

## UPSC Daily Current Affairs| Prelim Bits 04-04-2025

### Painted Lady Butterfly

**Prelims** - Biodiversity, species migration, scientific innovations, and climate change impacts.

**Mains (GS - I & III)** - GS I (Biogeography, species adaptation) | GS III (Biodiversity conservation, climate change, scientific advancements).

### Why in News?

A recent study found that painted lady butterflies (*Vanessa cardui*) don't have significant genetic differences between short- and long-distance migrants.

- Painted Lady butterfly is a medium-sized butterfly belonging to the Nymphalidae family.
- It is renowned for its *extensive migratory patterns and adaptability to various habitats*.
- **Habitat** - Thrives in diverse environments, from temperate grasslands to deserts.
- They can be *found on every continent except Antarctica and South America*.
- **Conservation status** - Listed as *Least Concern* on International Union for Conservation of Nature's Red List.
- **Migratory Behaviour** - This species is a *long-distance migrant*, originating from areas like the desert fringes of North Africa, the Middle East, and Central Asia.
- Each year, it moves northwards, recolonizing mainland Europe and reaching Britain and Ireland.



### Key findings of the study

- **Isotope Tracking** - Scientist studied about the species using the ratios of the isotopes in the wings of species.
- Wings retain hydrogen & strontium isotopes from larval food/water, revealing birthplace.
- **No genetic difference in migration** - Short- and long-distance painted lady butterflies *belong to a single interbreeding population*.
- **Migration driven by environment** - *Distance covered depends on environmental factors, not genetics*.

- **Single migratory cycle** - Painted Lady butterfly can travel up to 15,000 km in a single migratory cycle, one of the longest insect migrations on the earth.

A "**single migratory cycle**" refers an animal (like a bird) makes one round trip between two places—usually moving from a breeding area to a wintering area and back—due to seasonal changes or food needs.

- **Multi-generational migration** - The full migration cycle spans 8-10 generations.
- **Super fly Adaptations** - Thoracic muscles like "bodybuilders" enable high-speed, high-altitude flights.
- Wing shape/size doesn't predict migration distance.
- **Different from bird migration** - Butterflies don't return to a single breeding ground, unlike birds.

### Phenotype

- **Phenotype** is a physical, biological, or behavioural characteristic shaped by genetics as well as environmental factors.
  - **Example** - Skin and hair colour in humans, vocal behaviour among birds, and the migratory patterns of some animals.
- Scientists use phenotyping to study migration patterns in butterflies.
  - **Example** - By examining butterfly wings, researchers can determine their place of origin based on isotopic composition.

### References

1. [The Hindu | Painted Lady](#)
2. [Britannica | Painted Lady](#)

## Protection of Interests in Aircraft Objects Bill, 2025

**Prelims** - Indian polity and Governance

**Mains (GS II & III)** - GS I (Government Policies & Interventions) | GS III (Infrastructure).

### Why in News?

*Protection of Interests in Aircraft Objects Bill, 2025, was recently introduced in Rajya Sabha.*

- The Bill seeks to give **legal effect** to the following international agreements in their application to India
  - Convention on International Interests in Mobile Equipment (also known as Capetown Convention of 2001), and
  - Protocol to the Convention on International Interests in Mobile Equipment on Matters specific to Aircraft Equipment.
- India had acceded to these in **2008**.

- The Convention and the Protocol aim to bring uniformity in securing rights for high-value assets such as aircrafts, helicopters, and engines.
- They aim to ensure predictability for creditors in the event of a financial default in
  - A lease - use for a specified period
  - Conditional purchase - transfer of ownership upon completion of certain terms and conditions, or
  - Security agreement - asset given as collateral for borrowing.
- **Registry Authority** - The Bill designates Directorate General of Civil Aviation (DGCA) as the Registry Authority for the purposes of the Convention.
- The Registry Authority is responsible for registration and de-registration of aircrafts.
- **Obligations of debtors** - Debtors *must submit records of dues* to DGCA.

*A debtor is a person who has taken an aviation asset under a lease or, conditional purchase agreement, or pledged an asset under a security agreement.*

- **Remedies in case of default** - The Convention gives creditors certain remedies in case of default by a debtor.

*A creditor is a person who has provided an aviation asset under a lease or conditional purchase agreement, or has lended under a security agreement.*

- It includes the right to take back possession of the asset within a period of 2 calendar months or a mutually agreed upon period, whichever is earlier.
- The Bill states that before exercising any remedy, **the creditor must notify DGCA** about the occurrence of default.
- **Detention of assets by government agencies** - The following entities will continue to have the right to detain an asset if dues for services related to that asset remain unpaid
  - Central government,
  - Any other entity providing public services in India, or
  - An inter-governmental organization of which India is a member.
- **Overriding effect** - In case of any inconsistency between the Bill and any other law, the *provisions of the Bill* will prevail.
- **Jurisdiction of High Courts** - The High Courts will have jurisdiction over any claim under the Convention.
- **Power to make Rules** - The Bill empowers the central government to make Rules to implement the provisions of the Convention and the Protocol.

