

**The Hindu Important News Articles & Editorial For UPSC CSE**

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The Aditya-L1 mission, India's first space-based observatory to study the Sun, has achieved a critical milestone by opening its second Announcement of Opportunity (AO). Launched in September 2023 and positioned at the Lagrange Point 1 (L1), the mission has already generated over 27 TB of data. This latest move by ISRO aims to democratize space science by inviting the Indian solar physics community to utilize the VELC and SUIT payloads for specific observations between July and September 2026.

## ISRO invites proposals for observation time on Aditya-L1

**The Hindu Bureau**  
BENGALURU

The Indian Space Research Organisation (ISRO) has released the second Announcement of Opportunity (AO) inviting proposals from the Indian solar physics community for observation time on the Aditya-L1 mission.

The Aditya-L1 is India's first dedicated space-based solar mission and has been making continuous and comprehensive observations of the sun from the sun-earth L1 point.

"The Aditya-L1 mission marks a major milestone in India's space science programme. Scientific data from the mission are regularly released in the public domain for global scientific



A file photo of ISRO's launch vehicle PSLV-C57 rocket carrying Aditya-L1. PTI

utilisation," ISRO said.

At present, there are more than 27 TB of data in the public domain, and several important scientific results have been pu-

blished in international peer-reviewed journals.

ISRO has invited proposals for the second Aditya-L1 AO to utilise observation time from the Visible Emission Line Coronagraph (VELC) and the Solar Ultraviolet Imaging Telescope (SUIT).

The proposals must be submitted electronically through the Aditya-L1 Proposal Processing System (ALPPS) hosted at the Indian Space Science Data Centre (ISSDC). ALPPS can be accessed via the ISSDC website. Approved observations for this second AO cycle will be conducted between July 2026 and September 2026.

The deadline for submission of proposals is April 30, 2026.

### Key Payloads in Focus

The current proposal call specifically targets two of the seven onboard payloads:

#### Visible Emission Line Coronagraph (VELC):

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**Function:** It is the primary payload, designed to study the Solar Corona (the outermost layer) and the dynamics of Coronal Mass Ejections (CMEs).

**Uniqueness:** It can observe the Sun extremely close to the solar disk, a feat made possible by its high-precision internal occultation.

### Solar Ultra-violet Imaging Telescope (SUIT):

**Function:** It images the Solar Photosphere and Chromosphere in near Ultra-violet (UV) light.

**Significance:** It measures solar irradiance variations, which are crucial for understanding the Sun's impact on Earth's climate and the UV radiation levels that affect the upper atmosphere.

## Strategic & Scientific Significance for India

### 1. Advancement in Solar Physics

The Sun's corona is much hotter than its surface (the "coronal heating mystery"). By providing observation time to researchers, ISRO is fostering a robust ecosystem for solving complex astrophysical puzzles, potentially leading to breakthroughs in understanding solar winds and magnetic fields.

### 2. Space Weather Forecasting

Solar flares and CMEs can disrupt satellite communications, GPS, and power grids on Earth. Continuous data from L1 allows for a "lead time" in warning systems, protecting India's multi-billion dollar space assets and terrestrial infrastructure.

### 3. Strategic Autonomy in Data

Previously, Indian scientists relied heavily on data from NASA (SOHO) or ESA. With 27 TB of indigenous data already available, India is now a net provider of solar data, enhancing its "Space Diplomacy" and standing in the global scientific community.

### 4. Institutional Strengthening

By using the Aditya-L1 Proposal Processing System (ALPPS) and the Indian Space Science Data Centre (ISSDC), ISRO is streamlining the interface between a government space agency and academic institutions, a key goal of the Indian Space Policy 2023.

## Conclusion

The opening of the second AO for Aditya-L1 is a testament to the maturing of India's space science sector. It moves the narrative from "successful launch" to "meaningful research." For the UPSC, this reflects the "Self-reliant India" (Atmanirbhar Bharat) in high-end technology. The mission not only safeguards our technological civilization from solar vagaries but also ensures that the "Laboratory in the Sky" is accessible to the brightest minds in Indian academia, ultimately contributing to the global pool of knowledge about our parent star.

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**UPSC Prelims Exam Practice Question**

**Ques:** Which of the following instruments onboard Aditya-L1 is specifically designed to study Coronal Mass Ejections (CMEs)?

- (a) SUIIT
- (b) VELC
- (c) ASPEX
- (d) HELIOS

Ans: b)

**UPSC Mains Exam Practice Question**

**Ques:** Discuss the scientific objectives of the Aditya-L1 Mission. How do its payloads contribute to understanding solar dynamics?



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**Page 04 : GS III : Indian Economy / Prelims Exam**

In March 2026, India's manufacturing sector experienced a significant deceleration, with the **HSBC India Manufacturing Purchasing Managers' Index (PMI)** dropping to **53.9**, the lowest in 45 months. While the sector remains in "expansion" territory (above 50), the sharp decline from 56.9 in February highlights the vulnerability of India's domestic production to geopolitical shocks, specifically the escalating crisis in **West Asia**.

## Hit by West Asia crisis, manufacturing activity slows to 45-month low in March

**The Hindu Bureau**  
NEW DELHI

Manufacturing sector activity slowed to its lowest level in nearly four years in March 2026, dragged down by the impact of the war in West Asia on costs, demand, and new order levels, according to a survey of private sector companies.

The HSBC India Manufacturing Purchasing Managers' Index (PMI) – a measure of overall conditions based on new orders, output, employment, supplier delivery times and stocks of purchases – fell sharply from 56.9 in February to 53.9 in March, marking the lowest reading since June 2022. A reading above 50 denotes expansion, while a reading below that level indicates contraction.

