Freedom UPSC

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Daily Current Affairs

To The Point

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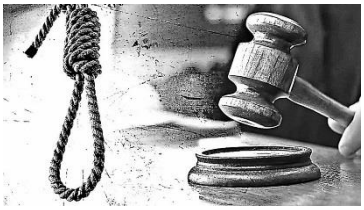
GS Paper 2 – Governance, Constitution, Polity, Social Justice

1 Maharashtra Establishes Dedicated Cell for Mercy Petitions



Context: The **Maharashtra government** has established a **dedicated cell** under the **Additional Secretary (Home)** to handle **mercy petitions** filed by **death row convicts**. This move follows the **Supreme Court's directive** to all states to set up such cells to **prevent delays** in the execution of death penalties, which the court noted can have a **"dehumanising effect"** on convicts.

Understanding Mercy Petitions:

What is a Mercy Petition?

A **mercy petition** is a **formal plea for clemency** filed by a convict (typically those on **death row** or serving long sentences) seeking relief in the form of:

- **Pardon**,
- **Commutation**,
- **Remission**,
- **Respite**, or
- **Reprieve**.

These petitions are directed to the **President of India** or the **Governor of a State** as a **last resort**, once all **judicial remedies** have been exhausted.

No fixed time limit is prescribed for the President's decision on a mercy petition.

Constitutional & Legal Provisions:

Relevant Articles:

- **Article 72 (President)**: Grants power to grant **pardons, reprieves, respites, remissions**, and **commutations** of sentences for:
    - Offenses against **Union laws**.
    - Cases involving **court-martial**.
    - **Death sentences**.
- **Article 161 (Governor)**: Empowers the Governor to grant **clemency** for offenses against **State laws**, excluding **court-martial cases**.

Key Judgment:

- **Maru Ram vs. Union of India (1981)**: The **Supreme Court** established that the **President must act based on the advice of the Council of Ministers** in mercy petitions.

Philosophy Behind Mercy Petitions:

1. **Right to Life (Article 21)**:Mercy petitions safeguard the **fundamental right to life and personal liberty** by allowing for **compassionate reconsideration**.
2. **Rectification of Judicial Errors**: They provide an opportunity to correct **judicial oversights** or errors, ensuring fairness in justice.
3. **Adherence to International Norms**: Aligns India with **global conventions** promoting **human rights and dignity** (e.g., **Universal Declaration of Human Rights**).

Types of Pardoning Powers in India:

Type	What Changes?	Example
Pardon	Completely cancels conviction & sentence.	Treated as not guilty.
Commutation	Changes the sentence to a lesser one.	Death → Life imprisonment.
Remission	Reduces sentence duration.	10 years → 6 years.
Respite	Grants lesser punishment for valid reasons.	Pregnant woman given lighter sentence.
Reprieve	Temporarily delays execution.	Time granted to file a petition.

Comparison of Pardoning Powers: President vs. Governor:

Aspect	President (Article 72)	Governor (Article 161)
Authority	President of India	Governor of a State
Jurisdiction	Union laws, court-martial cases, death penalties.	Offenses under State laws.
Military Law	Can pardon or reduce sentences for court-martial.	No power over court-martial cases.
Death Sentence	Can grant pardon and commute death sentences.	Can only **commute**, not **pardon**.
Binding Advice	Acts on advice of the **Central Council of Ministers**.	Acts on advice of the **State Council of Ministers**.

Conclusion:

The creation of a **dedicated cell for mercy petitions** in Maharashtra reflects a significant step towards ensuring **fairness and humanity** in the justice system. Mercy petitions are essential to maintaining a **balance between justice and compassion**, ensuring that the system remains **aligned with constitutional values and international human rights standards**.

GS Paper 3 – Science and Technology

2 Neuralink's Groundbreaking 'Blindsight' Chip: Human Trials Expected by 2025

Context: Elon Musk's brain-chip company, **Neuralink**, is gearing up to initiate **human trials** of its revolutionary visual prosthesis device, **"Blindsight"**, by the end of **2025**. This **Brain-Computer Interface (BCI)** aims to **restore vision** in individuals who are **completely blind**.

What is Blindsight?