## References

1. [Economic Times | Protection of Interests in Aircraft Objects Bill, 2025](#)
2. [PRS India | Protection of Interests in Aircraft Objects Bill, 2025](#)

# Saturn

## Prelims - General Science

### Why in news?

*Astronomers have discovered 128 new moons around Saturn, increasing its total count to 274 moons.*

- Saturn is the ***second-largest planet*** in the solar system.
- **Position**- 6<sup>th</sup> planet from the Sun.
- **Type**- Gas giant.
- It is surrounded by a beautiful ring system.
- **Size** - With an equatorial diameter of about 74,897 miles (120,500 kilometers), Saturn is 9 times wider than Earth.
- **Distance** - Saturn is 9.5 Astronomical Units (AU) away from the Sun.

*One astronomical unit (abbreviated as AU), is the distance from the Sun to Earth.*

- **Mass**- 95 times the mass of Earth.
- **Composition**- Mostly hydrogen and helium, similar to Jupiter.
- **Density**- The ***least dense planet*** in the Solar System (it could float in water).
- **Orbit & Rotation** - One day on Saturn takes only ***10.7 hours***.
- **Orbital Period**- Takes **29.5 Earth years** to complete one orbit around the Sun.
- **Moon system of Saturn**
  - **Total Moons**- 274 (after the recent discovery of 128 new moons).
  - **Largest Moon**- Titan (2,159 miles across).
  - **Other Major Moons**- Enceladus is known for its subsurface ocean and icy plumes.
  - Many newly discovered moons are small (as tiny as 2 miles across) and follow irregular, retrograde orbits.
- **Discovery - Observation in 2023** - Conducted using the *Canada-France-Hawaii Telescope* at **Mauna Kea, Hawaii**.
- **Tracking Technique**- Scientists observed patches of space near Saturn and tracked the motion of small moon-like objects over time.
- **Characteristics of the new moons**
  - All are irregular moons - meaning they have highly inclined orbits and travel backward (retrograde motion).
  - Some moons are as small as 2 miles across.
  - The discovery suggests these moons are remnants of cosmic collisions that happened 100 million years ago.
- The ***International Astronomical Union (IAU)*** has officially ratified the newly identified moons.

- **Established in** - 1919.
- **Mission**- Promote and safeguard astronomy through research, education, and international cooperation.
- **Headquarters** - Paris, France.
- **Governance**
  - **General Assembly (Every 3 years)** defines long-term policy
  - **Executive Committee** implements decisions
  - **IAU Officers & Secretariat** handle day-to-day operations
- **India is an active member in IAU.**

## Reference

[Indian Express| Newly discovered moons of Saturn](#)

## Government e-Marketplace

**Prelims (GS - I)** - *Public Policy.*

**Mains (GS III)** - *Economic Development and Inclusive Growth.*

## Why in the news?

*Government e-Marketplace (GeM) aims to boost start-up participation through upcoming events like Startup Mahakumbh 2025*

- It is India's **public procurement portal** for purchasing goods and services by central and state government ministries, Departments, Public Sector Units (PSUs), and affiliated entities.
- **Launched in** - 2016
- **Aim** - To make the public procurement process transparent, efficient, and inclusive.
- **Developed by** - Directorate General of Supplies and Disposals (DGS&D) in collaboration with MeitY (Ministry of Electronics and Information Technology) and National e-Governance Division (NeGD).
- GeM is now managed by GeM SPV (Special Purpose Vehicle), a 100% government-owned company under the Ministry of Commerce & Industry.
- **Three Pillars of GeM**
  - **Efficiency** - Ensures cost and time savings
  - AI-driven procurement reduces process time.
  - **Transparency** - Digital footprint ensures no manipulation in transactions.
  - AI tools prevent fraudulent activities.
  - **Inclusion** - Focus on women-led MSMEs, artisans, Farmer Producer Organizations (FPOs).
  - 50% of businesses on GeM come from MSMEs.
- **Advantages of GeM**
  - **Centralized Platform** - Unified portal for government buyers & suppliers.
  - **Policy Reforms** - Modernized regulations ensure compliance & efficiency.
  - **MSME Boost** - Supports small businesses & startups in government contracts.

- **Automation & Transparency** - Tech-driven system reduces delays & enhances accountability.
- **Achievements**
  - Business transactions increased from its first year to 2024.
  - Contributed to major government projects, including India's lunar mission (Chandrayaan 3).

