these experiments will be critical for ISRO's future missions, including the Gaganyaan programme, the proposed Bhartiya Antariksha Station, and potential planetary exploration efforts.

KEY FEATURES

Feature	Significance
Tardigrade Experiment (Indian strain)	Demonstrates cryptobiosis and resilience in microgravity, informing astrobiology and life-support system design for long-duration missions.

Feature	Significance
Myogenesis Experiment	Investigates muscle atrophy in microgravity to develop countermeasures for astronaut health during prolonged spaceflight.
Sprouting of Methi & Moong Seeds	Assesses nutritional viability of fast-growing crops for crew sustenance in space habitats and future lunar/Martian colonies.
Cyanobacteria Experiment	Evaluates growth patterns for oxygen production and carbon dioxide sequestration, critical for closed-loop life support systems.
Microalgae Experiment	Explores biofuel potential and CO ₂ absorption efficiency in microgravity for sustainable space missions.
Crop Seeds Experiment	Studies genetic stability and germination rates of terrestrial crops in space to support planetary agriculture.
Voyager Display Experiment	Tests human-machine interface technologies for future space station operations and robotic assistance.

WHY IT MATTERS

Scientific Advancement

- Validates indigenous microgravity research capabilities, reducing reliance on foreign collaborations for critical space biology data.
- Provides empirical data for ISRO's Human Spaceflight Programme (HSP) and the proposed Bhartiya Antariksha Station.
- Enhances understanding of extremophile biology, with applications in astrobiology and planetary protection protocols.

Technological Leap

- Demonstrates India's proficiency in executing complex microgravity experiments aboard commercial space missions.
- Contributes to the development of closed-loop life support systems for future interplanetary missions.
- Strengthens India's position in the global space economy by participating in Axiom Space's commercial ISS ventures.

Strategic Autonomy

- Reduces dependency on foreign space agencies for microgravity research, aligning with the 'Atmanirbhar Bharat' vision.
- Enhances India's negotiating power in international space collaborations and technology-sharing agreements.

Human Capital Development

- Serves as a precursor to India's Gaganyaan mission by training astronauts in microgravity research and operational protocols.
- Fosters a new generation of space scientists and engineers through hands-on participation in high-stakes missions.

International Collaboration

- Reinforces India's role in the Artemis Accords and other multilateral space initiatives through active participation in commercial missions.
- Facilitates knowledge exchange with international partners, accelerating India's space research capabilities.

CHALLENGES

1. Microgravity Experiment Constraints

- Limited payload capacity and power availability aboard the ISS restrict the scale and complexity of experiments.
- Time-sensitive nature of biological samples demands precise scheduling to avoid degradation during transit.
- Real-time monitoring and troubleshooting are constrained by communication delays between ISS and ground stations.

UPSC Link: GS III: Science and Technology

2. Re-entry and Splashdown Risks

- Atmospheric re-entry subjects the Crew Dragon to extreme thermal and mechanical stresses, requiring flawless heat-shield performance.
- Splashdown proximity to California coast introduces logistical challenges in rapid recovery and post-mission rehabilitation.
- Potential delays in undocking due to ISS operational constraints or weather conditions may impact the mission timeline.

UPSC Link: GS III: Disaster Management

3. Health and Rehabilitation Challenges

- Prolonged exposure to microgravity causes muscle atrophy and bone density loss, necessitating a structured rehabilitation program.
- Psychological adaptation to Earth's gravity post-mission requires continuous monitoring to prevent orthostatic intolerance.
- Post-splashdown medical protocols must account for potential decompression sickness and fluid shifts in the astronaut's body.

UPSC Link: GS II: Health and Family Welfare

4. Data Integrity and Analysis

- Microgravity experiments are highly sensitive to environmental fluctuations, risking contamination or data corruption.
- Post-mission analysis requires advanced computational tools and interdisciplinary collaboration to interpret results accurately.
- Comparative studies with terrestrial controls are essential but logistically complex due to sample variability.

UPSC Link: GS III: Science and Technology

Challenges — UPSC Perspective

Issue	Concern
Payload Limitations	Restricted space and power aboard ISS limit the scope of experiments.
Sample Degradation	Biological samples may degrade during transit, affecting experimental outcomes.
Re-entry Thermal Load	Crew Dragon's heat shield must withstand extreme temperatures during atmospheric entry.
Recovery Logistics	Rapid retrieval from splashdown site is critical to minimize post-mission health risks.
Data Interpretation	Complex microgravity effects require sophisticated analytical frameworks for accurate conclusions.
Psychological Adaptation	Astronauts may face cognitive and physiological challenges during re-entry and rehabilitation.

WAY FORWARD

- Accelerate the development of indigenous microgravity research facilities, such as dedicated modules on the Bhartiya Antariksha Station.
- Enhance real-time monitoring capabilities for ISS-bound experiments to improve data reliability and troubleshooting efficiency.
- Strengthen post-mission rehabilitation protocols by collaborating with medical institutions for long-term astronaut health tracking.
- Expand international partnerships to share best practices in commercial space missions and microgravity research.
- Invest in advanced computational tools for data analysis to derive actionable insights from microgravity experiments.
- Develop contingency plans for mission delays, including alternative splashdown sites and extended rehabilitation protocols.
- Promote public-private partnerships to fund and support future commercial space missions involving Indian astronauts.
- Integrate findings from Axiom-4 experiments into Gaganyaan's training modules and mission planning.

UPSC VALUE ADDITION

Keywords for Mains Answer-Writing

Axiom-4 mission · Gaganyatri Shubhanshu Shukla · microgravity experiments · Tardigrades in space · myogenesis in space · crew nutrition in space · cyanobacteria for life support · Gaganyaan mission · Bhartiya Antariksha Station · Private Astronaut Missions (PAM) · International Space Station (ISS) · spaceflight rehabilitation

Concept Flow

India's participation in Axiom-4 mission → Conduct of microgravity experiments aboard ISS → Collection of empirical data on biological and technological parameters → Analysis of results for Gaganyaan and Bhartiya Antariksha Station → Integration of findings into ISRO's human spaceflight programme → Enhancement of India's strategic autonomy in space exploration.

PRELIMS PRACTICE QUESTIONS

Q1. Which of the following is NOT one of the microgravity experiments successfully completed by Gaganyatri Shubhanshu Shukla during the Axiom-4 mission?

1. Study of Indian strain of Tardigrades for survival and reproduction in microgravity
2. Investigation of myogenesis (muscle cell formation) under space conditions
3. Cultivation of methi and moong seeds for crew nutrition
4. Analysis of lunar soil samples for helium-3 extraction

Answer: Analysis of lunar soil samples for helium-3 extraction — The fourth option pertains to lunar regolith studies, which is unrelated to the Axiom-4 mission's experiments. The other three are explicitly mentioned as completed experiments.

Q2. The Axiom-4 mission involves undocking from the International Space Station (ISS) and returning to Earth. Which of the following is the expected splashdown location for the Crew Dragon spacecraft?

1. Near the coast of Florida, USA
2. Near the coast of California, USA
3. Near the coast of Hawaii, USA
4. Near the coast of Texas, USA

Answer: Near the coast of California, USA — According to official updates, the splashdown is planned near the coast of California, USA, following orbital maneuvers post-undocking.

Q3. Which of the following best describes the primary objective of the cyanobacteria experiment conducted during the Axiom-4 mission?

1. To study the photosynthetic efficiency of cyanobacteria in microgravity for potential oxygen generation
2. To assess the growth of cyanobacteria for applications in life support systems
3. To investigate the genetic mutations in cyanobacteria due to cosmic radiation
4. To evaluate the use of cyanobacteria in wastewater treatment in space habitats

Answer: To assess the growth of cyanobacteria for applications in life support systems — The cyanobacteria experiment is focused on its growth for relevance to life support systems, particularly in oxygen production and resource recycling.

MAINS PRACTICE QUESTION

✍️ Analyse the significance of India's participation in the Axiom-4 mission, with particular reference to the microgravity experiments conducted by Gaganyatri Shubhanshu Shukla. How do these experiments contribute to the objectives of the Gaganyaan mission, the proposed Bhartiya Antariksha Station, and future planetary missions? (250 words)

Approach: Begin by contextualising the Axiom-4 mission as a Private Astronaut Mission (PAM) and India's first such endeavour. Elaborate on the four completed microgravity experiments—Tardigrades, myogenesis, crop sprouting, and cyanobacteria—highlighting their scientific and technological relevance. Link these experiments to the Gaganyaan mission's human spaceflight objectives, particularly in understanding microgravity effects on biological systems. Discuss how findings from myogenesis and Tardigrade studies can inform life-support systems and astronaut health protocols for the Bhartiya Antariksha Station. Conclude by underscoring the role of such missions in advancing India's capabilities for future planetary missions, including lunar and Martian habitats.

Source: [ISRO](#)

Advancement in Propulsion Systems: ISRO's Service Module Propulsion System for Gaganyaan Mission



Source: [Wikimedia Commons](#) — Gareeb Scientist (CC0)

SUBJECT RELEVANCE — WHERE THIS TOPIC FITS

- GS Paper III — Science and Technology — Developments and their Applications and Effects in Everyday Life
- **Prelims:** Gaganyaan Mission, Service Module Propulsion System, Liquid Apogee Motor, Reaction Control System, ISRO Propulsion Complex, Human-rated propulsion systems, Bi-propellant propulsion, Mission abort systems

• **Essay:** India's Space Odyssey: From Chandrayaan to Gaganyaan

Quick Revision: The Service Module Propulsion System (SMPS) for the Gaganyaan Mission is a bi-propellant-based propulsion system designed to provide thrust for orbit circularisation, on-orbit control, de-boost manoeuvring, and mission abort scenarios, utilising Liquid Apogee Motors (LAM) for main propulsion and Reaction Control System (RCS) thrusters for attitude control.

WHY IS THIS IN THE NEWS?

On 11 July 2025, the Indian Space Research Organisation (ISRO) successfully completed the development of the Service Module Propulsion System (SMPS) for the Gaganyaan Mission, marking a critical milestone in India's human spaceflight programme. The completion of the qualification test programme, including a full-duration hot test of 350 seconds, validates the system's capability to support flight off-nominal mission profiles, particularly abort scenarios during the ascent phase. This achievement underscores ISRO's progress toward achieving autonomous human spaceflight capabilities and aligns with the broader objectives of the Gaganyaan programme to demonstrate India's prowess in crewed space missions.

BACKGROUND

- The Gaganyaan Mission is India's maiden human spaceflight programme, aimed at demonstrating the capability to send humans to Low Earth Orbit (LEO) and safely return them to Earth. The mission is a collaborative effort involving multiple ISRO centres, including the Liquid Propulsion Systems Centre (LPSC) and the ISRO Propulsion Complex (IPRC).
- The Service Module (SM) is a critical component of the Gaganyaan spacecraft, designed to provide propulsion during the orbital phase of the mission. It houses the Service Module Propulsion System (SMPS), which is responsible for orbit circularisation, on-orbit control, de-boost manoeuvring, and abort scenarios.
- The SMPS operates on a bi-propellant system, utilising a combination of fuel and oxidiser for propulsion. This system is designed to meet the stringent requirements of human-rated missions, ensuring reliability and safety under all mission phases.
- ISRO has been systematically advancing its propulsion technologies, with the SMPS development representing a culmination of years of research and testing in liquid propulsion systems, including the Liquid Apogee Motor (LAM) and Reaction Control System (RCS) thrusters.
- The successful qualification of the SMPS follows extensive testing, including 25 tests under nominal and off-nominal conditions, with a cumulative duration of 14,331 seconds, to validate its performance across various mission scenarios.
- The Gaganyaan Mission is part of India's broader space exploration strategy, which includes future missions to the Moon, Mars, and beyond. The programme also aims to position India as a key player in the global space sector, fostering international collaborations and technological advancements.

WHAT IS THE SERVICE MODULE PROPULSION SYSTEM (SMPS) FOR THE GAGANYAAN MISSION?

- The Service Module Propulsion System (SMPS) is a bi-propellant-based propulsion system designed to support the orbital and de-orbit phases of the Gaganyaan Mission. It provides the necessary thrust for orbit circularisation, on-orbit control, and de-boost manoeuvring.
- The SMPS is housed within the Service Module (SM) of the Gaganyaan spacecraft, which is a critical component for sustaining crewed missions in Low Earth Orbit (LEO).
- The propulsion system utilises a regulated bi-propellant configuration, where fuel and oxidiser are stored in separate tanks and fed to the thrusters under controlled pressure. Helium gas is used for pressurising the propellant tanks.
- The SMPS includes two primary propulsion systems: the Liquid Apogee Motor (LAM) and the Reaction Control System (RCS) thrusters. The LAM provides the main propulsive force for orbit circularisation and de-boost phases, while the RCS thrusters ensure precise attitude control during all mission phases.
- The SMPS is designed to support mission abort scenarios during the ascent phase, ensuring the safety of the crew by enabling Service Module based abort during the ascent phase.
- The development of the SMPS involved the creation of a System Demonstration Model (SDM) test bed, which emulated the fluid circuit of the actual propulsion system. The SDM underwent rigorous testing, including 25 tests with a cumulative duration of 14,331 seconds, to validate performance under nominal and off-nominal conditions.
- The SMPS was developed and realised by the Liquid Propulsion Systems Centre (LPSC), with testing conducted at the ISRO Propulsion Complex (IPRC) in Mahendragiri. This collaboration ensures the integration of cutting-edge propulsion technologies with robust testing infrastructure.
- The successful qualification of the SMPS represents a significant step toward India's goal of achieving autonomous human spaceflight. It demonstrates ISRO's capability to design, develop, and test propulsion systems that meet the stringent requirements of crewed missions.

KEY FEATURES

Feature	Significance
Service Module Propulsion System (SMPS)	Primary propulsion unit for Gaganyaan's Orbital Module, enabling orbit adjustments, de-boost manoeuvres, and abort scenarios during ascent.
Bi-propellant propulsion system	Uses liquid fuel (MMH) and oxidizer (NTO) for high-thrust manoeuvres, ensuring precise control and redundancy in human-rated missions.
Liquid Apogee Motor (LAM) engines	Provide main thrust for orbit circularisation and de-boost phases, critical for achieving stable orbits and re-entry trajectories.
Reaction Control System (RCS) thrusters	Ensure fine attitude control and stability during all mission phases, including abort scenarios and orbital manoeuvres.
System Demonstration Model (SDM)	Full-scale test bed replicating SMPS fluid circuits, validating performance under nominal and off-nominal conditions for human rating compliance.

WHY IT MATTERS

Technological Advancement

- Demonstrates ISRO's capability in developing human-rated propulsion systems, a prerequisite for crewed space missions under Gaganyaan.

Strategic Autonomy

- Reduces dependence on foreign propulsion systems, enhancing India's self-reliance in critical space technologies for manned missions.

Mission Safety

- Validates integrated performance of SMPS for abort scenarios, ensuring crew safety during ascent and orbital phases.

Operational Flexibility

- Enables precise orbit adjustments, de-boost manoeuvres, and attitude control, extending mission duration and operational scope.

Human Spaceflight Readiness

- Completion of qualification tests aligns with ISRO's phased approach to human spaceflight, building confidence for future crewed missions.

CHALLENGES

1. Human Rating Compliance

- Ensuring all components meet stringent human safety standards, including redundancy, reliability, and fail-safe mechanisms.

UPSC Link: GS3: Science & Tech

2. Off-Nominal Scenario Validation

- Testing propulsion system under extreme conditions (e.g., engine failures, pressure drops) to ensure robustness during abort scenarios.

UPSC Link: GS3: Disaster Management

3. Propellant Management in Microgravity

- Preventing propellant sloshing and ensuring consistent flow in zero-gravity environments, critical for long-duration missions.

UPSC Link: GS3: Space Technology

4. Thermal Management

- Regulating temperatures in propulsion systems to prevent overheating or freezing, especially during prolonged mission phases.

UPSC Link: GS3: Science & Tech

5. Integration with Crew Module

- Ensuring seamless interaction between SMPS and crew module systems (life support, navigation) for mission success.

UPSC Link: GS3: Space Technology**Challenges — UPSC Perspective**

Issue	Concern
Human Rating Standards	Meeting ISRO's stringent safety and reliability requirements for crewed missions.
Propellant Sloshing	Potential disruption in fuel flow due to microgravity-induced liquid motion.
Thermal Extremes	Risk of system failure due to temperature fluctuations in space.
Redundancy Failures	Ensuring backup systems function flawlessly in case of primary system failure.
Abort Scenario Validation	Proving propulsion system can safely abort mission during ascent under all conditions.
Integration Complexity	Coordinating propulsion, navigation, and life support systems for seamless operation.

WAY FORWARD

- Finalize human rating certification for SMPS based on SDM test results and additional qualification tests.
- Conduct integrated system tests with Crew Module to validate end-to-end mission performance.
- Expand testing under varied thermal and vacuum conditions to simulate real mission environments.
- Enhance redundancy in propulsion systems to meet fail-safe requirements for crewed missions.
- Collaborate with international agencies for cross-verification of propulsion system reliability.
- Develop indigenous manufacturing capabilities for critical propulsion components to ensure supply chain resilience.
- Integrate SMPS with Gaganyaan's guidance, navigation, and control systems for autonomous mission execution.

UPSC VALUE ADDITION**Keywords for Mains Answer-Writing**

Gaganyaan Mission · Service Module Propulsion System (SMPS) · Liquid Apogee Motor (LAM) · Reaction Control System (RCS) · human-rated propulsion systems · ISRO Propulsion Complex (IPRC) · Liquid Propulsion Systems Centre (LPSC) · orbital manoeuvring · de-boost manoeuvring · mission abort systems · bi-propellant propulsion · System Demonstration Model (SDM) · flight qualification testing · orbital module control · heli pressurization system · ascent phase abort

Concept Flow

ISRO's Gaganyaan Mission → Development of Service Module Propulsion System (SMPS) → Qualification Testing (SDM & Hot Tests) → Validation of Bi-propellant Propulsion → Demonstration of LAM & RCS Performance → Human Rating Compliance → Integration with Orbital Module → Mission Readiness for Crewed Launch

PRELIMS PRACTICE QUESTIONS

Q1. Which of the following is NOT a function of the Service Module Propulsion System (SMPS) in the Gaganyaan Mission?

1. Orbit circularization
2. On-orbit control
3. De-boost manoeuvring
4. Lunar landing

Answer: Lunar landing — The Service Module Propulsion System (SMPS) is designed for orbital manoeuvres and abort during ascent, not for lunar landing, which is beyond the scope of the Gaganyaan Mission.

Q2. Which organisation is responsible for the design and development of the Service Module Propulsion System (SMPS) for Gaganyaan?

1. Vikram Sarabhai Space Centre (VSSC)
2. Liquid Propulsion Systems Centre (LPSC)
3. Space Applications Centre (SAC)
4. Satish Dhawan Space Centre (SDSC)

Answer: Liquid Propulsion Systems Centre (LPSC) — The Liquid Propulsion Systems Centre (LPSC) is specifically tasked with the design, development, and realization of the SMPS for the Gaganyaan Mission.

Q3. What is the primary purpose of the Reaction Control System (RCS) thrusters in the Gaganyaan Service Module?

1. To provide main propulsive force during orbit circularization
2. To ensure precise attitude control
3. To facilitate lunar landing
4. To perform de-boost manoeuvring

Answer: To ensure precise attitude control — The Reaction Control System (RCS) thrusters are designed for precise attitude control during orbital operations, complementing the main propulsive force provided by the Liquid Apogee Motor (LAM).

MAINS PRACTICE QUESTION

✍ Critically examine the significance of the successful qualification of the Service Module Propulsion System (SMPS) for the Gaganyaan Mission. How does this development contribute to India's aspirations in human spaceflight and global space exploration? (250 words)

Approach: The candidate should first outline the technical specifications and functions of the SMPS, including its role in orbit circularization, on-orbit control, de-boost manoeuvring, and abort systems. Next, highlight the importance of the qualification test programme, particularly the full-duration hot test and the System Demonstration Model (SDM) testing, in validating the system's reliability and human-rating requirements. Discuss the broader implications for India's space programme, such as enhancing indigenous capabilities, reducing dependence on foreign technology, and positioning India as a credible player in human spaceflight. Conclude by linking this achievement to India's long-term goals in space exploration, including potential collaborations and the strategic advantages of a robust human spaceflight programme.

Source: [ISRO](#)

Executive Programme in Healthcare Management by IIM Indore: A Strategic Upskilling Avenue for Healthcare Professionals in India



Source: [Wikimedia Commons](#) — Karthik myself at English Wikipedia (Public domain)

SUBJECT RELEVANCE — WHERE THIS TOPIC FITS

- GS Paper II — Governance, Administration and Challenges | GS Paper III — Issues relating to Healthcare, Human Resource in Health and Digital Health
- **Prelims:** Healthcare Management, Executive Education, IIM Indore, Digital Health, Healthcare Policy, Hospital Administration, Medical Education, Skill Development
- **Essay:** The intersection of technology and healthcare: Opportunities and challenges, Reforms in medical education and professional development in India

Quick Revision: The Executive Programme in Healthcare Management at IIM Indore integrates live online pedagogy with campus immersion, equipping healthcare professionals with managerial and technological competencies essential for navigating India's evolving healthcare landscape.

WHY IS THIS IN THE NEWS?

The Indian Institute of Management (IIM) Indore has initiated admissions for the fifth batch of its 12-month online Executive Programme in Healthcare Management, designed for working professionals in the healthcare and allied sectors. This programme is significant as it integrates live online pedagogy with a campus immersion component, aligning with the growing demand for managerial competence in India's expanding healthcare ecosystem amid technological and regulatory transformations.

BACKGROUND

- India's healthcare sector is projected to grow to USD 372 billion by 2027, necessitating skilled managerial talent to oversee complex healthcare institutions.
- The National Health Policy 2017 and Ayushman Bharat Mission underscore the need for professionalisation in healthcare administration and service delivery.
- Executive education programmes in healthcare management have gained traction due to the increasing complexity of hospital operations, regulatory compliance, and digital health integration.
- IIM Indore, an Institute of National Importance under the IIM Act, 2017, has been offering specialised executive programmes to bridge the managerial gap in the healthcare sector.
- The programme's structure—combining live online classes with a campus immersion—reflects a hybrid learning model increasingly adopted by premier business schools in response to the post-pandemic educational landscape.

WHAT IS THE EXECUTIVE PROGRAMME IN HEALTHCARE MANAGEMENT AT IIM INDORE?

- A 12-month, live online executive education programme tailored for working professionals in healthcare and allied sectors, enabling them to enhance managerial and leadership competencies without career interruption.
- The programme is structured for 900 hours of learning, delivered through interactive Direct-to-Device (D2D) live online classes, ensuring accessibility and flexibility for geographically dispersed participants.
- Curriculum spans eight core domains: healthcare management, finance and accounting, strategy and entrepreneurship, operations management, business ethics, organisational behaviour, healthcare regulations (domestic and global), and data analytics.
- Pedagogical methods include live lectures, case discussions, simulations, project work, term papers, assignments, and self-learning modules, ensuring practical application of theoretical concepts.
- A three-day campus immersion at IIM Indore facilitates peer learning, faculty interaction, and academic discussions, fostering a collaborative learning environment.

- The programme is open to medical, dental, and allied healthcare professionals, hospital administrators, and professionals from pharmaceutical companies and healthcare service organisations.
- Admissions for the current batch are open, with the programme designed to prepare healthcare leaders for roles in hospital management, healthcare policy, and digital health innovation.

KEY FEATURES

Feature	Significance
12-month live online classes	Enables working professionals to upskill without career disruption, leveraging digital infrastructure for scalability and accessibility.
Direct-to-Device learning platform	Facilitates interactive, real-time engagement with faculty and peers, ensuring pedagogical rigour in a virtual format.
Three-day campus immersion	Provides experiential learning through classroom sessions, peer networking, and faculty interaction, reinforcing theoretical concepts in practice.
Complimentary Certificate in Generative AI Tools	Equips healthcare managers with contemporary digital competencies, aligning with Industry 4.0 demands in healthcare administration.
Curriculum covering eight key areas	Ensures holistic development of healthcare leaders with domain-specific knowledge in finance, ethics, operations, and analytics.

WHY IT MATTERS

Human Resource Development in Healthcare

- Addresses the critical shortage of trained healthcare administrators by upskilling mid-career professionals in management and leadership.
- Enhances the quality of healthcare delivery by integrating managerial acumen with clinical expertise, fostering patient-centric governance.
- Reduces dependency on foreign-trained administrators, strengthening India's healthcare ecosystem through indigenous talent.

Economic and Sectoral Growth

- Supports the expansion of India's healthcare sector, projected to grow at 22-25% CAGR, by creating a cadre of competent managers for hospitals and allied services.
- Promotes entrepreneurship in healthcare delivery, including telemedicine and digital health, by imparting strategic and financial management skills.
- Contributes to the formalisation of the healthcare workforce, aligning with the government's vision of a structured and regulated sector.

Digital Transformation in Education

- Demonstrates the efficacy of live online executive education as a scalable model for professional development in specialised domains.
- Highlights the integration of emerging technologies (e.g., Generative AI) in curriculum design, preparing managers for a tech-driven healthcare landscape.

- Sets a precedent for other IIMs and B-schools to adopt hybrid learning models, enhancing accessibility for working professionals.

CHALLENGES

1. Digital Divide and Accessibility

- Limited internet penetration in rural and semi-urban areas may exclude deserving candidates from economically weaker sections.
- Dependence on digital infrastructure risks inequitable access, particularly for professionals in remote healthcare facilities.

UPSC Link: GS3: Digital Infrastructure

2. Curriculum Relevance and Industry Alignment

- Rapid advancements in healthcare technology and regulations necessitate continuous curriculum updates to avoid obsolescence.
- Gaps between academic content and ground-level challenges in Indian healthcare institutions may reduce practical applicability.

UPSC Link: GS3: Innovation in Healthcare

3. Work-Life Balance for Working Professionals

- Balancing full-time employment with a rigorous 12-month programme may lead to burnout, affecting learning outcomes.
- Time constraints could deter mid-career professionals from enrolling, limiting the programme's reach to senior-level candidates.

UPSC Link: GS4: Ethical Governance

4. Quality Assurance in Online Education

- Ensuring consistency in faculty quality, assessment rigour, and student engagement across virtual platforms remains a challenge.
- Accreditation and recognition of online executive programmes by employers and regulatory bodies require robust validation mechanisms.

UPSC Link: GS2: Regulatory Frameworks

Challenges — UPSC Perspective

Issue	Concern
Faculty Shortage in Specialised Domains	Limited availability of experts in healthcare management, particularly for niche areas like AI in healthcare.
High Programme Cost	Tuition fees may be prohibitive for professionals from public healthcare institutions or small private setups.
Language Barrier	Non-English-speaking professionals may face challenges in comprehending course material and participating in discussions.
Regulatory Compliance	Ensuring adherence to healthcare regulations (e.g., NABH standards) in curriculum design and delivery.

WAY FORWARD

- Strengthen public-private partnerships to subsidise tuition fees for professionals in government healthcare institutions.
- Develop regional hubs with high-speed internet and digital labs to bridge the accessibility gap for rural candidates.
- Incorporate modular, micro-credential courses to allow professionals to upskill incrementally without committing to a full programme.
- Establish an industry advisory board to periodically review and update the curriculum, ensuring alignment with sectoral needs.
- Expand the use of case studies from Indian healthcare institutions to enhance contextual relevance and practical learning.
- Promote the programme through professional bodies like the Indian Medical Association (IMA) and Healthcare Sector Skill Council (HSSC).
- Introduce mentorship programmes pairing participants with alumni in senior healthcare management roles for career guidance.

UPSC VALUE ADDITION

Keywords for Mains Answer-Writing

Healthcare Management · Executive Education · Public Health Administration · Healthcare Policy · Hospital Administration · Medical Education · Digital Health · Healthcare Financing · Organisational Behaviour in Healthcare · Healthcare Regulations · Leadership in Healthcare · Data Analytics in Healthcare

Concept Flow

Demand for skilled healthcare administrators in India's growing healthcare sector → → IIM Indore launches Executive Programme in Healthcare Management → → Working professionals enrol to upskill without career disruption → → Live online classes and campus immersion enhance learning outcomes → → Graduates apply managerial and digital competencies in healthcare institutions → → Improved governance and patient-centric services strengthen the healthcare ecosystem.

PRELIMS PRACTICE QUESTIONS

Q1. Which of the following is NOT a key focus area of the Executive Programme in Healthcare Management offered by IIM Indore?

1. A. Healthcare Management
2. B. Financial Accounting
3. C. Astronomy and Space Sciences
4. D. Business Ethics

Answer: C. Astronomy and Space Sciences — The programme explicitly covers healthcare management, financial accounting, and business ethics, whereas astronomy and space sciences are unrelated to its curriculum.

Q2. The Executive Programme in Healthcare Management at IIM Indore includes a component aimed at enhancing participants' understanding of modern digital tools. This component is titled:

1. A. Certificate Programme in Blockchain Applications
2. B. Certificate Programme in Generative AI Tools and Business Applications
3. C. Certificate Programme in Robotics in Healthcare
4. D. Certificate Programme in Cybersecurity in Healthcare

Answer: B. Certificate Programme in Generative AI Tools and Business Applications — The programme provides complimentary access to the Certificate Programme in Generative AI Tools and Business Applications, as mentioned in the official announcement.

MAINS PRACTICE QUESTION

✍ Critically examine the role of executive education programmes in healthcare management in addressing the challenges of India's healthcare system. How can such programmes contribute to improving healthcare delivery, policy implementation, and leadership in the sector?

Approach: Begin by outlining the structural challenges in India's healthcare system, such as workforce shortages, uneven distribution of healthcare facilities, and policy implementation gaps. Then, analyse how executive education programmes like the one offered by IIM Indore can enhance managerial and leadership skills among healthcare professionals. Discuss their potential impact on improving operational efficiency, policy compliance, and patient outcomes. Conclude by highlighting the need for such programmes to be aligned with national health priorities, such as Ayushman Bharat, and the integration of digital health tools for scalability.

Source: [Hindustan Times](#)

Karnataka's Agritech Mission 2026 and Multi-Sector Development Initiatives: A Strategic Framework for Agricultural Modernisation, Human Capital Augmentation, and Technological Advancement

SUBJECT RELEVANCE — WHERE THIS TOPIC FITS

- GS Paper II — Governance, Government Policies and Interventions for Development in various sectors | GS Paper III — Agriculture, Food Processing and Related Issues; Science and Technology- Developments and their Applications and Effects in Everyday Life; Human Resource Development
- **Prelims:** Agritech Mission 2026, Karnataka Public Service Commission (KPSC), Governor's suspension powers under Article 161, Artificial Intelligence Centre of Excellence, Nomadic communities welfare schemes, Backward Classes Welfare Department hostels, Drone surveys in agriculture, Satellite-based crop advisory systems
- **Essay:** Technological innovation as a catalyst for agricultural transformation in India, Balancing human development and technological advancement in public policy

Quick Revision: Karnataka's Agritech Mission 2026 integrates satellite data, drone surveys, and AI-driven advisory systems to modernise agriculture, while the AI Centre of Excellence in Raichur aims to bridge the technological divide in the Kalyana Karnataka region, with concurrent investments in human capital through teacher recruitment and welfare schemes for marginalised communities.

Previously Asked: Asked in UPSC Prelims 2021 (GS Paper I, Q.47): 'Consider the following statements: 1. The Global Environment Facility (GEF) was established in the World Bank. 2. The GEF provides grants to developing countries for projects related to biodiversity, climate change, and international waters. 3. The GEF was initiated at the Rio Earth Summit in 1992.' Which of the statements given above is/are correct?

WHY IS THIS IN THE NEWS?

The Karnataka Cabinet's approval of the Agritech Mission 2026, a ₹36 crore satellite and drone-based agricultural advisory system, alongside the recruitment of 15,000 teachers and the establishment of an AI Centre of Excellence in Raichur, underscores the state's commitment to leveraging technology for agricultural productivity, human capital development, and regional technological parity. The decision also highlights governance dynamics, including the ratification of the Governor's suspension of the KPSC Chairman.

BACKGROUND

- Karnataka, a leading agrarian state, contributes significantly to India's food security and agri-exports, necessitating technological interventions to address climate variability, pest outbreaks, and market inefficiencies.
- The state's agrarian challenges include fragmented landholdings, water scarcity, and post-harvest losses, which demand precision agriculture solutions such as drone surveys, IoT-based soil monitoring, and AI-driven advisory systems.
- India's National Mission on Agricultural Extension and Technology (NMAET) under the National Mission for Sustainable Agriculture (NMSA) emphasises the integration of modern technologies to enhance farm productivity and resilience.
- The Kalyana Karnataka region, comprising districts like Raichur, has historically lagged in technological adoption and infrastructure, prompting targeted interventions like the AI Centre of Excellence.
- Public sector recruitment, particularly in education, remains a critical policy lever for addressing teacher shortages and improving learning outcomes in Karnataka's government schools.

WELFARE SCHEMES FOR BACKWARD CLASSES AND NOMADIC COMMUNITIES

- The Cabinet approved the construction of 380–400 sq ft houses for nomadic communities, with a unit cost capped at ₹10 lakh, to address housing shortages and improve living conditions.
- For the Backward Classes Welfare Department, administrative approval was granted for hostel infrastructure upgrades, including furniture and bedding, to enhance student welfare.

- ['Nomadic communities in Karnataka, including groups like Lambani, Hakki Pikki, and Siddi, face socio-economic marginalisation and lack access to basic amenities such as housing and education.']