**War impact**

The manufacturing PMI for March 2026 slipped to a 45-month low

Month	PMI Value
April-2024	58.5
May-2024	57.5
June-2024	58.5
July-2024	58.0
Aug-2024	57.5
Sept-2024	56.5
Oct-2024	56.5
Nov-2024	57.5
Dec-2024	58.0
Jan-2025	58.5
Feb-2025	59.3
Mar-2025	58.0
Apr-2025	57.0
May-2025	56.5
Jun-2025	56.5
Jul-2025	56.5
Aug-2025	56.5
Sep-2025	56.5
Oct-2025	56.5
Nov-2025	56.5
Dec-2025	56.5
Jan-2026	56.5
Feb-2026	56.9
Mar-2026	53.9

Source: HSBC India Manufacturing PMI

“March data saw input prices increase to the greatest extent in over three and a half years. Aluminium, chemicals, fuel, jute, leather, fabric, oil, rubber, and steel were some of the items reported to have increased in price.”

According to Pranjul Bhandari, Chief India Economist at HSBC, firms seem to currently be absorbing a large part of the increase in input costs, keeping output prices “relatively contained”.

On a positive note, the report said that Indian manufacturers in March 2026 saw the strongest expansion in external sales since last September, with gains seen from customers in Australia, Brazil, Canada, mainland China, Europe, Japan, West Asia, Türkiye and Vietnam.

“Growth in India's manufacturing industry took a step back in March as cost pressures, fierce competition, heightened market uncertainty, and the war in the Middle East all contributed to softer increases in new orders and output,” the report stated. “Firms also faced an intensification of cost pressures, the steepest since August 2022.”

The report went on to say that the two largest sub-components of the PMI – new orders and output – rose at their slowest rates since mid-2022.

“Anecdotal evidence showed that growth was curbed by challenging market conditions, cost pressures, and the war in the Middle East,” it added.

**Key Drivers of the Slowdown**

**1. Geopolitical Headwinds (West Asia Crisis)**

The conflict in the Middle East has acted as a "double-edged sword" for Indian manufacturers:

**Logistical Disruptions:** Uncertainty in trade routes (likely affecting the Red Sea/Suez Canal) leads to delayed supplier delivery times and increased freight costs.

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# Daily News Analysis

**Market Uncertainty:** Heightened global tension dampens investor sentiment and leads to a "wait-and-watch" approach for new domestic orders.

## 2. Intensification of Input Costs

The report highlights the steepest rise in input prices since August 2022.

**Affected Commodities:** Crucial raw materials including **fuel, steel, chemicals, aluminum, and rubber** saw price hikes.

**Inflationary Pressure:** While firms are currently "absorbing" costs to keep output prices stable, this reduces profit margins and limits the capital available for future expansion or hiring.

## 3. Competitive Pressures

Indian firms are facing "fierce competition" both domestically and globally. To maintain market share amidst rising costs, manufacturers are forced to sacrifice margins, which is unsustainable in the long run.

### Strategic Analysis: The "Silver Lining"

Despite the domestic slowdown, a critical observation for UPSC is the **resilience of external demand**.

**Export Growth:** New export orders saw the strongest expansion since September 2025.

**Diversification:** India's ability to gain customers in diverse markets like **Australia, Brazil, Canada, and Vietnam** suggests that the "China Plus One" strategy and various Free Trade Agreements (FTAs) are providing a buffer against regional crises.

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### Impact on the Indian Economy

Category	Impact Analysis
<b>GDP Growth</b>	Manufacturing is a major contributor to GVA (Gross Value Added). A slowdown here could lead to a downward revision of Q4 FY26 GDP estimates.
<b>Employment</b>	The PMI includes an employment sub-component. If output growth remains soft, the capacity for job creation in the formal manufacturing sector may stagnate.
<b>Monetary Policy</b>	Rising input costs (Cost-Push Inflation) present a challenge for the RBI. If these costs are eventually passed to consumers, it may delay any potential interest rate cuts.

### Conclusion

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The March 2026 PMI data serves as a reminder that India's manufacturing ambitions—underpinned by "Make in India"—are deeply intertwined with global stability. While the sector is still expanding, the transition from a high-growth phase to a 45-month low emphasizes the need for **supply chain resilience** and energy security. For India to reach its goal of manufacturing contributing 25% to the GDP, the policy focus must shift toward mitigating the impact of external shocks through strategic petroleum reserves, diversified logistics, and support for MSMEs facing high input costs.

### UPSC Prelims Exam Practice Question

**Ques:** With reference to the Purchasing Managers' Index (PMI), consider the following statements:

1. PMI above 50 indicates expansion in economic activity.
2. PMI is released by the Reserve Bank of India.
3. PMI is based on a survey of manufacturing firms.

**Which of the statements given above is/are correct?**

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

**Ans: (a)**

### UPSC Mains Exam Practice Question

**Ques:** Explain the significance of the Purchasing Managers' Index (PMI) as a leading indicator of economic activity. **(150 Words)**

**Page 07 : GS II : Social Justice / Prelims Exam**

Despite India having the world's third-largest number of transplants annually, the financial ecosystem surrounding organ donation remains "fragmented and inadequate." As non-communicable diseases (NCDs) like diabetes and hypertension drive organ failure at a mass scale, the lack of comprehensive insurance for pre-transplant, peri-transplant, and post-transplant care is pushing families into a "medical debt trap."



