Today's Prelims Topics

Vostro Accounts

Context

India's RBI allowed 'vostro' accounts to invest entire surplus in government securities

What is a Vostro Account?

- It is a type of bank account that one bank holds **on behalf of a foreign bank** in the *domestic currency* of the country where the account is maintained.
- **E.g.,** Bank of America opens an INR account with SBI in India.
- **RBI** (not Ministry of Finance) issued the **operational guidelines**.
- **Benefits:**
    - Reduces forex reserve pressure.
    - Promotes INR as an international settlement currency.
    - Helps continue trade with sanctioned/restricted countries (e.g., Russia under sanctions).

Other Type of Accounts for International Transaction

Type of Account	Meaning	Example	Currency Denomination
Nostro Account	Account of a **domestic bank** maintained with a **foreign bank** in the **foreign currency**.	SBI opens USD account with Bank of America in USA.	Foreign currency (e.g., USD)
Loro Account	Account maintained by **one domestic bank** with another domestic bank, **on behalf of a third bank**, in foreign currency.	Canara Bank uses Bank of Baroda's Nostro account with National Bank of Hong Kong.	Foreign currency

Source: Reuters

Muon g-2 (g minus two)

Context

The Muon g-2 (pronounced "gee minus two") Experiment at Fermilab in the U.S. had measured a unique property of a subatomic particle called a muon with an unprecedented precision of 0.127 ppm, outdoing its stated goal of 0.140 ppm.

What is a Muon?

- It is a type of **elementary particle** — meaning it has no smaller known components.
- It belongs to the same family as the electron (called **leptons**) and behaves almost identically in terms of electric charge and spin.
- However, there are key differences:
    - **Mass** – A muon is about **207 times heavier** than an electron.
    - **Discovery** – First detected in **1936** in cosmic rays (high-energy particles from space).
    - **Magnetic Nature** – Like an electron, it has a **property called quantum spin**, which makes it act like a miniature bar magnet.

What is Muon g-2?

- In classical physics, when you have a charged, spinning object (like a spinning charged ball), it produces a magnetic field.
- The **g factor** is simply a ratio:
    - g = Actual magnetic strength of particle/ Predicted strength from simple theory
- For a basic, point-like particle without any quantum complications, the theory says **g = 2** exactly.
- In quantum physics, particles are **never truly alone**.
- Even in empty space, the particle is constantly interacting with **virtual particles** — fleeting particles that pop in and out of existence due to quantum fluctuations.
- These "ghost" particles can be photons, gluons, W/Z bosons, or even hypothetical unknown particles.
- Every such interaction slightly changes the particle's magnetic strength.
- These interactions cause **g** to be *slightly more than 2* for the muon and electron.
- If g is measured more precisely than it's predicted, and there's a mismatch:
    - Either the **Standard Model calculation is missing something**
    - Or **new unknown particles/forces** are contributing to the shift.
- This is why muon g − 2 is exciting — the muon is heavy enough to be sensitive to possible new physics.

What the Muon g–2 Experiment Measures

- The experiment looks at the **difference between two frequencies**:
    - **Orbit frequency** – how fast the muon moves in a magnetic field.
    - **Spin precession frequency** – how fast the muon's spin axis rotates in that field.
- This difference reveals the muon's **g–2** value with extreme precision.

Source: TheHindu

How does satellite internet work?