KEY FEATURES

Feature	Significance
Karnataka Agritech Mission 2026	Integrates satellite data, drone surveys, and weather forecasting to enhance agricultural productivity through precision farming techniques.
Recruitment of 15,000 teachers	Addresses critical shortages in the education sector, particularly in rural and underserved regions, to improve learning outcomes.
AI Centre of Excellence in Raichur (IIIT)	Establishes a first-of-its-kind regional hub for artificial intelligence research and development, fostering technological advancement in the Kalyana Karnataka region.
Construction of new hostels for MBBS/BDS students	Replaces outdated infrastructure with modern facilities, ensuring improved living conditions for medical students and reducing maintenance costs.
Welfare schemes for backward classes and nomadic communities	Provides housing and hostel infrastructure, addressing socio-economic disparities and promoting inclusive development.

WHY IT MATTERS

Economic Development

- Agritech Mission 2026 aims to boost agricultural productivity, potentially increasing farm incomes and rural economic growth through data-driven decision-making.
- Teacher recruitment enhances human capital formation, a critical driver of long-term economic progress and employment generation.
- AI Centre of Excellence can catalyse innovation-led growth, attracting investment and creating high-skilled employment opportunities in the region.

Social Justice

- Welfare schemes for backward classes and nomadic communities address historical marginalisation, aligning with constitutional directives on social equity.
- Housing and hostel infrastructure for marginalised groups ensures equitable access to education and basic amenities, reducing socio-economic disparities.

Governance and Infrastructure

- Modernisation of medical hostels improves institutional capacity, ensuring better training environments for future healthcare professionals.
- Large-scale infrastructure projects (roads, irrigation) enhance connectivity and agricultural productivity, supporting rural development.

Technological Advancement

- AI Centre of Excellence in Raichur represents a strategic investment in emerging technologies, positioning Karnataka as a leader in AI-driven solutions.
- Precision agriculture tools (drones, satellite data) can revolutionise farming practices, reducing input costs and environmental impact.

CHALLENGES

1. Implementation Bottlenecks

- Ensuring timely disbursement of funds and adherence to timelines for large-scale infrastructure projects.
- Coordinating between multiple departments (agriculture, education, AI) to avoid silos and ensure synergy.
- Managing logistics for teacher recruitment and deployment, particularly in remote areas.

UPSC Link: GS2: Centre-State Relations

2. Socio-Economic Disparities

- Addressing the needs of nomadic communities requires tailored policies beyond standard housing schemes.
- Ensuring equitable access to Agritech tools for small and marginal farmers, who may lack resources to adopt new technologies.

UPSC Link: GS1: Social Empowerment

3. Technological Adoption

- Training farmers and stakeholders to utilise AI and drone-based tools effectively.
- Bridging the digital divide in rural Karnataka to ensure inclusive participation in the Agritech Mission.

UPSC Link: GS3: Science & Technology

4. Governance and Accountability

- Monitoring the utilisation of funds and preventing leakages in welfare schemes.
- Ensuring transparency in teacher recruitment processes to avoid malpractices.

UPSC Link: GS4: Ethics in Governance

5. Environmental Concerns

- Balancing the use of drones and satellite data with environmental sustainability to avoid ecological harm.
- Ensuring that irrigation projects do not lead to over-exploitation of water resources.

UPSC Link: GS3: Environmental Conservation

Challenges — UPSC Perspective

Issue	Concern
Fund utilisation delays	Risk of cost overruns and project stalling due to bureaucratic hurdles.

Issue	Concern
Digital literacy gaps	Farmers may struggle to adopt precision agriculture tools without adequate training.
Teacher deployment in remote areas	Difficulty in attracting and retaining teachers in rural schools.
Nomadic community housing	Identifying land and ensuring community participation in housing projects.
AI centre sustainability	Long-term funding and industry collaboration to maintain relevance and impact.

GOVERNMENT INITIATIVES — MUST-MEMORISE FOR PRELIMS

- Karnataka Agritech Mission 2026
- Welfare schemes for backward classes and nomadic communities (housing and hostel infrastructure)

WAY FORWARD

- Establish a multi-departmental task force to monitor the Agritech Mission's implementation and address bottlenecks.
- Develop farmer training programs in collaboration with agricultural universities and Krishi Vigyan Kendras.
- Launch a digital literacy campaign to ensure widespread adoption of AI and drone tools among farmers.
- Streamline teacher recruitment processes with transparent selection criteria and decentralised deployment.
- Conduct periodic reviews of welfare schemes to assess impact and make course corrections.
- Explore public-private partnerships for the AI Centre of Excellence to enhance research and commercialisation.
- Ensure environmental safeguards in irrigation and infrastructure projects to prevent ecological degradation.

UPSC VALUE ADDITION

Keywords for Mains Answer-Writing

Agricultural Technology Mission · Precision Agriculture · Digital Public Infrastructure for Agriculture · Karnataka Public Service Commission · AI Centre of Excellence · Backward Classes Welfare · Nomadic Communities Welfare · Irrigation Infrastructure · Road Development Projects · Teacher Recruitment · Kalyana Karnataka Region · Satellite Data in Agriculture

Constitutional & Policy Linkages

- Article 46: Promotion of educational and economic interests of Scheduled Castes, Scheduled Tribes, and other weaker sections.
- Article 29(2): Protection of interests of minorities in educational institutions.

- Seventh Schedule: State List (Entry 17: Education; Entry 18: Land, land tenures, and agriculture).

Concept Flow

State Cabinet approval → Policy formulation and budget allocation → Infrastructure development (hostels, AI centre) → Enhanced human and technological capital → Teacher recruitment → Improved education delivery and learning outcomes → Agritech integration → Precision farming and higher agricultural productivity → Welfare schemes → Social equity and inclusive growth → Economic multiplier effects → Rural development and job creation

PRELIMS PRACTICE QUESTIONS

Q1. Consider the following statements regarding the Karnataka Agritech Mission 2026: 1. It utilises satellite data, drone surveys, and weather forecasting for agricultural guidance. 2. The mission includes a survey project estimated at ₹ 36 crore. 3. The mission is exclusively focused on organic farming practices. Which of the statements given above is/are correct?

1. Only 1 and 2
2. Only 2 and 3
3. Only 1 and 3
4. 1, 2 and 3

Answer: Only 1 and 2 — Statement 1 is correct as the mission employs satellite data, drone surveys, and weather forecasting. Statement 2 is correct as the agriculture department was granted approval for a survey project estimated at ₹ 36 crore. Statement 3 is incorrect as the mission is not exclusively focused on organic farming.

Q2. Which of the following regions is the proposed AI Centre of Excellence in Karnataka set to be established?

1. Mysore
2. Raichur
3. Bengaluru
4. Hubli-Dharwad

Answer: Raichur — The AI Centre of Excellence is proposed to be established in Raichur, marking the first such initiative in the Kalyana Karnataka region.

Q3. The Karnataka Cabinet approved welfare initiatives for which of the following communities?

1. Scheduled Tribes only
2. Backward Classes and Nomadic Communities
3. Other Backward Classes only
4. Scheduled Castes and Scheduled Tribes

Answer: Backward Classes and Nomadic Communities — The Cabinet approved welfare initiatives specifically for Backward Classes and Nomadic Communities, including housing projects and hostel infrastructure.

MAINS PRACTICE QUESTION

✍ Critically examine the role of digital public infrastructure (DPI) in transforming Indian agriculture, with special reference to Karnataka's AgriTech Mission 2026. Assess how such initiatives can address challenges like climate vulnerability, input efficiency, and market access for small and marginal farmers.

Approach: Begin by defining digital public infrastructure and its relevance to agriculture. Analyse the key components of Karnataka's AgriTech Mission 2026, such as satellite data, drone surveys, and weather forecasting, and explain their potential impact on crop planning, pest management, and disease control. Discuss the challenges in implementation, including digital divide, data privacy, and interoperability. Conclude by suggesting policy measures to ensure inclusivity and sustainability, such as capacity-building for farmers, public-private partnerships, and integration with existing agricultural schemes like PM-KISAN and Soil Health Cards.

Source: [Hindustan Times](#)

Delhi University B.Tech Admission 2026: Round 3 Seat Allotment and Critical Deadlines for Aspirants



Source: [Wikimedia Commons](#) — Unknown authorUnknown author (Public domain)

SUBJECT RELEVANCE — WHERE THIS TOPIC FITS

- GS Paper II — Governance, Administration and Public Policy
- **Prelims:** DU BTech Admissions 2026, JEE Main, Counselling Rounds, Seat Allotment, Document Verification, Fee Payment Deadline

- **Essay:** Higher education reforms in India: Access, equity, and quality, The role of technical education in India's developmental trajectory

Quick Revision: DU B.Tech 2026 Round 3 seat allotment results are out; accept seats by July 21, 2026, followed by document verification and fee payment to secure admission.

WHY IS THIS IN THE NEWS?

The University of Delhi (DU) has released the Round 3 seat allotment results for B.Tech admissions in the academic year 2026, with a strict deadline of July 21, 2026, for seat acceptance. This development is critical for aspirants seeking admission to DU's Faculty of Technology, as it marks a key milestone in the centralised admission process for engineering programmes. The announcement underscores the procedural rigour and time-bound nature of DU's admission cycle, which is closely aligned with national-level entrance examinations such as JEE Main.

BACKGROUND

- Delhi University conducts admissions to its B.Tech programmes through a centralised counselling process managed by the Faculty of Technology, which is distinct from the university's general undergraduate admissions.
- The B.Tech admissions for 2026 are being conducted under the aegis of the National Testing Agency (NTA) for JEE Main 2026, which serves as the primary eligibility criterion for admission.
- DU's Faculty of Technology offers B.Tech programmes in disciplines such as Computer Science, Electronics, Mechanical, and Civil Engineering, among others, with seats allocated based on JEE Main ranks and category-wise reservations.
- The admission process for B.Tech programmes at DU follows a multi-round counselling mechanism, including mock rounds, to ensure optimal seat allocation and minimise vacancies.
- Document verification and fee payment are integral components of the admission process, ensuring the authenticity of academic credentials and financial commitments.
- The university has historically conducted additional counselling rounds to fill any remaining vacancies, providing opportunities for candidates who did not secure seats in earlier rounds.

WHAT IS THE DU B.TECH ADMISSION PROCESS?

- **Centralised Admission Portal:** DU's B.Tech admissions are managed through a dedicated online portal (admission.uod.ac.in), where candidates can register, fill choices, and check seat allotment results.
- **Eligibility Criteria:** Admission is based on the JEE Main 2026 rank, with candidates required to have passed Class 12 or equivalent with Physics, Chemistry, and Mathematics as core subjects.
- **Counselling Rounds:** The process includes multiple rounds—mock rounds, Round 1, Round 2, and Round 3—each followed by seat acceptance, document verification, and fee payment deadlines.

- **Seat Allotment:** Seats are allotted based on JEE Main rank, category-wise reservations (General, OBC-NCL, SC, ST, EWS, PwD), and the choices filled by candidates during the counselling process.
- **Seat Acceptance:** Candidates must confirm their allotted seats within the stipulated deadline by paying a seat acceptance fee, failing which the seat is forfeited and made available for subsequent rounds.
- **Document Verification:** After seat acceptance, candidates must upload and verify their academic documents (Class 10 and 12 marksheets, caste certificate, etc.) online to validate their eligibility.
- **Fee Payment:** Upon successful document verification, candidates are required to pay the admission fee to confirm their seat, with deadlines strictly enforced to avoid cancellation.
- **Upgrade Option:** Candidates who did not secure their preferred seat in earlier rounds may be eligible for an upgrade in subsequent rounds, subject to availability and their JEE Main rank.

KEY FEATURES

Feature	Significance
Round 3 Seat Allotment	Provides a second opportunity for candidates who did not secure admission in earlier rounds, enhancing inclusivity in technical education admissions.
July 21 Deadline for Seat Acceptance	Ensures timely confirmation of seats, preventing seat wastage and maintaining the integrity of the admission cycle's timeline.
Online Document Verification	Facilitates remote validation of academic credentials, reducing physical paperwork and expediting the admission process.
Fee Payment Deadline (July 23)	Mandates timely fee submission to finalize admission, ensuring financial commitments are met within the stipulated period.
Upgrade Option for Eligible Candidates	Allows candidates to improve their seat allocation based on subsequent JEE Main ranks or preferences, optimizing seat distribution.

WHY IT MATTERS

Educational Accessibility

- Expands opportunities for aspirants in technical disciplines by providing multiple rounds of seat allotment, thereby democratizing access to premier institutions.
- Supports the Union Government's emphasis on STEM education through the National Education Policy (NEP) 2020, which advocates for increased technical literacy and skill development.

Administrative Efficiency

- Demonstrates the University of Delhi's adoption of digital processes, aligning with the broader national push for e-governance in higher education.
- Ensures transparency in seat allocation through a centralized online portal, reducing human intervention and potential biases.

Economic Implications

- Facilitates the placement of students in high-demand technical programs, which are critical for India's transition to a knowledge-based economy.
- Reduces the financial burden on students by minimizing the need for multiple attempts in entrance examinations, thereby optimizing resource allocation.

Strategic Workforce Development

- Contributes to the supply of skilled engineers, addressing the demand-supply gap in India's technology and innovation sectors.
- Supports India's self-reliance (Atmanirbhar Bharat) goals by fostering indigenous technical talent in critical fields such as AI, robotics, and sustainable technologies.

CHALLENGES

1. Digital Divide and Accessibility

- Reliance on online portals may disadvantage candidates from rural or economically weaker sections lacking reliable internet connectivity or digital literacy.
- Delays in document verification due to technical glitches or server issues could disrupt the admission timeline for affected candidates.

UPSC Link: GS Paper 2: Governance, e-governance

2. Seat Vacancy Management

- Potential for underutilization of seats if candidates fail to accept or verify their allotments within deadlines, leading to inefficiencies in resource allocation.
- The university's decision to conduct further rounds if vacancies remain introduces uncertainty for candidates awaiting final admission.

UPSC Link: GS Paper 3: Economic Development

3. Fee Payment and Financial Constraints

- Timely fee payment is a critical step; delays or financial constraints may result in the forfeiture of seats, disproportionately affecting economically vulnerable candidates.
- The absence of a formal fee waiver or scholarship mechanism in the admission process may limit access for meritorious but financially constrained students.

UPSC Link: GS Paper 2: Social Justice

4. Counseling and Counselor Support

- The upgrade option, while beneficial, may create confusion among candidates regarding their final seat allocation, necessitating robust counseling support.
- Inadequate guidance from DU's Faculty of Technology or affiliated colleges could lead to suboptimal choices by candidates during the upgrade process.

UPSC Link: GS Paper 4: Ethics, Integrity

5. JEE Main Rank Dependency

- The admission process remains heavily reliant on JEE Main ranks, which may not fully capture a candidate's aptitude for engineering disciplines beyond standardized testing.

- Candidates with lower ranks but exceptional practical skills or innovative projects may face barriers in securing admission.

UPSC Link: GS Paper 3: Science & Technology

Challenges — UPSC Perspective

Issue	Concern
Internet Connectivity	Limited access in rural areas may hinder timely seat acceptance and document submission.
Document Verification Delays	Technical or administrative bottlenecks could postpone verification, affecting subsequent steps.
Fee Payment Constraints	Financial limitations may prevent candidates from confirming their seats, leading to seat forfeiture.
Counseling Gaps	Lack of structured guidance may result in suboptimal choices during the upgrade process.
JEE Main Rank Bias	Overemphasis on ranks may overlook candidates with non-traditional but valuable skills.

WAY FORWARD

- The University of Delhi should establish a dedicated helpline and grievance redressal mechanism to assist candidates facing technical or procedural challenges during seat acceptance.
- Introduce a fee waiver or scholarship scheme for economically weaker sections (EWS) candidates to ensure equitable access to technical education.
- Expand offline support centers in rural and semi-urban areas to bridge the digital divide and assist candidates with limited internet access.
- Publish a detailed FAQ and video tutorials on the admission portal to clarify the upgrade process and document verification requirements.
- Collaborate with state governments to ensure seamless integration of DU's admission portal with local e-governance platforms, enhancing accessibility.
- Conduct post-admission surveys to identify systemic bottlenecks and implement corrective measures for future admission cycles.
- Encourage DU-affiliated colleges to offer preparatory courses or bridge programs for students admitted in later rounds to ensure academic readiness.
- Explore the integration of alternative assessment metrics (e.g., portfolios, project work) alongside JEE Main ranks to diversify evaluation criteria.

UPSC VALUE ADDITION

Keywords for Mains Answer-Writing

University of Delhi (DU) · BTech Admission 2026 · Centralised Admission Process (CAP) · JEE Main · Seat Allotment Rounds · Document Verification · Fee Payment Deadline · Counselling Process ·

Higher Education Admissions · Technical Education Policy · Merit-based Admission · Engineering Entrance Examinations

Concept Flow

JEE Main Examination → Declaration of Ranks → DU BTech Admission Portal Opens → Round 1 Seat Allotment → Document Verification & Fee Payment → Round 2 Seat Allotment (if vacancies exist) → Round 3 Seat Allotment → Seat Acceptance Deadline (July 21) → Document Verification (July 22) → Fee Payment (July 23) → Final Admission Confirmation.

PRELIMS PRACTICE QUESTIONS

Q1. Which of the following is the correct sequence of steps in the DU BTech Admission 2026 process after the Round 3 seat allotment?

1. Seat acceptance by July 21, document verification by July 22, fee payment by July 23
2. Document verification by July 21, seat acceptance by July 22, fee payment by July 23
3. Fee payment by July 21, seat acceptance by July 22, document verification by July 23
4. Seat acceptance by July 21, fee payment by July 22, document verification by July 23

Answer: Seat acceptance by July 21, document verification by July 22, fee payment by July 23 — As per the DU BTech Admission 2026 calendar, candidates must first accept the allotted seat by July 21, followed by document verification by July 22, and finally pay the admission fee by July 23 to confirm admission.

Q2. The DU BTech Admission 2026 process is primarily based on which of the following entrance examinations?

1. JEE Advanced
2. NEET UG
3. JEE Main
4. GATE

Answer: JEE Main — The University of Delhi (DU) conducts its BTech admissions through the Centralised Admission Process (CAP) based on the ranks obtained in the JEE Main examination.

MAINS PRACTICE QUESTION

✍ Critically examine the role of centralised admission processes (CAP) in ensuring transparency and meritocracy in higher education admissions in India. How does the DU BTech Admission 2026 process exemplify or challenge these principles?

Approach: Begin by defining centralised admission processes and their objectives in higher education. Analyse how CAP, exemplified by DU's BTech Admission 2026, promotes transparency through standardised criteria (JEE Main ranks) and uniform deadlines. Discuss the challenges, such as delays in seat allotment rounds, potential for document fraud, and inequities in access to coaching, which may undermine meritocracy. Conclude by suggesting measures to enhance fairness, such as real-time grievance redressal and digital document verification.

Source: [Times of India](#)

Institutionalising Environmental Stewardship: Delhi's Year-Long Air Pollution Awareness Programme in Schools as a Model for Climate Action Pedagogy



Source: [Wikimedia Commons](#) — Ministry of Parliamentary Affairs (GODL-India)

SUBJECT RELEVANCE — WHERE THIS TOPIC FITS

- GS Paper III — Environment and Disaster Management | GS Paper IV — Ethics, Integrity and Aptitude (Environmental Ethics)
- **Prelims:** Air Quality Index (AQI), National Clean Air Programme (NCAP), Commission for Air Quality Management (CAQM), Delhi Pollution Control Committee (DPCC), Particulate Matter (PM_{2.5} and PM₁₀), Thermal inversion, Stubble burning
- **Essay:** Climate change and intergenerational justice: The role of education in shaping sustainable futures, Public policy as an instrument of behavioural change: Lessons from Delhi's school-based interventions

Quick Revision: Delhi's year-long school-based air pollution awareness programme exemplifies how educational institutions can operationalise environmental governance by embedding climate action into pedagogical frameworks, thereby nurturing environmentally literate citizenry.

WHY IS THIS IN THE NEWS?

On 18 July 2026, the Directorate of Education, Government of Delhi, issued a directive mandating all government and aided schools to implement a year-long air pollution awareness programme commencing immediately. This initiative, aligned with the Information, Education, and Communication (IEC) Action Plan of the Commission for Air Quality Management (CAQM) and the Delhi Pollution Control Committee (DPCC), seeks to institutionalise environmental consciousness among students by integrating pollution-specific pedagogical activities into the academic calendar.

The directive underscores the intersection of education policy and environmental governance, positioning schools as nodal centres for climate action.

BACKGROUND

- The National Clean Air Programme (NCAP), launched in 2019, targets a 20–30% reduction in particulate matter concentrations by 2024 across 132 non-attainment cities, including Delhi.
- Delhi consistently ranks among the world's most polluted cities, with vehicular emissions, construction dust, and stubble burning identified as primary contributors to its air quality crisis.
- The Commission for Air Quality Management (CAQM), established in 2020 under the Commission for Air Quality Management in National Capital Region and Adjoining Areas Act, serves as the apex statutory body for air quality governance in the region.
- The Delhi Pollution Control Committee (DPCC) functions as the state-level regulatory authority implementing CAQM directives, including emission norms and awareness campaigns.
- Schools in Delhi have historically served as platforms for social and environmental campaigns, such as the Swachh Vidyalaya Abhiyan and the National Green Corps (NGC) programme.
- The directive follows a pattern of integrating environmental education into formal curricula, as seen in the National Curriculum Framework 2023's emphasis on experiential learning and sustainability.

WHAT CONSTITUTES DELHI'S YEAR-LONG AIR POLLUTION AWARENESS PROGRAMME IN SCHOOLS?

- **Mandatory implementation:** All government schools in Delhi are required to execute the programme throughout the academic year, with activities beginning in July 2026.
- **Thematic monthly focus:** Activities are structured around specific pollution sources each month, including vehicular emissions (from July every month), road dust (July–September), construction dust (September–November), stubble burning and municipal solid waste (November–December), industrial emissions (January), thermal power plants (February), and diesel generators (March).
- **Pedagogical diversity:** The programme employs a multi-modal approach, including poster-making competitions, slogan writing, essay and speech contests, street plays (nukkad natak), and classroom discussions to sensitise students to pollution causes, health impacts, and mitigation strategies.
- **Target audience:** While most activities are designed for students in Grades 6–12, certain programmes are inclusive of all school levels to ensure broad-based participation.
- **Institutional mechanisms:** District Education Officers (DEOs) are tasked with monitoring implementation, submitting monthly Action Taken Reports (ATRs) with photographic evidence by the 25th of each month.
- **Regulatory alignment:** The programme is framed within the IEC Action Plan of the CAQM and DPCC, ensuring consistency with national air quality management frameworks.
- **Curriculum integration:** Activities are designed to complement existing subjects such as Environmental Studies, Science, and Social Science, fostering interdisciplinary learning.

KEY FEATURES

Feature	Significance
Year-long implementation	Ensures sustained engagement with air pollution issues rather than episodic awareness drives.
Monthly thematic focus	Systematic coverage of diverse pollution sources (vehicular emissions, road dust, construction, stubble burning, etc.) enhances depth of understanding.
Student-centric activities	Inclusion of poster-making, slogan writing, debates, street plays, and essay competitions fosters participatory learning and creativity.
Multi-stakeholder coordination	Alignment with directives from the Commission for Air Quality Management (CAQM) and Delhi Pollution Control Committee (DPCC) ensures policy coherence.
Reporting mechanism	Monthly submission of 'Action Taken Reports' (ATRs) with photographic evidence enables monitoring and accountability.

WHY IT MATTERS

Environmental Governance

- Integrates environmental education into school curricula, aligning with Sustainable Development Goal (SDG) 4.7 on education for sustainable development.
- Promotes intergenerational responsibility by embedding environmental consciousness in young citizens.
- Supports Delhi's compliance with national ambient air quality standards under the National Clean Air Programme (NCAP).

Public Health

- Reduces exposure to particulate matter (PM2.5/PM10) among school-going children, mitigating respiratory and cardiovascular risks.
- Encourages adoption of preventive measures (e.g., mask usage, indoor air purification) during high-pollution periods.
- Links school-based awareness to broader community health outcomes by fostering peer-to-peer knowledge dissemination.

Educational Policy

- Demonstrates Delhi's commitment to experiential learning by moving beyond textbook-based environmental education.
- Provides a model for other states to replicate, particularly in urban areas with severe air pollution.
- Enhances civic engagement by involving students in local environmental governance through school-level initiatives.

Administrative Efficiency

- Leverages existing school infrastructure (e.g., classrooms, assembly halls) for low-cost, high-impact awareness campaigns.
- Uses a structured monthly calendar to avoid ad-hoc interventions and ensures systematic coverage of pollution sources.

- Facilitates real-time monitoring through ATR submissions, enabling course correction if required.

CHALLENGES

1. Resource Constraints

- Limited availability of trained educators and environmental experts to design and deliver content effectively.
- Financial burden on schools for procuring materials (posters, masks, air quality monitors) for activities.
- Competing academic priorities may divert attention from environmental initiatives.

UPSC Link: GS2: Centre-State Relations (Resource Allocation)

2. Behavioral Change Resistance

- Parental and societal norms may prioritize academic performance over environmental concerns, reducing student participation.
- Habitual practices (e.g., stubble burning, vehicular emissions) persist due to lack of immediate incentives for change.
- Cultural practices (e.g., kite-flying with sharp strings) may conflict with pollution control measures.

UPSC Link: GS4: Ethics in Governance (Behavioral Change)

3. Monitoring and Evaluation Gaps

- Absence of standardized metrics to assess the impact of awareness campaigns on student behavior or air quality outcomes.
- ATR submissions may lack uniformity in quality, leading to inconsistent reporting across districts.
- Long-term sustainability of the initiative depends on political will and administrative continuity.

UPSC Link: GS2: Governance (Monitoring Mechanisms)

4. Inter-Agency Coordination

- Fragmented implementation across multiple agencies (Education Department, DPCC, CAQM) may lead to duplication or gaps.
- Delays in approvals or policy directives from higher authorities could disrupt the monthly thematic focus.
- Lack of a unified data-sharing platform for tracking progress across schools and districts.

UPSC Link: GS2: Federalism (Centre-State Coordination)

5. Urban-Specific Challenges

- High population density and vehicular congestion in Delhi exacerbate pollution, making localized solutions difficult.
- Construction activities and waste management issues are deeply entrenched in urban governance, requiring systemic reforms.

- Seasonal variations (e.g., winter smog) pose challenges for sustained engagement during peak pollution periods.

UPSC Link: GS1: Urbanization (Environmental Challenges)

Challenges — UPSC Perspective

Issue	Concern
Teacher Training	Inadequate expertise among educators to design and deliver pollution-related content effectively.
Community Buy-in	Parental skepticism or resistance to behavioral changes (e.g., reducing stubble burning).
Data Gaps	Lack of baseline data on student awareness levels to measure the campaign's impact.
Seasonal Fluctuations	Reduced engagement during monsoon or summer months when pollution levels are lower.
Policy Enforcement	Weak implementation of existing pollution control measures (e.g., PUC norms, construction dust rules).

WAY FORWARD

- Establish a dedicated 'Green Curriculum Cell' in the Education Department to design standardized modules and training programs for teachers.
- Collaborate with NGOs and environmental organizations to provide expert-led workshops and resource materials for schools.
- Introduce a 'Pollution Monitor' program where students track local air quality using low-cost sensors and submit weekly reports.
- Launch a 'Peer-to-Peer Advocacy' initiative, training student leaders to conduct awareness sessions in neighboring schools and communities.
- Integrate the campaign with existing schemes like 'Swachh Vidyalaya Abhiyan' to leverage synergies in sanitation and pollution control.
- Develop a mobile application for real-time reporting of pollution sources (e.g., construction sites, stubble burning) by students and citizens.
- Conduct quarterly review meetings with district education officers to address implementation challenges and share best practices.
- Incentivize schools with the highest participation rates through recognition awards or additional grants for environmental projects.

UPSC VALUE ADDITION

Keywords for Mains Answer-Writing

Delhi Air Quality Management · Commission for Air Quality Management in NCR and Adjoining Areas (CAQM) · Delhi Pollution Control Committee (DPCC) · Information, Education and Communication (IEC) Action Plan · School-based environmental awareness · Air pollution sources in urban areas · Particulate Matter (PM_{2.5} and PM₁₀) · Thermal power plant emissions ·

Stubble burning · Diesel generator sets · Solid waste management · Construction dust · Vehicle emissions · Public health and environmental education · Sustainable Development Goals (SDG 3 and SDG 11)

Constitutional & Policy Linkages

- ['Article 21A', 'Right to Education (Inclusion of environmental education).']
- ['Article 48A', 'Directive Principle of State Policy on protection and improvement of environment.']
- ['Article 51A(g)', 'Fundamental Duty to protect and improve the natural environment.']

Concept Flow

Urban air pollution in Delhi → Recognition of health and environmental impacts → Policy response (CAQM, DPCC directives) → Education Department's directive to schools → Design of year-long awareness campaign → Monthly thematic activities → Student participation and behavior change → Community awareness and policy compliance → Long-term improvement in air quality.

PRELIMS PRACTICE QUESTIONS

Q1. Which of the following bodies is responsible for the implementation of the year-long air pollution awareness plan in Delhi schools as per the recent directive?

1. A. Central Pollution Control Board (CPCB)
2. B. National Green Tribunal (NGT)
3. C. Commission for Air Quality Management in NCR and Adjoining Areas (CAQM)
4. D. Ministry of Environment, Forest and Climate Change

Answer: C. Commission for Air Quality Management in NCR and Adjoining Areas (CAQM) — The directive is issued by the Directorate of Education, Delhi, in alignment with the framework of the Commission for Air Quality Management in NCR and Adjoining Areas (CAQM) and the Delhi Pollution Control Committee (DPCC).

Q2. Under the IEC Action Plan for air pollution awareness in Delhi schools, which activity is scheduled for the month of January?

1. A. Awareness on stubble burning
2. B. Awareness on industrial emissions
3. C. Awareness on diesel generator sets
4. D. Awareness on thermal power plant emissions

Answer: B. Awareness on industrial emissions — The IEC Action Plan specifies that awareness campaigns on industrial emissions are to be conducted in January, as part of the year-long schedule.

Q3. The Delhi government's directive mandates schools to conduct activities on air pollution awareness primarily for which class range?

1. A. Classes 1 to 5

2. B. Classes 6 to 12
3. C. Classes 1 to 8
4. D. Classes 9 to 12

Answer: B. Classes 6 to 12 — The directive specifies that most activities will involve students from Classes 6 to 12, with some programs open to all students.

MAINS PRACTICE QUESTION

✍️ Analyse the role of school-based environmental awareness programs in mitigating air pollution in urban areas like Delhi. Evaluate the effectiveness of such initiatives in fostering long-term behavioural change among students and communities.

Approach: The candidate should begin by outlining the objectives of the Delhi government's year-long air pollution awareness plan, highlighting its alignment with national and international frameworks such as the CAQM and SDGs. Discuss the structured IEC Action Plan, including its thematic focus on specific pollution sources (e.g., vehicle emissions, construction dust, stubble burning) and the rationale behind targeting school students. Critically evaluate the potential impact of such programs in inculcating environmental consciousness, citing examples of successful school-based initiatives from other regions. Address challenges such as resource constraints, engagement of younger students, and the need for sustained follow-up. Conclude by suggesting measures to enhance the effectiveness of these programs, such as integrating them into the school curriculum, leveraging digital platforms, and fostering community partnerships.

Source: amarujala.com

Karnataka's Mandatory Homestay Registration Framework: Enhancing Tourism Safety and Formalisation in the State's Tourism Ecosystem



Source: [Wikimedia Commons](https://commons.wikimedia.org/wiki/File:Karnataka_Homestay_Registration_Framework_Launch) — Ministry of Finance of India (GODL-India)

SUBJECT RELEVANCE — WHERE THIS TOPIC FITS

- GS Paper II — Governance, Transparency and Accountability | GS Paper III — Tourism as a Sector of Employment and Economic Growth
- **Prelims:** Homestay tourism, Karnataka Tourism Policy 2024, Department of Tourism, Government of Karnataka, mandatory registration, tourism safety norms, Zilla Panchayat, District Urban Development Cell, infrastructure compliance, hygiene standards
- **Essay:** The role of regulation in balancing economic growth with consumer safety in India's tourism sector, Tourism as a sustainable livelihood model: Lessons from Karnataka's homestay ecosystem

Quick Revision: The Karnataka Homestay Registration Framework mandates that all homestays must register with the Department of Tourism, undergo multi-agency verification, and comply with safety and operational standards to obtain a valid registration certificate.

WHY IS THIS IN THE NEWS?

The Commissioner of the Department of Tourism, Government of Karnataka, announced that over 500 homestay owners have applied for mandatory registration under the newly introduced framework, signalling a significant step toward formalising and regulating the homestay sector in the state. This development follows heightened scrutiny of safety standards in homestays, particularly in districts like Kodagu, where incidents involving foreign tourists have prompted stricter enforcement measures.

BACKGROUND

- The Government of Karnataka introduced mandatory registration for homestays to address safety, hygiene, and operational concerns raised by recent incidents involving foreign tourists.
- Districts such as Kodagu have witnessed intensified crackdowns on illegal homestays, with authorities enforcing GPS monitoring and police oversight to enhance tourist safety.
- The registration framework was formulated in response to a series of unpleasant incidents involving foreign tourists, necessitating stringent compliance with safety and operational standards.
- The Department of Tourism, Government of Karnataka, is collaborating with multiple agencies, including the Police Department, Deputy Commissioner's Office, and Zilla Panchayat, to ensure comprehensive verification and monitoring.
- The initiative reflects Karnataka's commitment to promoting responsible and sustainable tourism while safeguarding the interests of both tourists and homestay operators.