The **Blindsight** device is an **experimental artificial vision system** that offers a new approach to restoring sight.

- **Microelectrode Array Implantation:** Uses a **microelectrode array** implanted directly in the **visual cortex** of the brain.
- **Bypasses Traditional Visual Pathways:** Completely **bypasses the eyes and optic nerves**, providing an alternative route for visual data processing.
- **Camera Feed Processing:** Captures visual information from a **camera feed** and **stimulates neurons** in the brain's visual center.
- **Artificial Perception of Images:** Enables the brain to **perceive visual information** even without functional eyes.

Understanding Brain-Computer Interfaces (BCIs):

Brain-Computer Interfaces (BCIs) are advanced systems designed to **connect the brain directly to external devices**.

Key Functions:

- **Signal Acquisition:** Capturing **brain signals** through electrodes or sensors.
- **Signal Analysis:** Processing the acquired data to **interpret neural activity**.
- **Command Translation:** Converting brain signals into actionable **commands**.
- **Device Control:** Sending commands to external devices to execute a desired action.

Types of BCIs:

BCIs can be categorized into three main types based on their **level of invasiveness:**

1. Invasive BCIs:

- **Direct implantation of electrodes** into the brain tissue.
- Offers the **highest signal quality** and precision.
- Associated with **surgical risks** such as infection, inflammation, and damage to brain tissue.
- **Applications:** Restoring motor function in paralyzed individuals, artificial vision systems like **Blindsight**.

2. Non-Invasive BCIs:

- Uses **external sensors**, such as **EEG headsets**, placed on the scalp.
- **Safer and more accessible** but suffers from **lower signal quality** due to interference from the skull and scalp.
- **Applications:** Communication devices, gaming, neurofeedback, and some medical diagnostics.

3. Partially Invasive BCIs:

- **Electrodes are placed inside the skull**, but outside the brain tissue.
- Provides a **compromise between safety and signal quality**.
- **Applications:** Cochlear implants, visual prosthesis development, etc.

Extra Insights: The Future of BCIs:

- **Rapid Advancements:** Companies like **Neuralink** and **Synchron** are pushing the boundaries of BCI technology.
- **Ethical Considerations:** Privacy, autonomy, and consent remain critical issues as these technologies advance.
- **Security Concerns:** BCIs are vulnerable to potential **cybersecurity threats**, emphasizing the need for robust safeguards.
- **Potential Beyond Medicine:** BCIs could enable **new forms of communication, education, and entertainment**, reshaping human-computer interaction.

Why This Matters:

Neuralink's **Blindsight** technology is a bold step toward **merging biology and technology**, offering hope to millions worldwide with visual impairments. As we approach **2025**, the world watches eagerly to see if this ambitious vision becomes a reality.

GS Paper 3 – Environment & Sustainable Development

3 Energy Statistics India 2025

Context: The **Ministry of Statistics and Programme Implementation (MoSPI)** has released its annual publication, **'Energy Statistics India 2025'**, through the **National Statistics Office (NSO)**. This comprehensive report provides insights into **India's evolving energy landscape** and future projections.

India's Energy Scenario in 2025:

Total Energy Supply and Demand:

- **Supply:** Approximately **1,800 Million Tonnes of Oil Equivalent (MToE)** — an annual increase of **4.5%** compared to 2024.
- **Demand Drivers:**
  - **Industrial Growth: 40%**
  - **Transportation: 25%**
  - **Residential Consumption: 20%**

Energy Mix (Sources and Shares):

- **Coal: 48%** (Dominant but declining gradually)
- **Oil: 28%** (Mainly for transportation and industrial use)
- **Natural Gas: 8%** (Growing, especially for cleaner energy initiatives)
- **Renewables (Solar, Wind, Hydro, Biomass): 12%** (Rapid growth, especially solar and wind)
- **Nuclear: 4%** (Stable but with planned expansion)

Fossil Fuel Reserves and Production:

Coal:

- **Total Reserves: 320 billion tonnes**.
- **Top States:**
  - **Odisha: 25.47%**
  - **Jharkhand: 23.58%**
  - **Chhattisgarh: 21.23%**
  - **West Bengal: 8.72%**
  - **Madhya Pradesh: 8.43%**
- **Concentration:** Approximately **85%** of total reserves are in these states.
- **Annual Production: 950 million tonnes** (meeting **85% of domestic demand**).
- **Global Rank: 2nd largest coal producer**, after China.

