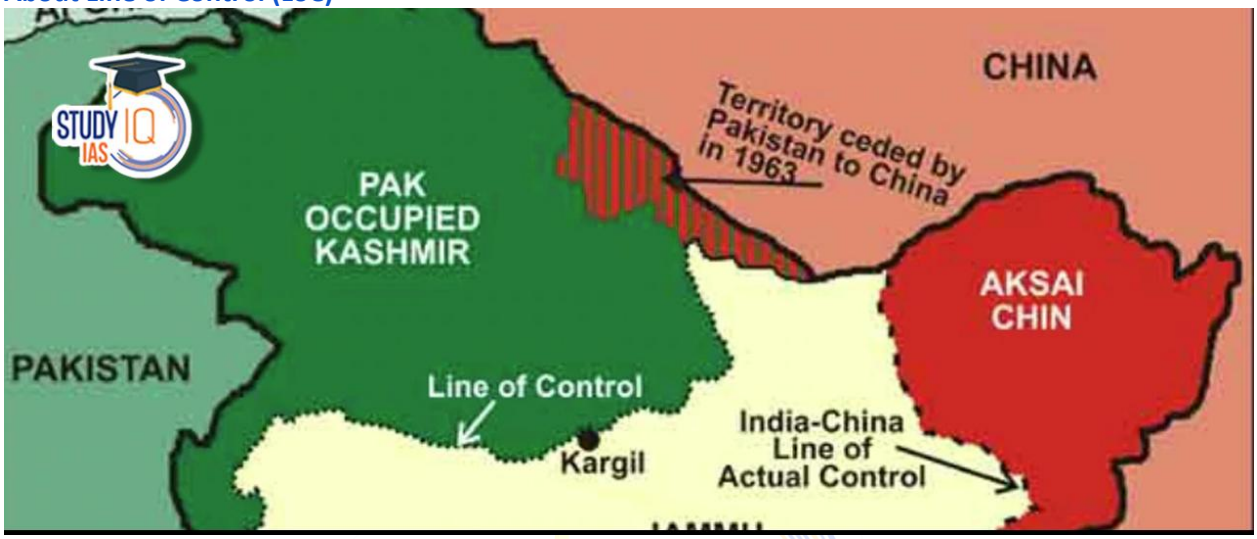
Today's Prelims Topics

Line of Control

Context

Pakistan violated the ceasefire along the Line of Control in the Kashmir Valley by resorting to unprovoked firing.

About Line of Control (LoC)



- **Nature of the Boundary**: The Line of Control (LoC) serves as the de facto military boundary between India and Pakistan in the Jammu and Kashmir region.
- **Historical Background**: It originated as the **Ceasefire Line** after the first India-Pakistan war in **1947–48** over Kashmir.
- **Redesignation Post Simla Agreement**: After the **1971 Indo-Pak war**, the **Simla Agreement** signed on **3 July 1972** officially renamed the Ceasefire Line as the **Line of Control**.
- **Length and Coverage**: The LoC spans approximately **740 kilometers**, running from **Ladakh in the north to Poonch district in the south**.
- **Security and Militarization**: It is a **highly militarized zone**, frequently witnessing **cross-border firing and skirmishes** between the armed forces of both nations.
- **Territorial Demarcation**:
    - On the **Indian side**, it encompasses parts of **Jammu & Kashmir** and **Ladakh**.
    - On the **Pakistani side**, it covers **Pakistan-occupied Kashmir (PoK)**, including **Gilgit and Baltistan**.

Source:

- Indian Express: The Hot Line of Control

Nuclear facilities of Iran

Context

U.S. Secretary of State Marco Rubio said that Iran has to 'walk away' from uranium enrichment and long-range missile development and it should allow Americans to inspect its facilities.