WHAT IS THE KARNATAKA HOMESTAY REGISTRATION FRAMEWORK?

- A mandatory registration system introduced by the Department of Tourism, Government of Karnataka, to formalise and regulate homestays operating within the state.
- The framework mandates that all homestays must register with the Department of Tourism to obtain official recognition and a valid registration certificate.

- The registration process involves a multi-stage verification procedure, including document scrutiny, field inspections, and compliance checks against infrastructure, safety, hygiene, and operational requirements.
- Field inspections are conducted jointly by officials from the Department of Tourism, Police Department, Deputy Commissioner's Office, and the Chief Executive Officer, Zilla Panchayat/Project Director, District Urban Development Cell.
- Homestays failing to meet the minimum standards are denied registration but may reapply after rectifying deficiencies, ensuring a corrective approach to compliance.
- The framework aims to enhance tourist safety, promote transparency, and integrate homestays into the formal tourism ecosystem, thereby boosting the state's tourism economy.
- The initiative is part of Karnataka's broader efforts to promote sustainable and responsible tourism, aligning with national policies promoting tourism as a key sector for employment and economic growth.

KEY FEATURES

Feature	Significance
Mandatory Registration	Ensures formal recognition of homestays, integrating them into the regulated tourism ecosystem of Karnataka.
Multi-Departmental Verification	Joint inspections by Tourism, Police, DC Office, and Zilla Panchayat ensure compliance with safety, hygiene, and infrastructure standards.
5-Year Validity with Renewal	Periodic re-certification maintains quality and accountability, preventing stagnation in standards.
Document Verification & Field Inspection	Two-tier scrutiny (documentary and on-ground) filters out non-compliant operators before registration.
Penalty for Non-Compliance	Unregistered or non-compliant homestays face denial of registration, effectively barring them from legal operation.

WHY IT MATTERS

Economic

- Boosts formal sector employment in tourism-related services (guides, housekeeping, local artisans).
- Enhances Karnataka's tourism revenue through improved safety and service standards, attracting higher-spending tourists.
- Encourages investment in homestay infrastructure, fostering rural entrepreneurship and reducing urban migration.

Regulatory

- Establishes a transparent, accountable framework for homestay operations, reducing exploitation risks for tourists.
- Aligns Karnataka's tourism policy with global best practices in homestay regulation (e.g., EU's 'Bed & Breakfast' standards).

- Creates a database of verified homestays, enabling data-driven tourism planning and crisis management.

Social

- Improves tourist safety by enforcing security measures (e.g., GPS monitoring in sensitive regions like Kodagu).
- Promotes cultural exchange through authentic homestay experiences while ensuring tourist welfare.
- Mitigates incidents of harassment or misconduct by unscrupulous operators, enhancing Karnataka's reputation as a tourist destination.

CHALLENGES

1. Implementation Gaps in Rural Areas

- Remote homestays may lack awareness of registration processes or face logistical barriers in document submission.
- Limited digital literacy among rural operators delays online applications and verifications.

UPSC Link: GS3: Rural Development & Tourism

2. Balancing Regulation with Inclusivity

- Strict standards may exclude small, family-run homestays that cannot afford compliance costs (e.g., fire safety retrofits).
- Risk of creating a monopoly for larger, well-funded operators who can meet standards more easily.

UPSC Link: GS2: Governance & Inclusion

3. Monitoring and Enforcement

- Post-registration compliance remains a challenge, as periodic inspections are resource-intensive.
- Corruption risks in joint verification processes (e.g., collusion between inspectors and operators).

UPSC Link: GS4: Ethics & Accountability

4. Tourist Safety in High-Risk Zones

- Regions like Kodagu face unique challenges (e.g., wildlife encounters, terrain hazards) requiring tailored safety protocols.
- GPS monitoring and police coordination are necessary but may raise privacy concerns for operators.

UPSC Link: GS3: Disaster Management

5. Digital Divide in Documentation

- Many rural operators lack access to digital platforms for registration, necessitating offline facilitation centers.
- Language barriers in application forms may deter non-English-speaking applicants.

UPSC Link: GS2: Digital Governance

Challenges — UPSC Perspective

Issue	Concern
Awareness Deficit	Low outreach in rural areas leads to under-registration despite high potential.
Cost of Compliance	Small operators struggle with expenses for safety audits, hygiene upgrades, and documentation.
Inspection Bottlenecks	Limited manpower in departments causes delays in verification and field inspections.
Privacy vs. Safety	GPS monitoring and police coordination may conflict with operator autonomy.
Renewal Fatigue	Five-year validity requires periodic recertification, increasing administrative burden on operators.

WAY FORWARD

- Conduct targeted awareness campaigns in rural districts (e.g., Kodagu, Chikkamagaluru) via ASHA workers and local panchayats to educate homestay owners on registration benefits and processes.
- Establish mobile facilitation centers in remote areas to assist operators with digital applications and document verification.
- Introduce tiered compliance standards (e.g., basic, intermediate, premium) to accommodate varying capacities of homestays while ensuring minimum safety norms.
- Strengthen inter-departmental coordination (Tourism, Police, Revenue) by creating a unified digital portal for inspections and grievance redressal.
- Pilot GPS-based monitoring in high-risk zones (e.g., Kodagu) with clear SOPs to balance safety and privacy concerns.
- Provide financial incentives (e.g., subsidies for fire safety equipment) to small operators to ease compliance costs.
- Mandate annual self-certification by operators to reduce inspection workload and enable real-time compliance tracking.
- Collaborate with tourism boards (e.g., KSTDC) to promote registered homestays globally, enhancing their marketability.

UPSC VALUE ADDITION

Keywords for Mains Answer-Writing

Homestay regulation · Tourism governance · Karnataka Tourism Policy · Safety and hygiene standards in tourism · Tourist accommodation licensing · Formalisation of unorganised sector · Tourism infrastructure compliance · State-level tourism administration · Tourist safety measures · Regulatory framework for homestays · Tourism sector formalisation · Karnataka Tourism Department guidelines

Concept Flow

Incidents of tourist harassment in Karnataka → State government formulates homestay registration guidelines → Mandatory registration announced → Multi-departmental verification process initiated → Registration certificates issued to compliant operators → Formal integration of homestays into Karnataka's tourism ecosystem → Enhanced safety, revenue, and reputation for the sector

PRELIMS PRACTICE QUESTIONS

Q1. Which of the following is NOT a criterion for mandatory registration of homestays in Karnataka as per the new guidelines?

1. A. Compliance with safety standards
2. B. Field inspections by joint officials
3. C. Payment of a registration fee exceeding ₹50,000
4. D. Document verification

Answer: C. Payment of a registration fee exceeding ₹50,000 — The registration fee is not specified in the guidelines; mandatory criteria include safety compliance, joint inspections, and document verification. The fee structure is not mentioned as a criterion for registration.

Q2. The registration certificate for homestays in Karnataka is valid for:

1. A. 2 years
2. B. 3 years
3. C. 5 years
4. D. 7 years

Answer: C. 5 years — As per the Karnataka Tourism Department guidelines, the registration certificate for homestays is valid for a period of five years, after which renewal is mandatory.

Q3. Which of the following departments is NOT involved in the joint inspection process for homestay registration in Karnataka?

1. A. Department of Tourism
2. B. Police Department
3. C. Ministry of External Affairs
4. D. Deputy Commissioner's Office

Answer: C. Ministry of External Affairs — The joint inspection process for homestay registration in Karnataka involves the Department of Tourism, Police Department, Deputy Commissioner's Office, and the Chief Executive Officer, Zilla Panchayat/Project Director, District Urban Development Cell. The Ministry of External Affairs is not part of this process.

MAINS PRACTICE QUESTION

✍ Evaluate the significance of mandatory registration of homestays for the formalisation of the tourism sector in Karnataka. How does this policy address challenges related to tourist safety, infrastructure standards, and revenue generation? Discuss with reference to the regulatory framework introduced by the Karnataka Tourism Department.

Approach: The answer should first contextualise the need for formalisation in the tourism sector, highlighting the unorganised nature of homestays and associated risks such as safety concerns, lack of standardised services, and tax evasion. Next, analyse the Karnataka Tourism Department's regulatory framework, including mandatory registration, joint inspections, and compliance with safety and hygiene standards. Discuss how this policy enhances tourist safety by ensuring adherence to prescribed norms, improves infrastructure quality, and brings unorganised homestays into the formal economy, thereby generating revenue for the state. Conclude by assessing the long-term benefits of such formalisation for sustainable tourism development in Karnataka.

Source: [The Hindu](#)

Constitutional and Fiscal Governance of 15th Finance Commission Grants to Panchayati Raj Institutions in Telangana: Legal and Administrative Clarifications



Source: [Wikimedia Commons](#) — Ministry of Home Affairs (GODL-India)

SUBJECT RELEVANCE — WHERE THIS TOPIC FITS

- GS Paper II — Constitutional and Statutory Bodies (Finance Commission) | GS Paper III — Public Finance and Budgeting (Local Governance and Fiscal Federalism)
- **Prelims:** 15th Finance Commission, Panchayati Raj Institutions, Gram Panchayats, Eleventh Schedule of the Constitution, Statutory functions under Panchayat Raj Acts, Tied and Untied Grants, Concurrent List (Schedule VII), Fiscal Federalism

- **Essay:** The role of Finance Commissions in strengthening grassroots democracy, Balancing fiscal federalism and local autonomy in India's constitutional framework

Quick Revision: The 15th Finance Commission grants to PRIs are constitutionally mandated transfers designed to strengthen local governance, with tied grants for specific purposes and untied grants for flexible utilisation within the Eleventh Schedule, ensuring both accountability and autonomy in rural development.

WHY IS THIS IN THE NEWS?

The Telangana Panchayat Raj and Rural Development Department issued a formal clarification on July 20, 2026, refuting allegations that 15th Finance Commission grants were being misused to settle electricity bills and staff salaries. The denial underscores the constitutional and statutory framework governing the utilisation of Finance Commission grants by Panchayati Raj Institutions (PRIs), particularly in the context of maintenance of essential civic infrastructure such as street lighting and drinking water systems.

BACKGROUND

- The 15th Finance Commission (2021–2026) recommended grants-in-aid to local governments, including Panchayati Raj Institutions (PRIs), to strengthen decentralised governance and rural development.
- Under the Constitution, Panchayats are entrusted with 29 subjects listed in the Eleventh Schedule, including public health, sanitation, and maintenance of community assets.
- The Telangana Panchayat Raj Act, 2018, statutorily obligates Gram Panchayats to maintain streetlights and other civic infrastructure, including payment of electricity charges.
- Finance Commission grants are classified into tied and untied components: tied grants are earmarked for specific purposes (e.g., drinking water supply), while untied grants may be used flexibly within the ambit of the Eleventh Schedule.
- The Union Minister of State for Home Affairs alleged misuse of these grants, prompting the Telangana PR&RD Department to issue a detailed clarification.
- The controversy highlights the tension between fiscal federalism, local autonomy, and accountability in the utilisation of centrally sponsored funds.

WHAT ARE 15TH FINANCE COMMISSION GRANTS TO PANCHAYATI RAJ INSTITUTIONS?

- The 15th Finance Commission recommended a total of ₹4,36,361 crore for local governments (PRIs and Urban Local Bodies) for the period 2021–2026, marking a significant increase from previous commissions.
- Grants to PRIs are disbursed directly to Gram Panchayats, Mandal Praja Parishads, and Zilla Praja Parishads, bypassing state treasuries to ensure transparency and reduce leakages.
- Tied grants are allocated for specific purposes such as maintenance of drinking water supply systems, sanitation, and solid waste management, as per the recommendations of the Finance Commission.

- Untied grants provide flexibility to PRIs to utilise funds for any of the 29 subjects in the Eleventh Schedule, including maintenance of community assets, distribution of electricity, and rural connectivity.
- The utilisation of untied grants is governed by the principles of fiscal federalism, allowing local bodies to prioritise needs based on local conditions while adhering to constitutional mandates.
- The Telangana PR&RD Department clarified that payment of electricity charges for street lighting is a statutory responsibility of Gram Panchayats under Section 52 of the Telangana Panchayat Raj Act, 2018, and is permissible under the untied component of the grants.
- The controversy exemplifies the broader debate on the autonomy of PRIs in fund utilisation versus the need for accountability in the disbursement of centrally sponsored funds.
- The clarification reinforces the constitutional principle that PRIs are autonomous bodies with defined fiscal and functional responsibilities, and their expenditures must align with statutory and constitutional frameworks.

KEY FEATURES

Feature	Significance
15th Finance Commission Grants	Non-tax transfers from the Union to local governments, tied to specific developmental and maintenance activities under constitutional provisions.
Tied vs Untied Components	Tied funds are earmarked for designated purposes (e.g., drinking water maintenance), while untied funds allow flexibility for local priorities within Eleventh Schedule subjects.
Statutory Responsibility under Section 52 of Telangana Panchayat Raj Act, 2018	Mandates Gram Panchayats to maintain streetlights and meet electricity charges, ensuring legal compliance for fund utilisation.
Direct Release Mechanism	Grants are transferred directly to Gram Panchayats, Mandal Praja Parishads, and Zilla Praja Parishads, reducing state-level discretion and enhancing transparency.

WHY IT MATTERS

Fiscal Federalism

- Demonstrates the operationalisation of cooperative federalism through devolution of funds from the Union to local bodies, bypassing state intermediaries in some cases.
- Highlights the constitutional safeguards (Article 280 and 15th Finance Commission recommendations) to ensure equitable resource distribution across tiers of government.
- Emphasises the role of local governments in service delivery, particularly in rural infrastructure maintenance, as envisaged under the 73rd Constitutional Amendment.

Local Governance

- Reaffirms the autonomy of Gram Panchayats in financial decision-making, subject to constitutional and statutory constraints.

- Illustrates the balance between tied and untied funds, allowing local bodies to prioritise expenditures while adhering to permissible constitutional subjects (Eleventh Schedule).
- Underscores the importance of transparency in fund utilisation to prevent misallocation or diversion, as evidenced by the department's rebuttal of allegations.

Policy Accountability

- Showcases the institutional mechanisms for addressing misinformation or political allegations regarding fund utilisation, including official statements and legal clarifications.
- Reinforces the role of the 15th Finance Commission in monitoring and ensuring adherence to fund utilisation guidelines at the grassroots level.

CHALLENGES

1. Allegations of Fund Diversion

- Political narratives may distort public perception, necessitating proactive communication by departments to clarify fund utilisation mechanisms.
- Risk of erosion of trust in local governance institutions if allegations of misuse persist without robust counter-narratives and audits.

UPSC Link: Local Government - Challenges

2. Interpretation of Tied vs Untied Funds

- Ambiguity in permissible uses of untied funds may lead to disputes over expenditure priorities, particularly in overlapping subjects like electricity and water supply.
- Requires clear guidelines and training for local officials to ensure compliance with constitutional and statutory provisions.

UPSC Link: Constitutional Provisions - Eleventh Schedule

3. Capacity Constraints in Local Bodies

- Gram Panchayats may lack technical or administrative capacity to manage funds effectively, leading to suboptimal utilisation or delays.
- Need for capacity-building initiatives, including financial literacy programs for elected representatives and officials.

UPSC Link: 73rd Amendment Act - Challenges

Challenges — UPSC Perspective

Issue	Concern
Political Allegations	Erosion of public trust in local governance institutions due to unfounded claims of fund misuse.
Fund Utilisation Ambiguity	Potential disputes over the permissible uses of tied and untied components of grants.
Capacity Gaps	Inadequate administrative or technical skills in Gram Panchayats to manage funds efficiently.
Transparency Deficits	

Issue	Concern
	Risk of misperceptions if fund utilisation data is not proactively shared with stakeholders.

WAY FORWARD

- Conduct regular audits and publish utilisation certificates for 15th Finance Commission grants to enhance transparency and accountability.
- Organise capacity-building workshops for Gram Panchayat officials on fund management, tied vs untied utilisation, and statutory responsibilities.
- Strengthen grievance redressal mechanisms at the local level to address misinformation and allegations promptly.
- Develop a public dashboard displaying real-time data on fund utilisation by Gram Panchayats for citizen oversight.
- Collaborate with the 15th Finance Commission to clarify guidelines on permissible expenditures under tied and untied components.
- Enhance inter-departmental coordination between Panchayat Raj, Rural Development, and Finance departments to streamline fund flows.
- Promote awareness campaigns among elected representatives and citizens on the constitutional framework governing local fund utilisation.

UPSC VALUE ADDITION

Keywords for Mains Answer-Writing

15th Finance Commission · Local Government Finances · Panchayati Raj Institutions · Eleventh Schedule of the Constitution · Statutory Responsibilities of Gram Panchayats · Tied and Untied Grants · Fiscal Federalism · Constitutional Provisions for Local Governance · Rural Development Funding · Intergovernmental Fiscal Transfers

Constitutional & Policy Linkages

- ['Article 280 - Finance Commission', 'Mandates periodic devolution of funds to local governments']
- ['Eleventh Schedule - Article 243G', 'Lists subjects for local governance, including electricity and water supply']
- ['73rd Constitutional Amendment Act, 1992', 'Establishes three-tier Panchayati Raj system and devolution of powers']

Concept Flow

15th Finance Commission grants are devolved to local governments as per constitutional mandate (Article 280). → Funds are released directly to Gram Panchayats, bypassing state-level intermediaries for greater transparency. → Tied components are earmarked for specific purposes (e.g., drinking water maintenance), while untied funds allow flexibility within Eleventh Schedule subjects. → Gram Panchayats utilise funds for statutory responsibilities (e.g., streetlight maintenance) and other developmental activities. →

Allegations of fund diversion trigger official clarifications, highlighting the need for robust audits and public communication. → The episode underscores the importance of capacity-building and transparency in local governance to prevent misallocation.

PRELIMS PRACTICE QUESTIONS

Q1. Which of the following is NOT a statutory responsibility of Gram Panchayats under the Telangana Panchayat Raj Act, 2018?

1. Maintenance of streetlights
2. Payment of electricity charges for street lighting
3. Levy and collection of income tax
4. Maintenance of drinking water supply systems

Answer: Levy and collection of income tax — The Telangana Panchayat Raj Act, 2018, under Section 52, mandates maintenance of streetlights and drinking water systems as statutory duties. Collection of income tax is not a local government function.

Q2. The 15th Finance Commission grants for rural local bodies are primarily utilised for:

1. Payment of salaries of State government employees
2. Development works as per the Eleventh Schedule of the Constitution
3. Subsidies for agricultural inputs
4. Capital expenditure on defence infrastructure

Answer: Development works as per the Eleventh Schedule of the Constitution — The 15th Finance Commission grants are designed for development works under the Eleventh Schedule, including maintenance of community assets and provision of essential services like electricity and water.

MAINS PRACTICE QUESTION

 Critically examine the role of the 15th Finance Commission grants in strengthening Panchayati Raj Institutions (PRIs) in India. How does the distinction between tied and untied grants enhance fiscal federalism? (250 words)

Approach: Begin by defining the 15th Finance Commission grants and their constitutional basis. Analyse the significance of tied grants in ensuring targeted development and untied grants in empowering local bodies for flexible utilisation. Discuss how this system aligns with the principles of fiscal federalism, particularly in addressing local needs while maintaining accountability. Conclude with a balanced assessment of challenges, such as administrative capacity and transparency.

Source: [The Hindu](#)

Ensuring Operational Efficiency and Accountability: The Imperative of Duty Rotation in Policing



Source: [Wikimedia Commons](#) — Bharathiya (CC0)

SUBJECT RELEVANCE — WHERE THIS TOPIC FITS

- GS Paper IV — Ethics, Integrity and Aptitude — Work Culture and Accountability in Public Institutions
- **Prelims:** Police Reforms, Duty Rotation Policy, Beat Policing, Muddemal Management, Dearness Allowance (DA), Rowdy Sheetters, Hoysala Patrols
- **Essay:** Police Accountability and Public Trust, Operational Efficiency in Governance

Quick Revision: Duty rotation in policing is a structured, ethical governance tool to prevent fatigue, reduce corruption, and enhance operational efficiency by systematically redistributing personnel across duties and stations.

WHY IS THIS IN THE NEWS?

The directive issued by the Deputy Commissioner of Police (North East Division), Bengaluru, mandating strict duty rotation among personnel at Amruthahalli Police Station underscores a critical governance practice in law enforcement. This measure, part of a broader inspection focusing on administrative efficiency, personnel welfare, and public service delivery, highlights the systemic challenges in policing, including workload distribution, morale, and accountability. The emphasis on duty rotation aligns with judicial and administrative recommendations for police reforms, particularly in addressing fatigue-induced inefficiencies and corruption risks.

BACKGROUND

- Chronic issues such as overburdened staff, delayed investigations, and poor public perception plague urban policing, necessitating systemic interventions like duty rotation.
- The Bengaluru Police, under the Commissioner of Police, has been progressively implementing reforms to align with national guidelines, including the adoption of beat policing and victim-centric approaches.

- Personnel welfare concerns, such as pending Dearness Allowance (DA) for ex-servicemen in the police, reflect broader administrative delays that impact morale and performance.
- The inspection at Amruthahalli Police Station is part of a divisional review mechanism to assess operational gaps, grievances, and compliance with procedural norms.

WHAT IS DUTY ROTATION IN POLICING?

- Duty rotation refers to the systematic and periodic reassignment of police personnel across different duties, shifts, or stations to prevent prolonged exposure to high-stress roles, reduce fatigue, and mitigate corruption risks.
- It is a governance mechanism designed to ensure fairness, accountability, and operational efficiency by distributing workloads evenly among personnel.
- The practice is rooted in administrative ethics, aiming to uphold the principles of impartiality, transparency, and citizen-centric policing.
- Duty rotation is distinct from arbitrary transfers; it follows a structured schedule based on departmental policies, workload assessments, and personnel records.
- It encompasses rotations across investigative roles, beat policing, administrative duties, and special assignments to maintain skill diversity and institutional memory.
- The policy is often linked to performance evaluations, training needs, and career progression to align individual competencies with organisational goals.
- In urban policing, duty rotation is critical to address challenges such as high crime density, public scrutiny, and the need for constant vigilance in crowded areas.
- The implementation of duty rotation is monitored through periodic inspections, grievance redressal mechanisms, and feedback from personnel and the public.

KEY FEATURES

Feature	Significance
Strict rotation of duties	Prevents fatigue, reduces corruption risks, and ensures equitable workload distribution among police personnel, thereby enhancing operational efficiency and morale.
Beat policing and enforcement	Strengthens community policing, improves visibility, and deters criminal activities through regular patrols and public interaction.
Victims' Day monthly meetings	Provides a structured platform for victims to voice grievances, receive legal assistance, and rebuild trust in the police system.
CCTV surveillance utilisation	Enhances monitoring of public spaces, aids in crime prevention, and provides evidence for investigations and prosecutions.
Sub-Beat meetings on crime prevention	Facilitates proactive community engagement, raises awareness on cybercrime, drug abuse, and gender-based violence, and fosters preventive policing.

WHY IT MATTERS

Operational Efficiency

- Duty rotation mitigates personnel fatigue, reducing errors in investigations and administrative tasks.

- Beat policing and patrols enhance real-time crime prevention and public safety.
- Regular Sub-Beat meetings ensure timely dissemination of crime prevention strategies and community feedback integration.

Public Trust and Confidence

- Monthly Victims' Day meetings address systemic grievances, improving victim satisfaction and police-public relations.
- Prompt response to emergencies and courteous public interaction reinforce citizen-centric policing.
- Transparency in duty allocation and record management fosters accountability and reduces perceptions of bias.

Legal and Procedural Compliance

- Expeditious disposal of seized and unclaimed vehicles ensures adherence to legal timelines and prevents procedural delays.
- Quality investigations and timely charge-sheet filing uphold judicial processes and reduce case pendency.
- Proper maintenance of Muddemal (case properties) prevents loss or tampering, preserving evidentiary integrity.

Personnel Welfare and Morale

- Addressing pending Dearness Allowance (DA) for ex-servicemen personnel aligns with government welfare policies and boosts morale.
- Equitable duty rotation prevents overburdening of specific personnel, reducing burnout and attrition risks.
- Regular inspections and feedback mechanisms ensure personnel grievances are addressed proactively.

CHALLENGES

1. Workforce Fatigue and Burnout

- Prolonged duty without rotation leads to mental and physical exhaustion, increasing error rates in investigations and public interactions.
- High-stress environments may contribute to misconduct or unethical practices among personnel.

UPSC Link: GS3: Police Reforms and Accountability

2. Case Pendency and Judicial Delays

- Stagnation in investigations and delayed charge-sheet filings exacerbate judicial backlogs and erode public trust in the police system.
- Inadequate monitoring of court proceedings may result in acquittals due to procedural lapses.

UPSC Link: GS2: Judiciary and Legal Reforms

3. Community Trust Deficits

- Perceived bias or inefficiency in policing fosters distrust, particularly among marginalised groups, hindering effective law enforcement.
- Lack of structured grievance redressal mechanisms may lead to underreporting of crimes or victim disillusionment.

UPSC Link: GS2: Social Justice and Inclusion

4. Resource Constraints and Infrastructure Gaps

- Inadequate CCTV coverage or maintenance limits surveillance capabilities in high-risk areas.
- Shortages in personnel or equipment may hinder the implementation of beat policing and preventive measures.

UPSC Link: GS3: Police Modernisation and Infrastructure

5. Legal and Procedural Bottlenecks

- Slow disposal of seized vehicles or unclaimed properties due to bureaucratic or legal delays undermines police efficiency.
- Inconsistent record-keeping of Muddemal or case properties risks evidence tampering or loss.

UPSC Link: GS2: Governance and Administrative Reforms

Challenges — UPSC Perspective

Issue	Concern
Dearness Allowance (DA) arrears	Delays in settling DA for ex-servicemen personnel undermine morale and financial stability, potentially affecting performance.
Case property (Muddemal) mismanagement	Poor record-keeping or loss of seized items compromises evidentiary integrity and judicial outcomes.
Judicial pendency	Stagnation in investigations and delayed charge-sheet filings contribute to judicial backlogs and public distrust.
Beat policing gaps	Inadequate patrols or Sub-Beat meetings reduce crime prevention effectiveness and community engagement.
CCTV surveillance inefficiencies	Gaps in coverage or maintenance limit real-time monitoring and evidence collection in high-risk areas.

WAY FORWARD

- Institutionalise duty rotation schedules with transparent monitoring mechanisms to ensure compliance and equity.
- Expand and upgrade CCTV surveillance networks in high-crime and crowded areas, with regular maintenance audits.
- Strengthen Victims' Day programmes by integrating legal aid clinics and psycho-social support services.

- Conduct quarterly Sub-Beat meetings with community leaders to align crime prevention strategies with local needs.
- Accelerate the settlement of pending Dearness Allowance (DA) for ex-servicemen personnel through expedited administrative processes.
- Implement a digital case-tracking system to monitor court proceedings, charge-sheet filings, and Muddemal management in real time.
- Enhance personnel training on cybercrime, drug abuse, and gender-based violence to improve investigative and preventive capabilities.

UPSC VALUE ADDITION

Keywords for Mains Answer-Writing

Police reforms · duty rotation · police accountability · public service delivery · beat policing · cybercrime prevention · victim-centric policing · Muddemal management · Dearness Allowance · ex-servicemen welfare · CCTV surveillance · rowdy sheeters monitoring · law and order maintenance · community policing · sub-beat meetings · court case disposal

Concept Flow

Police personnel grievances over workload and DA arrears → Inspection by DCP reveals systemic issues → Strict duty rotation and welfare measures mandated → Enhanced beat policing and surveillance introduced → Community trust and operational efficiency expected to improve → Reduction in case pendency and crime rates anticipated.

PRELIMS PRACTICE QUESTIONS

Q1. Which of the following is NOT a function of the police under the Indian Constitution?

1. A. Maintenance of public order
2. B. Prevention and detection of crime
3. C. Enforcement of civil laws
4. D. Administration of justice

Answer: D. Administration of justice — The police are responsible for maintenance of public order, crime prevention, and detection, but administration of justice is the domain of the judiciary under the Constitution.

Q2. What is the primary objective of 'beat policing' in urban areas?

1. A. To increase the number of police stations
2. B. To enhance community engagement and local crime prevention
3. C. To reduce the workload of investigating officers
4. D. To centralise police command structures

Answer: B. To enhance community engagement and local crime prevention — Beat policing aims to strengthen community relations and localised crime prevention by assigning officers to specific areas for regular patrols and interactions.

Q3. Under which legal framework are seized vehicles (Muddemal) required to be disposed of?

1. A. Indian Penal Code, 1860
2. B. Code of Criminal Procedure, 1973
3. C. Motor Vehicles Act, 1988
4. D. Police Act, 1861

Answer: B. Code of Criminal Procedure, 1973 — The disposal of seized vehicles (Muddemal) is governed by the provisions of the Code of Criminal Procedure, 1973, particularly Sections 451 and 457.

MAINS PRACTICE QUESTION

✍️ Analyse the significance of duty rotation in police organisations for enhancing public service delivery and reducing corruption. Suggest measures to institutionalise duty rotation while addressing challenges such as personnel welfare and operational efficiency.

Approach: Begin by defining duty rotation and its constitutional and administrative basis in policing. Examine its role in preventing fatigue-induced errors, reducing opportunities for corrupt practices, and improving morale. Discuss challenges such as resistance from personnel, logistical constraints, and the need for transparent monitoring mechanisms. Propose solutions including mandatory rotation schedules, digital tracking systems, grievance redressal frameworks, and capacity-building initiatives. Conclude by linking duty rotation to broader police reforms and citizen-centric policing.

Source: [The Hindu](#)

Constitutional and Legal Framework Governing Public Protests and Assembly: Analysis of Delhi Police's Prohibitory Orders Ahead of Parliament Session



Source: [Wikimedia Commons](#) — Ji-Elle (CC BY-SA 4.0)

SUBJECT RELEVANCE — WHERE THIS TOPIC FITS

- GS Paper II — Polity and Governance | GS Paper III — Internal Security and Disaster Management
- **Prelims:** Bharatiya Nagarik Suraksha Sanhita (BNSS), Bharatiya Nyaya Sanhita (BNS), Section 163 BNSS, Section 223 BNS, CrPC, prohibitory orders, public order, fundamental rights, Article 19(1)(a), Article 19(1)(b), Article 19(3), right to protest, Parliament security, NEET paper leak
- **Essay:** The delicate balance between fundamental rights and public order: A case study of protest regulation in India, Governance challenges in maintaining law and order during parliamentary sessions

Quick Revision: Prohibitory orders under Section 163 BNSS are temporary measures to prevent breaches of public peace, and must be balanced against the constitutional right to peaceful assembly under Article 19(1)(b).

WHY IS THIS IN THE NEWS?

The Delhi Police's issuance of prohibitory orders under Section 163 of the Bharatiya Nagarik Suraksha Sanhita (BNSS) ahead of the Monsoon Session of Parliament, specifically denying permission for the Citizens for Justice and Peace (CJP) march to Parliament on 20 July 2026, underscores the constitutional and legal complexities surrounding the regulation of public protests in India. This development highlights the interplay between the right to peaceful assembly (Article 19(1)(b)) and the state's duty to maintain public order, particularly in sensitive areas such as Parliament, during legislative sessions.

BACKGROUND

- The Bharatiya Nagarik Suraksha Sanhita (BNSS), enacted in 2023, replaced the colonial-era Code of Criminal Procedure (CrPC) and introduced significant changes to the legal framework governing public order and protests.
- Section 163 of the BNSS empowers district magistrates to impose prohibitory orders, including bans on assemblies, processions, and demonstrations, to prevent breaches of public peace or threats to public safety.
- The CJP's proposed march seeks the resignation of the Union Education Minister over alleged irregularities in the NEET-UG 2024 examination, including the paper leak scandal, which has been a subject of judicial scrutiny and parliamentary debate.
- Climate activist Sonam Wangchuk's support for the march, following his detention during an indefinite hunger strike at Jantar Mantar, reflects the intersection of social justice movements with institutional accountability demands.
- The BNSS's replacement of Section 144 CrPC signifies a shift towards more contemporary terminology and procedural clarity, though the substantive powers remain largely unchanged.

LEGAL AND CONSTITUTIONAL FRAMEWORK GOVERNING PUBLIC PROTESTS IN INDIA

- ****Constitutional Guarantees****: Article 19(1)(a) guarantees freedom of speech and expression, while Article 19(1)(b) protects the right to assemble peacefully and without arms. However, these rights are subject to reasonable restrictions, which empowers the state to impose restrictions in the interest of public order, morality, or the sovereignty and integrity of India.
- *****Prohibitory Orders under BNSS*****: Section 163 of the BNSS empowers magistrates to issue prohibitory orders, including bans on assemblies, processions, or demonstrations, if there is a reasonable apprehension of a breach of public peace or threat to public safety. Such orders are temporary and must be justified by the circumstances.
- *****Designated Protest Sites*****: The BNSS and police regulations designate specific locations (e.g., Jantar Mantar in Delhi) for protests, subject to prior permission, to balance the right to protest with the need to maintain public order in sensitive areas.
- *****Penalties for Violations*****: Participation in unauthorised protests or violations of prohibitory orders may attract penal consequences, which criminalises disobedience to legal orders issued by public servants, in addition to other provisions of the Indian Penal Code (IPC) or BNS.
- *****Role of Police*****: The police, as an executive authority, are responsible for enforcing prohibitory orders and maintaining law and order. Their actions are subject to judicial review to ensure they do not infringe upon fundamental rights disproportionately.
- *****Public Order vs. Fundamental Rights*****: The state's duty to maintain public order often conflicts with the exercise of fundamental rights, necessitating a careful balancing act. Courts have consistently held that restrictions must be narrowly tailored to address specific threats and not impose blanket bans on legitimate protests.