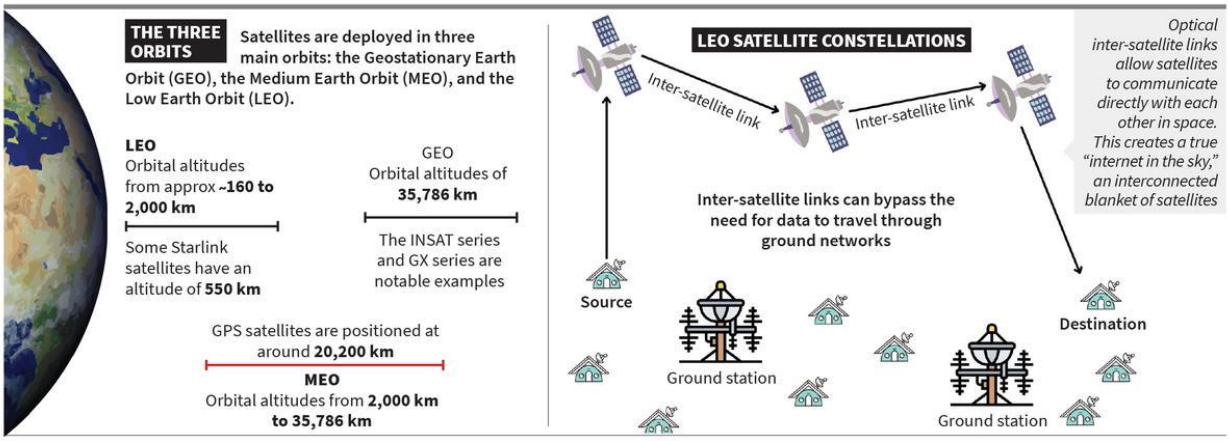
Context

Satellite internet is in the news as **India prepares for the debut of Elon Musk's Starlink**, expected to reshape connectivity, bridge the digital divide, and enhance both civilian and military communication capabilities.

What is Satellite Internet?

- Internet access provided through **communication satellites**.
- Typically uses **geostationary satellites** capable of delivering speeds up to **506 Mbit/s**.
- Internet signals are sent to satellites and received by **home-based antenna kits**.

How Does Satellite Internet Work?



Working

- **Satellite Constellation** – Uses a network of satellites in Low Earth Orbit (LEO), Medium Earth Orbit (MEO), or Geostationary Orbit (GEO).
- **User Terminal (Dish Antenna)** – Installed at the user's location; sends and receives signals from satellites.
- **Ground Stations (Gateways)** – Link satellites to the terrestrial internet backbone.
- **Data Flow** – User device → dish antenna → satellite → ground station → internet servers (and vice versa).
- **LEO Advantage** – LEO satellites reduce latency to ~20–40 ms compared to 600+ ms for GEO satellites.

Advantages of Satellite Internet

- **Bridges Digital Divide** – Enables internet access in remote and rural areas worldwide.
- **No Wiring Needed** – No requirement for laying cables in difficult terrains.
- **Maritime & Remote Communication** – Works well in oceans, deserts, and isolated regions.
- **Better Security** – Harder to hack compared to traditional cable-based systems.

Drawbacks of Satellite Internet

- **Space Debris** – Defunct satellites and parts contribute to orbital junk.
- **Impact on Astronomy** – Satellite constellations interfere with ground-based telescopes.
- **Space Congestion** – Large constellations (e.g., Starlink's 12,000 satellites) crowd orbits.
- **Kessler Syndrome Risk** – Collisions can create more debris, triggering a chain reaction.
- **High Latency** – Average round-trip signal delay is ~550 milliseconds.
- **Signal Interference** – Affected by rain, snow, and moisture.
- **High Costs** – Equipment and maintenance are more expensive than cable internet.

Key Features

- **Global Coverage** – Can connect even remote, mountainous, desert, or maritime regions.
- **High-Speed Broadband** – Speeds up to 150–250 Mbps (Starlink example).
- **Low Latency** – Especially with LEO constellations.
- **Quick Deployment** – No need for laying optical fiber; installation in hours.
- **Scalable** – New satellites can be added to expand coverage.
- **Resilient to Disasters** – Less affected by floods, earthquakes, or cable cuts.

Applications

- **Rural & Remote Connectivity** – Villages, islands, and border areas without fiber infrastructure.
- **Disaster Relief** – Quick restoration of communication after earthquakes, floods, cyclones.
- **Maritime & Aviation Internet** – Ships, aircraft, and offshore platforms.
- **Defence & Security** – Secure, high-speed communication for armed forces in remote areas.
- **Scientific Research** – Polar stations, deep-sea missions, and desert research stations.
- **IoT & Smart Agriculture** – Monitoring, automation, and precision farming in remote regions.

Source: TheHindu

Long Range Missiles Arsenal

Context

After the success of *Operation Sindoor*, the Indian Air Force (IAF) is focusing on inducting **long-range air-to-ground and air-to-air missiles** with strike ranges exceeding **200 km** to counter enemy air defence systems.

