

Today's Prelims Topics

Astatine- 188

Context

University of Jyväskylä in Finland has recently detected and successfully measured the half-life of the heaviest known proton-emitting isotope of astatine, ¹⁸⁸At.

About Astatine

• General Properties

- **Symbol & Atomic Number:** At, atomic number 85
- **Category:** Halogen group (Group 17)
- **Appearance:** Likely a dark-colored solid at room temperature and pressure
- **Radioactivity:** Highly radioactive; emits a blue glow due to ionizing surrounding air
- **Isotopes:** 41 known radioactive isotopes, ranging from mass numbers 188 and 190 to 229

• Chemical & Physical Properties

- **Chemical Behavior:** Resembles iodine but exhibits more metallic characteristics
- **Compounds:** Forms compounds similar to iodine but with more metallic properties
- **Electronegativity:** Estimated to be between 2.2 and 2.5
- **Density:** Estimated to be around 6.3 g/cm³
- **Melting Point:** Estimated to be between 302°C and 337°C
- **Boiling Point:** Estimated to be between 337°C and 352°C

• Uses

- **Medical Applications:** Used in targeted alpha-particle **cancer therapy**
 - Astatine is released in the human thyroid; hence, it is used in the treatment of **thyroid diseases**.
- **Research:** Studied for potential use in radiopharmaceuticals
- **Industrial Applications:** Limited due to its rarity and radioactivity

Astatine (At) Element

Atomic Number	85	[Xe] 4f ¹⁴ 5d ¹⁰ 6s ² 6p ⁵	Electronic Configuration
	At		Symbol
	Astatine		Name
Atomic Weight	210		

Fact: The total amount of astatine in the Earth's crust at any time is less than 30 grams, with only a few micrograms ever artificially produced.

Source: [TheHindu](https://www.thehindu.com)

Ayushman Bharat Pradhan Mantri Jan Arogya Yojana (AB PM-JAY)

Context

Ayushman Bharat Pradhan Mantri Jan Arogya Yojana (AB-PMJAY) is empowering rural Bihar by saving over **₹1000 crore** in out-of-pocket medical expenses within just **one year**.

About

- Pradhan Mantri Jan Arogya Yojana (PM-JAY) is the **world's largest government-funded health insurance/assurance scheme**.
- Beneficiary households are selected based on deprivation and occupational criteria from the **Socio-Economic Caste Census 2011 (SECC 2011)** for both rural and urban areas.
- The scheme provides health coverage of **₹5 lakhs per family per year** for **secondary and tertiary care hospitalization**.
- Coverage is available at **both public and private empanelled hospitals** across India.
- Beneficiaries receive **cashless access to healthcare services** at the point of service (hospital).
- There are **no restrictions** on family size, age, or gender for eligibility.
- Scheme benefits are **portable nationwide**, allowing beneficiaries to access cashless treatment at any empanelled hospital in India.
- The scheme is implemented and overseen by the **National Health Authority**.

Source: [PIB](#)



Ejiao

Context

Donkey prices in Pakistan have surged due to rising **Chinese demand for ejiao**.

What is Ejiao?

- **Ejiao** (pronounced uh-jee-ow), also known as 'colla corii asini' or 'donkey-hide glue', is a **key ingredient in traditional Chinese medicine**.
- Ejiao is a gelatinous substance made by **boiling donkey hides** to extract collagen, which is then processed into a tonic. It is often consumed in the form of:
 - Powders
 - Tablets
 - Syrups
 - Candy-like tonics
 - Mixed with other herbs or foods like walnuts and sesame

Uses in Traditional Chinese Medicine

- **Nourish the blood** – Especially for women with anemia or menstruation issues.
- **Boost energy (qi)** and vitality.
- **Improve skin health** and slow aging.
- **Treat respiratory conditions** like dry cough and asthma.
- **Aid fertility** and pregnancy support.