**Running around in circles to secure insurance for transplantations**

As India's burden of non-communicable diseases soars, the country is facing a widening gap between growing burden of organ failure and the limited financial protection available to patients if organs are failing at a mass scale in India, care prior to a transplant, during a transplant and after a transplant needs to be recognised and prioritised

The Hindu Bureau

**R**hino-orcoid Ganes (rhino changed) had been working in the US, which he had returned to India, while it became evident that his transplant had failed, he was on dialysis again for five years, before reaching under his insurance, the State government's deceased donor organ donation programme. He, Ganes was lucky enough to receive a kidney from a deceased donor in 2020, and believed his years of struggle were behind at last. This, however, was not the case. His ordeal actually began after the surgery when he sought reimbursement under his private insurance plan. My application was rejected several times despite multiple queries. I had to pursue my case repeatedly for months and go right up to the top management before the insurer finally agreed to pay the bill," he says.

As India's burden of non-communicable diseases soars, the country is facing a widening gap between the growing burden of organ failure and the limited financial protection available to patients seeking transplants, with insurance coverage remaining fragmented and inadequate, particularly for post-transplant care. A 50-year-old man who has been on dialysis for high end-stage chronic kidney disease, and has a certain income threshold, coverage for certain months of these issues (dialysis and for working population) is provided. In the private sector, insurance companies are not interested in high-risk, high-cost cases, such as organ failure. However, post-transplant care requires frequent follow-ups, identify medication costs, and in some cases, up to ₹1000 or more, particularly in the initial months when the risk of rejection is high.

**Recipients and organ donors face staggering costs, delays and details of claims. If they are covered under insurance, as well as denial of coverage following a transplant**

**Lead consultant** says insurance policies and their transplant surgery at Aster CMI Hospital, Bangalore, adding that requirements, caps and claim rejections further limit access. For organics, if funds run out, adherence to medication protocols can become a challenge. Non-adherence to immunosuppressive medication in the post-transplant period resulting in the failure of the graft is also common, doctors say. This is especially challenging in pediatric transplants, where the cost has to be borne for many years. "One case, because of financial constraints, medications and non-adherence got disrupted. There have been several instances where the patient goes back to a critical care following graft rejection," points out Dr. Gadgil. There are even less financially protected in private insurance plans placing them in a precarious position for any complication that arises from their surgery or any care required after their procedure. Rajesh Kulkarni, director at Public Trust Hospital, says that the policies for donor expenses are available. "However, specifications of cover vary by insurer. Some plans cover donor complications, while other policies explicitly exclude donor screening, transportation of the organ, or any donor medical expense incurred prior to the recipient's surgery."

From Mitra, a cardiologist at a multi-specialty hospital, refers to another issue. "Many patients develop heart complications post-organ transplantation, but often are not able to claim insurance for these ailments," he says. Even when comprehensive insurance exists, there may be problems. "The major issue is newer advances in treatment. A person may have purchased a particular insurance with a particular coverage. When he/she needs treatment, if newer advances or newer biological drugs are available, they may not be able to access it," says Dr. Rajesh. Finally, finding a transplant policy after having undergone a transplant or having obtained a organ is not a simple task.

For another, a large chunk of transplants takes place in private hospitals, and even if they are covered under State health insurance schemes, costs may exceed the insurance ceiling. Post-transplant care can take a hit when it comes to the private sector, says Anjali Ray Choudhary, a senior technology and retail specialist based in Kolkata. "As government hospitals the treatment is free, and so patients show up for follow-ups, but over 75% of organ transplants in India happen in the private sector. Follow-ups are a major issue here," she says. What is needed insurance models are patchy and unevenly distributed across the country as for a government model go and with private models, have patients to the mercy of insurance companies for reimbursement. Stories of being made to run after to pay, obtain an add-on insurances of documents and be subjected to multiple checks, abound in social media. Data from IRDAI reveals that in FY23 health insurance claims rose 21%, but that an IRDAI order by health insurers increased by only 12.8%.



**The Triple Burden: Gaps in the Transplant Journey**

**1. Pre-Transplant: The Hidden Costs**

**The Issue:** Most insurance policies focus on the surgery but ignore the years of "maintenance" leading up to it.

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# Daily News Analysis

**Costs:** Long-term dialysis (for kidneys), expensive medications, and frequent hospitalizations often exhaust a family's savings before the transplant even occurs.

## 2. The Surgery: Donor Neglect

**Living Donors:** Over 93% of donors in India (15,000 out of 16,000 in 2023) are living donors.

**Insurance Exclusion:** Private insurers often explicitly exclude **donor screening**, organ harvesting complications, and post-donation health monitoring. This places a financial burden on the donor—often a family member—creating a "double financial hit" for the household.

## 3. Post-Transplant: The Lifelong Debt

**Immunosuppression:** Recipients must take life-saving drugs for life to prevent organ rejection (costing ₹10,000–₹15,000/month).

**Outpatient Exclusion:** Most private insurance does not cover **OPD (Outpatient Department)** costs, regular investigations, or long-term monitoring, which are critical for survival.

**Graft Failure Risk:** Financial constraints lead to non-adherence to medication, resulting in the failure of the newly transplanted organ (Graft Rejection).

## Institutional & Policy Challenges

Stakeholder	Key Issue/Conflict
Insurance Companies	Classify recipients and donors as <b>"high-risk,"</b> leading to high premiums or denial of new coverage.
IRDAI (Regulator)	Mandates protection for donors/recipients, but patients report a lack of compliance by private insurers and delays in grievance redressal (Ombudsman).
Government Schemes	<b>PM-JAY (Ayushman Bharat)</b> offers limited packages. While some states (TN, Karnataka) offer free drugs, others do not, leaving the <b>"missing middle"</b> (those too rich for subsidies but too poor for private care) vulnerable.
Private Sector	75% of transplants happen here; while technically advanced, these hospitals often see the highest rates of post-transplant follow-up dropouts due to cost.

## The Concept of the "Graft Rejection" Cycle

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## Way Forward: Recommendations for Reform

**Unified State-Supported Model:** India needs a national framework similar to international models (e.g., Spain or the US's Medicare for ESRD) that covers lifelong post-transplant care.