IAF Long-Range Missile Induction – Post Operation Sindoor

1. **BrahMos**
   - Type: Supersonic cruise missile
   - Range: ~450 km (upgraded versions beyond 250 km)
   - Role: Precision strikes against land and sea targets
   - Feature: Can be launched from land, sea, and air platforms
2. **SCALP**
   - Type: Long-range, air-launched cruise missile
   - Range: ~250–300 km
   - Origin: France (used on Rafale aircraft)
   - Role: Deep strike on high-value targets with precision
3. **Rampage**
   - Type: Air-launched standoff missile (Israel origin)
   - Range: ~150–250 km
   - Role: Attacks on high-value strategic targets like airbases and infrastructure
4. **Crystal Maze**
   - Type: Air-to-surface missile (Israel origin, also called AGM-142 Popeye)
   - Range: ~80–150 km
   - Role: Precision strikes, especially on fortified targets
5. **Astra (longer-range variants)**
   - Type: Indigenous beyond-visual-range air-to-air missile (BVRAAM)
   - Range: Current version ~110 km; longer-range versions in development (>160–200 km)
   - Role: Air dominance against enemy aircraft
6. **Russian R-37**
   - Type: Long-range air-to-air missile
   - Range: >200 km
   - Role: Targets high-value assets like AWACS, surveillance aircraft

Other Developments

- **Project Kusha**: DRDO initiative to develop indigenous long-range air defence missile system.
- Procurement of **two additional squadrons** of Russian S-400 Triumf surface-to-air missile system.

Significance

- Extends strike capability beyond enemy air defence range.
- Enhances deterrence against China's HQ-9 and Pakistan's air force.
- Supports indigenous missile development & reduces dependency on imports.

Source: TheHindu

News in Short

UNDP Equator Initiative Award

News? Bibi Fatima Women's self-help group (SHG) from Dharwad district (Karnataka) has bagged the 'Equator Initiative Award'.

About the Award

- Also referred to as the Nobel Prize for Biodiversity Conservation.
- **Presented biennially** under the Equator Initiative of **United Nations Development Programme (UNDP).**
- The award underscores the **critical role of Indigenous and local communities** in delivering nature-centric climate solutions, restoring ecosystems, and promoting sustainable livelihoods.

Source: The Hindu

Operation Falcon

News? In 2025, Assam's **Operation Falcon** has so far achieved **zero rhino poaching incidents**, arresting **42 poachers**, dismantling **six major poaching gangs**, and preventing **nine poaching attempts**.

About Operation Falcon

- **What it is:** A joint anti-poaching drive launched in 2024 by the **Assam Police** and **Assam Forest Department** to dismantle rhino poaching networks and curb illegal wildlife trade.
- **Organisations Involved:**
  - **Assam Police** – Handles law enforcement, intelligence collection, and operational execution.
  - **Assam Forest Department** – Focuses on habitat monitoring, patrolling, and wildlife protection.

Source: IndianExpress

Section 152 of BNS

News? The Supreme Court has questioned the **"potentiality of abuse"** of **Section 152 of the Bharatiya Nyaya Sanhita**.

Section 152 of the Bharatiya Nyaya Sanhita (BNS) – Provisions

- It criminalizes the acts of anyone who,
  - Excites or attempts to excite **secession**, **armed rebellion**, or **subversive activities**;
  - Encourages **feelings of separatist activities**;
  - Engages in any act that **endangers India's sovereignty, unity, and integrity**.
- Violators face **imprisonment for life** or up to **seven years**, along with a **fine**. This is a **cognizable**, **non-bailable** offense, triable by a **Court of Session**.
- Although the term **"sedition"** is not used in Section 152, it is broadly considered a successor to Section 124A of the Indian Penal Code (IPC).

Source: TheHindu

Editorial Summary

Organ transplantation in India

Context

- **Organ transplantation** is one of modern medicine's greatest achievements, offering a lifeline for patients with terminal organ failure.
    - In India, however, despite medical advancements and rising transplant numbers, the organ donation rate remains at **0.8 per million population** — far below global leaders like Spain and the USA (>45 pmp).
    - This shortage leads to over **5 lakh preventable deaths annually**, highlighting an urgent need to address socio-cultural barriers, policy gaps, and public awareness deficits.

What are the Various Challenges?

- **Low Public Awareness & Myths:** Fear of body disfigurement affecting funeral rites.
    - Misbelief that organ donation violates religious norms.
    - Suspicion of premature brain death declaration for organ harvesting.
- **Religious & Cultural Sensitivities:** Despite endorsements from faith leaders, myths persist.
    - Lack of consistent outreach to counter misconceptions.
- **Brain Death Concerns:** Misunderstanding of medical & legal safeguards under the *Transplantation of Human Organs and Tissues Act, 1994*.
    - Brain death certified only after **strict legal, ethical, and multi-doctor procedures**.
- **Age & Health Misconceptions:** False belief that only young accident victims can donate.
    - **Reality:** Older donors, natural death cases, and donations of tissues (skin, bone, cornea, heart valves) are possible.
- **Insufficient Engagement of Medical Professionals:** Lack of training to counsel grieving families effectively.