Demand of Donkey due to Ejiao

- Demand is so high that the Donkey population in China declined by 76%.
- Illegal Trafficking of Donkeys from India to China is also happening due to China's high demand.
- 2022 estimates suggest pop now under <1 lakh.
- Ejiao industry now requires a minimum of 5.9 million donkey skins to keep up with the latest demand figures.
- If current trends continue, this will increase by 200 per cent by 2027.

A future for the ejiao industry?

To end the cruelty of the global donkey skin trade, experts advocate replacing real donkey collagen with lab-grown collagen using **cellular agriculture**.

CONSISTENT DROP

Donkey population in India has dropped by nearly 90 per cent in the past three decades



Cellular Agriculture

Cellular agriculture is a method of making products like meat, milk, or leather without using whole animals. Instead, scientists grow animal cells in a lab under safe and controlled conditions. This way, we get the same products without harming animals.

Source: [TheHindu](https://www.thehindu.com)

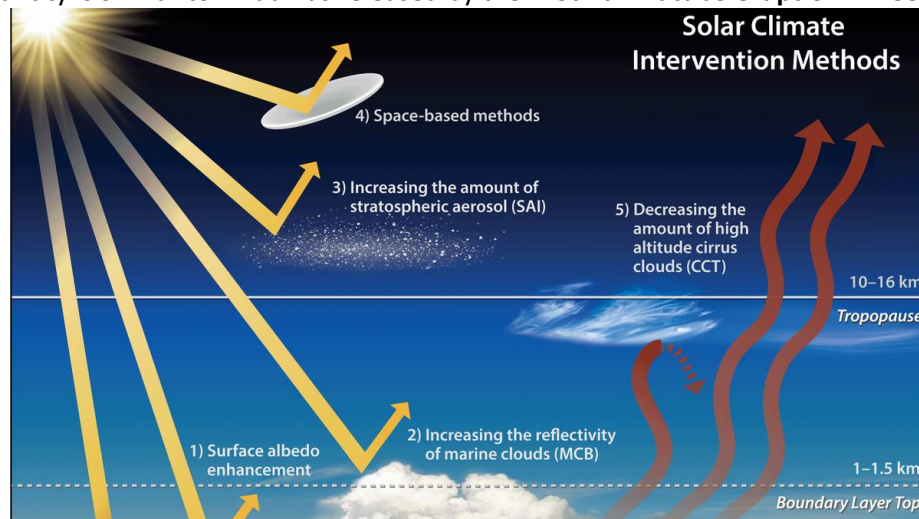
Stratospheric aerosol injection (SAI)

Context

A new study has made the controversial idea of stratospheric aerosol injection (SAI)—a **method to cool the Earth by spraying reflective particles into the upper atmosphere**.

About Stratospheric Aerosol Injection (SAI)

- SAI aims to cool the planet and reduce climate change impacts by adding tiny reflective particles to the upper atmosphere.
- The method is based on volcanic eruptions, which have a cooling effect by releasing aerosols into the air.
- **Effectiveness by Altitude:**
 - **Higher altitude injection** is more effective as particles remain in the atmosphere longer.
 - **Lower altitude injection** is technically easier but less effective since particles can be washed out by rain or trapped in clouds.
- Injecting **12 million tonnes of sulphur dioxide** annually at 13 km altitude could cool the planet by **0.6°C**.
- This quantity is similar to what was released by the **Mount Pinatubo eruption in 1991**.



Key Facts about Aerosols

- **Definition:** Aerosols are tiny solid or liquid particles suspended in air or gas.
- **Sources:**
 - **Natural:** Fog, volcanic gases, sea spray, dust.
 - **Artificial:** Smoke from burning fossil fuels, industrial emissions.
- **Types:**
 - **Primary aerosols:** Emitted directly into the atmosphere (e.g., dust, soot).
 - **Secondary aerosols:** Formed in the atmosphere from precursor gases (e.g., sulfur dioxide).
- **Composition:** Made up of various **inorganic and organic substances**.
- **Size Range:**
 - True aerosol particles range from a few millimicrometres to about **1 micrometre** (10^{-4} cm) in diameter.
 - **Aitken nuclei:** Particles smaller than 0.1 micrometre.
- **Visible Forms:** Includes **smoke, smog, haze, and dust plumes** commonly seen in polluted or dusty environments.