## References

1. [GeM| GeM and its advantages](#)
2. [Economics Times | Pillars of GeM](#)

## Naini Lake's water crisis

**Prelims** - Current events of National Importance

**Mains (GS- I)** - Location-changes in critical geographical features (including water-bodies and ice-caps).

## Why in News?

*Naini Lake has recorded a water level of 4.7 feet, marking a five-year low that sparked concerns over drinking water scarcity ahead of the summer season.*

- It is a natural kidney-shaped lake in Nainital, Uttarakhand surrounded by seven hills.
- **Discovered by** - P. Baron, a British businessman in 1839.
- The **third largest lake** in Uttarakhand by surface area.
- **Topology** -It is connected by a bridge between Mallital (north) and Tallital (south), and this bridge houses the world's only post office on a lake bridge.

*76% of the city's water demand was met by the Naini Lake in 2024.*

- **Reasons for the water crisis** - Decrease in snowfall and rainfall in the winter months.
- A report from the Uttarakhand State Council for Science and Technology found that compared to other Kumaon lakes, Naini Lake is subjected to the greatest man-made manipulations.
- It cited unplanned construction, encroachment, and degradation of recharge zones as key factors.
- The construction of concrete structures nearby further causes low rainwater infiltration, worsened by the low rainfall in some years.
- Enhancing siltation, dumping debris in **Sukhatal Lake**, which is a major aquifer recharge area for Naini Lake, causing the lake to shrink.
- Pollution from the discharge of untreated wastewater, improper disposal of solid waste, and inadequate sewer systems causing sewage to overflow into stormwater drains, discharge into the Lake.

## Reference

[The Indian Express | Naini Lake](#)

## Mitathal and Tighrana Harappan Sites

**Prelims** - *History of India.*

**Mains (GS I)** - *Indian Heritage and Culture.*

### Why in News?

*The Haryana government has declared two sites of over 4,400-year-old Harappan civilization in Bhiwani district as protected monuments and archaeological sites.*

- These are notified under the *Haryana Ancient and Historical Monuments and Archaeological Sites and Remains Act, 1964.*

### Mitathal site

- The site was first discovered in 1913 when a hoard of coins belonging to Samudra Gupta of the Gupta dynasty was found.
- Archaeological excavation conducted in 1968 has thrown light on the Copper- Bronze Age culture, a complex of the Indo-Gangetic divide of the 3rd-2nd millennia BCE.
- From 1965 to 1968, *beads and copper implements* were discovered at the site, yielding proto-historic material.
- Mitathal bear out the Harappan tradition in *town planning, architecture and in arts and crafts.*
- The pottery was well-burnt, sturdy red ware painted in black with pipal leaf, fish scale, and other geometric designs.
- The site has yielded a variety of antiquities, such as beads, bangles, and terracotta, as well as stone, shell, copper, ivory, and bone objects.

### Tighrana site

- According to the Tighrana village site, the post-Harappan period remnants shed light on the development and persistence of human habitation in the area.
- Chalcolithic farming communities originally settled in the area around 2,400 BCE.
- These early settlers, often referred to as ***Sothians***, resided in modest thatched-roofed mud-brick homes at Chang, Mitathal, Tighrana, and other locations.
- Some of their settlements may have been fortified and comprised 50 to 100 houses each.
- They used wheel-made ceramics decorated in ***bichrome with black-and-white motifs***, domesticated cows, bulls, goats, and other animals, and engaged in agriculture.
- They used copper, bronze and stone implements as discovered in large numbers.
- The presence of ***beads and green carnelian bangles*** indicate a thriving industry of

bead making and jewellery production.

- Remains from pre-Siswal, pre-Harappan, and post-Harappan settlements were found in Tighrana, making it an important archaeological site.

## Reference

[The Indian Express | Harappan civilization spots](#)

### One Liners 04-04-2025

#### Polity & Governance

##### Poshan Tracker app

Recently, over 10.12 crore beneficiaries registered on Poshan tracker app.

- **Umbrella scheme** - Poshan Bhi Padhai Bhi (PBPB) Programme.
- **Nodal Ministry** - Ministry of Women and Child Development (MWCD).
- **Aim** - To enhance Anganwadi Worker's (AWWs) capacity to deliver optimal early childhood care and education services to all children.
- To empower Anganwadi Workers and provide them with continuous digital support and coaching.

##### Major Minerals

Recently, mining leases for the major minerals issued in the 5<sup>th</sup> and 6<sup>th</sup> Schedule areas.