Major Nuclear Facilities of Iran

- **Natanz Nuclear Facility: Uranium enrichment**
  - **Location:** Isfahan Province
  - **Significance:** One of Iran's most important nuclear sites. Houses thousands of centrifuges for uranium enrichment.
- **Fordow Fuel Enrichment Plant (FFEP): Uranium enrichment**
  - **Location:** Near Qom, buried deep inside a mountain.
  - **Significance:** Highly fortified against airstrikes. Originally secret, but revealed by Western intelligence in 2009.

Source: New Scientist/ Global Security

- **Arak Heavy Water Reactor (IR-40): Plutonium production**
  - **Location:** Markazi Province
  - **Significance:** Can produce plutonium, which can be used in nuclear weapons.
- **Bushehr Nuclear Power Plant: Civilian nuclear energy production**
  - **Location:** Southern Iran, near the Persian Gulf
  - **Significance:** Iran's only operational nuclear power plant. Built with Russian assistance.

Source:

- **Indian Express: Iran must 'walk away' from all uranium enrichment: Rubio**

Vizhinjam Port

Context

Prime Minister Narendra Modi commissioned India's first deepwater transhipment port at Vizhinjam, Kerala.

About Vizhinjam International Seaport

- It is **India's first deepwater transshipment port** located in **Vizhinjam (near Thiruvananthapuram), Kerala.**
    - **Deepwater Port:** Manmade structures that are used as ports or terminals to transport, store or handle oil and natural gas.
    - **Transhipment Port:** It is a transit hub where cargo is transferred from one ship to another while in transit to its final destination.
- It is built on a **design, build, finance, operate and transfer (DBFOT) model.**
    - **DBFOT** model is a **Public-Private Partnership (PPP)** model under which a private partner is responsible for:
        - **Designing, Building, Financing and Operating** the project during the contracted period.
    - **Transferring the project back to the public sector** after the end of contract period.

India's Port Sector

- India is the **16th largest maritime country in the world.**
- The Indian maritime sector contributes to **95% of India's trade by volume and 70% by value.**
- **Major Port:** Controlled by the **Ministry of Ports, Shipping & Waterways** controls major ports in India.
- **Minor Port:** Controlled by State Maritime Boards/Governments. There are 200 non-major ports.
- There are **12 Major Ports in India:** Chennai, Cochin, Deendayal (Kandla), Jawaharlal Nehru (Nhava Sheva), Kolkata, Mormugao, Mumbai, New Mangalore, Paradip, V. O. Chidambaranar (Tuticorin),Visakhapatnam and Kamarajar Port Limited.
    - **13th -Vadhavn Port (under construction).**
- India's **largest** port by **volume of cargo** handled is **Paradip Port, Odisha.**
- India owns over **30% global market share in the ship breaking industry** and is home to the **largest ship-breaking facility in the world at Alang (Gujarat).**

Source:

- **The Hindu- Port Economy will drive India's Growth, says PM**

US-Ukraine mineral deal

Context

Ukraine and the United States signed a deal that will give the United States preferential access to new Ukrainian minerals deals and fund investment in Ukraine's reconstruction.

What are Rare Earths and Their Uses?

- **Definition**: Rare earths are a group of **17 metallic elements** essential for producing high-performance magnets.
- **Applications**: These magnets are critical in:
  - **Electric vehicles (EVs)**
  - **Cell phones**
  - **Missile guidance systems**
  - **Other advanced electronics**
- **Substitutes**: Currently, **no viable substitutes** exist for rare earths in these technologies.
- **Classification**: The **U.S. Geological Survey (USGS)** lists 50 minerals as "critical," including **rare earths, nickel, and lithium**.
- **Industrial Importance**: Critical minerals are indispensable for sectors like:
  - **Defence**
  - **Aerospace**
  - **High-tech appliances**
  - **Green energy technologies**

Facts

- **China** remains the **world's largest producer** of rare earths and several other critical minerals.