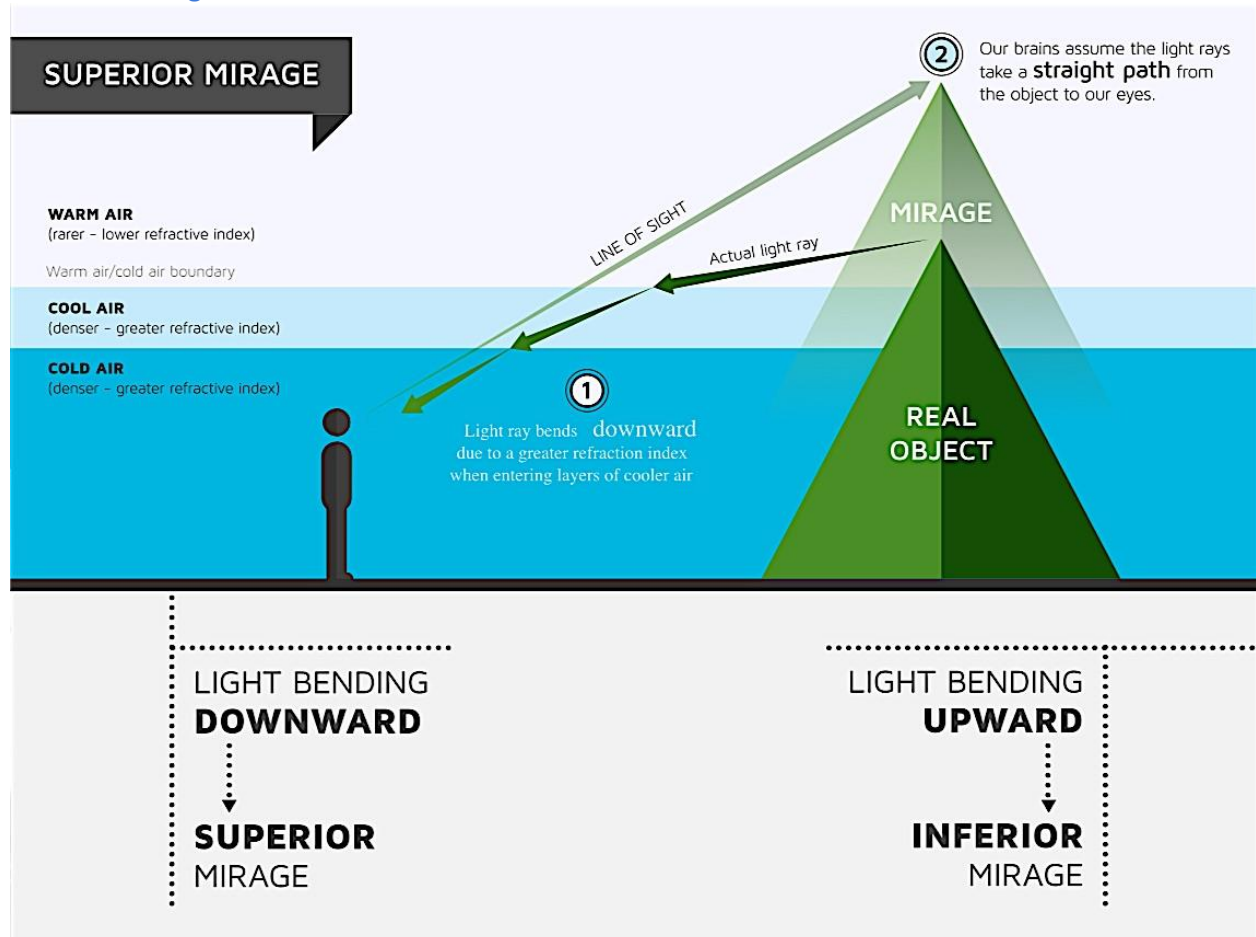
Source: [TheHindu](https://www.thehindu.com)

Mirage

Context

A **mirage** was seen on Kartavya Path in New Delhi **due to intense heat and humidity**.