**Expansion of PM-JAY:** As recommended in the national review meeting, **lifelong immunosuppressant costs** must be included under the Ayushman Bharat umbrella.

**Standardized Donor Coverage:** IRDAI must strictly enforce a "Universal Donor Clause" in all health policies, ensuring that the person saving a life isn't penalized financially.

**Focus on OPD Coverage:** Insurance must evolve from "hospitalization-only" models to "chronic care" models that include outpatient diagnostics and drugs.

## Conclusion

Organ transplantation in India is currently a "privilege of the few" rather than a "right of the many." The transition from a crisis-driven health system to a care-driven one requires recognizing that a transplant is not a one-time surgical event, but a lifelong medical commitment. Without bridging the gap between medical advancement and financial protection, India's success in surgical expertise will continue to be undermined by the economic collapse of its patients.

### UPSC Prelims Exam Practice Question

**Ques:** Which of the following best describes "Graft Rejection"?

- (a) Failure of organ matching before transplant
- (b) Immune system attacking the transplanted organ
- (c) Surgical error during transplantation
- (d) Donor refusing consent

**Ans:** b)

### UPSC Mains Exam Practice Question

**Ques:** Explain the major financial challenges associated with organ transplantation in India. (250 Words)

**Page 10 : GS III : Science & Technology / Prelims Exam**

The launch of **Artemis II** on April 2, 2026, marks a watershed moment for NASA. As the first crewed mission beyond Low-Earth Orbit (LEO) since **Apollo 17** in 1972, it serves as the ultimate "stress test" for the Space Launch System (SLS) and the Orion capsule. More than just a scientific endeavor, Artemis II is the centerpiece of a high-stakes geopolitical race to establish a permanent human presence on the Moon before **China**.

**Artemis II: what is at stake for U.S.?**

The Artemis II mission sent a crew of four astronauts beyond low-earth orbit for the first time since 1972; it aims to prove the whole system works as designed and accelerate plans to land U.S. astronauts on the moon amid increasing competition from China

**EXPLAINER**

Yasudevankur Mukumbh

The NASA Artemis II mission launched in the early hours of April 2 (IST). The giant rocket ascended en route to sending a crew of four astronauts to near the moon for the first time in more than half a century. In so doing, it marked a milestone for the U.S. space programme. Its crew – commander Reid Wiseman, pilot Victor Glover, mission specialist Christina Koch, and Canadian Space Agency astronaut Jeremy Hansen – are also the first humans to travel beyond low-earth orbit since Apollo 17 in 1972. Glover also became the first person of colour, Koch the first woman, and Hansen the first non-U.S. citizen to embark on a lunar trajectory.

The Artemis II mission uses the Space Launch System (SLS) rocket and the crew capsule is called Orion. The SLS will propel Orion into a free-return trajectory around the far side of the moon, reaching around 7,500 km from the moon's surface before the earth's gravity pulls them back to splash down in the Pacific Ocean in a little over a week.

The mission does not plan to land on the moon. Instead, NASA is flying to prove that the whole system – from the ground teams to the rocket and its crew – works as designed and the processes to land humans on the moon are ready.

**Mission profile**

After the SLS core stage is separated, the crew will spend 24 hours in a high orbit around the earth as it checks the capsule's life-support and environment systems. If they're all in order, they will fire Orion's trans-lunar injection burn. The crew will also test manual piloting and proximity operations, communications and navigation systems, and a high-speed data relay and collect data about physiological and biological responses of the human body to deep-space travel.

Once Orion has finished going around the moon, it will be pulled towards the earth by gravity. NASA engineers expect the capsule will enter the earth's atmosphere at a speed of around 40,000 km/hr. Its 5-metre-wide heat shield will endure temperatures as high as 5,000°C. NASA will be collecting important data at this time because during the Artemis I mission in 2022, engineers found that Orion's heat shield was eroded during re-entry as gases trapped in the shield's material cracked it. In response, NASA used the same material but this time modified the re-entry trajectory so that Orion spends less time in the atmosphere as it descends.

**Artemis overhaul**

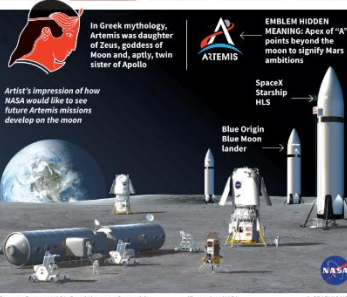
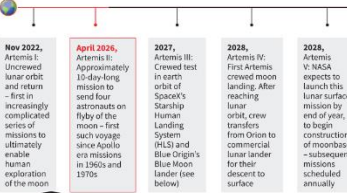
Artemis II will be the first test flight in the programme since NASA Administrator Jared Isaacman overhauled the programme's milestones earlier this year. In the older plan, the Artemis III mission was to land humans on the moon for the first time in the 21st century. In the new plan, however, Artemis III will launch a crewed Orion capsule to earth orbit to dock with prototype lunar landers designed by SpaceX and Blue Origin to ensure the technology works. Mr. Isaacman has said this mission is currently planned for 2027. NASA will actually land American astronauts on the moon in the Artemis IV mission, currently planned for 2028.

This is why SpaceX and Blue Origin

**Artemis space programme**

NASA's ambitious Artemis programme sees the U.S. endeavour to return humans to the moon's surface, as well as construct the first moonbase on our nearest celestial neighbour

**WHERE WE ARE IN ARTEMIS MISSION TIMELINE**



recently announced that they would focus on their plans to help U.S. astronauts reach the moon in the near future. The restructuring also allowed a deeper operational problem. NASA flew the Artemis I test flight in late 2022 and Artemis II has now flown in 2026. This three-year gap included workforce attrition that could have resulted in loss of institutional memory, forcing parts of the mission to start afresh. So instead, NASA abandoned a plan to upgrade SLS for the Artemis II mission; instead, it flew with the same configuration that flew on Artemis I. NASA also said it will increase the launch frequency, with the additional mission in 2027, followed by at least one mission landing on the moon's surface from 2028 onwards.