- Major minerals include iron ore, coal, bauxite, gold, and now, Barytes, Feldspar, Mica, and Quartz
- **Mines and Minerals (Development and Regulation) (MMDR) Act, 1957** - It empowers the State Governments to grant mineral concessions for the minerals located within their respective jurisdiction.
- **Responsibility of State Government:**
  - To collect the revenue generation.
  - Rehabilitation of displaced people.
- **Madhya Pradesh** - It has been granted above 7 leases after obtaining all requisite permissions.
- Gujarat, Rajasthan and Chhattisgarh states were not granted mining lease in the past 5 years.

##### Mining Surveillance System (MSS)

Recently, the government has begun to use geo-spatial technologies such as Mining Surveillance System (MSS), Geographic Information System (GIS) and Satellite imagery to prevent illegal mining.

- **Launched in** - 2016.
- **Developed by:**
  - Indian Bureau of Mines (IBM).
  - Ministry of Electronics and Information Technology (MeitY).
  - Bhaskaracharya Institute for Space Applications and Geo-informatics (BISAG).
- **Aim** - To develop a system for detection of incidence of illegal mining by use of space technology.
- To survey an area up to 500m outside the lease boundary to check incidences of illegal mining.
- Since, the inception of MSS in 2016-17, the project was implemented in major mineral rich states including in Odisha.



### **DoT Action to Curb Spam/Fraud Call**

Recently, the Department of Technology (DoT) has disconnected nearly 1.75 lakh unauthorized numbers.

- **Spam calls** - DoT identified that large number of spam calls are being originated from telecom identifiers like numbers starting from 0731, 079,080 etc.
- **DoT Actions** - It urges *enterprises to comply with telecom regulations* to avoid strict penalties.
- It encourages *citizens to continue reporting spam calls* through the Chakshu module of Sanchar Saathi app.
- It remains dedicated to *strict monitoring and prompt action* against Unsolicited Commercial Communication (UCC) (spam/fraud call) violators to protect consumer interests.

### **Smugglers and Foreign Exchange Manipulators (Forfeiture of Property) Act (SAFEMA), 1976**

Recently, a special court in Mumbai finally handed over 14 properties belonging to Tiger Memon to the central government of India. Tiger Memon is the key accused in the 1993 Bombay Blasts.

- **Objectives of the Act** - To fight smuggling and illegal money activities.
- It allows the government to take away properties that were bought with illegal money.
- **Ambit of an act** - It applies not just to the accused person but also to their family members and associates.

### **Pension Adalats**

The government aspires to organize additional Pension Adalats recently.

- **About** - It is a long standing *redressal of pension grievances* pertaining to Central Government Pensioners.
- **Objective** - To provide *on-the-spot resolution of unresolved and chronic grievances* in Centralized Pension Grievance Redress and Monitoring System (CPENGRAMS).
- **Unresolved cases** - These cases are revisited and their status is considered before holding the next Pension Adalat.

### **Multi Modal Logistics Parks (MMLPs)**

Out of 32 approved MMLPs 5 MMLPs at Jogighopa, Chennai, Bengaluru, Nagpur and Indore are under development and expected to be operational in FY 2025-27.

- **About** - It is a transportation hub that offers *multiple modes of transportation and logistics services in one location*.
- **Developed by** - Both public and private entities.
- It is a facility that integrates various transportation modes such as rail, road, sea, and air, as well as warehousing, storage, distribution, and value-added services.

## **Security**

### **Bollard Pull (BP) Tug Ojas**

Recently, the 5<sup>th</sup> 25T Bollard Pull (BP) Tug Ojas was launched.

- **Tugs** - It is designed indigenously and built in accordance with relevant *Naval Rules and Regulation of Indian Register of Shipping (IRS)*.
- **Objective** - To provide assistance to *Naval ships and submarines* during berthing, unberthing and manoeuvring in confined waters.
- To provide afloat firefighting support to ships and it have the capability to conduct limited *search and rescue operations*.

## INS Tarkash

Recently, *INS Tarkash* has successfully intercepted and seized over 2500 kg of narcotics.

- **About** - It is a *frontline frigate of the Indian Navy* operating under the Western Naval Command.
- **Part of** - Combined Maritime Forces (CMF), for Maritime Security Operations.
- **Deployed in** - Western Indian Ocean.
- It is participating in the multi-national forces joint focus operation, *Anzac Tiger*.

## **Miscellaneous**

### Tarang

Recently, the *Tarang* facilities was discussed in the Parliament.

- **About** - It is a *64-bit High Performance Computing (HPC) system*, capable of supporting multi-tasking, multi-programming, multi-user and time-sharing environment.
- It avoids single point of failure, to meet the operational requirements.
- **HPC technical support** - It is supported by transformers, diesel generators, UPS, batteries, multiple utility paths, lighting system, adequate number of earthing pits and cables.