What is a Mirage?



- A **mirage** is an **optical illusion** caused by the **refraction (bending)** of **light rays** as they pass through layers of air at **different temperatures**.
- It is not a physical object, but rather an image that appears displaced from its actual position.

Scientific Principle Behind a Mirage

- **Refraction:** Light travels at different speeds in hot and cold air. When it passes through layers of air with varying temperatures, it bends.
- On **hot days**, the ground heats the air just above it, making it **much hotter than the cooler air** above.
- This creates a **temperature gradient**, or what scientists call a **thermal inversion**.

How It Happens on Hot Roads (Inferior Mirage)

- The sun heats the **asphalt road**, which in turn heats the **air just above it**.
- Light coming from the **sky** bends **upward** as it passes through this gradient of hot and cool air.
- To the human eye, this bent light appears to be **coming from the ground**.
- The brain interprets this as a **reflection**—making the road **look wet**, as if there's water ahead.
- This is called an **inferior mirage**, the most common type seen on roads or deserts.

Types of Mirages

Type	Description	Example
Inferior Mirage	Image appears below the actual object	“Water” on road
Superior mirage	Image appears above the actual object, due to cold air below and warm air above (temperature inversion)	Ships floating in the sky
Fata Morgana	A complex and distorted mirage seen in polar regions or over oceans; can stack images or distort them dramatically	Ship castles, cliffs appearing in mid-air

Is a Mirage Real?

- **Not real in physical terms**—you cannot touch it or go to it.
- It's a **visual illusion** created by the natural behavior of light.

Source: [TheHindu](https://www.thehindu.com/news/national/article3644444.ece)



Census

Context

The Union Home Ministry has announced the next Census will be conducted in two phases and that the reference date for Census enumeration would be March 1, 2027.

About Census

- **History of Census in India**
 - **Ancient References:** Population enumeration is mentioned in **Kautilya's Arthashastra** and **Abul Fazl's Ain-i-Akbari** during Akbar's reign.
 - **Modern Census Begins (British Era):** The first **synchronous census** (data collected simultaneously across the country) was held in **1881** under **W. C. Plowden**, India's first Census Commissioner.
 - Subsequent censuses were held **every 10 years** without interruption till 2011.
 - **Post-Independence:** Censuses continued every decade; the last was in **2011**.
 - **Caste enumeration for Hindus** was last done in **1931**; post-independence censuses only captured **SC/ST data**.
- **How is the Census Conducted?**
 - **Legal Framework:** Governed by the **Census Act, 1948** (a Union List subject).
 - The **Central Government** appoints the **Registrar General and Census Commissioner** to lead the process.
 - **Operational Structure:** **Directors of Census Operations** are appointed in each state.
 - **State governments** provide staff (mostly **school teachers**) through local authorities.
 - **Two Phases of Operation (Since 1971):**
 - **House Listing Phase** (5–6 months): Collects data on housing — type, facilities, assets, etc. (*35 questions in 2011*)
 - **Population Enumeration Phase** (typically in February): Captures demographic details — **name, age, sex, religion, mother tongue, literacy, occupation, caste (SC/ST)**, etc. (*Reference date is usually March 1 of Census year*)
- **Data Release:** **Provisional data** is released within a month.
 - **Final detailed reports** are released 1–2 years later (e.g., 2011 Census report in April 2013).