NASA also cancelled the Lunar Gateway project to build a space station orbiting the moon, and reallocated its components to infrastructure that will eventually be installed on the moon's south pole.

**The Chinese pressure**  
Mr. Isaacman was only responding to technical challenges. A big reason for NASA to change its plans to return to the moon so drastically is China. As he put it: "... with credible competition from our greatest geopolitical adversary increasing by the day, we need to move faster, eliminate delays, and achieve our objectives." China is set to conduct a test flight of its



Importantly, China also plans to land humans on the moon by 2030 and subsequently until its 'International Lunar Research Station' in the 2030s. As the U.S.-China rivalry continues to dig in on the earth, with the entrenched hegemon reluctant to cede dominance and the rising power determined to reshape the international order, the space

race they're leading wouldn't be what it is if it weren't for a particular limited resource: water on the moon.

There are craters in the moon's south pole region that have been permanently shadowed. These areas have escaped the drastic temperature swings on the parts of the moon that are exposed to the sun (from 127°C during the day to -173°C at night). As a result, they are expected to contain water ice. The thinking goes: whichever country establishes infrastructure first in this area could corner these water ice deposits and shape the scientific and geopolitical rules for everything that follows.

But in 2025, former NASA Administrator Jim Bridenstine told a Senate Commerce Committee hearing that without significant changes, it is highly unlikely the U.S. will beat China's projected timeline to land people on the moon.

If Artemis II and III go as planned and Artemis IV is able to lift off on time, U.S. astronauts could reach the moon's surface at least two years before China's mission. However, that depends on many things happening right on schedule – perhaps too many. Artemis I was delayed four times before it launched; Artemis II was delayed at least three. More broadly, whereas China has followed an incremental approach driven by the state, the U.S. has been following a commercial model with a large coalition: more than 50 countries (through the Artemis Accords) plus private companies like SpaceX and Blue Origin.

**Success versus failure**

The Artemis II mission will last 10 days. Assuming it succeeds on all counts (since it is a test flight), it will prove the SLS rocket and the Orion crew capsule work, encourage NASA's partners to focus on Artemis III, potentially galvanise political commitment to land U.S. astronauts on the moon before China does.

Delaying launches, especially those including a human crew, is par for the course in spaceflight because safety comes first. But that doesn't mean these decisions exist in a vacuum. If Artemis II had been delayed again, for example, public as well as institutional confidence in U.S. and Orion could have eroded further. There could have been cascading complications for NASA's partners, including the European and Japanese space agencies.

A delay could also have prompted the U.S. government to revisit the question of whether the programme is too expensive. It has so far cost at least \$33 billion and each new launch costs at least \$2 billion. SpaceX also still has to demonstrate its in-orbit refuelling technology that lunar missions require.

If, however, Artemis II had failed (or fails in the latter part of the mission), the time-wise consequences range from a small but important delay if the failure is non-catastrophic to a delay of several years as the programme is halted altogether if the failure is catastrophic. It will also give reason for NASA's partners to consider whether they should suspend or possibly exit their involvement and for the U.S. government to consider a more punctured programme just to beat China to the moon.

So as Artemis II launched, it did more than just send four people farther from the earth than any mission has in 54 years. It signalled that the U.S. is still in the race, against a China that has kept the U.S. anxious by almost always sticking to its schedule even as it thunders towards a crewed landing on the moon by 2030.

**THE GIST**

The mission will spend 24 hours in high earth orbit to check the capsule's life-support and environment systems, followed by a trans-lunar injection burn and tests of manual piloting, communications and navigation systems.

The capsule is expected to enter earth's atmosphere at around 40,000 km/hr, with its heat shield enduring temperatures as high as 5,000°C, as NASA collects important data after erosion issues in Artemis I.

The Artemis programme was overhauled recently to reduce complexity, revise timelines, and increase the launch frequency to respond to competition from China.



**Mission Profile & Technical Objectives**

Artemis II is a 10-day mission that follows a **"Free-Return Trajectory."** The goal is not to land, but to validate that the systems designed for deep space are "human-rated."

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# Daily News Analysis

**The Crew:** A diverse team representing a "new era" of spaceflight:

- Victor Glover:** First person of color on a lunar mission.
- Christina Koch:** First woman on a lunar mission.
- Jeremy Hansen:** First non-U.S. citizen (Canada) on a lunar mission.

**Critical Tests:**

- Life Support:** 24 hours of rigorous testing in high-Earth orbit before committing to the Moon.
- Heat Shield Integrity:** Following erosion issues in Artemis I, NASA modified the re-entry trajectory to protect the capsule from **5,000° C** temperatures at **40,000 km/hr**.
- Manual Handling:** Testing manual piloting and proximity operations.

**Strategic Analysis: What is at Stake?**

**1. The "Water Ice" Geopolitics**

The Moon's **South Pole** is the new "high ground." Permanently shadowed craters contain **water ice**, which can be converted into oxygen for breathing and hydrogen for rocket fuel.

**The Stake:** The first nation to establish infrastructure near these resources will likely set the **"norms and rules"** for lunar commerce and international law (the "Artemis Accords" vs. the China-led "ILRS").

**2. The China Challenge**

NASA Administrator Jared Isaacman's recent overhaul of the Artemis timeline is a direct response to China's "incremental but consistent" progress.

- China's Timeline:** Aims for a crewed landing by **2030** using the *Mengzhou* spacecraft and *Long March-10* rocket.
- U.S. Strategy:** To stay ahead, NASA restructured Artemis III (2027) as an orbital docking test and moved the actual landing to **Artemis IV (2028)**.