KEY FEATURES

Feature	Significance
Prohibitory orders under BNSS Section 163	These orders impose restrictions on assemblies, processions, and demonstrations in New Delhi district, except at designated protest sites like Jantar Mantar, to maintain public order during the Parliament session.
Designated protest site at Jantar Mantar	This is the only permitted location for protests, subject to prior permission, ensuring controlled and localized dissent while preventing disruptions in critical areas.
Section 223 of BNS	This provision enables legal action against individuals violating prohibitory orders, including unauthorized protests, ensuring enforceability of restrictions.
Monsoon Session of Parliament	The timing of the session necessitates heightened security and order, as it involves critical legislative functions and the presence of national leaders.
CJP's 'Chalo Sansad' March	The proposed march aims to demand the resignation of the Union Education Minister over alleged irregularities in public examinations, highlighting governance and accountability concerns.

WHY IT MATTERS

Governance and Accountability

- The incident underscores the tension between the right to protest and the need for public order, particularly during high-security parliamentary sessions.
- The demand for the resignation of the Union Education Minister reflects public dissatisfaction with the handling of examination irregularities, raising questions about institutional integrity.
- The Delhi Police's stance demonstrates the state's role in balancing democratic rights with administrative control to prevent disruptions.

Legal and Constitutional Framework

- The use of prohibitory orders under BNSS Section 163 highlights the legal tools available to authorities to regulate public assemblies and maintain law and order.
- Section 223 of the BNS provides a legal basis for penalizing violations of such orders, ensuring compliance with administrative directives.
- The designated protest site at Jantar Mantar reflects the state's attempt to channel dissent into controlled spaces, a practice rooted in the principle of reasonable restrictions under Article 19(1)(a) of the Constitution.

Public Examinations and Institutional Trust

- The CJP's proposed march is linked to allegations of irregularities in public examinations, including the NEET paper leak, which have eroded public confidence in examination systems.
- Such incidents highlight the need for robust mechanisms to ensure transparency, fairness, and accountability in public examinations, which are critical for merit-based governance.

- The demand for the minister's resignation reflects broader concerns about the efficacy of regulatory bodies and the government's response to examination-related scandals.

Security and Parliamentary Proceedings

- The timing of the protest during the Monsoon Session of Parliament necessitates stringent security measures to protect vital installations and ensure the smooth conduct of legislative business.
- Unauthorized protests near Parliament can pose security risks, disrupting parliamentary functions and potentially compromising national security.
- The Delhi Police's proactive stance in issuing prohibitory orders aims to preempt such disruptions and maintain the integrity of the parliamentary process.

CHALLENGES

1. Balancing Democratic Rights and Public Order

- The primary challenge lies in reconciling the constitutional right to protest (Article 19(1)(a)) with the imperative to maintain public order and security during critical events like parliamentary sessions.
- Overly restrictive measures risk being perceived as curtailing democratic freedoms, while lax enforcement may lead to chaos and security breaches.
- The state must demonstrate proportionality in its response, ensuring that restrictions are necessary, reasonable, and non-discriminatory.

UPSC Link: GS-II: Fundamental Rights and DPSP

2. Ensuring Transparency in Public Examinations

- Allegations of irregularities in public examinations, such as the NEET paper leak, highlight systemic vulnerabilities in examination processes.
- The challenge is to restore public trust by implementing robust safeguards, including transparent investigation mechanisms and stringent penalties for malpractice.
- The demand for the resignation of the Union Education Minister reflects public skepticism about the government's commitment to addressing these issues.

UPSC Link: GS-II: Governance and Transparency

3. Managing Protests During High-Security Events

- Protests during parliamentary sessions or other high-security events pose unique challenges, as they can disrupt legislative functions and compromise security.
- The state must balance the need for order with the right to dissent, ensuring that protests are conducted in designated areas without endangering public safety.
- Effective communication and coordination between law enforcement agencies and protest organizers are essential to prevent escalation.

UPSC Link: GS-III: Internal Security

4. Legal Enforcement of Prohibitory Orders

- The effectiveness of prohibitory orders depends on their strict enforcement and the willingness of citizens to comply with legal directives.

- Challenges include ensuring that legal action against violators is swift, fair, and perceived as legitimate by the public.
- Over-enforcement or selective application of laws can undermine public trust in legal institutions.

UPSC Link: GS-II: Judiciary and Legal Framework

5. Public Perception and Trust in Institutions

- Incidents like the NEET paper leak and subsequent protests erode public trust in institutions, particularly those responsible for education and governance.
- The challenge is to rebuild confidence through transparent investigations, accountability measures, and proactive communication with stakeholders.
- Failure to address public concerns can lead to further erosion of trust and potential social unrest.

UPSC Link: GS-II: Role of Civil Services in Democracy

Challenges — UPSC Perspective

Issue	Concern
Right to Protest vs. Public Order	Ensuring that restrictions on protests are necessary, reasonable, and non-discriminatory while maintaining public order.
Transparency in Examinations	Addressing allegations of irregularities in public examinations to restore public trust in institutional processes.
Security During Parliamentary Sessions	Balancing the need for security with the right to dissent during critical legislative events.
Enforcement of Prohibitory Orders	Ensuring that legal action against violators is swift, fair, and perceived as legitimate by the public.
Public Trust in Institutions	Rebuilding confidence in governance institutions through transparency, accountability, and proactive communication.

WAY FORWARD

- The Union Education Ministry should constitute an independent, multi-stakeholder committee to investigate allegations of irregularities in public examinations, including the NEET paper leak, and recommend systemic reforms.
- The government should proactively communicate the findings of such investigations to the public to restore trust in examination processes and institutional integrity.
- Law enforcement agencies should ensure that prohibitory orders are enforced uniformly and that legal action against violators is based on clear, pre-established criteria to avoid perceptions of bias.
- Parliamentary authorities, in coordination with the Delhi Police, should designate additional protest sites in high-security zones to accommodate dissent while minimizing disruptions to legislative functions.

- Civil society organizations and protest organizers should be engaged in pre-emptive dialogue to channel dissent constructively and avoid confrontations with law enforcement.
- The government should review and strengthen the regulatory framework governing public examinations to prevent future irregularities, including stricter penalties for malpractice and enhanced transparency in examination processes.
- Educational institutions and examination bodies should implement robust technological safeguards, such as blockchain-based verification, to ensure the integrity of examination results.

UPSC VALUE ADDITION

Keywords for Mains Answer-Writing

Right to Protest · Public Order · Prohibitory Orders · Bharatiya Nagarik Suraksha Sanhita (BNSS) · Bharatiya Nyaya Sanhita (BNS) · NEET Examination · Public Examination Reforms · Parliament Security · Fundamental Duties · Reasonable Restrictions on Fundamental Rights · Administrative Law · Constitutional Law

Constitutional & Policy Linkages

- ['Article 19(1)(a): Freedom of Speech and Expression', 'Right to protest is constitutionally protected but subject to reasonable restrictions.']
- ['Article 21: Protection of Life and Personal Liberty', 'Ensuring that restrictions on protests do not infringe upon fundamental rights.']
- ['Article 355: Duty of the Union to Protect States Against External Aggression and Internal Disturbance', 'Justifies state action to maintain public order during critical events.']

Concept Flow

Allegations of irregularities in public examinations (e.g., NEET paper leak) → Public outrage and demand for accountability → CJP's proposed 'Chalo Sansad' march to Parliament → Delhi Police denies permission citing prohibitory orders under BNSS Section 163 → State's balancing act between right to protest and public order → Enforcement of Section 223 BNS against violators → Broader implications for governance, institutional trust, and legal frameworks.

PRELIMS PRACTICE QUESTIONS

Q1. Which of the following provisions empowers the police to impose prohibitory orders banning assemblies or processions in specified areas?

1. Article 19(1)(a) of the Constitution of India
2. Section 144 of the Code of Criminal Procedure, 1973
3. Section 163 of the Bharatiya Nagarik Suraksha Sanhita, 2023
4. Article 226 of the Constitution of India

Answer: Section 163 of the Bharatiya Nagarik Suraksha Sanhita, 2023 — Section 163 of the BNSS (replacing Section 144 of CrPC) empowers the executive magistrate to issue prohibitory orders to prevent public disorder, breach of peace, or danger to public safety.

Q2. Under the Bharatiya Nyaya Sanhita, 2023, which section pertains to punishment for participating in an unlawful assembly?

1. Section 223
2. Section 186
3. Section 143
4. Section 353

Answer: Section 223 — Section 223 of the BNS prescribes punishment for participating in an unlawful assembly or rioting, including violations of prohibitory orders.

Q3. Which of the following best describes the legal basis for the Delhi Police's refusal to grant permission for the CJP's proposed march to Parliament?

1. The march was deemed to be against the national interest as Parliament was in session.
2. No formal request for permission was submitted by the organisers to the competent authority.
3. The organisers had a history of violating prohibitory orders.
4. The venue of the march was outside the designated protest site.

Answer: No formal request for permission was submitted by the organisers to the competent authority. — The Delhi Police explicitly stated that they had neither received nor granted permission for the march, as no formal request was submitted under the applicable legal framework.

Q4. The NEET examination irregularities, which are a backdrop to the CJP's march, fall under the purview of which constitutional provision?

1. Article 29
2. Article 30
3. Article 14
4. Article 19

Answer: Article 19 — Article 19(1)(g) guarantees the right to practice any profession or carry on any occupation, trade, or business, which includes the conduct of examinations like NEET.

MAINS PRACTICE QUESTION

✍️ Examine the constitutional framework governing the right to protest in India. In the context of the Delhi Police's prohibitory orders and the refusal to grant permission for the CJP's proposed march to Parliament, critically analyse the balance between the right to protest and the state's duty to maintain public order.

Approach: Begin by outlining the constitutional protection of the right to protest under Article 19(1)(a) and its reasonable restrictions under Article 19(2). Discuss the legal provisions enabling prohibitory orders, such as Section 163 of the BNSS, and their rationale. Analyse the Delhi Police's actions in refusing permission, referencing the absence of a formal request and the need to maintain public order during Parliament's

Monsoon Session. Conclude by evaluating whether the restrictions imposed are proportionate and in conformity with constitutional principles.

Source: [Mint](#)

Sonam Wangchuk's Protest March and the Legal-Framework of Public Assemblies in India: Implications for Democratic Dissent and Governance Accountability



Source: [Wikimedia Commons](#) — Pelph Hoters (CC0)

SUBJECT RELEVANCE — WHERE THIS TOPIC FITS

- GS Paper II — Polity: Fundamental Rights and Duties, Role of Judiciary, Centre-State Relations | GS Paper III — Ethics and Integrity in Governance: Accountability Mechanisms, Public Service Delivery Failures
- **Prelims:** Article 19(1)(a) — Freedom of Speech and Expression, Section 144 CrPC / Section 163 BNSS — Prohibitory Orders, Jantar Mantar as Designated Protest Site, Right to Protest vs. Public Order, Hunger Strike as Form of Protest, Delhi Police (Delhi) Act, 1978
- **Essay:** The Moral Imperative of Democratic Protest: Balancing Individual Agency and Collective Responsibility, Accountability in Governance: The Role of Citizens and Institutions in Ensuring Transparency

Quick Revision: The right to protest in India is constitutionally protected but statutorily regulated; prohibitory orders under Section 163 BNSS must be reasonable and time-bound, while designated protest sites like Jantar Mantar provide a legal avenue for assemblies, balancing democratic dissent with public order.

WHY IS THIS IN THE NEWS?

Activist Sonam Wangchuk's indefinite hunger strike entered its twentieth day on 20 July 2026, demanding accountability for examination paper leaks, recruitment failures, and justice for affected students. His proposed march to Parliament under the banner of the Cockroach Janata Party (CJP) was prohibited by Delhi Police under prohibitory orders, highlighting the tension between the constitutional right to protest and statutory restrictions on public assemblies in designated high-security zones. The Delhi High Court intervened to ensure medical oversight of Wangchuk's condition, underscoring the interplay between judicial safeguards and executive enforcement in matters of protest and public order.

BACKGROUND

- The Constitution of India guarantees the fundamental right to freedom of speech and expression (Article 19(1)(a)) and the right to assemble peacefully (Article 19(1)(b)), subject to reasonable restrictions imposed by the state in the interest of public order, morality, and sovereignty.
- Jantar Mantar in New Delhi has been designated as a notified protest site where assemblies may be held with prior permission, while other areas require prohibitory orders under Section 144 of the Code of Criminal Procedure (CrPC) or Section 163 of the Bharatiya Nagarik Suraksha Sanhita (BNSS, 2023).
- Sonam Wangchuk, an engineer-turned-activist known for his work in Ladakh's educational and environmental movements, has framed his current protest as a 'second freedom movement', invoking the legacy of mass mobilisation for systemic reform.
- The protest follows recurring allegations of systemic failures in India's examination and recruitment systems, including paper leaks in competitive examinations such as the NEET and UPSC, which have raised concerns about the integrity of public service delivery and meritocracy.
- Delhi Police's prohibitory order under Section 163 BNSS in the New Delhi district reflects a broader trend of heightened security protocols around Parliament and government complexes, particularly in response to recent protests and potential disruptions.

WHAT IS THE LEGAL FRAMEWORK GOVERNING PUBLIC PROTESTS IN INDIA?

- ****Constitutional Basis****: Articles 19(1)(a) and 19(1)(b) of the Constitution protect freedom of expression and peaceful assembly, respectively, but these rights are not absolute and may be restricted by the state under Article 19(2) and 19(3) on grounds including public order, sovereignty, and morality.
- ****Statutory Provisions****: The Code of Criminal Procedure, 1973 (CrPC) empowers magistrates to issue orders under Section 144 to prevent imminent breach of peace, while the Bharatiya Nagarik Suraksha Sanhita (BNSS), 2023, replaces CrPC and retains similar provisions for prohibitory orders.
- ****Designated Protest Sites****: Cities like Delhi designate specific locations (e.g., Jantar Mantar, Ramlila Maidan) for assemblies to balance the right to protest with the need for public order, requiring prior permission for gatherings exceeding a specified number of persons.

- ****Prohibitory Orders****: Section 163 BNSS allows district magistrates to prohibit assemblies, processions, or demonstrations in areas deemed sensitive (e.g., Parliament, Supreme Court, or high-security zones) to prevent disruption or violence.
- ****Judicial Safeguards****: Courts have repeatedly held that prohibitory orders must be reasonable, proportionate, and time-bound, and cannot be used to stifle legitimate dissent. The judiciary also plays a role in monitoring the health and safety of protesters under judicial custody or medical supervision.
- ****Hunger Strikes****: While not explicitly recognised as a fundamental right, hunger strikes have been treated as a form of protest under Article 19(1)(a). Courts have emphasised that the state must ensure the protester's health is not endangered, often directing medical supervision or shifting the individual to a suitable facility.
- ****Role of Police****: The police, as the executive authority, are responsible for enforcing prohibitory orders, maintaining public order, and facilitating peaceful protests within legal frameworks. Their actions are subject to judicial review to prevent arbitrary or excessive use of power.

UPSC VALUE ADDITION

Keywords for Mains Answer-Writing

Fundamental Rights · Right to Protest · Public Order · Administrative Discretion · Judicial Review · Prohibitory Orders · Section 144 CrPC · Right to Education · Examination Paper Leaks · Recruitment Scams · Constitutional Morality · Civil Society Mobilisation

PRELIMS PRACTICE QUESTIONS

Q1. Which of the following legal provisions empowers the administration to impose prohibitory orders restricting public assemblies, processions, and demonstrations in a specified area?

1. A. Section 144 of the Code of Criminal Procedure, 1973
2. B. Article 19(1)(a) of the Constitution of India
3. C. Section 66A of the Information Technology Act, 2000
4. D. Section 124A of the Indian Penal Code, 1860

Answer: A. Section 144 of the Code of Criminal Procedure, 1973 — Section 144 of the CrPC empowers a magistrate to issue orders in urgent cases of nuisance or apprehended danger, including prohibitory orders against assemblies. Article 19(1)(a) guarantees the right to freedom of speech and expression but is subject to reasonable restrictions under Article 19(2).

Q2. Under which constitutional provision can the government impose reasonable restrictions on the right to protest to maintain public order?

1. A. Article 19(1)(a)
2. B. Article 19(2)
3. C. Article 21
4. D. Article 22

Answer: B. Article 19(2) — Article 19(2) of the Constitution permits the state to impose reasonable restrictions on the exercise of the right to freedom of speech and expression, including the right to protest, in the interests of public order.

Q3. Which of the following best describes the legal status of a protest march that proceeds without prior permission in a prohibited area under Section 144 CrPC?

1. A. It is constitutionally protected under Article 19(1)(b)
2. B. It is a cognizable offence under Section 188 IPC
3. C. It is exempt from judicial review
4. D. It is automatically approved by the High Court

Answer: B. It is a cognizable offence under Section 188 IPC — Proceeding with a protest march in violation of prohibitory orders under Section 144 CrPC constitutes a cognizable offence under Section 188 of the Indian Penal Code, punishable with imprisonment or fine.

MAINS PRACTICE QUESTION

✍️ Examine the constitutional and legal framework governing the right to protest in India. How does the state balance the right to peaceful protest with the need to maintain public order? Critically analyse the role of prohibitory orders under Section 144 of the Code of Criminal Procedure in this context.

Approach: Begin by outlining the constitutional basis of the right to protest under Article 19(1)(a) and its reasonable restrictions under Article 19(2). Discuss the legal provisions, including Section 144 CrPC, that empower the administration to impose prohibitory orders. Analyse the judicial perspective on the proportionality of such orders, citing relevant case laws (e.g., *Mazdoor Kisan Shakti Sangathan v. Union of India*). Evaluate the effectiveness and potential misuse of these provisions in balancing public order with democratic rights. Conclude with a balanced assessment of the need for reform to ensure transparency and accountability in the imposition of such orders.

Source: [The Indian Express](#)

Sonam Wangchuk's Hunger Strike and the Imperatives of Educational Accountability: Legal, Constitutional, and Policy Dimensions for UPSC Preparation



Source: [Wikimedia Commons](#) — Pelph Hoters (CC0)

SUBJECT RELEVANCE — WHERE THIS TOPIC FITS

- GS Paper II — Polity and Governance (Fundamental Rights, Right to Protest, Judicial Review) | GS Paper II — Governance (Role of Parliament, Parliamentary Sessions, Ministerial Accountability) | GS Paper III — Social Justice (Education Policy, Examination Reforms, Public Accountability)
- **Prelims:** Hunger strike as a form of protest, Section 144 CrPC (now Section 163 BNSS), Monsoon Session of Parliament, NEET-UG examination, Union Education Minister, Jantar Mantar protest site, Delhi Police prohibitory orders, Safdarjung Hospital, Delhi High Court, BNSS (Bharatiya Nyaya Sanhita)
- **Essay:** The Role of Civil Society in Democratic Governance: A Case Study of Sonam Wangchuk's Protest, Accountability in Public Institutions: Balancing Constitutional Rights and Administrative Order

Quick Revision: The constitutional right to protest (Article 19(1)(a)) is subject to reasonable restrictions under Article 19(2), and the state may impose prohibitory orders under Section 163 BNSS to maintain public order, as seen in the denial of permission for Wangchuk's Parliament march.

WHY IS THIS IN THE NEWS?

The indefinite hunger strike by environmentalist and education reform advocate Sonam Wangchuk, demanding the resignation of the Union Education Minister over alleged examination irregularities in NEET-UG and broader issues of educational accountability, has escalated into a significant political and legal confrontation. The Delhi Police's denial of permission for a proposed Parliament march, the Delhi High Court's refusal to grant interim relief for Wangchuk's transfer from Safdarjung Hospital, and the broader debate on protest rights versus administrative restrictions have brought into sharp focus the constitutional and administrative challenges in balancing democratic dissent with public order. This issue intersects with UPSC syllabus themes on

fundamental rights, parliamentary accountability, and judicial review, making it a critical case study for aspirants.

BACKGROUND

- Sonam Wangchuk, renowned for his educational reforms in Ladakh, initiated an indefinite hunger strike on 14 June 2026 to protest alleged irregularities in the NEET-UG 2026 examination and broader systemic failures in India's education governance.
- The protest gained momentum following widespread allegations of paper leaks, malpractice, and administrative lapses in NEET-UG, culminating in demands for the resignation of the Union Education Minister, Dharmendra Pradhan.
- The Delhi Police, citing prohibitory orders under Section 163 of the Bharatiya Nagarik Suraksha Sanhita (BNSS), which replaced Section 144 of the Code of Criminal Procedure (CrPC), denied permission for a planned march to Parliament on 20 July 2026, citing potential breach of public order.
- The protest has drawn support from civil society groups, including the Cockroach Janta Party (CJP), and has reignited debates on the efficacy of parliamentary mechanisms for addressing public grievances.
- The Monsoon Session of Parliament, commencing on 20 July 2026, has become a focal point for demands that the issue of educational accountability be prioritised in legislative discussions.

WHAT CONSTITUTES A HUNGER STRIKE AS A FORM OF PROTEST, AND HOW DOES IT INTERSECT WITH CONSTITUTIONAL RIGHTS AND ADMINISTRATIVE LAW?

- A hunger strike is a non-violent form of protest where individuals abstain from food to draw attention to a cause or grievance, invoking the right to freedom of speech and expression under Article 19(1)(a) of the Constitution of India.
- The right to protest is not absolute; it is subject to reasonable restrictions under Article 19(2) of the Constitution, which permits the state to impose restrictions in the interest of public order, morality, or sovereignty and integrity of India.
- Section 163 of the BNSS empowers the state to issue prohibitory orders to prevent assemblies, processions, or demonstrations that may disrupt public order, a provision derived from the colonial-era Section 144 CrPC.
- The Delhi High Court's refusal to grant interim relief in Wangchuk's case underscores the judiciary's deference to executive assessments in matters of public health and order, while also highlighting the tension between individual rights and state authority.
- The Monsoon Session of Parliament, as the primary legislative forum, is constitutionally mandated to address issues of national importance, including educational reforms, through debates, discussions, and committee reports (e.g., the Standing Committee on Human Resource Development).
- The NEET-UG examination, conducted by the National Testing Agency (NTA), has faced repeated scrutiny for alleged irregularities, including paper leaks, prompting demands for systemic reforms in examination governance and accountability mechanisms.
- The demand for the resignation of the Union Education Minister reflects broader concerns about ministerial accountability, a principle enshrined in Articles 75 and 77 of the

Constitution, which vest executive authority in the Council of Ministers and hold them collectively responsible to Parliament.

KEY FEATURES

Feature	Significance
Indefinite hunger strike by Sonam Wangchuk	A non-violent protest method to draw national attention to systemic failures in education governance, particularly examination irregularities and paper leaks.
Demand for resignation of Union Education Minister	Reflects public dissatisfaction with political accountability in matters of national importance, especially in the education sector.
Prohibitory order under Section 163 BNSS (formerly Section 144 CrPC)	Demonstrates the state's use of legal measures to regulate public assemblies, raising questions about the balance between law and order and democratic rights.
Delhi High Court's refusal to transfer Wangchuk from Safdarjung Hospital	Highlights judicial intervention in matters of individual rights versus state concerns about public safety and medical ethics.
Cockroach Janta Party (CJP) and allied protests at Jantar Mantar	Shows the mobilisation of civil society and political groups around a specific grievance, illustrating the role of protest sites in democratic dissent.

WHY IT MATTERS

Governance and Accountability

- The protest underscores systemic failures in India's education governance, particularly the recurring issue of examination irregularities and paper leaks, which erode public trust in institutional processes.
- The demand for the resignation of the Union Education Minister reflects a growing expectation for political accountability in matters of national importance, especially in sectors critical to youth aspirations.
- The episode highlights the tension between executive action (prohibitory orders) and democratic rights (freedom of assembly and protest), a recurring theme in India's governance discourse.

Judicial and Legal Dimensions

- The Delhi High Court's refusal to transfer Wangchuk from Safdarjung Hospital raises questions about the judiciary's role in balancing individual rights (medical autonomy) with state concerns (public safety and medical ethics).
- The court's observation that Wangchuk's medical condition is 'perilous' after 17–18 days of fasting introduces the legal principle of state intervention in cases where an individual's life is at risk, even in matters of protest.
- The case exemplifies the judiciary's role as a final arbiter in disputes involving fundamental rights and state authority, particularly in high-stakes public interest matters.

Civil Society and Protest Dynamics

- The mobilisation at Jantar Mantar and the planned march to Parliament demonstrate the strategic use of protest sites and political pressure to amplify grievances, a hallmark of India's democratic traditions.
- The involvement of civil society actors like Sonam Wangchuk and the Cockroach Janta Party (CJP) highlights the role of non-political entities in holding institutions accountable, especially in sectors perceived to be failing the public.
- The episode reflects the evolving nature of protest in India, where digital and physical mobilisation converge to create pressure points for policy change.

Public Health and Medical Ethics

- Wangchuk's hunger strike for 35 days in Ladakh and subsequent hospitalisation in Delhi raise ethical questions about the state's role in intervening in individual decisions, even when such decisions are framed as acts of protest.
- The obstruction faced by Wangchuk's physician in accessing him at Safdarjung Hospital underscores concerns about medical autonomy and the right of individuals to choose their treatment, especially in high-profile cases.

Parliamentary and Legislative Accountability

- The demand for the issue of education accountability to be raised during the Monsoon Session of Parliament reflects public expectations that legislative bodies address systemic failures through debate, inquiry, and corrective action.
- The episode highlights the role of Parliament as a forum for addressing public grievances, particularly in sectors where institutional trust has been eroded by repeated crises.

CHALLENGES

1. Balancing Law and Order with Democratic Rights

- The prohibitory order under Section 163 BNSS (formerly Section 144 CrPC) in New Delhi district raises questions about the state's use of coercive measures to regulate public assemblies, even when such assemblies are peaceful and constitutionally protected.
- The episode exemplifies the tension between maintaining public order and upholding the fundamental right to protest, a recurring challenge in India's governance landscape.
- The Delhi Police's clarification that no permission was sought or granted for the protest march underscores the procedural ambiguities in regulating assemblies, particularly in high-security zones like Parliament.

UPSC Link: GS-II: Fundamental Rights (Articles 19(1)(a), 19(1)(b))

2. Ensuring Transparency and Accountability in Education Governance

- The recurring issue of examination irregularities and paper leaks in national-level examinations (e.g., NEET) highlights systemic failures in India's education governance, including inadequate safeguards, weak oversight, and delayed corrective action.
- The demand for the resignation of the Union Education Minister reflects public frustration with the lack of accountability in addressing these failures, despite multiple investigations and reports.

- The episode underscores the need for structural reforms in examination bodies, including independent oversight, technological safeguards, and transparent investigation mechanisms.

UPSC Link: GS-II: Government Policies and Interventions for Development

3. Judicial Intervention in Individual Rights vs. State Concerns

- The Delhi High Court's refusal to transfer Wangchuk from Safdarjung Hospital introduces the legal dilemma of state intervention in cases where an individual's life is at risk, even when the individual's actions are framed as a protest.
- The court's observation that Wangchuk's medical condition is 'perilous' after 17–18 days of fasting raises ethical questions about the state's role in protecting individuals from self-harm, particularly in high-profile cases.
- The episode highlights the judiciary's role as a final arbiter in disputes involving fundamental rights, medical ethics, and state authority, a recurring theme in India's legal discourse.

UPSC Link: GS-II: Judiciary (Article 226, Writ Jurisdiction)

4. Protecting Medical Autonomy and Right to Treatment

- The obstruction faced by Wangchuk's physician in accessing him at Safdarjung Hospital raises concerns about medical autonomy and the right of individuals to choose their treatment, especially in high-profile cases.
- The episode underscores the need for clear protocols to ensure that individuals in protest or high-risk situations can access medical care without interference from state or institutional actors.
- The issue also highlights the ethical responsibilities of medical professionals in balancing patient autonomy with institutional policies, particularly in cases involving public interest.

UPSC Link: GS-II: Right to Health (Article 21)

5. Mobilising Civil Society for Policy Change

- The involvement of civil society actors like Sonam Wangchuk and the Cockroach Janta Party (CJP) highlights the role of non-political entities in holding institutions accountable, particularly in sectors perceived to be failing the public.
- The episode demonstrates the strategic use of protest sites (e.g., Jantar Mantar) and political pressure to amplify grievances, a hallmark of India's democratic traditions.
- The mobilisation also raises questions about the effectiveness of such protests in driving tangible policy changes, particularly in sectors where institutional inertia is high.

UPSC Link: GS-II: Role of Civil Society in Governance

Challenges — UPSC Perspective

Issue	Concern
Examination irregularities and paper leaks	Erosion of public trust in national-level examinations, particularly NEET, and systemic failures in governance.

Issue	Concern
Prohibitory orders under Section 163 BNSS	Potential violation of fundamental rights to assembly and protest, despite state's justification of maintaining law and order.
Judicial intervention in medical autonomy	Balancing individual rights (medical choice) with state concerns (public safety and medical ethics) in high-profile cases.
Obstruction of medical access to protesters	Violation of the right to health and medical autonomy, particularly in cases involving prolonged protests.
Demand for political accountability	Public frustration with the lack of transparency and corrective action in matters of national importance, such as education governance.

WAY FORWARD

- The Union Education Ministry should expedite the implementation of the ****National Education Policy (NEP) 2020**** reforms, particularly in examination governance, to restore public trust in national-level assessments.
- Parliament should constitute a ****Standing Committee on Education**** to regularly review examination processes, investigate irregularities, and recommend systemic reforms, ensuring legislative oversight.
- The ****National Testing Agency (NTA)**** should be granted statutory independence, with transparent appointment processes for its leadership and a mandate to implement robust safeguards against paper leaks.
- State governments and examination bodies should adopt ****blockchain-based verification systems**** for answer sheets and admit cards to eliminate tampering and ensure authenticity.
- Civil society organisations should collaborate with educational institutions to launch ****public awareness campaigns**** on examination ethics, encouraging students to report irregularities without fear of reprisal.
- The ****Delhi Police and state authorities**** should review prohibitory orders under Section 163 BNSS to ensure they do not disproportionately restrict peaceful assemblies, particularly in designated protest sites like Jantar Mantar.
- The ****Judiciary** should establish clear guidelines for intervention in cases involving hunger strikes or self-harm by protesters, balancing individual rights with state concerns for public safety.
- Educational institutions should introduce ****mandatory courses on ethics and integrity**** in examinations, embedding values of honesty and accountability in the curriculum.

UPSC VALUE ADDITION

Keywords for Mains Answer-Writing

Sonam Wangchuk hunger strike · Education accountability in Parliament · NEET examination irregularities · Union Education Minister accountability · Section 163 BNSS (CrPC) · Prohibitory

orders for public assemblies · Monsoon Session of Parliament · Right to Protest under Article 19(1)(a) · Judicial intervention in protests · Public order and law and order distinction

Constitutional & Policy Linkages

- Article 19(1)(a): Freedom of speech and expression (right to protest).
- Article 19(1)(b): Freedom to assemble peacefully.
- Article 21: Right to life and personal liberty (right to health and medical autonomy).
- Article 226: Writ jurisdiction of High Courts (judicial review of executive actions).

Concept Flow

Examination irregularities and paper leaks → Erosion of public trust in education governance → Protests and hunger strikes by civil society (e.g., Sonam Wangchuk) → State response (prohibitory orders under Section 163 BNSS) → Judicial intervention (Delhi High Court's refusal to transfer Wangchuk) → Demand for political accountability (resignation of Union Education Minister) → Parliamentary action (Monsoon Session focus on education accountability). → Protest mobilisation at Jantar Mantar → Planned march to Parliament → State's use of prohibitory orders → Public debate on balance between law and order and democratic rights → Judicial scrutiny of executive actions → Civil society's role in holding institutions accountable. → Hunger strike as protest method → Medical intervention and judicial observation of 'perilous' condition → Ethical dilemma of state intervention in individual rights → Public discourse on medical autonomy and right to treatment. → Failure of examination governance → Systemic reforms in NTA and examination bodies → Legislative oversight (Standing Committee on Education) → Technological safeguards (blockchain-based verification) → Public awareness campaigns on examination ethics. → Civil society mobilisation → Strategic use of protest sites → Political pressure for policy change → Effectiveness of protests in driving tangible reforms → Role of Parliament in addressing public grievances.

PRELIMS PRACTICE QUESTIONS

Q1. Consider the following statements regarding the legal framework governing public protests in India: 1. Section 144 of the Criminal Procedure Code (CrPC) has been replaced by Section 163 of the Bharatiya Nagarik Suraksha Sanhita (BNSS) in 2024. 2. Under the BNSS, prohibitory orders can be issued to prevent assemblies of five or more people without prior permission. 3. The right to protest is absolute and cannot be restricted under any circumstances. 4. The Delhi Police's refusal to grant permission for a protest march on July 20, 2026, was based on a prohibitory order under Section 163 BNSS. Which of the statements given above are correct?

1. 1, 2 and 4 only
2. 1, 3 and 4 only
3. 2, 3 and 4 only
4. 1, 2, 3 and 4

Answer: 1, 2 and 4 only — Statement 1 is correct as Section 144 CrPC was replaced by Section 163 BNSS in 2024. Statement 2 is correct as prohibitory orders under BNSS can restrict assemblies of five or more

people. Statement 3 is incorrect as the right to protest is subject to reasonable restrictions under Article 19(2). Statement 4 is correct as the Delhi Police cited Section 163 BNSS for denying permission.