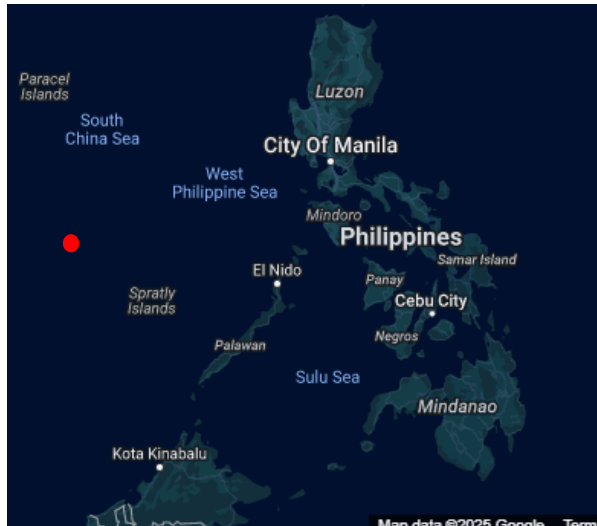
Significance of Upcoming Census

- **Caste Enumeration:** For the **first time post-Independence**, caste data for all Hindus may be included, addressing long-standing political and social demands.
- **Delimitation Basis:** Will serve as the **basis for redrawing Lok Sabha and State Assembly constituencies** after the freeze ends in **2026**.
- **Women's Reservation:** The data will also facilitate the implementation of **one-third reservation for women** in legislatures.

Source: [The Hindu](#)

Places in News

Thitu Island



News? Chinese ship runs aground off Philippines-occupied Thitu Island.

About Thitu Island

- Also known as **Pag-asa Island**.
- Part of **Spratly Islands** archipelago.

Editorial Summary

How Indian Courts Are Undermining Article 19(1)(a)

Context

India's constitutional guarantee of free speech under Article 19(1)(a) is facing erosion, as courts increasingly manage rather than defend expression, prioritizing sentiments and decorum over constitutional liberty.

Concerns Related to Freedom of Speech in India

- **Judiciary's Shift from Principle to Sentiment:** Courts are increasingly assessing speech based on emotional reactions rather than constitutional thresholds.
 - **Example:** Allahabad High Court refused to quash FIR against a man criticizing PM Modi, citing "emotions cannot be permitted to overflow."
- **Validation of Outrage and Populist Sentiments:** Courts often advise apologies rather than defending lawful speech, emboldening mobs and serial litigants.
 - **Example:** Karnataka High Court advised Kamal Haasan to apologise for his comment on Kannada-Tamil linguistic ties.
- **Chilling Effect through Legal Harassment:** FIRs and judicial scrutiny are increasingly used to punish expression, even without convictions.
 - **Example:** Ranveer Allahbadia faced judicial comments for using explicit language in a podcast; a professor was investigated for tweets questioning military optics.
- **Misuse of Harsh Laws for Minor Offence:** Overbroad laws like **Section 152 and 353(2) of the Bharatiya Nyaya Sanhita** are invoked for **sarcasm or criticism**.
 - **Example:** A man calling the PM "coward" was booked under laws meant for threats to sovereignty.

- **Section 353(2) BNS:** This section targets misinformation and hate speech that disrupt communal harmony.
- **Section 152 BNS:** This provision replaces the colonial-era sedition law (IPC 124A) and criminalizes acts threatening India's sovereignty, unity, or integrity.

- **Silencing Political Dissent:** Opposition leaders face legal action for criticism of state institutions.
 - **Example:** Rahul Gandhi denied relief in a defamation case for his remarks on the Army; court equated criticism with defamation.
- **Process as Punishment:** Courts refuse to quash FIRs early, forcing citizens into prolonged legal battles that deter free expression.
 - **Example:** Courts routinely cite it's "too early to interfere" and allow investigations to continue.

Impacts of Judicial Retreat on Freedom of Speech

- **Erosion of Democratic Values:** When courts prioritize sentiments over rights, it undermines the **liberal democratic spirit** of the Constitution.
 - The citizen's role as the **primary holder of sovereignty** is weakened, and institutional critique is delegitimized.
- **Rise of a Culture of Fear and Self-Censorship:** The legal uncertainty and risk of litigation push citizens, artists, comedians, academics, and journalists to **self-censor**, weakening democratic discourse.
 - Even lawful but provocative or satirical speech is avoided to stay "safe."