**3. Commercial vs. State-Led Models**

- U.S. Model:** A complex coalition of **50+ countries** and private giants like **SpaceX** and **Blue Origin**. While innovative, it is prone to delays and high costs (\$93 billion total).
- China Model:** A state-driven, centralized approach that has shown remarkable adherence to schedules (e.g., Chang'e missions).

**The Cost of Failure vs. Success**

Scenario	Consequences
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# Daily News Analysis

Scenario	Consequences
<b>Success</b>	Validates the \$2 billion-per-launch SLS; stabilizes international partnerships; ensures U.S. lands on the Moon by 2028 (2 years before China).
<b>Delay</b>	Erodes public and institutional trust; risks "institutional memory" loss; allows China to potentially "leapfrog" the U.S. timeline.
<b>Catastrophic Failure</b>	Could halt the U.S. lunar program for years; might prompt a "panic-driven" restructure or a total exit from manned lunar exploration.

### Conclusion

Artemis II is the "proof of concept" for the American vision of space exploration in the 21st century. It is not merely a repeat of Apollo; it is the foundation for the **Lunar Gateway** and eventual Mars missions. However, the U.S. is no longer racing against a singular Cold War rival but against a sophisticated, tech-forward China. The success of Artemis II determines whether the U.S. remains the "entrenched hegemon" in space or whether the "International Lunar Research Station" led by China becomes the dominant lunar order.

### UPSC Prelims Exam Practice Question

**Ques : What is meant by a "Free-Return Trajectory" in space missions?**

- (a) A path that allows spacecraft to return to Earth without propulsion
- (b) A trajectory that avoids gravitational pull
- (c) A low-cost orbital path
- (d) A stationary orbit around the Moon

**Ans: a)**

### UPSC Mains Exam Practice Question

**Ques:** Analyze the challenges associated with deep-space human missions beyond Low-Earth Orbit. **(150 Words)**

**Page : 12 : GS III : Indian Economy / Prelims Exam**

In March 2026, the global supply of **Helium**, a non-renewable and irreplaceable strategic gas, faced a severe crunch due to geopolitical instability in **West Asia**. With India being **100% import-dependent** for its annual requirement of **3.4 million cubic tonnes**, the disruption at Qatar's Ras Laffan complex has exposed the vulnerability of India's high-tech sectors—ranging from healthcare (MRI) to the nascent semiconductor ecosystem.

**The Helium Crisis: Key Drivers**

**1. The Qatar Dependency**

**Geopolitical Shock:** Missile strikes and "force majeure" (unforeseeable circumstances) in Qatar have throttled production.

**Impact on India:** India sources **over 50%** of its Helium from Qatar. Because Qatar accounts for 34% of global exports, there is no immediate "spare capacity" in the global market to fill the void.

**2. Economic Impact: The Price Surge**

**Cost Pressures:** Prices have surged by **35–50%** in just a few weeks.

**Inventory Stress:** Indian industries typically maintain only **7–10 days** of inventory, making them highly susceptible to "spot price" volatility and sudden stock-outs.

**Sectoral Vulnerabilities**

Sector	Why Helium is Irreplaceable	Consequences of Shortage
<b>Healthcare (MRI)</b>	Liquid Helium cools superconducting magnets to near absolute zero	If levels drop, magnets "quench" (vaporize Helium), leading to permanent damage and multi-week hospital downtime.
<b>Semiconductors</b>	Used as a cooling medium and inert atmosphere in "chip fabs."	High costs threaten the viability of India's new semiconductor missions (ISM).

**'West Asia crisis hits Helium supplies'**

**Mini Tejaswi**  
BENGALURU



The supply of Helium, a critical gas used to save lives and power technology seems suddenly at risk on account of geopolitics, observed industry experts. Helium, a colourless, odourless, non-toxic, and inert gas and primarily used to cool superconducting magnets, MRI scanners and chip fabs, has no or a few substitutes. Over 50% of India's Helium imports traditionally come from Qatar, which accounts for some 34% of global helium exports. Missile strikes and force majeure at Qatar's Ras Laffan complex in March significantly reduced Qatar's Helium export capacity. According to Ralf Gubler, research director for industrial gases and fertilizers at S&P Global Energy, India is 100% import-dependent for helium, making many industries, such as healthcare (MRI), semiconductors & electronics, fibre optics & display manufacturing etc. in the country acutely vulnerable to global disruptions. Mr Gubler said liquid Helium was indispensable for cooling superconducting magnets (MRI scanners). If Helium levels fell below critical thresholds, superconductivity would be lost, the Helium rapidly quenches (vaporises) which even lead to damaging superconducting magnets resulting in long and costly repairs. Most MRI scanners in India India rely on periodic refilling and failure risks magnet quench and multi-week downtime. Supply disruptions force hospitals to ration refills, delay installations and prioritise emergency scans. On India's helium demand and supply scenario, Mr. Gubler, said, the country's helium demand in 2025 was estimated at 3.4 million cubic tonne with zero domestic production. 'Eye other suppliers' Mr. Gubler said India should benefit from multi-origin contracts, including Russia, the U.S. and emerging suppliers like South Africa and Tanzania. In India, traces of Helium exist in natural gas fields in West Bengal and Jharkhand but concentrations are below the 0.2% economic threshold. Commercial viability is at least 5-10 years away, as per S&P Global Energy data. Ashok Chandak, President, India Electronics & Semiconductor Association said, critical materials such as helium must be treated as strategic inputs as India scales its semiconductor ecosystem. **Sharp price increase** Typical inventories in India are for 7-10 days. "Helium prices have seen a sharp surge of about 35-50% in recent weeks, with spot prices in some cases rising even higher. The impact is more in the form of cost pressures than production disruptions," Mr. Chandak said.