Ukraine's Mineral Resources

- **Critical Mineral Diversity**: Ukraine has deposits of **22 out of 34 critical minerals** identified by the **European Union**.
- **Types of Resources**:
  - **Industrial and construction materials**
  - **Ferroalloy metals**
  - **Precious and non-ferrous metals**
  - **Some rare earth elements**
- **Rare Earth Elements Found**:
  - **Lanthanum & Cerium** – used in TVs and lighting
  - **Neodymium** – used in wind turbines and EV batteries
  - **Erbium & Yttrium** – used in lasers and nuclear power
  - **Scandium** – identified in EU research, data classified
- **Key Strategic Minerals Identified by WEF**:
  - Lithium
  - Beryllium
  - Manganese
  - Gallium
  - Zirconium
  - Graphite
  - Apatite
  - Fluorite
  - Nickel
- **Lithium Reserves**: Estimated at **500,000 metric tons**

    - Used in **batteries, ceramics, and glass**
    - Found in **central, eastern, and southeastern Ukraine**
- **Titanium**: Mainly in **northwestern and central Ukraine**
- **Graphite**:
    - Accounts for **20% of global resources**
    - Located in **central and western Ukraine**
    - Used in **EV batteries and nuclear reactors**
- **Coal**: Significant reserves exist, but **most are under Russian control**
- **Mining Status**: Ukraine **currently lacks operational rare earth mines**

Source:

- **The Hindu: What are Ukraine's critical minerals and what do we know about the deal with U.S.**

Tax Collected at Source (TCS)

Context

Wrist watches, handbags, antiques, paintings, sculptures, sunglasses, home theatre systems, shoes and sportswear priced over Rs 10 lakh will now face a Tax Collected at Source (TCS) levy of 1 per cent at the point of sale.

What is the Difference between TCS and TDS?

Aspect	TDS (Tax Deducted at Source)	TCS (Tax Collected at Source)
Meaning	Tax deducted **by the payer** from the payment made to the payee.	Tax collected **by the seller** from the buyer during the sale of goods/services.
Who deducts/collects	**Payer of income** (e.g., employer, company, etc.)	**Seller of goods/services**
When it is applicable	When making specified payments like salary, interest, rent, commission, etc.	When selling specified goods like scrap, minerals, timber, or collecting payments for remittances.
Nature of transaction	Applies mostly to **services and financial transactions**.	Applies mostly to **sale of specified goods or services**.
Paid on behalf of	Deducted on behalf of the **payee (recipient)**.	Collected on behalf of the **buyer (payer)**.
Scope	**Wider** – covers salaries, interest, rent, commission, dividends, etc.	**Narrower** – applies to specific goods/services like minerals, scrap, e-commerce, remittances.
Purpose	To ensure **advance collection** of tax by the government.	To **track and collect tax** at the point of sale.
Relevant Section of IT Act	Covered under **Sections 192 to 196**.	Covered under **Section 206C**.
Rates (examples)	Salary: 10–30%, Rent: 10%, Interest: 10%, Commission: 5%	Timber: 1%, Scrap: 0.1%, Foreign remittances: 5%
Example	An employer deducts TDS from an employee's salary before payment.	A seller of scrap collects TCS at 0.1% from the buyer while selling the scrap.

Source:

- **Indian Express: From watches to handbags, and paintings: Income Tax dept notifies luxury items on which taxpayers will have to pay 1% TCS**

News in Shorts

Water sharing dispute between Punjab & Haryana

News? Punjab rejected the Bhakra Beas Management Boards's (BBMB's) decision to release an extra 4,500 cusecs of water to Haryana.

Background of BBMB

- **Established**: 1966 under **Section 79 of the Punjab Reorganisation Act**.
- **Earlier Name**: Bhakra Management Board.
- **Renamed**: As **Bhakra Beas Management Board (BBMB)** in 1976 when Beas projects were added.
- **Jurisdiction**: Manages water and power sharing from the **Bhakra-Nangal** and **Beas** river projects.
- **Projects under BBMB**:
  - **Bhakra Dam** (Himachal Pradesh)
  - **Nangal Dam** (Punjab)
  - **Beas-Sutlej Link Project**
  - **Pong Dam** (Himachal Pradesh)

Source:

- **Indian Express: Water sharing dispute between Punjab & Haryana**

UN launches network to support victims and survivors of terrorism

News? The UN Office of Counter-Terrorism (UNOCT) launched the Victims of Terrorism Associations Network (VoTAN).