Suggested Solutions

- **Awareness & Education:** Nationwide **audio-visual and social media campaigns**.
    - Real-life donor and recipient stories to humanize the cause.
    - School & college curriculum integration — focus on ethics & life sciences.
- **Community-Level Outreach:** Workshops by trained counsellors to address myths on religious rites, medical protocols, and donor eligibility.
- **Capacity Building in Healthcare:** Regular training for healthcare staff on communication & counselling.
    - Dedicated **transplant coordination teams** in hospitals.
- **Policy Reforms:**
    - **Presumed Consent Model**: Adopted in Spain, Croatia — every adult considered a donor unless opted out.
    - Grievance redress mechanisms to build public trust.
- **Sustained Commitment:** National-level mission with continuous funding, monitoring, and grassroots engagement.

Source: The Hindu

Debunking the myth of job creation

Context

- On **1 July 2025**, the Government of India approved the **Employment Linked Incentive (ELI) Scheme** with an outlay of **₹99,446 crore** to promote job creation, particularly in the manufacturing sector.
    - While the scheme is positioned as a flagship intervention for employment generation, its design raises concerns about inclusivity, sectoral imbalance, and long-term sustainability.

Provisions of the ELI Scheme

- **Objective:** To promote employment generation, improve employability, and enhance social security across sectors, with a special focus on manufacturing.
- **Job Creation Target:**
    - Seeks to generate over **3.5 crore jobs** in 2 years.
    - Includes **1.92 crore first-time workers** entering the workforce.
- **Incentive Period:** Benefits applicable for jobs created between **1st August 2025 and 31st July 2027**.
- **Scheme Structure: Two Parts:**
    - **Part A: Incentives for First-Time Employees**
        - Applicable to employees newly registered with EPFO.
        - Eligible if salary is up to ₹1 lakh/month.
        - Benefit: One month's wage (up to ₹15,000) in **two installments**.
        - Payment through **Direct Benefit Transfer (DBT)** using Aadhaar-Based Payment System (ABPS).
    - **Part B: Support to Employers**
        - Incentivizes new employment creation in all sectors, especially manufacturing.
        - Employers get **up to ₹3,000 per employee/month** for **two years**, if employment is sustained for at least 6 months.
        - For the manufacturing sector, benefits are extended to the **third and fourth years**.
        - Payment made directly to **PAN-linked employer accounts**.
- **Focus Sector:** While applicable to all sectors, special incentives are provided to the **manufacturing sector** for long-term employment generation.

Issues with the Scheme

- **Employer-Centric Approach:** Strengthens employers' bargaining power rather than workers'.
    - Mimics subsidising capital, reinforcing **capital–labour asymmetry**.
- **Skill Mismatch Ignored:** Only **8.25%** of graduates in jobs matching their qualifications; **4.9%** of youth have formal vocational training.
    - Without skilling reforms, employers may absorb an **unprepared workforce**.
- **Exclusion of Informal Sector:** 90% of workers in the informal sector left out due to EPFO-linked design.
    - Risks widening the **formal–informal divide**.
- **Risk of Disguised Employment:** Possibility of reclassifying old jobs as new to claim subsidies.
- **Sectoral Bias:** Over-focus on manufacturing (<13% of employment share) despite falling employment elasticity.
    - Marginalises women, rural youth, and low-skilled workers concentrated in services/agriculture.

Alternatives & Way Forward

- **Strengthen Skilling Infrastructure**: Integrate vocational training, industry-linked curricula, and upskilling for low-skilled workers.
- **Job Quality & Security**: Ensure labour rights, social security, and collective bargaining power.
- **Inclusivity for Informal Sector**: Extend benefits to micro, small, and informal enterprises.
- **Diversified Sectoral Focus**: Encourage employment in services, agriculture, and green economy alongside manufacturing.
- **Long-Term Productivity Growth**: Shift from headcount-based incentives to sustainable employment strategies.
- **Education–Employment Alignment**: Reform higher education to meet labour market needs.

Source: The Hindu