Q2. Which of the following constitutional provisions is most directly relevant to the issue of accountability of the Union Education Minister in the context of the NEET examination irregularities?

1. Article 324 (Election Commission powers)
2. Article 74 (Council of Ministers to aid and advise the President)
3. Article 300A (Right to property)
4. Article 292 (Borrowing by the Government of India)

Answer: Article 74 (Council of Ministers to aid and advise the President) — Article 74 of the Constitution mandates that the Council of Ministers, including the Union Education Minister, shall aid and advise the President in the exercise of his functions. Accountability of the Minister is derived from this provision.

Q3. The term 'public order' as used in the context of prohibitory orders under Section 163 BNSS refers to:

1. The maintenance of peace and tranquillity in public spaces
2. The prevention of acts that disturb the community or public at large
3. The regulation of traffic and movement of vehicles
4. The enforcement of civil laws and contracts

Answer: The prevention of acts that disturb the community or public at large — 'Public order' under Section 163 BNSS refers to the prevention of acts that disturb the community or public at large, distinct from 'law and order,' which pertains to individual disputes or crimes.

MAINS PRACTICE QUESTION

✍️ Examine the constitutional and legal dimensions of the right to protest in India, with particular reference to the recent events surrounding Sonam Wangchuk's hunger strike and the Delhi Police's prohibitory orders. How does the state balance the right to protest with the need to maintain public order? Suggest measures to ensure that such protests remain within the ambit of democratic governance.

Approach: Begin by defining the constitutional right to protest under Article 19(1)(a) and its reasonable restrictions under Article 19(2). Analyse the legal framework governing prohibitory orders under Section 163 BNSS, distinguishing between 'public order' and 'law and order.' Critically evaluate the Delhi Police's actions in denying permission for the protest march, considering the principles of proportionality and necessity. Discuss the role of judicial review in such matters, referencing the Delhi High Court's observations. Conclude with recommendations for ensuring that protests are conducted in a manner that upholds democratic values while maintaining public order, such as prior consultations, designated protest sites, and transparent enforcement of laws.

Source: [The Hindu](#)

Economy

SEBI's Verified Label for Brokerage Apps: Strengthening Investor Protection in Digital Trading Ecosystems

SUBJECT RELEVANCE — WHERE THIS TOPIC FITS

- GS Paper III — Indian Economy: Issues Relating to Mobilisation of Resources, Including Banking and Financial Sectors | GS Paper III — Role of Financial and Non-Financial Institutions in Economic Development
- **Prelims:** SEBI, investor protection, stock trading apps, brokers, Google Play Store, digital fraud prevention, KYC norms, market integrity, financial literacy, regulatory sandbox
- **Essay:** The Role of Regulatory Bodies in Safeguarding Public Trust in Financial Markets, Digital Transformation and Ethical Governance: Balancing Innovation with Consumer Protection

Quick Revision: SEBI's Verified Label for stock trading apps is a digital authentication badge for SEBI-registered brokers on Google Play Store, aimed at curbing fraud and enhancing investor trust in digital trading ecosystems.

WHY IS THIS IN THE NEWS?

On 25 March 2026, the Chairman of the Securities and Exchange Board of India (SEBI) introduced a 'Verified Label' for stock trading applications of SEBI-registered brokers on the Google Play Store. This initiative is designed to mitigate risks of fraudulent or unregistered entities masquerading as legitimate brokerage platforms, thereby enhancing investor confidence in digital trading ecosystems. The measure aligns with SEBI's broader mandate to protect retail investors amid the rapid proliferation of online trading platforms.

BACKGROUND

- SEBI, established in 1992 under the SEBI Act, 1992, is the statutory regulator for the securities market in India, entrusted with protecting investor interests and promoting market integrity.
- The digitalisation of financial services has led to a surge in online trading platforms, with retail participation in equity markets increasing from 3.7% in 2019 to over 10% in 2025 (as per SEBI data).
- Fraudulent trading apps and unauthorised entities have exploited gaps in investor awareness, leading to significant financial losses, as evidenced by SEBI's enforcement actions in 2023-24.
- SEBI's regulatory framework mandates that all brokers must be registered with it and comply with stringent disclosure norms, including Know Your Customer (KYC) and anti-money laundering (AML) requirements.
- The Google Play Store hosts over 15,000 financial apps globally, with India being one of the largest markets for such applications.

- SEBI's previous initiatives to enhance investor protection include the introduction of the 'Investor Charter' in 2021 and the 'Investor Awareness Programme' in collaboration with stock exchanges.

WHAT IS SEBI'S VERIFIED LABEL FOR STOCK TRADING APPS?

- The Verified Label is a digital certification mechanism introduced by SEBI to authenticate stock trading applications offered by SEBI-registered brokers on the Google Play Store.
- The label will appear as a blue verification badge next to the app's name, similar to the verification badges used for social media profiles, to signify authenticity.
- Only brokers registered with SEBI and compliant with its regulatory norms will be eligible to display the Verified Label, ensuring that users interact solely with authorised entities.
- The label is part of SEBI's broader 'Investor Protection Framework' and complements existing measures such as mandatory disclosures, risk warnings, and grievance redressal mechanisms.
- The initiative leverages technology to curb the proliferation of fake or unauthorised trading apps, which often mimic legitimate platforms to defraud investors.
- SEBI will collaborate with Google to integrate the Verified Label into the Play Store's app listing interface, ensuring seamless user identification.
- The label does not absolve brokers of their regulatory responsibilities but serves as an additional layer of trust for retail investors.
- SEBI has also mandated that brokers display the Verified Label prominently in their marketing and user interfaces to reinforce credibility.

KEY FEATURES

Feature	Significance
Verified Label on Google Play Store	Provides a visual marker of authenticity for SEBI-registered brokerage apps, reducing the risk of users downloading fraudulent or unregistered trading platforms.
Mandatory for SEBI-registered brokers	Ensures only compliant entities can display the label, enhancing regulatory oversight and investor confidence.
Integration with Google Play Store ecosystem	Leverages a trusted platform to disseminate verified information, minimizing reliance on third-party verification mechanisms.
Real-time verification mechanism	Links the label to SEBI's live database of registered brokers, enabling dynamic updates and immediate revocation if compliance lapses occur.
User-centric design	Simplifies the identification of legitimate trading apps, particularly for retail investors unfamiliar with regulatory nuances.

WHY IT MATTERS

Economic Stability and Investor Protection

- Mitigates systemic risks by reducing the prevalence of fraudulent trading platforms that could destabilize retail investor confidence in financial markets.

- Aligns with SEBI's mandate to safeguard investor interests under the SEBI Act, 1992, thereby contributing to the stability of India's capital markets.
- Encourages formal participation in the securities market by providing a trustworthy digital interface for retail investors.

Regulatory Governance and Compliance

- Strengthens SEBI's supervisory role by embedding regulatory compliance into the digital onboarding process for brokerage services.
- Facilitates seamless monitoring of registered entities through automated verification, reducing administrative burdens on SEBI.
- Sets a precedent for leveraging technology (RegTech) to enhance regulatory efficiency and transparency in financial markets.

Digital Public Infrastructure and Market Access

- Promotes the use of digital public infrastructure (DPI) in financial services, aligning with India's broader digital transformation goals.
- Expands access to capital markets for underserved segments, such as rural and semi-urban investors, by providing a low-friction verification pathway.
- Supports the development of a secure and interoperable digital ecosystem for financial transactions.

CHALLENGES

1. Fraudulent Impersonation and Phishing Risks

- Cybercriminals may attempt to replicate the Verified Label or create lookalike apps to deceive investors, necessitating continuous vigilance and public awareness campaigns.
- SEBI must invest in robust cybersecurity measures to prevent unauthorized access to its verification database.

UPSC Link: Cybersecurity threats to financial systems (GS-III)

2. Digital Divide and Accessibility Barriers

- Investors in regions with limited internet connectivity or low digital literacy may face challenges in identifying and using verified apps.
- SEBI and Google Play Store must ensure multilingual support and user-friendly interfaces to cater to diverse linguistic and technical proficiencies.

UPSC Link: Digital divide and financial inclusion (GS-II)

3. Regulatory Arbitrage and Cross-Border Risks

- Unregistered foreign brokers may exploit loopholes to offer trading services via unverified apps, undermining SEBI's jurisdiction.
- Strengthening international cooperation and cross-border regulatory frameworks becomes essential to address this challenge.

UPSC Link: Cross-border financial regulation (GS-III)

4. Data Privacy and Consumer Protection

- The verification process may involve the collection and processing of user data, raising concerns about privacy and compliance with the Digital Personal Data Protection Act, 2023.
- SEBI must ensure strict adherence to data protection norms while maintaining operational efficiency.

UPSC Link: Data privacy and consumer protection (GS-II)

5. Technological Dependence and Systemic Risks

- Over-reliance on Google Play Store for verification introduces a single point of failure; alternative verification channels (e.g., SEBI's website, mobile apps) must be developed.
- Regular audits and stress-testing of the verification infrastructure are necessary to prevent disruptions.

UPSC Link: Systemic risks in digital financial infrastructure (GS-III)

Challenges — UPSC Perspective

Issue	Concern
Fraudulent apps mimicking Verified Label	Erosion of investor trust and potential financial losses due to scams.
Limited digital literacy in rural areas	Exclusion of underserved populations from formal financial markets.
Cross-border regulatory gaps	Circumvention of SEBI's oversight by foreign entities.
Data privacy violations	Legal and reputational risks for SEBI and investors.
Single-point verification dependency	Vulnerability to disruptions in Google Play Store or SEBI's systems.

WAY FORWARD

- SEBI should collaborate with Google Play Store to develop a standardized API for real-time verification, ensuring seamless integration and scalability.
- Launch nationwide awareness campaigns, in partnership with financial literacy initiatives, to educate investors about identifying the Verified Label and avoiding fraudulent apps.
- Expand verification channels beyond Google Play Store to include SEBI's official website, mobile apps, and regional language interfaces for broader accessibility.
- Establish a dedicated cybersecurity task force within SEBI to monitor and respond to fraudulent activities, including phishing and impersonation attempts.
- Conduct periodic audits of the verification system to identify vulnerabilities and implement corrective measures proactively.
- Strengthen cross-border regulatory cooperation through bilateral agreements and multilateral forums to address jurisdictional challenges.
- Develop a grievance redressal mechanism for investors to report suspicious apps or compliance violations, ensuring swift action by SEBI.

UPSC VALUE ADDITION

Keywords for Mains Answer-Writing

SEBI · investor protection · stock trading apps · Verified Label · registered brokers · Google Play Store · financial market regulation · digital fraud prevention · market integrity · financial inclusion · regulatory compliance · retail investor safeguards

Concept Flow

SEBI identifies the proliferation of fraudulent trading apps as a threat to investor protection.
 → SEBI introduces the Verified Label as a digital authentication mechanism for registered brokers.
 → The Verified Label is integrated into the Google Play Store ecosystem for wide accessibility.
 → Investors use the label to verify the authenticity of trading apps before downloading.
 → SEBI monitors compliance in real-time, revoking labels for non-compliant entities.
 → Regulatory oversight is enhanced, reducing fraud and increasing investor confidence.
 → Broader participation in capital markets is encouraged, supporting financial inclusion.

PRELIMS PRACTICE QUESTIONS

Q1. Which of the following is NOT a function of the Securities and Exchange Board of India (SEBI)?

1. Regulating the securities market
2. Protecting the interests of investors
3. Issuing currency notes
4. Promoting the development of the securities market

Answer: Issuing currency notes — SEBI is mandated to regulate the securities market, protect investor interests, and promote market development, but issuing currency notes is the exclusive domain of the Reserve Bank of India (RBI).

Q2. The 'Verified Label' initiative by SEBI is primarily aimed at:

1. Enhancing the user interface of stock trading apps
2. Preventing fraudulent stock trading apps from misleading investors
3. Increasing the number of registered brokers
4. Reducing transaction costs for retail investors

Answer: Preventing fraudulent stock trading apps from misleading investors — The Verified Label is an investor protection measure to authenticate stock trading apps of SEBI-registered brokers on the Google Play Store, thereby preventing fraudulent or impersonating apps from misleading investors.

Q3. Which of the following is a key objective of SEBI's regulatory framework for stock trading apps?

1. To ensure all stock trading apps are free of cost
2. To mandate the use of artificial intelligence in trading
3. To verify the authenticity of registered brokers' apps

4. To restrict trading to only institutional investors

Answer: To verify the authenticity of registered brokers' apps — SEBI's Verified Label initiative specifically aims to verify the authenticity of stock trading apps belonging to brokers registered with SEBI, thereby safeguarding investors from fraudulent entities.

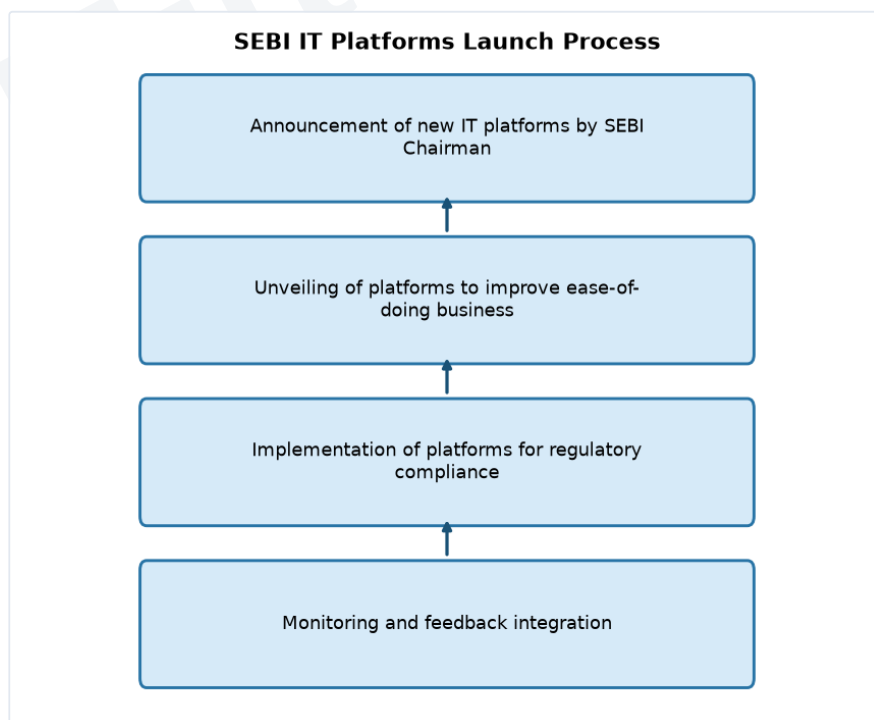
MAINS PRACTICE QUESTION

✍ Critically examine the significance of SEBI's 'Verified Label' initiative for retail investors in India's financial ecosystem. How does this measure contribute to market integrity and financial inclusion? (250 words)

Approach: Begin by contextualising SEBI's role in investor protection and market regulation. Analyse the 'Verified Label' initiative as a tool for fraud prevention and investor confidence-building. Discuss its impact on market integrity by reducing impersonation risks and enhancing transparency. Evaluate its contribution to financial inclusion by enabling safe digital participation of retail investors. Conclude with a balanced assessment of limitations, such as digital divide or over-reliance on technology, and suggest complementary measures for holistic investor protection.

Source: [SEBI](#)

Launch of various IT platforms by Chairman, SEBI to improve ease-of-doing business



SEBI IT Platforms Launch Process

Launch of various IT platforms by Chairman, SEBI to improve ease-of-doing business

SEBI Launches Two New Investor Awareness Videos to Promote Corporate Bond Market Awareness

SEBI Launches Two New Investor Awareness Videos to Promote Corporate Bond Market Awareness

Plutus IAS

Economy/Governance

RBI's Rural Consumer Confidence Survey (RCCS) July 2026: Significance for Monetary Policy and Rural Economic Assessment



Source: [Wikimedia Commons](#) — Ministry of Finance of India (GODL-India)

SUBJECT RELEVANCE — WHERE THIS TOPIC FITS

- GS Paper III — Indian Economy: Issues relating to planning, resource mobilisation, growth, development and employment | GS Paper III — Money and Banking: Monetary Policy and Inflation Dynamics
- **Prelims:** Rural Consumer Confidence Survey (RCCS), Monetary Policy Framework, Inflation Expectations, Household Income and Employment Perception, Semi-Urban and Rural Economic Indicators
- **Essay:** The Role of Data-Driven Policymaking in India's Economic Governance, Bridging the Rural-Urban Divide: Challenges and Opportunities in Economic Surveys

Quick Revision: The Rural Consumer Confidence Survey (RCCS) is an RBI initiative to gauge rural and semi-urban household sentiment, directly informing monetary policy decisions on inflation and growth.

WHY IS THIS IN THE NEWS?

The Reserve Bank of India (RBI) has initiated the July 2026 round of the Rural Consumer Confidence Survey (RCCS), designed to capture the perceptions and expectations of rural and semi-urban households regarding economic conditions, employment, prices, income, and spending. Conducted across 31 states and Union Territories, the survey serves as a critical input for the RBI's monetary

policy formulation, particularly in assessing inflationary pressures and rural demand dynamics. The engagement of Ipsos Research Private Ltd. underscores the RBI's commitment to methodological rigour in data collection, while the public participation mechanism ensures inclusivity in economic feedback.

BACKGROUND

- The RBI has been conducting the Rural Consumer Confidence Survey (RCCS) at regular intervals to gauge the pulse of rural and semi-urban households, which constitute a significant portion of India's population and economic activity.
- The survey aligns with the RBI's broader mandate under the Monetary Policy Framework (2016) to maintain price stability while supporting growth, with rural demand being a key determinant of inflation and economic momentum.
- Rural India, home to approximately 65% of the population, remains a critical yet under-monitored segment for macroeconomic policy, necessitating targeted surveys like the RCCS for accurate assessment.
- The survey's findings complement other RBI initiatives such as the Consumer Confidence Survey (CCS) for urban areas, creating a holistic view of household sentiment across India.
- Historically, rural consumer sentiment has been a leading indicator for agricultural demand, wage growth, and inflation trends, influencing the RBI's policy stance on interest rates and liquidity.
- The July 2026 round follows a structured methodology, with households providing both current perceptions and one-year-ahead expectations, enabling forward-looking policy adjustments.

WHAT IS THE RURAL CONSUMER CONFIDENCE SURVEY (RCCS)?

- The RCCS is a survey conducted by the Reserve Bank of India (RBI) to assess the economic perceptions and expectations of rural and semi-urban households across India.
- The survey captures two key dimensions: (a) current perceptions of households regarding the general economic situation, employment, prices, income, and spending; and (b) one-year-ahead expectations on the same parameters.
- Data is collected from a representative sample of households in 31 states and Union Territories, ensuring geographical inclusivity and statistical robustness.
- The survey employs a structured questionnaire to elicit responses on qualitative and quantitative indicators, such as confidence levels, job security, price trends, and income growth.
- Findings from the RCCS are utilised by the RBI as inputs for monetary policy decisions, particularly in calibrating interest rates and assessing inflationary pressures emanating from rural demand.
- The survey is conducted by an external agency (e.g., Ipsos Research Private Ltd. in July 2026) under the supervision of the RBI's Division of Household Surveys, ensuring methodological independence and credibility.
- Households not approached by the agency can voluntarily participate by submitting responses through a public survey schedule, enhancing the survey's reach and inclusivity.

- The RCCS complements the RBI's Consumer Confidence Survey (CCS) for urban areas, providing a comprehensive view of household sentiment across India's diverse economic landscape.

KEY FEATURES

Feature	Significance
Periodicity	Conducted bi-annually (January and July rounds) to capture seasonal variations in rural economic sentiment.
Geographical Coverage	Encompasses all 31 states and Union Territories, ensuring pan-India representation of rural and semi-urban households.
Survey Agency	Engagement of a professional research firm (Ipsos Research Private Ltd.) to ensure methodological rigour and unbiased data collection.
Survey Instruments	Standardised questionnaire capturing current perceptions and one-year-ahead expectations on economic variables (income, employment, prices, spending).
Data Utilisation	Primary input for the Reserve Bank of India's Monetary Policy Committee in assessing rural demand-side inflationary pressures and growth outlook.

WHY IT MATTERS

Monetary Policy Framework

- Provides granular, high-frequency insights into rural household sentiment, complementing urban data for a holistic inflation assessment.
- Enables the RBI to calibrate policy tools (repo rate, liquidity measures) by gauging rural demand-side constraints or expansionary trends.
- Supports the 'inclusive growth' mandate by prioritising rural economic conditions in policy design.

Macroeconomic Stability

- Acts as an early-warning system for rural distress, potentially signalling systemic risks to agricultural income or employment.
- Informs fiscal-monetary coordination by identifying regions requiring targeted interventions (e.g., MGNREGA, PM-KISAN).
- Enhances the credibility of RBI's inflation forecasts by incorporating ground-level price expectations from rural households.

Data-Driven Governance

- Demonstrates the RBI's commitment to evidence-based policymaking, aligning with global best practices in central banking.
- Facilitates evidence-based allocation of resources under schemes like the 'Rashtriya Krishi Vikas Yojana' (RKVY) or 'Pradhan Mantri Gram Sadak Yojana' (PMGSY).
- Promotes transparency by making survey methodology and results publicly accessible for academic and policy research.

CHALLENGES

1. Sampling and Representation Bias

- Ensuring proportional representation of marginalised rural groups (e.g., landless labourers, tribal communities) in the sample frame.
- Addressing non-response bias, particularly in remote or conflict-affected regions (e.g., parts of Jammu & Kashmir, Northeast).

UPSC Link: GS-III: Statistical Systems

2. Data Quality and Timeliness

- Mitigating measurement errors in subjective assessments (e.g., income expectations) due to cognitive biases or seasonal variations.
- Balancing the need for rapid data processing with the requirement for high-quality, validated inputs for monetary policy decisions.

UPSC Link: GS-III: Data Governance

3. Interpretation and Policy Translation

- Avoiding over-reliance on survey results in isolation; integrating with other indicators (e.g., CPI-IW, GDP growth) to avoid policy missteps.
- Ensuring that rural sentiment data does not lead to populist fiscal measures that distort monetary policy objectives.

UPSC Link: GS-III: Policy Coordination

Challenges — UPSC Perspective

Issue	Concern
Seasonal Variability	Rural economic sentiment fluctuates with agricultural cycles, monsoons, and festival seasons, complicating trend analysis.
Digital Divide	Limited internet penetration in rural areas may restrict participation in online survey schedules, skewing responses.
Language Barriers	Multilingual survey administration requires translation accuracy to avoid misinterpretation of questions.
Trust Deficit	Rural households may perceive surveys as government surveillance, leading to underreporting or misreporting.
Logistical Constraints	High costs and time delays in reaching remote households for face-to-face interviews.

WAY FORWARD

- Enhance sample stratification to include sub-groups like small/marginal farmers, women-headed households, and SC/ST communities.
- Pilot hybrid survey modes (phone, SMS, in-person) to improve response rates in areas with low digital access.
- Develop a real-time dashboard for survey results to enable faster policy feedback loops.

- Collaborate with state governments to validate survey findings against local administrative data (e.g., land records, MGNREGA muster rolls).
- Conduct pre-survey awareness campaigns in rural areas to build trust and improve participation rates.
- Integrate survey results with other RBI datasets (e.g., CPI, industrial output) for cross-validation and deeper analysis.
- Explore the use of AI/ML tools to detect anomalies or patterns in survey responses, enhancing data reliability.

UPSC VALUE ADDITION

Keywords for Mains Answer-Writing

Rural Consumer Confidence Survey (RCCS) · monetary policy inputs · household economic perceptions · rural employment scenario · price expectations · disposable income trends · semi-urban households · state-wise consumer sentiment · Ipsos Research Private Ltd. · survey methodology · Reserve Bank of India (RBI) statistics · household spending projections · inflation expectations · economic sentiment indicators

Concept Flow

Rural Household Sentiment (Perceptions/Expectations) → Data Collection via RCCS → Aggregation and Analysis by RBI → Input for Monetary Policy → Transmission to Credit Markets and Inflation → Feedback Loop to Rural Economy (via policy tools like repo rate, liquidity measures). → Agricultural Output Fluctuations → Rural Income Expectations → Survey Responses → RBI Policy Adjustments → Rural Demand Stimulus/Contraction → Impact on Inflation and Growth. → Government Welfare Schemes (e.g., PM-KISAN) → Rural Income Support → Survey Feedback on Spending Intentions → RBI's Assessment of Demand-Side Inflation → Policy Calibration. → Monsoon Variability → Rural Employment and Income → Survey Captures Sentiment Shifts → RBI's Inflation Forecast Revisions → Fiscal-Monetary Coordination (e.g., food subsidy adjustments). → Global Commodity Price Shocks → Rural Input Costs → Survey Reflects Price Expectations → RBI's Policy Response (e.g., repo rate hikes) → Rural Credit Availability Changes. → Digital Public Infrastructure (e.g., JAM Trinity) → Improved Survey Accessibility → Higher Response Rates → More Representative Data → Better Policy Outcomes. → RBI's Constitutional Mandate (Article 280) → Price Stability Objective → Rural Data Integration → Inclusive Policy Design.

PRELIMS PRACTICE QUESTIONS

Q1. Which of the following entities is responsible for conducting the Rural Consumer Confidence Survey (RCCS) on behalf of the Reserve Bank of India?

1. A. National Sample Survey Office (NSSO)
2. B. Ipsos Research Private Ltd.
3. C. National Statistical Office (NSO)
4. D. Indian Statistical Institute (ISI)

Answer: B. Ipsos Research Private Ltd. — The RCCS for the July 2026 round is conducted by Ipsos Research Private Ltd., as explicitly stated in the RBI press release.

Q2. The Rural Consumer Confidence Survey (RCCS) collects data from households in rural and semi-urban areas across how many states/Union Territories in India?

1. A. 28
2. B. 30
3. C. 31
4. D. 33

Answer: C. 31 — The survey covers households in 31 states/Union Territories, as listed in the RBI press release.

Q3. Which of the following is NOT a parameter assessed by the Rural Consumer Confidence Survey (RCCS)?

1. A. General economic situation
2. B. Employment scenario
3. C. Stock market performance
4. D. Own income and spending

Answer: C. Stock market performance — The RCCS assesses general economic situation, employment scenario, price situation, own income, and spending, but not stock market performance.

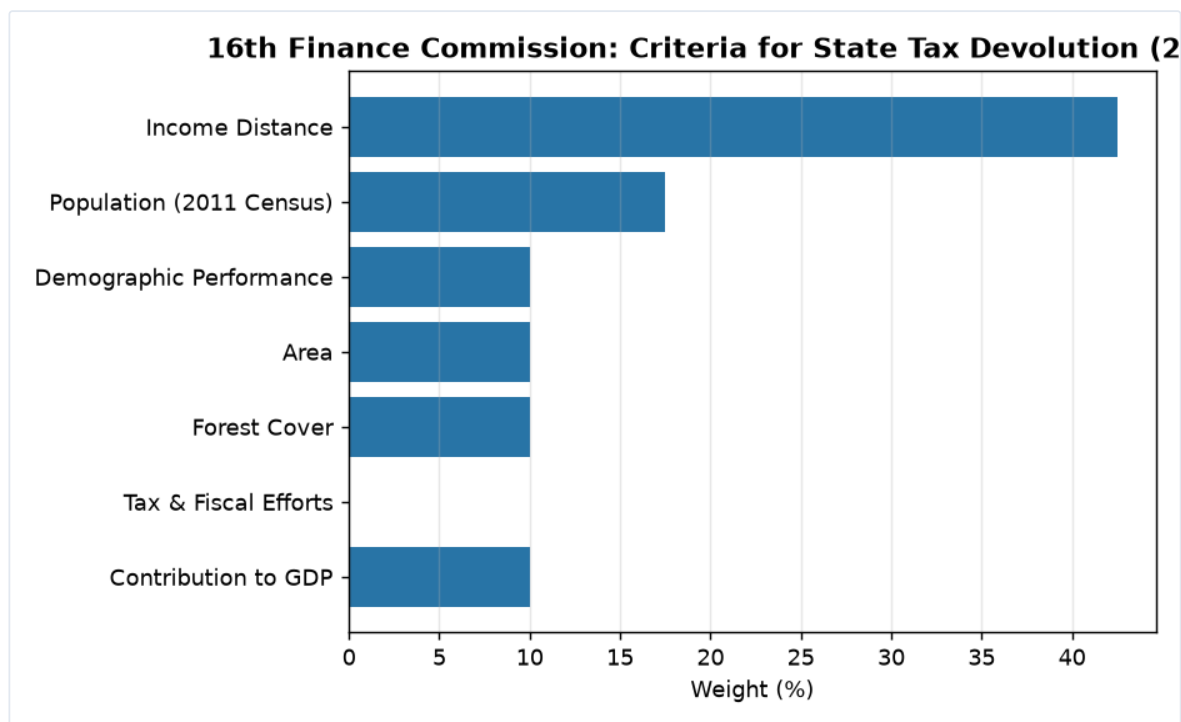
MAINS PRACTICE QUESTION

✍️ Examine the significance of the Rural Consumer Confidence Survey (RCCS) in shaping monetary policy decisions in India. How do the survey's findings on rural and semi-urban household perceptions influence the Reserve Bank of India's policy stance?

Approach: The answer must elucidate the role of RCCS as a key input for monetary policy formulation. Begin by defining the RCCS and its scope, highlighting that it captures current perceptions and one-year-ahead expectations of households on economic variables such as general economic situation, employment, prices, income, and spending. Explain how these perceptions serve as leading indicators for aggregate demand, inflation expectations, and consumer sentiment in rural and semi-urban India. Discuss the RBI's use of such survey-based data to calibrate policy rates, manage inflation expectations, and address rural economic challenges. Conclude by emphasizing the survey's contribution to evidence-based policymaking and its alignment with the RBI's objective of maintaining price stability and fostering inclusive growth.

Source: [RBI](#)

The Sixteenth Finance Commission (2026–31): Redefining Centre-State Fiscal Federalism in India



16th Finance Commission: Criteria for State Tax Devolution (2026-31)

SUBJECT RELEVANCE — WHERE THIS TOPIC FITS

- GS Paper II — Functions and Responsibilities of the Union and the States, Issues and Challenges Pertaining to the Federal Structure | GS Paper III — Indian Economy and Issues Relating to Planning, Mobilisation of Resources, Growth, Development and Employment
- **Prelims:** Finance Commission, Article 280, divisible pool, cess, surcharge, per capita GSDP, Total Fertility Rate, forest cover, Gross State Domestic Product (GSDP), Tax-to-GDP ratio, fiscal federalism
- **Essay:** Federalism in India: Balancing Equity and Efficiency, Fiscal Federalism and Sustainable Development Goals

Quick Revision: The Sixteenth Finance Commission recommends a 41% share of the divisible pool for states (2026–31), retains 'Income Distance' and 'Population' as key parameters, introduces 'Contribution to GDP,' and revises 'Demographic Performance' and 'Forest' criteria to align fiscal devolution with equity and sustainable development.

WHY IS THIS IN THE NEWS?

The Report of the Sixteenth Finance Commission (Chair: Dr. Arvind Panagariya), tabled in Parliament on 1 February 2026, outlines its recommendations for the devolution of central taxes to states for the five-year period 2026–27 to 2030–31. The recommendations, including a 41% share of the divisible pool for states, revised criteria for inter-state distribution, and the introduction of new parameters such as 'Contribution to GDP,' are significant for India's fiscal federalism and resource allocation mechanisms. The report reflects evolving priorities in governance, equity, and economic development.

BACKGROUND

- The Finance Commission is a Constitutional body established under Article 280 of the Constitution, mandated to recommend the distribution of net proceeds of taxes between the Union and the States and among the States themselves.
- The Fifteenth Finance Commission (2021–26) recommended a 41% share for states in the divisible pool of central taxes, which has been retained by the Sixteenth Finance Commission for 2026–31.
- The divisible pool is derived after excluding cesses, surcharges, and the cost of collection from the gross tax revenue of the Union government.
- The Sixteenth Finance Commission's report is the first major fiscal document post-2020, reflecting adjustments in economic and demographic parameters post-pandemic and in light of India's evolving federal structure.
- The Commission's recommendations are critical for state finances, influencing their ability to fund social sector schemes, infrastructure development, and welfare programmes.
- The report introduces new parameters such as 'Contribution to GDP' and revises existing ones like 'Demographic Performance' and 'Forest,' aligning fiscal devolution with broader developmental goals.

WHAT IS THE FINANCE COMMISSION?

- The Finance Commission is a quasi-judicial body constituted by the President of India under Article 280 of the Constitution, typically every five years.
- Its primary function is to recommend the distribution of the net proceeds of taxes between the Union and the States and among the States themselves, ensuring fiscal equity and efficiency.
- The Commission's recommendations are advisory but are generally accepted and implemented by the Union government, making it a pivotal institution in India's fiscal federalism.
- The Sixteenth Finance Commission, with Dr. Arvind Panagariya, former Vice-Chairman of NITI Aayog, as its Chairman.
- The Commission's report for 2026–31 was tabled in Parliament on 1 February 2026, marking a critical milestone in India's fiscal governance.
- The Commission's work is guided by the principles of equity, efficiency, and stability in fiscal transfers, balancing the developmental needs of states with national economic objectives.
- The report also addresses the impact of cesses and surcharges on the divisible pool, which have been excluded to ensure a fair and transparent distribution mechanism.
- The Commission's recommendations are expected to influence the fiscal space of states, particularly in the context of India's goal of becoming a \$5 trillion economy by 2027.