About VoTAN (Victims of Terrorism Advocacy Network)

- **Background**: VoTAN was created under the initiative of the *Group of Friends of Victims of Terrorism*, which has been co-chaired by **Spain and Iraq** for nearly six years. The group emphasizes the protection of victims' rights globally.
- **Origin**: The network emerged as a major outcome of the **2022 United Nations Global Congress on Victims of Terrorism**.
- **Purpose**: VoTAN aims to offer a **safe and supportive platform** where victims and survivors can connect, foster resilience, and take on roles as **advocates, educators, and peacebuilders**.
- **Funding**: The initiative is **financially supported by Spain**.

Source:

- **UN- Launch of the Victims of Terrorism Associations Network (VoTAN)**

Places in News

Bagram Air Base

News? US President Donald Trump claimed that China now occupies the Bagram Airfield.

About Bagram AirBase

- **Location**: Afghanistan.
- **Built By**: The Soviet Union in the 1950s.
  - Used extensively during the **Soviet-Afghan War (1979–89)**.
- **US Interest**: The base was later expanded and modernized after the **US invasion post-9/11**.
  - It was under US control from 2001–2021.
  - US vacated Bagram on **July 2, 2021**; Taliban took control on **August 15, 2021**.

Source: **Indian Express: As Trump invokes Bagram, story of the strategic air base in Afghanistan**

Editorial Summary

Strengthening parliamentary oversight in India

Context

The article examines the diminishing role of Parliamentary oversight in India, despite the constitutional emphasis on checks and balances, and suggests targeted reforms to revitalise its effectiveness.

Key Issues

- **Decline in Parliamentary Oversight:** Despite mechanisms like Question Hour, Zero Hour, and Standing Committees, oversight has weakened due to frequent disruptions and lack of follow-up.
    - In the 17th Lok Sabha, Question Hour functioned only **60% (Lok Sabha)** and **52% (Rajya Sabha)** of scheduled time.
- **Underutilised Committees:** Department-related Standing Committees (DRSCs) produce detailed reports, but their recommendations often do not influence legislation or policy.
    - Limited stakeholder engagement and lack of continuity hinder committee effectiveness.

Notable Successes of Committees

- **Railways (2016):** Standing Committee recommended waiving dividend payments.
- **Motor Vehicles Act (2017):** Amendments influenced by Standing Committee.
- **NHAI Projects:** Public Undertakings Committee recommended initiating projects only after 80% land acquisition.
- **Commonwealth Games (2010):** PAC exposed delays and corruption.
- **PAC's effectiveness:** On average, 180 recommendations annually, with ~80% acceptance rate by the government.

Way Forward

- **Post-Legislative Scrutiny:** Establish subcommittees or a specialised body to review law implementation.
    - Adopt the UK model where laws are reviewed 3–5 years after enactment.
- **Enhancing Committee Work:** Bring key DRSC reports for floor discussion and mandatory ministerial response.
    - Improve accessibility of reports via regional translations, infographics, and videos.
    - Provide committees with **dedicated research and technical support**.
- **Leveraging Technology:** Use **AI and data analytics** to help MPs scrutinise policies and budgets.
    - Enable evidence-based questioning and tracking of irregularities.

Conclusion

A robust parliamentary oversight mechanism is essential for **transparent and accountable governance**. Strengthening committees, ensuring post-legislative reviews, and integrating technology can revive the accountability function of Parliament. As Dr. Ambedkar envisaged, democracy demands "more responsibility than stability," and that begins with **Maximum Accountability through Maximum Governance**.