# Daily News Analysis

Sector	Why Helium is Irreplaceable	Consequences of Shortage
Fiber Optics	Used in the rapid cooling of glass fibers during the drawing process.	Could slow down the domestic manufacturing of 5G/6G infrastructure.

## Strategic Challenges for India

### 1. The "Zero Production" Trap

While India has traces of Helium in **West Bengal and Jharkhand**, the concentration is below the **0.2% economic threshold**. S&P Global Energy estimates that commercial domestic production is at least **5–10 years away**.

### 2. Strategic Input Recognition

As noted by the India Electronics & Semiconductor Association (IESA), Helium is not just an "industrial gas" but a **strategic input**. The current crisis highlights the lack of a "National Helium Reserve" similar to Strategic Petroleum Reserves (SPR).

### The Way Forward: Recommendations

**Source Diversification:** India must aggressively pursue multi-origin contracts with **Russia, the U.S., South Africa, and Tanzania** to reduce "single-point failure" risks in West Asia.

**Technological Innovation:** Investing in **Helium Recovery and Recycling** systems (especially in hospitals and labs) to reduce the "top-up" requirement.

**Exploration Incentives:** Providing subsidies for Helium extraction from lower-concentration natural gas fields to achieve long-term "Atmanirbharta."

## Conclusion

The Helium shortage is a "canary in the coal mine" for India's high-tech ambitions. It demonstrates that **strategic autonomy** is not just about designing chips or launching rockets, but about securing the invisible supply chains of rare gases and minerals. For a UPSC aspirant, this case study emphasizes the need for a **Critical Minerals & Gases Policy** that treats these inputs with the same diplomatic and economic urgency as crude oil.

**UPSC Prelims Exam Practice Question**

**Ques: Why is liquid Helium used in MRI machines?**

- (a) It acts as a contrast agent
- (b) It cools superconducting magnets to extremely low temperatures
- (c) It increases radiation output
- (d) It enhances imaging resolution directly

**Ans: b)**

**UPSC Mains Exam Practice Question**

**Ques:** "The Helium crisis exposes the hidden vulnerabilities in India's high-technology ambitions." Discuss. **(250 Words)**



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## ECI transfer controversy, top court's clarifications

**R**ecently, the Election Commission of India (ECI) transferred a number of senior officers in some of the election-bound States as soon as their election schedules were announced. In the election schedule for 2026, polls are to be held in four States, namely, Assam, Kerala, Tamil Nadu and West Bengal, and the Union Territory of Puducherry.

In the State of West Bengal, the Chief Secretary and Director General of Police – the head of State administration and the head of the police force – were among several officials transferred overnight without the consent or prior knowledge of the State government. The ECI claimed that such a step had been taken to ensure free and fair elections in those States. The States concerned, particularly West Bengal, were virtually stunned by the ferocity of these transfer orders, which have almost paralysed the administration. The crucial question here is whether it is within the powers of the ECI to transfer, in this manner, the heads of State administration in the name of ensuring free and fair elections. Are we then to conclude that, without transferring a handful of top officers, the ECI cannot conduct free and fair elections? There are many such disturbing questions that arise from these transfers.

It is difficult to find any statute under which such transfers can be made by the ECI. Of course, it always points to Article 324 of the Constitution (Superintendence, direction and control of elections to be vested in an Election Commission) to justify such actions. It is true that the Article confers unspecified powers on the ECI to conduct free and fair elections.

### Article 324 and scope of powers

The Supreme Court of India had, in *Mohinder Singh Gill and Anr. vs The Chief Election Commissioner, New Delhi and Ors.* (1978), and in a host of other cases, held that Article 324 is a plenary provision which is in fact a reservoir of powers that can be used by the ECI whenever the need arises to ensure free and fair elections. But in all such cases the Court has added a rider that such powers can be used only where the field is unoccupied by a statute. In other words, the ECI cannot draw any such power from Article 324 where a law made by Parliament or a State legislature holds the field in which case it has to obey that law.

In *Mohinder Singh Gill*, the Court made the following significant observations which have clearly laid out the scope of the powers under this Article as well as its limitations. It said, "The



**P.D.T. Achary**

Former Secretary  
General, Lok Sabha

Constitution, contemplates a free and fair election and vests comprehensive responsibilities of superintendence, direction and control of the conduct of elections in the Election Commission. This responsibility may cover powers, duties and functions of many sorts, administrative or other, depending on the circumstances".

However, there is a caveat. The Court added, "Two limitations at least are laid on its plenary character in the exercise thereof. Firstly, when Parliament or any State Legislature has made valid law, relating to or in connection with elections, the Commission shall act in conformity with, not in violation of such provisions but where such law is silent Art. 324 is a reservoir of power, to act for the avowed purpose of, not divorced from pushing forward a free and fair election with expedition. Secondly, the Commission shall be responsible to the rule of law, act bona fide and be amenable to the norms of natural justice in so far as conformance to such canons can reasonably and realistically be required of it as fairplay-in-action in a most important area of the constitutional order, viz., elections."

### The issue of statutory backing

The officers belonging to the all India services are governed by the All India Services Act and the rules made thereunder. The transfer of an officer is the exclusive prerogative of the government. The all India service officers who are serving a State government are under the administrative control of the State government which has exclusive authority to transfer them at any time.

Under the Seventh Schedule of the Constitution, the State Public Services are under the exclusive control of the State governments. It is the exclusive function of the governments – the State and the Union – to deal with all aspects of the services of the officers serving under these governments.

The crucial question that has arisen in the context of the transfer of senior officials of the State governments under the orders of the ECI is whether this action has any statutory backing. The duty of the ECI is to conduct elections in a free and fair manner. Of course, it has all the powers to perform this task in accordance with the mandate of the Constitution and statute.