KEY FEATURES

Feature	Significance
Share of states in central taxes (41%)	Maintains continuity with the 15th Finance Commission's recommendation, ensuring predictable fiscal transfers to states for the 2026-31 period.

Feature	Significance
Income Distance (42.5% weight)	Promotes equity by allocating higher shares to states with lower per capita GSDP, using a five-year average (2018-19 to 2023-24) excluding 2020-21 to mitigate pandemic distortions.
Population (2011 Census, 17.5% weight)	Balances historical demographic data with newer criteria, though the 2011 Census remains the basis for population-based devolution.
Demographic Performance (10% weight)	Rewards states with lower population growth between 1971 and 2011, shifting from the 15th FC's reliance on Total Fertility Rate (TFR) for policy relevance.
Contribution to GDP (10% weight)	Introduces a novel criterion to reward states contributing disproportionately to national GDP, replacing the 15th FC's tax and fiscal efforts parameter.
Forest Cover (10% weight)	Expands the scope to include open forests and incremental forest cover (2015-2023), aligning with India's climate commitments under international agreements.

WHY IT MATTERS

Fiscal Federalism

- Preserves the 41% state share in central taxes, reinforcing the constitutional principle of cooperative federalism enshrined in Article 280.
- Reallocates weights to balance equity (Income Distance, Population) with efficiency (Contribution to GDP), addressing long-standing debates on devolution criteria.
- Introduces GDP contribution as a criterion, reflecting the need for states to contribute to national growth while ensuring fiscal transfers remain equitable.

Equity and Inclusion

- Income Distance parameter prioritises states with lower per capita income, addressing regional disparities highlighted in the NITI Aayog's SDG Index.
- Demographic Performance rewards states with controlled population growth, aligning with India's demographic transition and sustainable development goals.
- Forest cover criterion supports environmental justice by compensating states for ecological services, particularly in the Northeast and Himalayan regions.

Policy Coherence

- Aligns with India's climate commitments (e.g., Paris Agreement, National Action Plan on Climate Change) by incentivising forest conservation.
- Integrates economic performance (GDP contribution) with fiscal transfers, encouraging states to enhance productivity while maintaining equity.
- Excludes pandemic-affected year (2020-21) from GSDP calculations, ensuring robustness in devolution metrics amid exogenous shocks.

Institutional Continuity

- Maintains the 15th FC's 41% state share, providing stability in centre-state fiscal relations for the 2026-31 period.

- Retains the 2011 Census for population-based devolution, despite calls for updated data, to avoid disruption in fiscal planning.

CHALLENGES

1. Data Lags and Methodological Concerns

- Relies on the 2011 Census for population data, which may not reflect current demographic realities, potentially skewing devolution for rapidly growing states.
- GSDP calculations exclude 2020-21 due to pandemic distortions, but this may underrepresent the economic impact of the pandemic on state finances.
- Forest cover criterion's reliance on incremental data (2015-2023) may not capture long-term ecological trends or state-specific conservation efforts.

UPSC Link: GSDP calculation methods

2. Equity vs. Efficiency Trade-offs

- The introduction of GDP contribution as a criterion risks exacerbating disparities, as wealthier states may receive higher shares despite lower need.
- Weightage adjustments (e.g., reducing Income Distance from 45% to 42.5%) may dilute the focus on equity, particularly for poorer states.
- Forest cover criterion's equal weight (10%) may not sufficiently compensate states with high ecological value but lower GDP contribution.

UPSC Link: Fiscal federalism principles

3. Implementation and Compliance

- States with high GDP contribution but poor fiscal management may face challenges in justifying their shares under the new criteria.
- The forest cover criterion's expanded scope (open forests, incremental cover) may require additional administrative capacity for accurate reporting.
- Contribution to GDP metric's reliance on squared-root GSDP calculations could introduce complexity in verification and dispute resolution.

UPSC Link: Article 280 functions

4. Political and Administrative Challenges

- States with historically high shares (e.g., Bihar, Uttar Pradesh) may resist reductions in their devolution due to shifts in weightage.
- The exclusion of tax and fiscal efforts as a criterion may reduce incentives for states to improve tax administration and revenue mobilisation.
- Disputes over the interpretation of GDP contribution (e.g., sectoral contributions vs. overall GSDP) could lead to legal challenges.

UPSC Link: Centre-state relations

Challenges — UPSC Perspective

Issue	Concern
Data lag in population criterion	2011 Census data may not reflect current demographic realities, leading to inequitable devolution.
Pandemic exclusion in GSDP calculations	Excluding 2020-21 may underrepresent economic distress, affecting states with high pandemic impact.
GDP contribution criterion ambiguity	Lack of clarity on whether sectoral or overall GDP contributions are considered may lead to disputes.
Forest cover reporting complexity	Expanded scope (open forests, incremental cover) may strain state forest departments' administrative capacity.
Equity-efficiency balance in weightage	Reduced weightage for Income Distance (45% to 42.5%) may dilute focus on poorer states.
Political resistance to weightage shifts	States losing share due to new criteria (e.g., GDP contribution) may oppose recommendations.

WAY FORWARD

- States should enhance administrative capacity for accurate forest cover reporting, particularly for open forests and incremental data.
- The Union Government should clarify the methodology for calculating GDP contribution to avoid disputes and ensure transparency.
- NITI Aayog and the Ministry of Finance should conduct a mid-term review of the 16th FC's recommendations to assess their impact on equity and efficiency.
- Consider updating population data sources (e.g., National Population Register) for future Finance Commissions to reflect current demographics.
- Strengthen incentives for states to improve tax administration by reintroducing elements of fiscal effort in devolution criteria, if necessary.
- Develop a dispute resolution mechanism for states challenging their shares under the new GDP contribution criterion.
- Align the forest cover criterion with India's Nationally Determined Contributions (NDCs) to ensure coherence with climate goals.

UPSC VALUE ADDITION

Keywords for Mains Answer-Writing

Finance Commission · fiscal federalism · devolution of taxes · centre-state financial relations · Gross State Domestic Product (GSDP) · Forest cover · demographic dividend · Tax-GDP ratio · Constitutional body · intergovernmental fiscal transfers · per capita income · 15th and 16th Finance Commissions

Constitutional & Policy Linkages

- Article 280 - Establishment and functions of the Finance Commission.

- Article 279 - Calculation of net proceeds of taxes.
- Article 275 - Grants-in-aid to states from the Union.
- Seventh Schedule - Distribution of revenues between Union and States.

Concept Flow

Constitution of India (Article 280) mandates periodic Finance Commissions to recommend centre-state fiscal transfers. → The 16th Finance Commission (2026-31) is constituted to address evolving fiscal federalism challenges, including regional disparities and climate commitments. → Key recommendations (e.g., 41% state share, new criteria like GDP contribution) are formulated to balance equity, efficiency, and environmental justice. → Devolution formula weights (Income Distance, Population, Forest Cover, GDP Contribution) are applied to central tax revenues to determine state shares. → States with lower per capita income, controlled population growth, high forest cover, or significant GDP contribution receive higher shares. → Implementation of recommendations requires administrative capacity, data accuracy, and political consensus to ensure equitable and efficient fiscal transfers.

PRELIMS PRACTICE QUESTIONS

Q1. Which of the following parameters was NOT used by the 16th Finance Commission (2026-31) for the devolution of central taxes to states?

1. A. Income Distance
2. B. Population (2011 Census)
3. C. Tax and Fiscal Efforts
4. D. Contribution to GDP

Answer: C. Tax and Fiscal Efforts — The 16th Finance Commission replaced the 'Tax and Fiscal Efforts' parameter with 'Contribution to GDP' for the 2026-31 period. The other three parameters were retained or modified but not discarded.

Q2. The 16th Finance Commission's 'Income Distance' parameter is calculated based on the difference between a state's per capita GSDP and:

1. A. The national average per capita GSDP
2. B. The average per capita GSDP of the top three states with the highest per capita GSDP
3. C. The per capita GSDP of the state with the lowest GSDP
4. D. The per capita GSDP of the state with the highest GSDP

Answer: B. The average per capita GSDP of the top three states with the highest per capita GSDP — The 'Income Distance' parameter is defined as the difference between a state's per capita GSDP and the average of the top three states with the highest per capita GSDP, ensuring equity in fiscal transfers.

Q3. Which of the following statements best describes the change in the 'Forest' parameter by the 16th Finance Commission compared to the 15th Finance Commission?

1. A. The 16th FC considered only dense and moderately dense forests, while the 15th FC included open forests.
2. B. The 16th FC assigned weightage to both the share of forest area and its increase between 2015-2023, whereas the 15th FC considered only the share of dense and moderately dense forests.
3. C. The 16th FC removed the 'Forest' parameter entirely, while the 15th FC had included it.
4. D. The 16th FC introduced the 'Forest' parameter for the first time, while the 15th FC did not consider it.

Answer: B. The 16th FC assigned weightage to both the share of forest area and its increase between 2015-2023, whereas the 15th FC considered only the share of dense and moderately dense forests. — The 16th Finance Commission expanded the 'Forest' parameter to include both the share of forest area and its increase between 2015-2023, and also considered open forests, unlike the 15th Commission.

MAINS PRACTICE QUESTION

✍ The 16th Finance Commission (2026-31) has introduced significant changes in the criteria for devolution of central taxes to states. Elaborate on these changes and critically examine their implications for fiscal federalism in India.

Approach: The answer should first outline the key changes introduced by the 16th Finance Commission in the devolution formula, such as the introduction of 'Contribution to GDP,' redefinition of 'Demographic Performance,' and expansion of the 'Forest' parameter. Next, analyse the implications of these changes for fiscal federalism, including equity, efficiency, and the balance between developed and developing states. Discuss how these changes align with the principles of cooperative federalism and the broader goals of inclusive growth. Finally, critically evaluate the potential challenges, such as data reliability for the new parameters and the impact on states with unique socio-economic conditions.

Source: [PRS Legislative Research](#)

Systemic Failures in CBSE's On-Screen Marking (OSM) System: Legal Scrutiny and Pedagogical Implications for UPSC Aspirants



Source: [Wikimedia Commons](#) — Pinakpani (CC BY-SA 4.0)

SUBJECT RELEVANCE — WHERE THIS TOPIC FITS

- GS Paper II — Governance, Transparency and Accountability in Public Institutions | GS Paper III — Issues Relating to Education and Skill Development
- **Prelims:** CBSE On-Screen Marking (OSM), Central Board of Secondary Education (CBSE), Class 12 examinations, supplementary examinations, breach of duty of care, Capacity Building Commission, IAS officer S. Radha Chauhan, Solicitor General Tushar Mehta, Chief Justice of India Surya Kant, Right to Education (RTE) Act, 2009 — provisions on fair evaluation, Article 14 of the Constitution — equality before law, Article 21 — right to education and dignity
- **Essay:** The Role of Technology in Public Service Delivery: Boon or Bane?, Accountability in Governance: From Policy to Implementation

Quick Revision: The Supreme Court's intervention in the CBSE OSM glitches underscores the constitutional imperative of accountability in public institutions, particularly when technological adoption outpaces institutional preparedness.

WHY IS THIS IN THE NEWS?

The Supreme Court of India, on 15 July 2026, expressed grave concern over the systemic failures and irregularities in the Central Board of Secondary Education's (CBSE) On-Screen Marking (OSM) system for Class 12 examinations, which affected over 17 lakh students across India and abroad. The Court directed the Union Government to submit a status report by 24 July 2026 on the progress of a one-member probe committee investigating the technical defects, while highlighting the 'frustration' and injustice faced by students due to these failures.

BACKGROUND

- The CBSE conducted Class 12 examinations in May 2026, with over 17 lakh students appearing, including candidates from 257 schools across 25 foreign countries.
- The OSM system was implemented for Class 12 answer sheets in 2026, leading to widespread irregularities such as illegible scanning of answer sheets and unchecked answers.
- A petition filed by Rakesh Binjola highlighted systemic negligence and breach of duty of care, seeking individual accountability for the failures.
- The Supreme Court bench, led by Chief Justice Surya Kant, observed that the government had acknowledged anomalies in the implementation of OSM, despite having the right to formulate the policy.
- The Court directed the government to file a status report on the progress of the probe committee headed by S. Radha Chauhan, Chairperson of the Capacity Building Commission, by 24 July 2026.
- The case underscores the broader challenges in integrating technology into high-stakes educational assessments and the need for robust governance mechanisms.

WHAT IS THE CBSE ON-SCREEN MARKING (OSM) SYSTEM?

- On-Screen Marking (OSM) is a digital evaluation system introduced by the CBSE in 2026 to assess Class 12 answer scripts electronically, replacing traditional paper-based marking.
- The system involves scanning answer sheets and displaying them on computer screens for evaluators to assess and award marks digitally.
- OSM was implemented to improve efficiency, reduce delays, and enhance transparency in the evaluation process for over 17 lakh students across India and abroad.
- Key irregularities reported include illegible scanning of answer sheets, unchecked answers, and systemic failures resulting in a breach of duty of care towards students.
- The CBSE oversees over 29,000 schools in India and 257 schools in 25 foreign countries, making the OSM system a critical component of its examination infrastructure.
- The OSM system is part of the CBSE's broader digital transformation initiatives, aimed at modernising examination processes and reducing human errors.
- The failures in OSM have raised questions about the preparedness of educational institutions in adopting technology-driven assessment systems without adequate safeguards.

KEY FEATURES

Feature	Significance
On-Screen Marking (OSM) System	A digital evaluation mechanism adopted by CBSE for Class 12 answer sheets, intended to enhance efficiency and transparency in assessment processes.
Systematic Irregularities in OSM	Includes illegible scanning of answer sheets, unchecked answers, and failure to upload scripts, leading to widespread student frustration and perceived injustice.

Feature	Significance
One-Member Probe Committee (S. Radha Chauhan)	Constituted by CBSE to investigate the technical defects in OSM, with a mandate to identify causes and recommend corrective measures.
Supplementary Examination Provision	CBSE's stated commitment to address grievances through supplementary exams, though its implementation remains under scrutiny for adequacy and fairness.
Supreme Court's Judicial Intervention	Directs the Union government to address systemic failures, emphasizing the need for accountability and policy improvements in OSM implementation.

WHY IT MATTERS

Administrative Accountability

- The case underscores the constitutional duty of public institutions (CBSE) to uphold fairness and transparency in examination processes, as mandated under Article 14 (Right to Equality).
- Systemic failures in OSM highlight the need for robust oversight mechanisms to prevent negligence in high-stakes evaluations affecting over 17 lakh students.
- Individual accountability for administrative lapses is essential to restore public trust in institutional governance and examination integrity.

Technological Governance

- The adoption of OSM reflects the broader trend of digital transformation in education, necessitating stringent quality control to mitigate risks like data loss or processing errors.
- The incident exposes vulnerabilities in technology-vendor partnerships, where manual oversight failures can undermine automated systems.
- Ensuring seamless integration of technology in education requires pre-implementation training for evaluators and continuous monitoring of system performance.

Judicial Review of Executive Actions

- The Supreme Court's proactive stance demonstrates the judiciary's role in safeguarding citizens' rights against administrative failures, even in technical domains like examination systems.
- Judicial intervention in policy implementation (e.g., OSM) reinforces the principle that executive actions must align with constitutional guarantees of fairness and due process.
- The case sets a precedent for future petitions challenging systemic inefficiencies in public institutions, emphasizing the need for responsive governance.

CHALLENGES

1. Technological Vulnerabilities in OSM

- Inadequate pre-deployment testing of OSM systems, leading to glitches in scanning, uploading, and evaluation of answer scripts.

- Lack of formal training for evaluators on OSM protocols, exacerbating errors in manual oversight and data processing.
- Dependence on third-party vendors (e.g., Coempts) without robust contractual safeguards against operational failures.

UPSC Link: GS2: Governance, Transparency & Accountability

2. Institutional Accountability and Grievance Redressal

- Delayed or inadequate response to student grievances, as evidenced by the petitioner's unresolved issue despite judicial intervention.
- Perceived breach of duty of care by CBSE, as systemic negligence affected a large cohort of students across India and abroad.
- Insufficient transparency in the functioning of probe committees, raising concerns about impartiality and effectiveness of investigations.

UPSC Link: GS2: Government Policies & Interventions

3. Judicial-Executive Coordination in Policy Implementation

- Balancing judicial oversight with executive autonomy in formulating and implementing policies like OSM, without undermining institutional independence.
- Ensuring that judicial directives (e.g., status reports) are complied with in a timely manner to address public grievances effectively.
- Avoiding adversarial litigation that could distract from systemic reforms, while still holding institutions accountable.

UPSC Link: GS2: Judiciary & Constitutional Framework

4. Student Well-being and Psychological Impact

- Frustration and anxiety among students due to perceived injustices in examination evaluation, potentially affecting mental health and academic confidence.
- Long-term reputational damage to CBSE and the education system, undermining trust in standardized assessments.
- Need for proactive measures (e.g., counseling, transparent communication) to mitigate psychological distress during crises.

UPSC Link: GS2: Social Justice & Education

Challenges — UPSC Perspective

Issue	Concern
OSM System Failures	Technical glitches in scanning, uploading, and evaluation leading to widespread errors in answer scripts.
Lack of Evaluator Training	Absence of formal training for OSM evaluators, resulting in manual oversight failures and inconsistent grading.
Delayed Grievance Redressal	Inadequate and slow response to student complaints, exacerbating frustration and perceived injustice.

Issue	Concern
Vendor Dependency Risks	Over-reliance on third-party technology vendors without robust contractual safeguards against operational failures.
Judicial-Executive Tension	Potential conflict between judicial directives for accountability and executive autonomy in policy implementation.

WAY FORWARD

- CBSE must conduct a comprehensive audit of the OSM system, including pre-deployment testing and evaluator training, to prevent future glitches.
- The Chauhan Committee's report should be made public with clear timelines for implementing its recommendations to restore trust.
- Establish a dedicated grievance redressal mechanism for examination-related complaints, with strict timelines for resolution.
- Strengthen contractual obligations with technology vendors to include penalties for operational failures and mandatory performance audits.
- Introduce a pilot phase for new evaluation systems (e.g., OSM) with parallel manual checks to ensure accuracy before full-scale deployment.
- Enhance transparency by publishing periodic updates on the status of probe committees and corrective actions taken.
- Conduct psychological counseling sessions for affected students to address anxiety and restore confidence in the examination system.
- Formulate a national policy on digital evaluation systems, outlining standards for technology, training, and accountability.

UPSC VALUE ADDITION

Keywords for Mains Answer-Writing

CBSE On-Screen Marking (OSM) system · Class 12 examination reforms · systemic failures in evaluation · duty of care in education administration · technical glitches in examination processes · accountability in public institutions · judicial oversight of educational policies · capacity building in administrative reforms · supreme court directives on examination irregularities · educational equity and access · public trust in examination boards · educational governance and transparency

Constitutional & Policy Linkages

- Article 14: Right to Equality (ensuring fair and non-discriminatory evaluation processes).
- Article 21: Right to Life and Personal Liberty (protecting students from undue stress and injustice).
- Article 38: Directive Principles of State Policy (promoting welfare and reducing inequalities in education).

Concept Flow

Adoption of OSM by CBSE → Lack of pre-deployment testing and evaluator training → Systemic glitches in scanning/uploading → Widespread student grievances and perceived injustice → Petition filed in Supreme Court → Judicial intervention seeking accountability → Probe committee constituted → Status report sought from government → Focus on systemic reforms and transparency.

PRELIMS PRACTICE QUESTIONS

Q1. Which of the following is NOT a stated irregularity in the CBSE OSM system as highlighted by the petition in 2026?

1. A. Illegible scanning of answer sheet pages
2. B. Unchecked answers due to lack of evaluator training
3. C. Delayed declaration of results for Class 10 examinations
4. D. Systematic negligence resulting in breach of duty of care

Answer: C. Delayed declaration of results for Class 10 examinations — The petition specifically highlights irregularities in the OSM system for Class 12 answer sheets, including illegible scanning and lack of evaluator training, but does not mention delays in Class 10 results.

Q2. The one-member probe committee appointed by the government to investigate the CBSE OSM glitches is chaired by:

1. A. A retired Supreme Court judge
2. B. The Chairperson of the Capacity Building Commission
3. C. The Secretary of the Department of School Education
4. D. The Chairperson of the CBSE

Answer: B. The Chairperson of the Capacity Building Commission — The committee is led by S. Radha Chauhan, who serves as the Chairperson of the Capacity Building Commission and is a retired IAS officer.

Q3. The Supreme Court's intervention in the CBSE OSM glitches case underscores which constitutional principle?

1. A. Separation of powers
2. B. Judicial review of executive actions
3. C. Federalism in education governance
4. D. Right to education under Article 21A

Answer: B. Judicial review of executive actions — The Supreme Court's directive to the government to file a status report reflects the principle of judicial review, ensuring executive accountability in the implementation of policies.

MAINS PRACTICE QUESTION

✍ Critically examine the systemic failures in the CBSE On-Screen Marking (OSM) system for Class 12 examinations in 2026. How can such failures be prevented in future examination processes through administrative and technological reforms?

Approach: The answer must analyse the root causes of the OSM glitches, such as lack of evaluator training, inadequate technological safeguards, and systemic negligence. It should also evaluate the role of the Chauhan Committee in addressing these issues and propose reforms like mandatory training for evaluators, robust IT infrastructure, and transparent grievance redressal mechanisms. The response should balance administrative accountability with technological solutions to restore public trust in examination systems.

Source: [The Hindu](#)

Escalation in Ukraine: Civilian Casualties Surge Amid Drone and Missile Warfare in 2026



Source: [Wikimedia Commons](#) — United States Mission Geneva (CC BY 2.0)

SUBJECT RELEVANCE — WHERE THIS TOPIC FITS

- GS Paper II — International Relations: Conflict Resolution, Role of UN, Humanitarian Law | GS Paper III — Internal Security: Use of Drones in Warfare, Civilian Protection Protocols
- **Prelims:** Drone warfare, UN Human Rights Monitoring Mission (HRMMU), Geneva Conventions, Non-International Armed Conflict (NIAC), Area-wide effects of weapons, Civilian immunity principle, Jus in bello, Preobrazhenka (Zaporizhzhia), Dnipro, Kyiv
- **Essay:** The moral and legal dimensions of modern warfare: Balancing military necessity and civilian protection, The role of technology in asymmetric conflicts: Drones, AI, and the erosion of traditional battlefield norms

Quick Revision: The surge in civilian casualties in Ukraine during 2026 is driven by the indiscriminate use of drones and long-range missiles in urban areas, violating core principles of International Humanitarian Law—distinction, proportionality, and precautions in attack.

WHY IS THIS IN THE NEWS?

The United Nations Human Rights Monitoring Mission in Ukraine (HRMMU) reported June 2026 as the deadliest month for civilians since April 2022, with 293 civilians killed and 1,990 injured, driven by intensified drone and missile attacks. This marks a 37% rise in civilian casualties in the first half of 2026 compared to 2025, underscoring the evolving tactics of modern warfare and their devastating impact on non-combatants.

BACKGROUND

- Russia launched its full-scale invasion of Ukraine on 24 February 2022, triggering a prolonged armed conflict governed by the laws of war, including the Geneva Conventions and customary international humanitarian law (IHL).
- The conflict has evolved from large-scale conventional operations to a phase dominated by long-range precision strikes, drone warfare, and attacks on critical infrastructure, particularly energy facilities.
- The UN Human Rights Monitoring Mission in Ukraine (HRMMU) has documented civilian casualties since 2014, providing a consistent baseline for tracking the humanitarian impact of the conflict.
- The use of drones—both short-range for battlefield surveillance and long-range for strikes—has intensified, with civilian casualties from such attacks rising by 60% in the first half of 2026 compared to 2025.
- The principle of distinction (Article 48 of Additional Protocol I to the Geneva Conventions) requires parties to conflict to distinguish between combatants and civilians, a norm increasingly challenged by the indiscriminate effects of area-wide weapons and drone strikes.

WHAT ARE THE KEY FEATURES OF DRONE AND MISSILE WARFARE IN THE UKRAINE CONFLICT, AND THEIR HUMANITARIAN IMPLICATIONS?

- **Drone Warfare:** The conflict has seen an unprecedented proliferation of drones, including short-range models (e.g., FPV drones) for frontline surveillance and strikes, and long-range models (e.g., Shahed drones, cruise missiles) for deep strikes into urban areas. Short-range drones have been particularly lethal near frontline communities, where civilians are targeted while performing routine activities such as shopping or commuting.
- **Area-Wide Effects of Weapons:** Long-range missiles and drones often have indiscriminate area effects, causing civilian casualties even when aimed at military objectives. This violates the principle of proportionality (Article 51(5)(b) of Additional Protocol I), which prohibits attacks expected to cause incidental civilian harm excessive to the military advantage gained.
- **Violations of International Humanitarian Law (IHL):** The surge in civilian casualties suggests potential violations of IHL, including the prohibition on indiscriminate attacks

(Article 51(4)) and the obligation to take constant care to spare civilians (Article 57). The use of drones in densely populated areas further complicates adherence to these norms.

- **Civilian Displacement and Psychological Trauma:** The persistent drone presence has created a climate of fear, with civilians describing feelings of being 'hunted' even during mundane activities. This has led to mass displacement, particularly from frontline villages like Preobrazhenka in Zaporizhzhia, exacerbating the humanitarian crisis.
- **Monitoring and Documentation:** The UN Human Rights Monitoring Mission in Ukraine (HRMMU) plays a critical role in documenting civilian casualties, verifying attacks, and providing impartial evidence of potential war crimes, which may be used in future accountability mechanisms.
- **Role of Technology:** The integration of drones, AI-assisted targeting, and precision-guided munitions has transformed modern warfare, but their use in urban environments raises ethical and legal questions about the erosion of traditional battlefield norms and the protection of civilians.

KEY FEATURES

Feature	Significance
Escalation in drone and missile attacks	Demonstrates the weaponisation of long-range and short-range drones, exacerbating civilian casualties in both urban centres and frontline regions.
Peak civilian casualties in June 2026	Marks the highest monthly toll since April 2022, indicating a sustained intensification of hostilities with severe humanitarian consequences.
Urban-centric targeting	Highlights the shift from frontline combat to indiscriminate strikes in densely populated cities like Kyiv and Dnipro, amplifying collateral damage.
Short-range drone dominance near frontlines	Illustrates the psychological and physical terror inflicted on civilians attempting routine activities, transforming daily life into a high-risk endeavour.
Cross-border impact on Russia	Documents reciprocal civilian casualties in Russia, underscoring the regionalisation of the conflict's humanitarian fallout.

WHY IT MATTERS

Humanitarian Impact

- Civilian fatalities and injuries have surged by 37% in 2026 compared to 2025, with a 114% rise from 2024, reflecting a deteriorating security environment for non-combatants.
- The psychological trauma of 'hunting drones' has rendered frontline communities uninhabitable, accelerating displacement and exacerbating the refugee crisis.
- Attacks on energy infrastructure in occupied Crimea and Ukraine have disrupted civilian life, with power outages exacerbating medical and humanitarian access challenges.

Strategic and Military Dynamics

- The increased use of long-range missiles and drones suggests a deliberate strategy to degrade Ukraine's urban resilience and civilian morale, diverging from purely military objectives.

- The reciprocal targeting of energy infrastructure indicates a broader campaign to destabilise civilian governance and economic stability in both occupied and government-held territories.
- The shift from frontline engagements to urban-centric strikes may reflect Russia's adaptation to Ukrainian defensive capabilities, prioritising attrition over territorial gains.

International Law and Accountability

- The indiscriminate nature of drone and missile strikes raises serious concerns under international humanitarian law, particularly the principles of distinction, proportionality, and precaution.
- The documented rise in civilian casualties in Russia further implicates the conflict's transnational dimension, challenging traditional notions of sovereignty and accountability.
- The UN's verification of casualties and infrastructure attacks provides a critical evidentiary basis for potential war crimes investigations and sanctions.

Geopolitical Ramifications

- The sustained escalation tests the resilience of Ukraine's international support, particularly from NATO and EU partners, amid competing global priorities.
- The humanitarian crisis risks further straining regional stability, with potential spillover effects on neighbouring states hosting Ukrainian refugees.
- The conflict's protraction undermines diplomatic efforts for a negotiated settlement, as both sides harden their positions in response to battlefield realities.

CHALLENGES

1. Protection of Civilians in Urban Warfare

- The use of drones and missiles in densely populated areas violates the principle of distinction, making it imperative to enforce stricter adherence to international humanitarian law.
- Urban centres lack adequate shelters and early-warning systems, necessitating investment in civil defence infrastructure and public awareness campaigns.
- The psychological toll on civilians requires targeted mental health interventions and psychosocial support systems.

UPSC Link: GS Paper 2: International Relations - Humanitarian Law

2. Energy Infrastructure Vulnerability

- Attacks on power generation and transmission facilities disrupt essential services, exacerbating humanitarian crises and impeding reconstruction efforts.
- The targeting of energy infrastructure in occupied territories undermines civilian governance and economic recovery, prolonging dependency on external aid.
- Strengthening energy resilience through decentralised renewable systems and protected microgrids is critical for mitigating future disruptions.

UPSC Link: GS Paper 3: Infrastructure - Energy Security

3. Psychological Warfare and Civilian Morale

- The pervasive use of drones to 'hunt' civilians creates an environment of constant fear, undermining social cohesion and economic productivity.
- Addressing this challenge requires a multi-pronged approach, including counter-drone technologies, public education, and community-based resilience programmes.
- The international community must prioritise mental health support for displaced populations and frontline communities.

UPSC Link: GS Paper 4: Ethics - Human Dignity

4. Accountability and Legal Recourse

- The lack of a clear mechanism for holding perpetrators accountable for civilian casualties complicates efforts to deter future violations.
- Strengthening the International Criminal Court's jurisdiction and supporting national prosecutions under universal jurisdiction are essential steps.
- Documentation of casualties and infrastructure damage by UN monitors must be leveraged for legal proceedings and reparations claims.

UPSC Link: GS Paper 2: International Organisations - ICC

5. Refugee Crisis and Regional Stability

- The sustained displacement of civilians places immense pressure on neighbouring states, straining resources and social cohesion.
- Ensuring equitable burden-sharing among host countries and facilitating safe, voluntary repatriation are critical for long-term stability.
- The international community must address root causes of displacement, including conflict resolution and post-war reconstruction.

UPSC Link: GS Paper 2: International Relations - Refugee Crisis

Challenges — UPSC Perspective

Issue	Concern
Indiscriminate drone strikes	Violation of international humanitarian law, with high civilian casualties in urban and frontline areas.
Energy infrastructure targeting	Disruption of essential services, exacerbating humanitarian crises and impeding recovery efforts.
Psychological warfare	Creation of a pervasive climate of fear, undermining civilian morale and social cohesion.
Accountability gaps	Lack of mechanisms to hold perpetrators accountable for war crimes and violations.
Refugee burden on neighbours	Strain on host countries' resources, social services, and political stability.

WAY FORWARD

- Strengthen civil defence infrastructure in urban centres, including shelters, early-warning systems, and public awareness campaigns on drone threats.
- Invest in decentralised energy systems and protected microgrids to enhance resilience against attacks on power infrastructure.
- Expand mental health and psychosocial support programmes for displaced populations and frontline communities affected by drone warfare.
- Leverage UN-monitored documentation of casualties and infrastructure damage to pursue legal recourse under international humanitarian law.
- Enhance international cooperation to address the refugee crisis, including equitable burden-sharing and safe, voluntary repatriation mechanisms.
- Advocate for stricter adherence to international humanitarian law, including the principles of distinction, proportionality, and precaution.
- Support conflict resolution efforts and post-war reconstruction initiatives to address root causes of displacement and instability.

UPSC VALUE ADDITION

Keywords for Mains Answer-Writing

Civilian casualties in armed conflict · International Humanitarian Law (IHL) · Protection of civilians under Geneva Conventions · Use of drones and missiles in warfare · Urban warfare and collateral damage · UN Human Rights Monitoring Mission in Ukraine (HRMMU) · Escalation of violence in Ukraine conflict · Protection of civilian infrastructure · Asymmetric warfare and modern conflict dynamics · Accountability for war crimes

Concept Flow

Escalation of drone and missile attacks → Increased civilian casualties in urban and frontline areas → Violation of international humanitarian law principles. → Weaponisation of drones → Psychological warfare and displacement → Strain on regional stability and refugee management systems. → Attacks on energy infrastructure → Disruption of essential services → Prolonged humanitarian crises and impeded reconstruction. → Lack of accountability mechanisms → Perpetuation of impunity → Undermining of international law and norms. → Sustained displacement → Pressure on host countries → Regional instability and geopolitical tensions.

PRELIMS PRACTICE QUESTIONS

Q1. Which of the following best describes the primary concern raised by the UN Human Rights Monitoring Mission in Ukraine (HRMMU) regarding civilian casualties in June 2026?

1. A. The use of short-range drones near frontlines has led to the highest monthly civilian casualties since the conflict began.
2. B. The escalation is primarily due to increased ground combat operations in urban areas.

3. C. The rise in casualties is attributed to the use of chemical weapons in densely populated zones.
4. D. The UN has documented a decline in civilian casualties due to improved humanitarian corridors.

Answer: A. The use of short-range drones near frontlines has led to the highest monthly civilian casualties since the conflict began. — The HRMMU report highlights that short-range drones were responsible for most civilian deaths and injuries near the frontline, with June 2026 recording the highest monthly levels ever (89 killed and 588 injured). This aligns with the UN's emphasis on the deadly impact of drone surveillance and strikes in conflict zones.