- **Empowerment of Mobs and Outrage Culture:** Courts validating hurt sentiments incentivize **mob outrage** and vigilantism.
 - This creates a "market for offence" where groups seek recognition by claiming to be hurt.
- **Delegitimization of Dissent and Opposition:** Political criticism is increasingly seen as defamation or anti-national, especially when aimed at the government or military.
 - This weakens the **functioning of opposition parties**, discourages robust policy debates, and promotes political conformity.
- **Distortion of Legal Standards:** Use of **sedition-like provisions** or harsh criminal laws for trivial speech offences distorts the proportionality principle.
 - This misuse blurs the distinction between **lawful dissent and actual harm**, leading to arbitrary state action.
- **Undermining Judicial Credibility and Independence:** By taking populist stances and avoiding hard constitutional questions, courts risk being seen as **arbiters of political decorum** rather than guardians of liberty.
 - This weakens **public faith in the judiciary** as a counter-majoritarian institution.

Way Ahead

- **Restore Principle-Centric Speech Jurisprudence:** Courts must ask whether the *right* was violated, not whether someone was offended.
- **Strengthen Chilling Effect Doctrine:** Indian courts must actively prevent misuse of law that discourages lawful dissent or humour.
- **Decriminalize Offence-Based Speech:** Redefine or scrap laws that criminalize vague concepts like "hurt sentiments" unless linked to incitement.
- **Avoid Judicial Policing of Culture and Morality:** Judges must protect constitutional freedoms, not enforce social decorum or emotional correctness.
- **Protect Expression in Academia, Art and Media:** Intellectual critique and satire must be shielded from populist backlash and legal harassment.
- **Uphold Apologies as Voluntary, Not Judicial Directives:** Judicially imposed remorse undermines the spirit of dissent and strengthens outrage culture.

Source: [The Hindu: Judicial sensitivity to sentiments is a sign of regression](#)

How to tailor the garment sector for exports

Context

India's apparel sector, rooted in tradition and employment-intensive, holds vast export potential. Yet, its global trade share remains stagnant, requiring bold reforms to scale up and boost competitiveness.

Current Status of the Apparel Sector in India

- **Employment Powerhouse:** Employs **45 million people**, contributing **2.3% to GDP**.
- **Low Global Share:** India's share in global **textiles and apparel trade** is just **4.2%**, with **only 3% in apparel** (\$15.7B out of \$529.3B).
- **Stagnant Growth:** Apparel exports have declined at an **AAGR of -2%** in recent years.
- **Fragmented Sector:** Over **80% of apparel units** are small MSMEs, lacking scale and integration.
- **Isolated Success:** Firms like **Shahi Exports** show what's possible with scale, integration, and professionalism.

Key Concerns in the Apparel Sector

- **Lack of Scale:** Highly fragmented industry; few large, integrated players.
- **High Cost of Capital:** Indian interest rates (9%) remain higher than competitors like China (3%) and Vietnam (4.5%).
- **Rigid Labour Laws:** Outdated laws, high overtime costs, and formalisation disincentives hinder hiring and expansion.
- **Insufficient Skilling:** Low female participation and poor linkage of skilling programmes to real-time demand.
- **Inadequate Infrastructure:** Labour migration pressures and absence of regional garment hubs.
- **Ineffective Incentives:** Focus on production (PLI) rather than export performance.

How These Can Be Addressed

- **Promote Scale through Capital Support:** Introduce **capital subsidies (25–30%)** linked to scale.
 - Offer **tax holidays (5–7 years)** to encourage investment.
- **Labour Reforms and Smart Subsidies:** Relax rigidities in labour laws.
 - **Link part of MGNREGA** to subsidise formal employment in garment units.
- **Targeted Skilling and Inclusion:** Expand schemes like **SAMARTH** for quick, demand-based training, especially for **women and youth**.
- **Garment-Focused Industrial Hubs:** Designate **PM MITRA parks** in states like UP and MP as apparel hubs to reduce migration and costs.
- **Shift to Export-Linked Incentives (ELI):** Move beyond **Production-Linked Incentives (PLI)** to reward export success, global competitiveness, and sustained job creation.

Source: [Indian Express: Tailoring A Sector](#)