Article 324(6) requires the State government or the Union government to make available to the ECI on demand the staff required by it to conduct elections. The Representation of the People Act of 1950 as well as the Representation of the People Act, 1951 contain elaborate provisions that deal with the duties and powers of the ECI. Nowhere

do any of these Acts contain any provision that empowers the ECI to transfer the head of a state administration or the head of the state police force, while keeping the State government in the dark, on the ground that their continuance in their posts will hamper the conduct of free and fair elections.

It is true that the Court has held that Article 324 has plenary powers to ensure free and fair election. But the Court has never dealt with the transfer of the seniormost officers in States by the ECI, taking the State governments by surprise and resulting in a paralysis of the administration, in the exercise of its plenary powers under Article 324. Apart from that, the Court has itself clarified that if the field is occupied by the law, the ECI needs to obey that law. It may be argued that the law mentioned by the Court must be related to, or in connection with, the election. It may also be argued that the All India Services Act or its rules are not laws relating to elections, but that is a very narrow, technical view.

The crucial point is that the ECI is not empowered to bypass a law made by Parliament dealing with the transfers and postings of all India Service officers, and cannot transfer such officers at will over the heads of the State government. The underlying assumption in such transfers is that those officers will not allow the ECI to conduct elections in a free and fair manner.

### On 'unchecked power'

The ECI has a proud history of conducting elections in the country since 1951-52. It has always depended on State government officials to accomplish this task as the ECI does not have any machinery of its own to undertake such a gigantic exercise. The ECI, by branding them as men lacking integrity and removing them from their posts on the eve of an election is a new trend that will most certainly demoralise civil servants in the country. It is also not clear under what procedure the ECI has reached the conclusion that these officers are biased and unsuitable for conducting free and fair elections. Article 324 does not give unfettered powers to the ECI. The Court, which granted plenary powers to the ECI, had also said this in *Mohinder Singh Gill* – "No one is an imperium in imperio in our constitutional order. It is reasonable to hold that the Commissioner cannot defy the law armed by Article 324. Likewise, his functions are subject to the norms of fairness and he cannot act arbitrarily. Unchecked power is alien to our system."

These words from the highest court of the land are loud and clear enough.

Article 324 does not give unfettered powers to the Election Commission of India

**GS Paper II: Indian Polity**

**UPSC Mains Exam Practice Question:** "Article 324 is a reservoir of power, but not a source of arbitrariness." Discuss in light of recent controversies over transfer of civil servants. **(150 Words)**

**Context :** The recent transfer of high-ranking officials (including Chief Secretaries and DGPs) in election-bound States like West Bengal, Assam, and Kerala has sparked a constitutional debate. While the ECI invokes **Article 324** to ensure an impartial electoral environment, critics argue that such "overnight" transfers without state consent bypass established statutes and demoralize the bureaucracy, potentially overstepping the limits of "plenary powers."

**The Constitutional Core: Article 324**

Article 324 vests the "superintendence, direction, and control" of elections in the ECI. However, its application is governed by specific judicial interpretations:

**1. The "Reservoir of Power" (Mohinder Singh Gill Case, 1978)**

The Supreme Court established that Article 324 is a **plenary provision**—a reservoir of power that the ECI can draw upon when specific laws are silent.

**2. The Limitations on ECI's Power**

The Court laid down two "riders" or limitations:

**Occupied Field:** The ECI cannot act against an existing law made by Parliament or State Legislatures. If a law exists (e.g., the All India Services Act), the ECI must act in conformity with it.

**Rule of Law & Natural Justice:** The ECI cannot act arbitrarily or mala fide. Its actions must be amenable to the norms of "fairplay-in-action."

**Legal and Administrative Points of Contention**

**1. Statutory Backing vs. Executive Prerogative**

**The Argument:** Officers of All India Services (IAS/IPS) are under the administrative control of the State government (**7th Schedule**). Transfers are a government prerogative under the **All India Services Act**.

**The Conflict:** The **Representation of the People Acts (1950 & 1951)** do not explicitly grant the ECI the power to transfer the heads of state administration (Chief Secretary/DGP) while keeping the state government in the dark.

**2. Deemed Deputation**

Under Section 13CC of the RPA 1950 and Section 28A of the RPA 1951, officers designated for election work are "deemed to be on deputation" to the ECI.

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**The Critique:** Achary argues this does not mean the ECI becomes an "imperium in imperio" (a state within a state) with unfettered power to bypass the State's role as the primary employer.

### 3. Bureaucratic Morale and Integrity

Transferring top officials on the eve of polls implies a "lack of integrity" or "bias." Achary warns this:

Brands senior officers as partisan without a clear, transparent procedure.

Leads to the "**paralysis of administration**" as new heads take time to stabilize the machinery during a sensitive period.

### The "Missing Middle" in Judicial Clarity

While the Supreme Court has upheld the ECI's right to ensure fair polls, it has **never specifically ruled** on whether the ECI can unilaterally remove the most senior civil servant (Chief Secretary) or police officer (DGP) of a state.

**Achary's View:** Since the field of "transfers" is already occupied by Service Rules, the ECI's use of Article 324 to override these rules is a "narrow, technical" circumvention of the law.

### Conclusion

The ECI's power to transfer is a "necessary evil" to prevent the misuse of state machinery by ruling parties. However, as the Supreme Court noted in Mohinder Singh Gill, "**Unchecked power is alien to our system.**" A healthy democracy requires a "Consultative Protocol" where the ECI maintains its independence without undermining the federal structure. For the future, a clear legislative framework or a judicial "Standard Operating Procedure" (SOP) is needed to define the criteria for such high-level transfers, ensuring they are based on objective evidence of bias rather than discretionary suspicion.