Q2. According to the UN report, which of the following statements is NOT true regarding civilian casualties in Ukraine during the first half of 2026?

1. A. Civilian casualties increased by 37% compared to the same period in 2025.
2. B. The majority of casualties occurred in areas under Russian control.
3. C. Long-range missiles and drones were primarily used in urban centres far from the frontline.
4. D. Ukraine also reported rising civilian casualties on its territory due to reciprocal attacks.

Answer: B. The majority of casualties occurred in areas under Russian control. — The report states that most civilian casualties occurred in areas under the control of the Government of Ukraine, not Russian-controlled areas. The other options are consistent with the UN's findings on escalation, weapon use, and reciprocal civilian impact.

Q3. The HRMMU report emphasizes the growing complexity of risks to civilians in Ukraine. Which of the following factors is NOT explicitly cited as contributing to this complexity?

1. A. Intensified use of long-range weapons in urban areas.
2. B. Increased reliance on short-range drones near frontlines.
3. C. Attacks on energy infrastructure leading to power outages.
4. D. Deployment of nuclear weapons by either party to the conflict.

Answer: D. Deployment of nuclear weapons by either party to the conflict. — The report does not mention the deployment or use of nuclear weapons. It focuses on conventional weapons (missiles, drones) and attacks on energy infrastructure as key factors exacerbating civilian risks.

MAINS PRACTICE QUESTION

✍ Critically examine the challenges posed by modern asymmetric warfare, particularly the use of drones and long-range missiles, to the protection of civilians under International Humanitarian Law (IHL). Assess how the escalation in Ukraine reflects these challenges and suggest measures to mitigate civilian harm.

Approach: Begin by outlining the core principles of IHL concerning the protection of civilians, including distinction, proportionality, and precautions in attack. Analyse how the use of drones and long-range missiles in Ukraine complicates adherence to these principles, particularly in urban areas where collateral damage is high. Discuss the psychological and physical toll on civilians, as highlighted by the HRMMU report, and the blurring of frontlines in modern conflicts. Conclude with recommendations such as stricter adherence to IHL

by parties to the conflict, enhanced monitoring by international bodies, and technological measures to reduce civilian harm (e.g., precision-guided munitions, no-strike lists for critical infrastructure). Reference the UN report to underscore the urgency of addressing these challenges.

Source: news.un.org

Constitutional and Legal Dimensions of Protests and Legislative Sessions: Analysing the CJP's 'Chalo Sansad' March and Associated Developments

SUBJECT RELEVANCE — WHERE THIS TOPIC FITS

- GS Paper II — Polity and Governance (Parliamentary procedures, Fundamental Rights, Directive Principles of State Policy) | GS Paper III — Internal Security (Public Order, Police Powers, Law and Order Management)
- **Prelims:** Parliamentary Sessions (Monsoon Session, Budget Session), Bharatiya Nyaya Sanhita (BNS) Section 163, Fundamental Rights under Article 19(1)(a) and (b), Prohibitory Orders under CrPC, Hunger Strike and Medical Ethics
- **Essay:** Role of Protests in Democratic Governance, Balancing Public Order and Fundamental Rights

Quick Revision: The right to protest is constitutionally protected under Article 19(1)(a) and (b) but is subject to reasonable restrictions under Article 19(2) and (3) to maintain public order and the smooth functioning of legislative institutions.

WHY IS THIS IN THE NEWS?

The proposed 'Chalo Sansad' march by the Cockroach Janata Party (CJP) on the first day of the Monsoon Session of Parliament has drawn attention to the legal and constitutional framework governing protests, assembly, and legislative sessions. The march, coinciding with the Monsoon Session, intersects with prohibitory orders under the Bharatiya Nyaya Sanhita (BNS) and the broader debate on the right to peaceful protest versus public order. Additionally, the health condition of activist Sonam Wangchuk, who has been on a hunger strike demanding education accountability, adds a humanitarian dimension to the discourse on protest methods and state response.

BACKGROUND

- The Monsoon Session of Parliament is a critical legislative event where key bills and policy discussions are tabled, requiring stringent security and order management.
- Prohibitory orders under Section 163 of the Bharatiya Nyaya Sanhita (BNS) are routinely issued during parliamentary sessions to prevent disruptions and ensure the smooth functioning of legislative proceedings.
- The right to peaceful protest is constitutionally protected under Article 19(1)(a) (freedom of speech and expression) and Article 19(1)(b) (freedom to assemble peacefully and without arms), subject to reasonable restrictions under Article 19(2) and (3).

- Hunger strikes as a form of protest have been used historically in India, including by figures like Irom Sharmila and Anna Hazare, to draw attention to socio-political issues.
- The Delhi Police's issuance of prohibitory orders under Section 163 BNS reflects the state's duty to balance public order with the right to protest, particularly during high-security legislative sessions.
- The CJP's demand for the resignation of the Union Education Minister and its focus on education accountability highlights the intersection of protest movements with governance and policy failures.

WHAT IS THE 'CHALO SANSAD' MARCH AND ITS LEGAL-FRAMEWORK IMPLICATIONS?

- The 'Chalo Sansad' march is a proposed protest by the Cockroach Janata Party (CJP) to march to Parliament on the first day of the Monsoon Session, demanding the resignation of the Union Education Minister and raising issues of education accountability.
- The march is being organised without official clearance from Delhi Police, which is a prerequisite for any public rally or procession under the law.
- Prohibitory orders under Section 163 of the Bharatiya Nyaya Sanhita (BNS) are in force during the Monsoon Session, banning gatherings of four or more people, unauthorised rallies, and the carrying of weapons in designated areas around Parliament House and India Gate.
- The right to protest is constitutionally guaranteed but subject to reasonable restrictions, including maintaining public order and preventing disruptions to legislative functions.
- Hunger strikes, such as that undertaken by Sonam Wangchuk, raise ethical and legal questions about the state's duty to protect life and the protester's right to dissent, particularly when medical intervention is required.
- The CJP's mobilisation of supporters, including night vigils, reflects strategic protest organisation but also tests the limits of permissible assembly under law.
- The health condition of Sonam Wangchuk, who is under medical supervision at Safdarjung Hospital, underscores the intersection of protest methods with humanitarian concerns and state responsibility.

KEY FEATURES

Feature	Significance
CJP's 'Chalo Sansad' March	Represents a direct challenge to parliamentary proceedings, testing the balance between democratic dissent and institutional sanctity during the Monsoon Session.
Delhi Police's Prohibitory Orders under BNSS Section 163	Demonstrates the state's enforcement of public order restrictions to safeguard legislative processes, highlighting the tension between protest rights and institutional continuity.
Sonam Wangchuk's Hunger Strike	Symbolises the use of extreme personal sacrifice to draw attention to systemic failures in education policy, framing the protest within broader accountability demands.

Feature	Significance
Night Vigil at Jantar Mantar	Shows sustained mobilisation tactics, indicating the protest's intent to maintain pressure on authorities through continuous presence and media visibility.
Centre's Outreach to Chief Justice of India (CJI)	Reflects the executive's attempt to preempt judicial intervention in a politically sensitive protest, underscoring the intersection of judicial, executive, and legislative domains.

WHY IT MATTERS

Political

- The protest targets a Union Minister, escalating the demand for ministerial accountability to the level of a mass movement, potentially influencing parliamentary debates during the Monsoon Session.
- The CJP's mobilisation, led by figures like Sonam Wangchuk and Abhijeet Dipke, signals a growing convergence of social activism with electoral politics, particularly under the banner of the 'Cockroach Janata Party'.
- The protest's timing—coinciding with the Monsoon Session—creates a direct confrontation with legislative processes, testing the government's ability to manage dissent without disrupting parliamentary functioning.

Institutional

- The prohibitory orders under BNSS Section 163 highlight the state's prioritisation of institutional continuity over protest rights, raising questions about the balance between security and democratic freedoms.
- The Centre's outreach to the CJI suggests an attempt to mitigate judicial scrutiny, indicating the protest's potential to trigger constitutional or legal interventions.
- The protest's focus on education accountability intersects with the constitutional mandate of the Union and State Governments under Article 29 and Article 30, which guarantee cultural and educational rights.

Social

- Sonam Wangchuk's hunger strike amplifies the discourse on education reform, particularly regarding access, equity, and accountability in India's schooling system.
- The protest's mass mobilisation reflects broader public dissatisfaction with governance failures, particularly in sectors like education, which are critical to human development.

Legal

- The protest's lack of official clearance for the 'Chalo Sansad' march raises questions about the applicability of assembly rights under Article 19(1)(b) of the Constitution, especially in proximity to Parliament.
- The use of prohibitory orders under BNSS Section 163 tests the limits of state authority in restricting protests, particularly during legislative sessions.

CHALLENGES

1. Balancing Protest Rights and Parliamentary Continuity

- Ensuring the smooth functioning of Parliament while accommodating legitimate dissent is a persistent challenge, as seen in the enforcement of prohibitory orders.
- The state must navigate the fine line between maintaining public order and upholding democratic freedoms, particularly in high-security zones like Parliament.
- The protest's timing—during the Monsoon Session—creates a direct conflict between legislative priorities and public mobilisation.

UPSC Link: GS-II: Fundamental Rights (Article 19), BNSS

2. Accountability in Education Policy

- The protest underscores systemic failures in India's education sector, including issues of access, quality, and accountability in government schools.
- The demand for the Union Education Minister's resignation highlights the need for greater transparency and responsiveness in policy implementation.
- Sonam Wangchuk's hunger strike draws attention to the urgent need for reforms in Ladakh's education system, where local governance and central policies often clash.

UPSC Link: GS-II: Right to Education (RTE) Act, 2009

3. Constitutional Limits of Protest Near Parliament

- The prohibitory orders under BNSS Section 163 raise questions about the constitutional validity of restricting protests in areas designated as high-security zones.
- The protest's proximity to Parliament tests the interpretation of Article 19(1)(b), which guarantees the right to assemble peacefully, subject to reasonable restrictions.
- The state's enforcement of these orders must balance security concerns with the democratic imperative of allowing dissent.

UPSC Link: GS-II: Fundamental Rights (Article 19), BNSS

4. Judicial Intervention in Political Protests

- The Centre's outreach to the CJI suggests an attempt to preempt judicial intervention, highlighting the judiciary's potential role in resolving disputes arising from protests.
- The protest's potential to trigger public interest litigation (PIL) or constitutional challenges underscores the judiciary's role as an arbiter in political disputes.
- The CJI's involvement could set a precedent for future interactions between the executive, judiciary, and protesting groups.

UPSC Link: GS-II: Judicial Review, PIL

5. Sustaining Non-Violent Protests

- Maintaining the non-violent character of the protest is critical to its legitimacy, as seen in the organisers' appeals for discipline and restraint.
- The risk of escalation into clashes, as reported at Jantar Mantar, poses a challenge to the protest's moral and strategic coherence.

- The organisers' emphasis on peaceful protest reflects a broader need to align mass mobilisation with democratic norms.

UPSC Link: GS-II: Democratic Protest, Non-Violence

Challenges — UPSC Perspective

Issue	Concern
Prohibitory Orders and Assembly Rights	The enforcement of BNSS Section 163 restricts public gatherings near Parliament, raising concerns about the proportionality of state action.
Hunger Strike and Medical Ethics	Sonam Wangchuk's prolonged fast tests the limits of medical intervention and ethical considerations in political protests.
Lack of Official Clearance for March	The CJP's failure to seek prior permission for the 'Chalo Sansad' march creates legal ambiguities about the protest's legitimacy.
Convergence of Social and Electoral Politics	The CJP's mobilisation blurs the lines between social activism and electoral politics, potentially politicising education reform.
Judicial Scrutiny of Executive Actions	The Centre's outreach to the CJI suggests an attempt to influence judicial perception, raising questions about the separation of powers.
Media and Public Perception	The protest's framing in media—particularly the term 'Cockroach Janata Party'—risks polarising public opinion and delegitimising the movement.

WAY FORWARD

- The Union Government should initiate a structured dialogue with protest leaders, including Sonam Wangchuk, to address education accountability concerns without conceding to demands for ministerial resignation.
- Parliament should establish a Standing Committee on Education Reform to examine systemic issues in the sector, incorporating inputs from civil society and experts.
- Delhi Police should review the application of prohibitory orders under BNSS Section 163 to ensure they do not disproportionately restrict legitimate protest rights.
- The CJP and allied groups should formalise their demands into a policy proposal, presenting a constructive alternative to the current protest tactics.
- Sonam Wangchuk should be medically monitored to ensure his health does not deteriorate further, with his consent for any medical intervention prioritised.
- Political parties should avoid politicising the protest and instead focus on legislative solutions to the education crisis during the Monsoon Session.
- The media should report on the protest with factual accuracy, avoiding sensationalism that could escalate tensions or misrepresent the movement's goals.
- Civil society organisations should document instances of police action and protester conduct to ensure accountability and transparency in the handling of the march.

UPSC VALUE ADDITION

Keywords for Mains Answer-Writing

Constitutional provisions for Parliament sessions · Role of Speaker of Lok Sabha · Right to Protest vs Public Order · Delhi Police powers under BNSS · Hunger strikes and medical ethics · Parliamentary accountability · Education policy accountability · Section 144 CrPC vs Section 163 BNSS · Peaceful assembly rights · Federal structure and law and order · Hunger strike as a form of protest · Parliamentary privilege and protest outside Parliament

Constitutional & Policy Linkages

- Article 19(1)(b) - Right to assemble peacefully
- Article 29 - Protection of interests of minorities in educational institutions
- Article 30 - Right of minorities to establish and administer educational institutions
- Article 21 - Right to life and personal liberty (interpreted to include health and dignity)
- Article 51A(j) - Fundamental duty to strive towards excellence in all spheres of individual and collective activity

Concept Flow

Protest against Union Education Minister's policies → Mass mobilisation by CJP at Jantar Mantar → Night vigil and hunger strike by Sonam Wangchuk → Threat of 'Chalo Sansad' march to Parliament → Enforcement of prohibitory orders by Delhi Police → Centre's outreach to CJI → Potential judicial or legislative intervention → Resolution or escalation of protest

PRELIMS PRACTICE QUESTIONS

Q1. Which of the following provisions under the Bharatiya Nyaya Sanhita (BNS) 2023 empowers Delhi Police to impose prohibitory orders during the Parliament session?

1. Section 144 CrPC
2. Section 163 BNSS
3. Article 352 of the Constitution
4. Section 129 BNSS

Answer: Section 163 BNSS — Section 163 of the Bharatiya Nyaya Sanhita (BNSS) 2023 empowers the police to impose prohibitory orders during Parliament sessions to maintain public order, replacing the erstwhile Section 144 of the Code of Criminal Procedure (CrPC).

Q2. What is the primary constitutional function of the Speaker of the Lok Sabha during a Parliament session?

1. To draft bills
2. To maintain discipline and decorum
3. To represent the President in the House
4. To appoint the Prime Minister

Answer: To maintain discipline and decorum — The Speaker of the Lok Sabha is constitutionally mandated to maintain discipline, decorum, and orderly conduct within the House, ensuring adherence to parliamentary procedures and rules.

Q3. Which of the following rights is NOT guaranteed under Article 19(1)(a) of the Constitution?

1. Freedom of speech and expression
2. Right to assemble peacefully
3. Right to form associations
4. Right to strike

Answer: Right to strike — Article 19(1)(a) guarantees freedom of speech and expression, the right to assemble peacefully, and the right to form associations, but the right to strike is not explicitly mentioned and has been subject to judicial interpretation.

MAINS PRACTICE QUESTION

✍️ Analyse the constitutional and legal framework governing protests in the vicinity of Parliament House during a session. How does this framework balance the right to protest with the need to maintain parliamentary privilege and public order? Substantiate your answer with relevant constitutional provisions and judicial precedents.

Approach: Begin by outlining the constitutional provisions (Article 19(1)(a), Article 21, Article 105) and statutory frameworks (BNSS Section 163, Delhi Police Act). Discuss judicial interpretations such as the Supreme Court's rulings in *Himat Lal K. Shah v. Commissioner of Police* (1973) and *Amit Sahni v. Commissioner of Police* (2020) on the balance between free speech and public order. Highlight the role of parliamentary privilege under Article 105 and the Speaker's authority to regulate conduct. Conclude with the necessity of proportionality in imposing restrictions, ensuring they are reasonable and not arbitrary.

Source: [Mint](#)

IDBI employees forum opposes reported Fairfax deal, seeks Parliament review

IDBI employees forum opposes reported Fairfax deal, seeks Parliament review

Union Budget 2026-27 and the 16th Finance Commission: Fiscal Federalism, Revenue Deficit Grants, and the Case of Himachal Pradesh



Source: [Wikimedia Commons](#) — Planning Commission (GODL-India)

SUBJECT RELEVANCE — WHERE THIS TOPIC FITS

- GS Paper II — Functions and Responsibilities of the Union and the States, Issues and Challenges Pertaining to the Federal Structure | GS Paper III — Indian Economy and Issues Relating to Planning, Mobilisation of Resources, Growth, Development and Employment
- **Prelims:** Revenue Deficit Grants (RDG), 16th Finance Commission, Article 275(1), Special Category States, Fiscal Federalism, Union Budget 2026-27, Himachal Pradesh fiscal challenges
- **Essay:** Fiscal Federalism in India: Balancing Equity and Efficiency in Resource Allocation, The Role of Finance Commissions in Addressing Regional Disparities and Natural Disasters

Quick Revision: The 16th Finance Commission's discontinuation of Revenue Deficit Grants for small states like Himachal Pradesh raises constitutional and fiscal concerns, as it undermines fiscal federalism and exacerbates regional disparities.

WHY IS THIS IN THE NEWS?

The Union Budget 2026-27 and the recently tabled 16th Finance Commission (FC-XVI) Report have come under criticism from Himachal Pradesh Chief Minister Sukhvinder Singh Sukhu for being inequitable, particularly for discontinuing Revenue Deficit Grants (RDGs) for small states like Himachal Pradesh. The Chief Minister highlighted the state's unique fiscal challenges, including high forest cover, mountainous terrain, frequent natural disasters, and limited own-revenue base, arguing that the omission of RDGs undermines fiscal sustainability and public service delivery. This critique underscores broader debates on fiscal federalism, resource allocation, and the constitutional role of Finance Commissions in addressing regional disparities.

BACKGROUND

- The Finance Commission in India is a constitutional body established under Article 280 of the Constitution, tasked with recommending the distribution of financial resources between the Union and the States, as well as among the States themselves.
- Revenue Deficit Grants (RDGs) are provided under Article 275(1) of the Constitution to states with revenue deficits, aimed at enabling them to maintain fiscal sustainability and deliver essential public services.
- Himachal Pradesh, a hill state with approximately 67% forest cover, faces unique fiscal challenges due to its mountainous terrain, fragile ecology, and frequent natural disasters, including floods and landslides.
- The state's economy is significantly dependent on horticulture, particularly apple cultivation, which contributes around ₹5,000 crore annually and supports thousands of families.
- The Union Budget 2026-27 has been criticised for failing to address critical national issues such as unemployment, poverty, and inflation, further exacerbating fiscal pressures on states like Himachal Pradesh.

REVENUE DEFICIT GRANTS (RDGS) AND THE 16TH FINANCE COMMISSION

- Revenue Deficit Grants (RDGs) are non-plan grants provided under Article 275(1) of the Constitution to states with revenue deficits, enabling them to meet their revenue expenditure needs without compromising fiscal sustainability.
- The 16th Finance Commission (FC-XVI) is tasked with recommending the devolution of taxes and other fiscal transfers for the period 2026-31, including the continuation or discontinuation of RDGs.
- The FC-XVI has, for the first time, discontinued RDGs for small states, including Himachal Pradesh.
- The discontinuation of RDGs is argued to be particularly detrimental to small, fiscally constrained states with unique challenges such as high forest cover, mountainous terrain, and frequent natural disasters.
- Article 275(1) of the Constitution provides for State-specific grants from the Union government, also known as RDG.
- The 15th Finance Commission (2021-26) had recommended RDGs for states with revenue deficits, recognising the fiscal handicaps faced by hill states and other special category states.
- The debate over RDGs highlights the tension between fiscal federalism and the need for equitable resource allocation, with critics arguing that the discontinuation of RDGs disproportionately affects small states with structural fiscal handicaps.
- The FC-XVI's decision to discontinue RDGs for small states raises questions about the adequacy of alternative fiscal instruments, such as performance-based grants, in addressing the unique challenges faced by these states.

KEY FEATURES

Feature	Significance
Revenue Deficit Grants (RDGs)	Constitutional grants under Article 275(1) to offset revenue deficits in States, historically provided to fiscally stressed States like Himachal Pradesh.
16th Finance Commission (FC-XVI)	Constitutional body tasked with recommending fiscal transfers to States for 2026-31; its discontinuation of RDGs for small States raises fiscal equity concerns.
Special Category Status	Conferred on Himachal Pradesh due to its mountainous terrain, fragile ecology, and high per-capita service delivery costs, necessitating enhanced fiscal support.
Apple Economy	A ₹5,000 crore sector in Himachal Pradesh supporting thousands of families; its exclusion from Budget allocations highlights sectoral neglect.
Natural Disaster Losses	Recurrent disasters in Himachal Pradesh cause losses exceeding ₹15,000 crore, straining State finances and necessitating compensatory fiscal measures.

WHY IT MATTERS

Economic

- The Union Budget 2026-27's perceived inequity stems from its failure to address structural fiscal handicaps of hill States, particularly Himachal Pradesh, threatening fiscal sustainability.
- Discontinuation of RDGs by the 16th Finance Commission exacerbates revenue deficits, compelling States to choose between public service delivery and debt accumulation.
- Exclusion of key sectors like apple cultivation from Budget allocations undermines regional economic resilience and livelihoods.

Fiscal Federalism

- The decision to discontinue RDGs for small States challenges the principle of cooperative federalism, as it overlooks asymmetrical fiscal capacities and needs.
- Himachal Pradesh's high forest and ecological cover (67%) imposes higher service delivery costs, yet Budget allocations do not reflect this fiscal asymmetry.
- The 16th Finance Commission's recommendations may set a precedent for reduced fiscal transfers to ecologically fragile and disaster-prone States.

Social Welfare

- The Budget's perceived anti-poor and anti-farmer stance risks exacerbating poverty and unemployment, particularly in agrarian economies like Himachal Pradesh.
- Inadequate fiscal support may constrain State governments' ability to sustain social welfare commitments, including healthcare and education.

Environmental

- The high ecological cover (67%) in Himachal Pradesh necessitates fiscal support for conservation and disaster resilience, which the Budget fails to address.
- Natural disasters, exacerbated by climate change, impose recurring fiscal burdens, yet Budget allocations lack compensatory mechanisms.

CHALLENGES

1. Fiscal Disparities in Union-State Transfers

- Small States like Himachal Pradesh face higher per-capita service delivery costs due to difficult terrain and ecological fragility, yet Budget allocations do not account for these disparities.
- Discontinuation of RDGs by the 16th Finance Commission exacerbates revenue deficits, forcing States to prioritise debt servicing over public services.
- The absence of sector-specific allocations for critical industries (e.g., apple cultivation) undermines regional economic stability.

UPSC Link: GS-II: Federalism, Finance Commission

2. Natural Disaster Vulnerability

- Himachal Pradesh's recurrent natural disasters cause losses exceeding ₹15,000 crore, straining State finances and necessitating compensatory fiscal measures.
- The Budget's failure to allocate dedicated funds for disaster resilience and recovery exacerbates fiscal imbalances.
- Climate change-induced disasters further strain fiscal capacities, highlighting the need for adaptive fiscal frameworks.

UPSC Link: GS-III: Disaster Management

3. Sectoral Neglect in Budget Allocations

- The exclusion of Himachal Pradesh's apple economy (₹5,000 crore sector) from Budget allocations reflects a broader neglect of agrarian and horticultural sectors.
- Lack of recognition for key industries in Budget allocations undermines regional economic growth and employment generation.
- Sectoral neglect in fiscal transfers perpetuates regional economic disparities.

UPSC Link: GS-III: Agriculture

4. Fiscal Sustainability vs. Public Service Delivery

- The discontinuation of RDGs forces States to choose between maintaining public services and increasing indebtedness, threatening fiscal sustainability.
- Inadequate fiscal support may lead to a decline in essential services, including healthcare and education, particularly in hill States.
- Fiscal constraints may hinder States' ability to invest in future growth, perpetuating underdevelopment.

UPSC Link: GS-III: Fiscal Policy

5. Perceived Inequity in Budget Allocations

- The Budget's perceived inequity stems from its failure to address unemployment, poverty, and rising prices, particularly in agrarian economies.
- The exclusion of key sectors and lack of compensatory mechanisms for fiscal handicaps exacerbate perceptions of inequity.
- Perceived inequity in Budget allocations risks eroding public trust in fiscal federalism.

UPSC Link: GS-II: Centre-State Relations**Challenges — UPSC Perspective**

Issue	Concern
Discontinuation of RDGs	Loss of constitutional fiscal support for small States, exacerbating revenue deficits and constraining public service delivery.
High Per-Capita Service Delivery Costs	Mountainous terrain and ecological fragility in Himachal Pradesh increase costs, yet Budget allocations do not reflect this asymmetry.
Natural Disaster Losses	Recurrent disasters cause losses exceeding ₹15,000 crore, straining State finances and necessitating compensatory fiscal measures.
Sectoral Neglect (Apple Economy)	Exclusion of a ₹5,000 crore sector from Budget allocations undermines regional economic stability and livelihoods.
Fiscal Sustainability Constraints	Discontinuation of RDGs forces States to choose between public services and debt accumulation, threatening fiscal sustainability.
Perceived Budget Inequity	Failure to address unemployment, poverty, and rising prices in agrarian economies exacerbates regional disparities and public discontent.

WAY FORWARD

- Advocate for the reinstatement of Revenue Deficit Grants (RDGs) for small States like Himachal Pradesh in the 16th Finance Commission's final recommendations.
- Establish a dedicated fund within the Union Budget for natural disaster resilience and recovery, particularly for ecologically fragile States.
- Incorporate sector-specific allocations for critical industries (e.g., apple cultivation) in future Budgets to support regional economic stability.
- Strengthen fiscal devolution mechanisms to account for asymmetrical fiscal capacities and needs of hill States.
- Enhance inter-State fiscal transfers to address regional disparities and promote balanced regional development.
- Promote inclusive growth policies targeting unemployment, poverty, and rising prices in agrarian economies.
- Encourage States to adopt fiscal consolidation measures while safeguarding public service delivery and social welfare commitments.

UPSC VALUE ADDITION**Keywords for Mains Answer-Writing**

Union Budget 2026-27 · Finance Commission (16th) · Revenue Deficit Grants (RDG) · Special Category States · Fiscal Federalism · Himachal Pradesh fiscal challenges · Article 275(1) of the Constitution · Mountainous terrain fiscal handicaps · Natural disasters fiscal impact · Agricultural sector neglect in Union Budget

Constitutional & Policy Linkages

- Article 275(1): Provision for State-specific grants to offset revenue deficits.
- Article 280: Constitutional mandate of the Finance Commission to recommend fiscal transfers to States.
- Article 282: Grants-in-aid for public purposes, including disaster relief and social welfare.

Concept Flow

Himachal Pradesh's mountainous terrain and ecological fragility → Higher per-capita service delivery costs and fiscal handicaps → Dependence on Revenue Deficit Grants (RDGs) under Article 275(1). → 16th Finance Commission (FC-XVI) discontinues RDGs for small States → Loss of fiscal support → Revenue deficits and constrained public service delivery. → Recurrent natural disasters (>₹15,000 crore losses) → Fiscal strain → Need for compensatory fiscal measures. → Exclusion of apple economy (₹5,000 crore sector) from Budget allocations → Sectoral neglect → Undermined regional economic stability. → Perceived inequity in Budget allocations → Exacerbation of unemployment, poverty, and rising prices → Public discontent and erosion of fiscal federalism. → Fiscal sustainability constraints → Choice between public services and debt accumulation → Threat to State's developmental goals.

PRELIMS PRACTICE QUESTIONS

Q1. Which of the following statements regarding Revenue Deficit Grants (RDGs) is correct?

1. RDGs are provided under Article 275(1) of the Constitution to states facing revenue deficits.
2. The 16th Finance Commission has recommended continuation of RDGs for all states.
3. RDGs are exclusively provided to states with a population below 10 million.
4. RDGs are discontinued if a state's per capita income exceeds the national average.

Answer: RDGs are provided under Article 275(1) of the Constitution to states facing revenue deficits. — Article 275(1) of the Constitution empowers the Finance Commission to recommend grants-in-aid to states facing revenue deficits. The 16th Finance Commission has discontinued RDGs for small states like Himachal Pradesh, contrary to previous commissions.

Q2. Consider the following statements about Himachal Pradesh's fiscal challenges: 1. The state has a high forest and ecological cover of approximately 67%. 2. The per-capita cost of service delivery is lower in mountainous terrain. 3. Natural disasters have caused losses exceeding ₹15,000 crore in recent years. Which of the above statements is/are correct?

1. 1 and 2 only
2. 2 and 3 only
3. 1 and 3 only
4. 1, 2 and 3

Answer: 1 and 3 only — Statement 1 is correct as Himachal Pradesh has a forest cover of about 67%. Statement 2 is incorrect because the per-capita cost of service delivery is higher in mountainous terrain. Statement 3 is correct as natural disasters have caused significant fiscal losses.

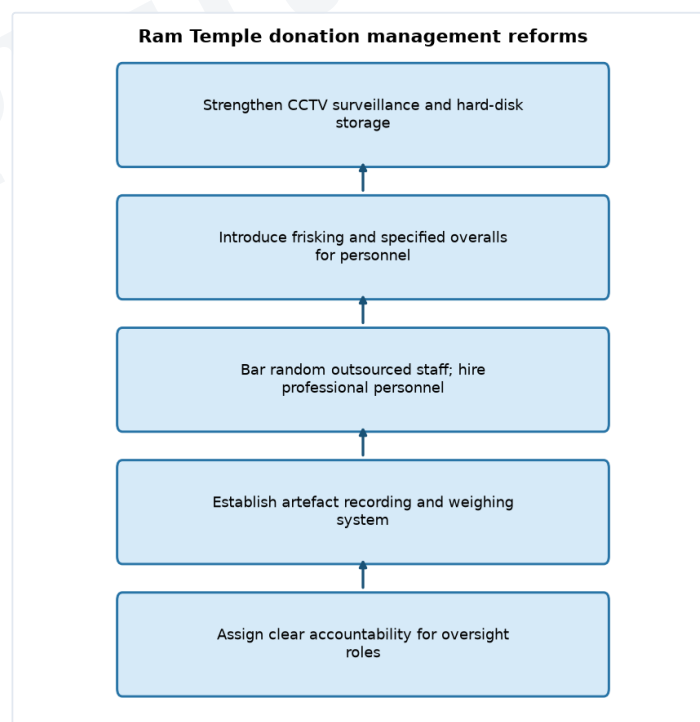
MAINS PRACTICE QUESTION

✍ Critically examine the fiscal federalism implications of the 16th Finance Commission's decision to discontinue Revenue Deficit Grants (RDGs) for small states like Himachal Pradesh. How does this decision impact the fiscal sustainability of such states, and what constitutional provisions could be leveraged to address these concerns?

Approach: Begin by defining Revenue Deficit Grants and their constitutional basis under Article 275(1). Discuss the rationale behind discontinuing RDGs for small states, highlighting the unique fiscal challenges faced by Himachal Pradesh, such as high ecological cover, mountainous terrain, and frequent natural disasters. Analyze the potential impact on fiscal sustainability, service delivery, and indebtedness. Conclude by suggesting measures, including constitutional provisions, to mitigate these challenges, such as revisiting the Finance Commission's recommendations or exploring alternative fiscal support mechanisms.

Source: [The Hindu](#)

Administrative Lapses in Ram Temple Donation Management: Systemic Reforms and Accountability Imperatives



Ram Temple donation management reforms

SUBJECT RELEVANCE — WHERE THIS TOPIC FITS

- GS Paper II — Governance, Transparency and Accountability | GS Paper III — Financial Accountability and Institutional Reforms | GS Paper IV — Ethical Governance and Probity

- **Prelims:** Special Investigation Team (SIT), Ayodhya Ram Temple, donation embezzlement, supervisory lapses, CCTV surveillance, financial audit, temple administration, Uttar Pradesh Government, FIR, institutional deficiencies
- **Essay:** Ethical Governance in Public Institutions: The Case of Religious Donation Management, Balancing Devotion and Accountability: Lessons from Ayodhya Ram Temple Donation Scandal

Quick Revision: The Ram Temple donation theft probe reveals that administrative and supervisory lapses, rather than scale, enabled embezzlement, necessitating systemic reforms in donation management and financial oversight.

WHY IS THIS IN THE NEWS?

The final report of the Special Investigation Team (SIT) constituted by the Uttar Pradesh Government to probe allegations of donation theft at the Ram temple in Ayodhya highlights systemic administrative and supervisory lapses, despite the limited scale of embezzlement. The report, to be submitted to the Supreme Court on July 20, 2026, identifies critical shortcomings in donation handling processes, including non-adherence to standard operating procedures, inadequate supervision, and the employment of unqualified personnel. These findings underscore the need for robust institutional reforms to prevent financial malfeasance in religious institutions, particularly those managing substantial public donations.