Source: The Hindu: Strengthening parliamentary oversight in India

Natural hydrogen can transform India's clean energy future

Context

- Hydrogen is emerging as a clean energy carrier, crucial for global decarbonisation and combating climate change.
- While green hydrogen is resource-intensive, the discovery of natural (geological) hydrogen presents a low-cost and sustainable alternative.
- If effectively tapped, natural hydrogen could transform energy security and support India's net-zero ambitions.

Understanding Natural Hydrogen

- **Conventional vs. Natural Hydrogen**: Conventional hydrogen is primarily produced using fossil fuels (e.g., steam methane reforming), while green hydrogen uses renewable energy—both are resource-heavy. Natural hydrogen, formed geologically, offers a low-carbon and potentially low-cost alternative.
- **Geological Formation**: Natural hydrogen originates from:
    - *Serpentinisation* of ultramafic rocks.
    - *Radiolysis* of water by radioactive elements.
    - *Thermal breakdown* of organic material at depth.
- **Discovery and Global Interest**: In **Mali (1987)**, a failed water drilling attempt uncovered a 98% pure hydrogen source.
    - Since then, research has identified seeps in **France, Spain, the U.S., Australia**, and **India**, sparking global exploration.

Global Reserve Estimates and Market Momentum

- **USGS Estimate (2022)**: Tens of trillions of tonnes of natural hydrogen may exist globally. Even if only 2% is usable, it could meet global demand for 200 years.
- **Recent Discoveries**:
    - France's Lorraine and Moselle regions hold ~92 million tonnes (worth $92 billion).
- **Industry Growth**:
    - Companies in over 10 countries are now exploring natural hydrogen.
    - Cost of production is estimated at $1/kg, cheaper than green and grey hydrogen.
    - Major investments include $245 million for U.S.-based Koloma from Amazon and Gates-backed ventures.

India's Strategic Opportunity

- **Geological Potential**: India's ophiolite complexes, greenstone belts, cratonic basins, and geothermal regions are rich in natural hydrogen potential.
    - A preliminary estimate suggests **3,475 million tonnes** of reserves.
- **Alignment with Energy Goals**: India's hydrogen demand is expected to grow from **6 Mt/year (2020)** to over **50 Mt/year by 2070**.
    - Natural hydrogen can support India's **net-zero 2070 target**, reduce reliance on fossil fuels, and enhance energy sovereignty.

Challenges in Exploration and Utilisation

- **Lack of Standard Techniques**: Unlike oil and gas, there are no proven methods for locating or quantifying natural hydrogen accurately.
- **Technical Barriers**:High diffusivity and reactivity of hydrogen complicate extraction and containment.
    - Infrastructure and materials may degrade without protective coatings or design adjustments.

- **Regulatory and Safety Concerns**: Absence of policy frameworks for natural hydrogen exploration.
    - High flammability and reactivity demand strict safety protocols.

Policy and Technological Way Forward

- **National Survey and Mapping**: India can replicate the SRRA model (used for solar mapping) via a **public-private hydrogen resource atlas**.
- **R&D and Demonstration Projects**: Inspired by the U.S. ARPA-E model, India can explore:
    - *Water-rock reactions*.
    - *CO_2 injection in iron-rich formations* to produce hydrogen and store carbon simultaneously.
- **Leveraging Existing Infrastructure**: Oil & gas sector assets (wells, cores, pipelines) can be adapted for hydrogen exploration and transport.
- **Institutional and Regulatory Support**:Provide exploration incentives.
    - Establish hydrogen-specific extraction norms.
    - Develop a regulatory body or empower the **Directorate General of Hydrocarbons** for oversight.

Conclusion

Natural hydrogen represents a game-changing opportunity for India's energy transition. With the right investments in geoscientific mapping, policy reforms, and technological innovation, India can emerge as a leader in natural hydrogen exploration. Unlocking this potential will not only help meet climate targets but also boost economic and strategic resilience.

Source: **The Hindu: Is Natural Hydrogen is Fuel of the Future**