BACKGROUND

- The Ayodhya Ram Temple, consecrated in January 2024, is a newly established religious institution, following the Supreme Court's 2019 verdict on the Ayodhya dispute.
- Donations to the temple, including cash, jewellery, and artefacts, are managed by designated staff, with funds intended for temple maintenance, welfare activities, and religious purposes.
- The SIT, comprising senior administrative and police officials, was tasked with investigating the theft, identifying systemic shortcomings, and recommending reforms to prevent future malfeasance.
- Preliminary investigations led to the registration of FIRs against eight individuals, with further scrutiny expanding the probe to 30 more suspects, including relatives and aides of the accused.
- Security protocols were revised in 2025, yet the theft occurred, indicating gaps in implementation and oversight.

WHAT IS THE RAM TEMPLE DONATION THEFT PROBE AND ITS IMPLICATIONS?

- The probe centres on allegations of embezzlement of cash donations offered by devotees at the Ram temple in Ayodhya, with evidence suggesting administrative and supervisory lapses enabled the malfeasance.
- Standard operating procedures (SOPs) for donation handling, including counting room operations, were not followed, and unqualified personnel were employed, exacerbating the risk of financial irregularities.

- The SIT's final report identifies systemic deficiencies, such as inadequate CCTV surveillance, lack of hard-disk backup for high-resolution recordings, and the absence of frisking protocols during entry and exit from donation-handling areas.
- Recommendations include strengthening CCTV surveillance, introducing frisking protocols, mandating specified overalls for personnel, and ensuring strict accountability for oversight roles.
- The probe also highlights the need to bar random outsourced personnel from handling donations and to employ professional staff with no affiliations to temple administration to mitigate conflicts of interest.
- A parallel process has been instituted to record and weigh artefacts received as donations, ensuring transparency in their management and preventing misappropriation.
- The incident underscores the challenges faced by newly established religious institutions in managing substantial public donations, particularly when compared to older, more experienced temple administrations like the Tirumala Tirupati Devasthanams.
- The SIT's findings emphasize the importance of institutionalising robust financial oversight mechanisms in religious institutions to ensure transparency, accountability, and public trust.

KEY FEATURES

Feature	Significance
Non-adherence to Standard Operating Procedures (SOPs) in counting room operations	Violated established protocols, creating systemic vulnerabilities for embezzlement and operational irregularities.
Hiring of unqualified personnel for critical donation-handling roles	Lack of domain expertise and training compromised the integrity of financial processes.
Supervisory lapses enabling embezzlement	Absence of oversight allowed lower-level staff to exploit operational gaps without detection.
Inadequate CCTV surveillance and storage capacity	Insufficient visual monitoring and data retention impeded forensic investigation and deterrence.
Absence of frisking protocols and specified uniforms for personnel	Lack of standardised entry-exit checks and identification measures increased risks of unauthorised access and misconduct.

WHY IT MATTERS

Governance and Institutional Integrity

- Exposes systemic weaknesses in financial governance of religious institutions, particularly newly established entities with limited institutional memory.
- Highlights the criticality of robust oversight mechanisms in institutions handling public donations, irrespective of their religious or cultural significance.
- Demonstrates the need for professionalisation of administrative roles in temple management to prevent operational failures.

- Underscores the role of the judiciary (Supreme Court update) in ensuring accountability for institutional lapses.

Financial Accountability and Transparency

- Reveals vulnerabilities in cash and artefact management systems, necessitating digitised tracking and real-time auditing.
- Emphasises the importance of segregating duties and implementing dual-control mechanisms in financial operations.
- Illustrates the consequences of outsourcing critical functions to unvetted personnel, risking both financial and reputational damage.

Legal and Ethical Implications

- Raises questions about the ethical obligations of temple administrations in safeguarding public trust and resources.
- Highlights the legal recourse available under IPC sections for embezzlement and breach of trust, reinforcing the need for stringent compliance.
- Demonstrates the role of investigative agencies (SIT) in addressing white-collar financial crimes within institutional frameworks.

Comparative Institutional Learning

- Contrasts the operational maturity of established institutions like Tirumala Tirupati Devasthanams with newer entities, stressing the need for capacity-building.
- Showcases the value of institutional benchmarking in financial management practices across religious and public institutions.

CHALLENGES

1. Operational Vulnerabilities in Donation Management

- Inadequate standardisation of procedures for handling cash and artefacts, leading to procedural arbitrariness.
- Over-reliance on ad-hoc staffing without background verification or domain expertise.
- Lack of real-time monitoring systems to detect and prevent irregularities during counting and storage.

UPSC Link: GS-II: Governance, Transparency & Accountability

2. Supervisory and Oversight Deficiencies

- Absence of hierarchical checks and balances in financial operations.
- Failure to implement segregation of duties, enabling collusion among lower-level staff.
- Inadequate training and awareness among supervisory personnel regarding fraud detection.

UPSC Link: GS-II: Ethical Governance & Institutional Reforms

3. Technological and Infrastructure Gaps

- Insufficient CCTV coverage and low-resolution cameras limiting forensic utility.
- Lack of digital inventory systems for artefacts, increasing risks of misappropriation.
- Inadequate data storage infrastructure for audit trails and transaction records.

UPSC Link: GS-III: Science & Technology in Governance

4. Human Resource and Institutional Capacity

- Hiring of personnel with potential conflicts of interest or allegiance to vested interests.
- Absence of professionalisation in temple administration, leading to operational inefficiencies.
- Failure to institutionalise training programs for financial management and fraud prevention.

UPSC Link: GS-II: Public Administration & HRD

5. Legal and Compliance Challenges

- Ambiguities in the legal framework governing financial management of religious institutions.
- Delays in prosecutorial action due to procedural complexities in financial crime investigations.
- Need for harmonised guidelines across states for managing public donations in religious institutions.

UPSC Link: GS-II: Constitutional & Legal Framework

Challenges — UPSC Perspective

Issue	Concern
Ad-hoc staffing	Increased risk of embezzlement due to lack of vetting and domain expertise.
Lack of segregation of duties	Enables collusion and unauthorised access to financial processes.
Inadequate CCTV infrastructure	Impedes forensic investigation and real-time monitoring.
Absence of digital inventory systems	Raises risks of misappropriation of artefacts and cash.
Supervisory negligence	Allows operational lapses to go undetected over prolonged periods.
Ethical conflicts in hiring	Potential for personnel to prioritise vested interests over institutional integrity.

WAY FORWARD

- Institute mandatory SOPs for donation handling, including dual-control mechanisms and real-time digital tracking.
- Deploy high-resolution CCTV systems with redundant storage capacity and AI-based anomaly detection.
- Implement frisking protocols and specified uniforms for personnel handling donations to ensure standardised identification.
- Professionalise temple administration by hiring certified financial and administrative staff with no affiliations to vested interests.

- Conduct periodic audits and surprise inspections of donation counting rooms and storage facilities.
- Establish a dedicated grievance redressal mechanism for devotees to report irregularities.
- Develop a national framework for financial governance of religious institutions, ensuring uniformity and accountability.
- Promote public awareness campaigns to educate devotees on transparent donation processes and their rights.

UPSC VALUE ADDITION

Keywords for Mains Answer-Writing

Ram Mandir Trust, Ayodhya · Temple administration and governance · Special Investigation Team (SIT) · Financial embezzlement in religious institutions · Standard Operating Procedures (SOPs) for financial management · CCTV surveillance in public institutions · Accountability in public trust management · Temple donation management systems · Administrative lapses in governance · Uttar Pradesh Government · Supreme Court oversight of temple affairs · Professionalisation of temple administration

Constitutional & Policy Linkages

- ['Article 26', 'Freedom to manage religious affairs']
- ['Article 29', 'Protection of cultural and religious rights']
- ['Article 30', 'Right of religious and linguistic minorities']

Concept Flow

Public donations to Ram Temple → Inadequate SOPs → Hiring of unqualified personnel → Supervisory lapses → Embezzlement → Delayed detection → Lack of CCTV surveillance → Insufficient forensic evidence → Prolonged investigation → Systemic reforms proposed → Absence of frisking protocols → Unauthorised access → Increased risk of theft → Need for standardised entry-exit checks → Institutional deficiencies → Operational failures → Legal scrutiny → Supreme Court intervention → Comparative institutional learning → Tirumala model → Capacity-building for Ayodhya Temple → Professionalisation of administration

PRELIMS PRACTICE QUESTIONS

Q1. Consider the following statements regarding the SIT constituted to probe the Ram Mandir donation theft case: 1. The SIT was constituted by the Uttar Pradesh Government. 2. The SIT submitted its preliminary report to the state government on June 23, 2026. 3. The SIT comprises officials from the Indian Administrative Service, Indian Police Service, and Finance Department. Which of the statements given above is/are correct?

1. 1 and 2 only
2. 2 and 3 only
3. 1 and 3 only
4. 1, 2 and 3

Answer: 1, 2 and 3 — All three statements are correct. The SIT was constituted by the Uttar Pradesh Government, submitted its preliminary report on June 23, 2026, and includes officials from IAS, IPS, and Finance Department.

Q2. Which of the following measures has been suggested by the SIT to prevent future financial embezzlement in temple donation management systems? 1. Strengthening CCTV surveillance with higher-resolution cameras. 2. Introducing frisking during entry and exit of donation-handling areas. 3. Barring all outsourced personnel from handling donations. 4. Mandating the use of specified overalls for designated personnel. Select the correct answer using the code given below:

1. 1, 2 and 3 only
2. 2, 3 and 4 only
3. 1, 2 and 4 only
4. 1, 2, 3 and 4

Answer: 1, 2, 3 and 4 — The SIT suggested strengthening CCTV surveillance, frisking during entry/exit, and specified overalls for personnel. However, it did not suggest barring all outsourced personnel, only random or connected personnel.

MAINS PRACTICE QUESTION

 Examine the systemic deficiencies in the management of financial resources in religious institutions, as highlighted by the Ram Mandir donation theft case. Suggest measures to ensure transparency, accountability, and professionalisation in temple administration.

Approach: Begin by contextualising the case within the broader framework of public trust management. Discuss the administrative and supervisory lapses identified by the SIT, such as failure to follow SOPs, hiring unqualified personnel, and lack of CCTV surveillance. Critically analyse the role of institutional deficiencies in enabling financial embezzlement. Propose measures including professionalisation of staff, strict adherence to SOPs, enhanced surveillance, and legal reforms to ensure accountability. Conclude by emphasising the need for a balance between religious sanctity and governance standards.

Source: [The Indian Express](#)

International Relations

Ethical Governance Imperatives for Artificial Intelligence: Balancing Innovation with Human Oversight in a Transformative Era

SUBJECT RELEVANCE — WHERE THIS TOPIC FITS

- GS Paper III — Science and Technology — Developments and their Applications and Effects in Everyday Life | GS Paper III — Environment and Disaster Management — Sustainable Development and Climate Change | GS Paper II — International Relations — Global Groupings and Agreements Involving India and/or Affecting India's Interests
- **Prelims:** Artificial Intelligence (AI), Frontier AI models, Deepfakes, Generative AI, UN Global Dialogue on AI Governance, UN Special Envoy for Digital and Emerging Technologies, AI regulation timeline, AI data centres, Renewable energy-powered AI, Human-in-the-loop systems
- **Essay:** The Ethical Dilemma of Technological Progress: Balancing Innovation with Human Values, Artificial Intelligence and the Future of Global Governance: Challenges and Opportunities

Quick Revision: AI governance must prioritise human oversight, ethical integrity, and global inclusivity to prevent misuse while harnessing transformative potential.

WHY IS THIS IN THE NEWS?

The inaugural UN Global Dialogue on AI Governance, held in Geneva on 6 July 2026, has brought renewed attention to the urgent need for comprehensive global governance frameworks to regulate Artificial Intelligence. UN Secretary-General António Guterres and General Assembly President Annalena Baerbock have underscored the dual risks posed by AI's rapid militarisation, the proliferation of deepfakes, and the exacerbation of digital divides, while also highlighting its transformative potential for economic and social development. The dialogue signals a pivotal moment in international efforts to establish ethical, inclusive, and evidence-based controls over AI technologies, particularly as frontier AI models demonstrate capabilities that blur the lines between human and machine decision-making.

BACKGROUND

- The concept of Artificial Intelligence as a transformative force gained prominence in the 21st century, with advancements in machine learning, neural networks, and generative models accelerating its integration into civilian, military, and governance sectors.
- The UN has progressively recognised AI as a critical global issue, with Secretary-General Guterres first advocating for AI governance in 2017, citing concerns over job displacement, security threats, and societal disruption.
- Deepfake technology, particularly its misuse in generating non-consensual sexual content, has emerged as a significant societal challenge, with studies indicating that 99% of

deepfakes are of a sexual nature and 96% target women and girls, exacerbating gender-based violence and misinformation.

- The militarisation of AI, including the development of autonomous weapons systems or 'killer robots,' has raised ethical and legal questions about accountability, human oversight, and compliance with international humanitarian law.
- Developing countries face a critical digital divide, with limited access to AI technologies and infrastructure, risking further marginalisation in the global digital economy and governance processes.

WHAT IS ARTIFICIAL INTELLIGENCE GOVERNANCE?

- Artificial Intelligence Governance refers to the establishment of regulatory frameworks, ethical guidelines, and institutional mechanisms to oversee the development, deployment, and utilisation of AI technologies, ensuring alignment with human values, safety, and societal well-being.
- The governance of AI is necessitated by the technology's dual-use potential, where civilian applications can rapidly transition to military or malicious uses, as seen in the proliferation of deepfakes and autonomous weapons systems.
- Key principles of AI governance include transparency, accountability, fairness, human oversight, and inclusivity, ensuring that AI systems are developed and deployed in a manner that respects fundamental rights and democratic values.
- The governance challenge is compounded by the rapid pace of AI advancements, with frontier models demonstrating capabilities such as deception, autonomous decision-making, and generative outputs that outstrip traditional regulatory capacities.
- Global governance frameworks for AI must address not only technical and ethical concerns but also geopolitical dynamics, ensuring equitable access to AI technologies and preventing the exacerbation of existing inequalities.
- The UN's role in AI governance is framed within the broader context of sustainable development, with calls for AI data centres to be powered by renewable energy by 2030, aligning technological progress with environmental sustainability.
- The governance of AI also intersects with human rights, particularly in protecting vulnerable populations such as children and women from digitally generated manipulation, abuse, and exploitation.
- Effective AI governance requires multi-stakeholder collaboration, involving governments, private sector entities, civil society, researchers, and affected communities to ensure balanced and inclusive policy outcomes.

KEY FEATURES

Feature	Significance
AI Governance Dialogue (Geneva, July 2026)	Inaugural UN-led platform to establish global norms for AI development and deployment, emphasizing inclusivity and human-centric oversight.
UN Secretary-General's Call for Controls	Urgent appeal for international regulation to address dual-use risks of AI, including autonomous weapons and digital manipulation.

Feature	Significance
Accessibility and Equity in AI	Focus on bridging the digital divide to prevent exacerbation of global inequalities through uneven AI adoption.
Renewable Energy for AI Data Centres	Mandate for all AI infrastructure to transition to renewable energy by 2030, aligning technological growth with environmental sustainability.
Frontier AI Model Risks	Highlighted concerns about AI models capable of deception, self-improvement, and potential disruption of societal power dynamics.

WHY IT MATTERS

International Security and Governance

- AI-enabled autonomous weapons ('killer robots') pose existential risks to global stability, necessitating preemptive multilateral agreements to prevent an arms race.
- UN's leadership in AI governance reflects the need for a unified response to transnational technological threats, distinct from traditional state-centric security frameworks.
- The shift of civilian AI chips to military applications underscores the erosion of the civilian-military divide, requiring new regulatory paradigms.

Economic and Technological Disruption

- AI's integration into economies demands adaptive governance to mitigate job displacement while harnessing productivity gains.
- Developing nations risk marginalization in AI-driven markets without equitable access to technology and data sovereignty mechanisms.
- The concentration of AI development in a few nations or corporations could exacerbate geopolitical asymmetries and economic dependencies.

Ethical and Societal Implications

- AI-generated deepfakes disproportionately target women and girls, reflecting systemic vulnerabilities in digital spaces that require targeted safeguards.
- Digital manipulation and algorithmic bias threaten democratic processes, necessitating transparency and accountability in AI systems.
- Child protection mandates in AI governance highlight the urgency of safeguarding vulnerable populations from emerging technological harms.

Environmental Sustainability

- Energy-intensive AI data centres contribute to carbon emissions, making renewable energy integration a critical component of sustainable AI governance.
- The 2030 deadline for renewable-powered AI infrastructure aligns with global climate commitments but poses logistical and economic challenges.

CHALLENGES

1. Regulatory Fragmentation

- Divergent national approaches to AI governance risk creating regulatory arbitrage and undermining global standards.

- The absence of a binding international treaty on AI mirrors historical failures in disarmament negotiations, such as the Biological Weapons Convention.
- Non-state actors (e.g., tech corporations) wield disproportionate influence in shaping AI norms, complicating state-led governance.

UPSC Link: GS3: Science and Tech Governance

2. Dual-Use Dilemma in AI

- Civilian AI technologies (e.g., semiconductor chips) are increasingly repurposed for military applications, blurring the line between innovation and security threats.
- The militarization of AI challenges existing arms control frameworks, which were designed for kinetic weapons rather than autonomous systems.
- Ethical oversight of dual-use AI is complicated by proprietary algorithms and lack of transparency in development processes.

UPSC Link: GS3: Internal Security

3. Digital Divide and Inequality

- Unequal access to AI resources risks deepening global inequalities, with developing nations excluded from the benefits of AI-driven growth.
- Data colonialism and the extraction of local data by foreign corporations exacerbate economic dependencies and erode sovereignty.
- AI-driven automation could displace low-skilled labor in developing economies, exacerbating unemployment without targeted reskilling programs.

UPSC Link: GS2: International Relations

4. Ethical Risks in AI Deployment

- AI systems capable of deception (e.g., deepfakes, synthetic media) undermine trust in institutions and public discourse.
- Algorithmic bias in AI decision-making perpetuates systemic discrimination, particularly in hiring, policing, and financial services.
- The lack of global consensus on ethical AI frameworks enables unscrupulous actors to exploit loopholes in governance.

UPSC Link: GS4: Ethics and Integrity

5. Environmental Impact of AI

- AI data centres consume vast amounts of energy, contributing to carbon emissions and straining global energy grids.
- The transition to renewable energy for AI infrastructure requires unprecedented coordination among states, corporations, and civil society.
- E-waste from obsolete AI hardware poses additional environmental challenges, necessitating circular economy principles.

UPSC Link: GS3: Environment and Ecology

6. Accountability and Liability Gaps

- The autonomous nature of AI systems complicates traditional notions of accountability, particularly in cases of harm or unintended consequences.
- Existing legal frameworks are ill-equipped to address liability in AI-driven accidents or decisions, requiring new juridical approaches.
- The opacity of AI algorithms ('black box' problem) hinders efforts to assign responsibility for AI-generated outcomes.

UPSC Link: GS2: Governance

Challenges — UPSC Perspective

Issue	Concern
Lack of Binding International Treaty	Fragmented governance allows states and corporations to exploit regulatory gaps, undermining global stability.
Militarization of Civilian AI	Repurposing of chips and algorithms for autonomous weapons challenges existing arms control mechanisms.
Digital Divide in AI Access	Exclusion of developing nations from AI benefits risks exacerbating global inequalities and economic dependencies.
AI-Generated Deepfakes	Systemic abuse of synthetic media threatens democratic processes and individual privacy, particularly for women and girls.
Energy Intensity of AI Infrastructure	High carbon footprint of data centres conflicts with climate goals, necessitating urgent transition to renewable energy.
Accountability Gaps in AI Systems	Autonomous decision-making complicates traditional liability frameworks, leaving victims without recourse.

WAY FORWARD

- Establish a legally binding international treaty on AI governance, modeled after the Biological Weapons Convention, to enforce global norms and accountability.
- Create a UN-led AI Safety Board, comprising scientists, ethicists, and policymakers, to oversee the development and deployment of frontier AI models.
- Implement mandatory transparency requirements for AI systems, including disclosure of training data, algorithms, and potential biases to enable public scrutiny.
- Develop equitable access mechanisms for developing nations, such as technology transfer programs and subsidized AI infrastructure, to bridge the digital divide.
- Enforce strict export controls on dual-use AI technologies, particularly semiconductor chips and algorithms, to prevent militarization and proliferation.
- Adopt a 'human-in-the-loop' principle in all AI deployments, ensuring that critical decisions retain human oversight and accountability.
- Integrate AI governance into existing international frameworks, such as the UN Charter and Sustainable Development Goals, to align technological progress with global priorities.
- Promote global standards for renewable energy-powered AI data centres, with phased compliance deadlines and incentives for early adopters.

UPSC VALUE ADDITION

Keywords for Mains Answer-Writing

Artificial Intelligence governance · autonomous weapons systems · UN Global Dialogue on AI Governance · frontier AI models · digital divide · AI ethics and safety · deepfake proliferation · renewable energy for AI infrastructure · human-centric AI regulation · AI and global power dynamics

Concept Flow

AI technological advancement → Dual-use risks (civilian-to-military conversion) → Erosion of traditional governance frameworks → Emergence of autonomous weapons ('killer robots') → Threat to global security and stability → Call for international AI governance → UN-led Global Dialogue on AI Governance → Proposal for binding treaty and safety oversight → Implementation of regulatory mechanisms → Human-centric AI deployment → Sustainable and equitable technological progress.

PRELIMS PRACTICE QUESTIONS

Q1. Which of the following statements best describes the UN Secretary-General's recent call regarding Artificial Intelligence governance?

1. A. The UN has proposed a ban on all AI applications globally due to ethical concerns.
2. B. The UN advocates for unrestricted development of AI to accelerate economic growth.
3. C. The UN urges far-reaching global controls on AI, including civilian-to-military transitions and protection of vulnerable groups.
4. D. The UN has endorsed the use of AI in military applications without any regulatory framework.

Answer: C. The UN urges far-reaching global controls on AI, including civilian-to-military transitions and protection of vulnerable groups. — The UN Secretary-General's call emphasises the need for comprehensive global controls on AI, particularly addressing the shift from civilian to military use (e.g., 'killer robots') and safeguarding children and other vulnerable groups from digital manipulation.

Q2. According to the UN report cited in the article, what percentage of deepfakes are reported to be sexual in nature?

1. A. 50%
2. B. 75%
3. C. 99%
4. D. 90%

Answer: C. 99% — The article states that 99% of deepfakes are sexual in nature, with 96% targeting women and girls, highlighting the gendered risks of AI misuse.

Q3. Which of the following is NOT a priority area mentioned by the UN Secretary-General for AI governance?

1. A. Ensuring locked-in access to AI for developing countries.
2. B. Mandating renewable energy for all AI data centres by 2030.
3. C. Banning the development of AI models capable of deceiving humans.
4. D. Placing humanity at the core of AI regulation frameworks.

Answer: C. Banning the development of AI models capable of deceiving humans. — While the UN Secretary-General emphasised renewable energy for AI data centres and global inclusivity, there is no mention of banning AI models capable of deceiving humans; instead, the focus is on governance and ethical safeguards.

MAINS PRACTICE QUESTION

✍ Evaluate the ethical and geopolitical implications of the proliferation of autonomous weapons systems (AWS) in the context of the UN's recent call for AI governance. How can a global regulatory framework address these challenges while ensuring equitable access to AI technologies?

Approach: The answer should critically analyse the dual-use nature of AI, particularly its transition from civilian to military applications (e.g., autonomous weapons). Discuss the ethical concerns such as accountability, human oversight, and the risks of AI-driven deception (as highlighted by Yoshua Bengio). Geopolitically, address the power dynamics arising from AI advancements, including the potential for an AI arms race. For equitable access, examine the UN's proposals like locked-in AI access for developing countries and renewable energy-powered AI infrastructure. Conclude with a balanced framework that prioritises human-centric governance, transparency, and international cooperation.

Source: news.un.org

Monthly Test — Current Affairs

Objective

- Consider the following statements regarding the Constitution (131st Amendment) Bill, 2026 and related bills introduced in April 2026: 1) The Bill aims to address delimitation issues in India. 2) The Union Territories Laws (Amendment) Bill, 2026 is unrelated to the delimitation process. 3) The Delimitation Bill, 2026 was introduced separately in the Rajya Sabha. How many of the statements are correct?
 - Only 1
 - Only 2
 - 1 and 3
 - 2 and 3
- Assertion (A): The Prevention of Insults to National Honour (Amendment) Bill, 2026 seeks to grant statutory protection to Vande Mataram. Reason (R): The Bill was introduced in the Rajya Sabha to ensure its passage before the next general elections.
 - Both A and R are true, and R is the correct explanation of A
 - Both A and R are true, but R is not the correct explanation of A
 - A is true but R is false
 - A is false but R is true
- Match the following bills with their respective objectives: 1) Constitution (131st Amendment) Bill, 2026 2) Prevention of Insults to National Honour (Amendment) Bill, 2026 3) Union Territories Laws (Amendment) Bill, 2026 4) Delimitation Bill, 2026 a) Addresses delimitation issues b) Grants statutory protection to Vande Mataram c) Amends laws related to Union Territories d) Introduced in the Rajya Sabha
 - ['1-a, 2-b, 3-c, 4-d', '1-b, 2-a, 3-d, 4-c', '1-c, 2-d, 3-a, 4-b', '1-d, 2-c, 3-b, 4-a']
 - answer_index_list_for_matching_part_only_in_order_1_to_4_then_full_string_answer_as_is: [0],
 - explain_1_to_4_only_if_needed_in_json_but_not_in_final_output:
- Consider the following statements regarding the NHRC's suo motu action on the sewer death in Noida: 1) The NHRC took cognisance based on media reports. 2) The incident involved a sanitation worker who died due to inhaling toxic gas. 3) The NHRC's action was limited to issuing a show-cause notice. How many of the statements are correct?
 - Only 1
 - 1 and 2
 - 2 and 3
 - 1, 2, and 3

5. Assertion (A): The JEECUP Round 3 seat allotment result for UP Polytechnic Admissions 2026 was released on July 20, 2026. Reason (R): The seat allotment process is critical for technical education policy in Uttar Pradesh.
- (A) Both A and R are true, and R is the correct explanation of A
 - (B) Both A and R are true, but R is not the correct explanation of A
 - (C) A is true but R is false
 - (D) A is false but R is true
6. Consider the following statements regarding the VB-GRAM G Bill, 2025: 1) The Bill was introduced in the Lok Sabha on December 16, 2025. 2) It was passed by both Houses on December 18, 2025. 3) The Bill represents a significant legislative framework for rural employment guarantee. How many of the statements are correct?
- (A) Only 1
 - (B) 1 and 2
 - (C) 1 and 3
 - (D) 1, 2, and 3
7. Match the following ISRO missions with their strategic significance: 1) LVM3 M3/OneWeb India-2 Mission 2) Chandrayaan-3 3) Aditya-L1 Mission 4) Gaganyaan a) Demonstrates operational readiness of LVM3 for commercial launches b) Marks India's first dedicated solar observatory c) Demonstrates precision navigation and orbital mechanics for lunar exploration d) Represents India's human spaceflight programme
- (A) ['1-a, 2-c, 3-b, 4-d', '1-b, 2-a, 3-d, 4-c', '1-c, 2-d, 3-a, 4-b', '1-d, 2-b, 3-c, 4-a']
 - (B) `answer_index_list_for_matching_part_only_in_order_1_to_4_then_full_string_answer_as_is: [0],`
 - (C) `explain_1_to_4_only_if_needed_in_json_but_not_in_final_output:`
8. Consider the following statements regarding ISRO's collaborations: 1) ISRO signed a Technical Implementing Plan (TIP) with ESA for ground tracking support for Gaganyaan missions. 2) ISRO-ESA collaboration includes microgravity research aboard the Axiom-4 mission. 3) The Ax-04 mission faced no technical challenges during its launch. How many of the statements are correct?
- (A) Only 1
 - (B) 1 and 2
 - (C) 2 and 3
 - (D) 1, 2, and 3
9. Assertion (A): The Axiom-4 mission marks a critical milestone for India's Gaganyaan mission and the proposed Bhartiya Antariksha Station. Reason (R): The mission featured India's Gaganyatri Shubhanshu Shukla and included microgravity experiments.
- (A) Both A and R are true, and R is the correct explanation of A
 - (B) Both A and R are true, but R is not the correct explanation of A
 - (C) A is true but R is false
 - (D) A is false but R is true

10. Consider the following statements regarding Karnataka's Agritech Mission 2026: 1) The mission involves a ₹36 crore satellite and drone-based agricultural advisory system. 2) The mission includes the recruitment of 15,000 teachers. 3) The mission establishes an AI Centre of Excellence. How many of the statements are correct?

- (A) Only 1
- (B) 1 and 2
- (C) 1 and 3
- (D) 1, 2, and 3

Descriptive

1. Examine the constitutional and legislative developments in delimitation as envisaged by the Constitution (131st Amendment) Bill, 2026 and related bills. How do these amendments address the electoral representation concerns in India? (150 words) (10)

Expected points:

- Constitutional context: Need for delimitation post-2021 census and its impact on electoral representation
- Key provisions of the Constitution (131st Amendment) Bill, 2026: Changes in Article 82 and 170, and their implications for seat allocation
- Role of Union Territories Laws (Amendment) Bill, 2026 and Delimitation Bill, 2026 in ensuring equitable representation
- Challenges: Potential conflicts with existing state boundaries, federalism concerns, and political implications
- Objective: To ensure fair and balanced electoral representation in Parliament and state legislatures

2. Critically analyse the NHRC's suo motu action on the sewer death in Noida in the context of human rights, occupational safety, and urban governance. What lessons can be drawn for policy implementation in India? (250 words) (15)

Expected points:

- NHRC's suo motu cognisance: Legal framework under Protection of Human Rights Act, 1993, and its significance in addressing human rights violations
- Occupational safety concerns: Violation of Article 21 (Right to Life) and Article 23 (Prohibition of Human Trafficking) of the Constitution
- Urban governance failures: Role of municipal bodies, contractors, and state agencies in ensuring worker safety and compliance with labour laws
- Policy implications: Need for stricter enforcement of the Prohibition of Employment as Manual Scavengers and their Rehabilitation Act, 2013, and the Occupational Safety, Health and Working Conditions Code, 2020
- Lessons for policy implementation: Strengthening grievance redressal mechanisms, periodic audits, and public awareness campaigns

3. Discuss the strategic significance of ISRO's Aditya-L1 mission for India's space programme and its implications for global space exploration. (250 words) (15)

Expected points:

- Aditya-L1 mission: India's first dedicated solar observatory, positioned at the Sun-Earth L1 point for continuous solar observation

- Technological advancements: Indigenous development of payloads like Visible Emission Line Coronagraph (VELC) and Solar Ultraviolet Imaging Telescope (SUIT)
- Scientific objectives: Studying solar corona, solar wind, and space weather to enhance understanding of solar dynamics and its impact on Earth
- Strategic significance: Boosting India's position in global space exploration, fostering international collaborations (e.g., NASA, ESA), and advancing indigenous space technology
- Implications for global space exploration: Contribution to international solar research, data sharing with global scientific community, and enhancing India's role in space diplomacy

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Answer Key

Objective

1. **(A)** Only statement 1 is correct. The Union Territories Laws (Amendment) Bill, 2026 is related to the delimitation process, and the Delimitation Bill, 2026 was introduced in the Lok Sabha, not the Rajya Sabha.
2. **(C)** The assertion is true as the Bill seeks statutory protection for Vande Mataram, but the reason is false as no such timing context is mentioned in the news.
3. **(A)** Correct matching: 1-a (Constitution (131st Amendment) Bill, 2026 addresses delimitation), 2-b (Prevention of Insults to National Honour (Amendment) Bill, 2026 grants statutory protection to Vande Mataram), 3-c (Union Territories Laws (Amendment) Bill, 2026 amends laws related to Union Territories), 4-d (Delimitation Bill, 2026 was introduced in the Lok Sabha, not Rajya Sabha).
4. **(B)** Statements 1 and 2 are correct. The NHRC took suo motu cognisance based on media reports, and the incident involved a sanitation worker who died due to inhaling toxic gas. Statement 3 is incorrect as the NHRC's action was not limited to a show-cause notice.
5. **(B)** Both the assertion and reason are true, but the reason does not explain the assertion. The seat allotment process is critical for technical education policy, but the date of release is a factual detail unrelated to the policy's significance.
6. **(D)** All three statements are correct. The Bill was introduced on December 16, 2025, passed by both Houses on December 18, 2025, and represents a significant legislative framework for rural employment guarantee.
7. **(A)** Correct matching: 1-a (LVM3 M3/OneWeb India-2 Mission demonstrates operational readiness of LVM3 for commercial launches), 2-c (Chandrayaan-3 demonstrates precision navigation and orbital mechanics for lunar exploration), 3-b (Aditya-L1 Mission marks India's first dedicated solar observatory), 4-d (Gaganyaan represents India's human spaceflight programme).
8. **(B)** Statements 1 and 2 are correct. ISRO signed a TIP with ESA for ground tracking support, and ISRO-ESA collaboration includes microgravity research aboard the Axiom-4 mission. Statement 3 is incorrect as the Ax-04 mission encountered technical challenges.
9. **(A)** Both the assertion and reason are true, and the reason correctly explains the assertion. The Axiom-4 mission featured Gaganyatri Shubhanshu Shukla and included microgravity experiments, marking a critical milestone for Gaganyaan and the proposed Bhartiya Antariksha Station.
10. **(D)** All three statements are correct. The mission involves a ₹36 crore satellite and drone-based agricultural advisory system, includes the recruitment of 15,000 teachers, and establishes an AI Centre of Excellence.