Lignite:

- **Total Estimated Reserves (as of April 2024): 47.30 billion tonnes**.
- **Top State: Tamil Nadu** (**79%** of total reserves).

Crude Oil:

- **Highest Reserves: Western Offshore region** (**32% of total reserves**).
- **Other Key Areas: Assam region** (**22% of total reserves**).

Natural Gas:

- **Largest Reserves: Western Offshore region** (**31%**).
- **Followed By: Eastern Offshore region** (**24%**).

Renewable Energy Growth:

Potential by Source:

- **Wind Power: ~55%** of total renewable potential.
- **Solar Energy and Hydro:** Also significant contributors.

Geographical Distribution:

- **Top States:**
  - **Rajasthan: 20.3%**
  - **Maharashtra: 11.8%**
  - **Gujarat: 10.5%**
  - **Karnataka: 9.8%**
- **More than 50% of renewable potential** concentrated in these states.

Capacity Expansion (2024-2025):

- **Solar Power: 175 GW** (Up from **150 GW** in 2024).
- **Wind Power: 50 GW** (Up from **45 GW** in 2024).

Hydro and Biomass Energy:

- **Hydropower: 52 GW** (**12%** of total electricity generation).
- **Biomass & Waste-to-Energy: 15 GW**, promoting sustainable practices in rural areas.

Electricity Generation and Consumption Trends:

- **Installed Capacity: 450 GW** (Increased from **420 GW** in 2024).
- **Total Electricity Generation: 1,700 TWh (terawatt-hours)**.
- **Per Capita Consumption: 1,500 kWh/year** (Reflecting economic growth and urbanization).
- **Transmission Losses:** Reduced to **17%** during FY 2023-24 (compared to **23%** in FY 2014-15), thanks to **Smart Grid Initiatives**.

Energy Efficiency and Sustainability Measures:

Government Policies and Initiatives:

- **National Hydrogen Mission:** Promoting **Green Hydrogen** for industrial use.
- **Perform, Achieve, and Trade (PAT) Scheme:** Encouraging energy-efficient technologies across industries.
- **FAME-III:** Accelerating the adoption of **Electric Vehicles (EVs)** and developing charging infrastructure.

Carbon Emissions and Climate Targets:

- **Projected Emissions (2025): 2.9 billion tonnes of CO_2** — a **4% decline** due to increased renewable usage.
- **Net-Zero Goal:** Commitment to achieving **net-zero emissions by 2070**.

Future Outlook (2026-2030):

Projections:

- **Renewable Share:** Expected to reach **25%** by **2030**.
- **Energy Demand Growth:** Projected **5% annual increase**, driven by **economic expansion**.

Challenges Ahead:

- **Dependence on Fossil Fuels:** Continued reliance on **coal and imported crude oil**.
- **Energy Security Risks: Geopolitical uncertainties** affecting oil and gas imports.
- **Infrastructure Bottlenecks:** Urgent need for **grid modernization** and **renewable storage solutions**.

4 Place in News: Gas Pipeline Burst in Malaysia

Context: A **gas pipeline explosion** in **Putra Heights, central Selangor state, Malaysia** has left **several individuals injured**. The incident highlights the **infrastructure vulnerabilities** in one of Malaysia's rapidly developing regions.

Political Features of Malaysia:

Location and Division:

- **Region: Southeast Asia**, **north of the Equator**.
- **Division:** Malaysia is divided by the **South China Sea** into:
  - **Peninsular Malaysia (West Malaysia)**.
  - **East Malaysia** (*located on Borneo Island*).

Land Bordering Countries:

- **Thailand** (to the north of Peninsular Malaysia).
- **Indonesia** (to the south and west of East Malaysia).
- **Brunei** (located entirely on the island of **Borneo**, sharing borders with **East Malaysia**).

Maritime Bordering Countries:

- **Singapore** (separated by the **Strait of Johor**).
- **Philippines** (to the northeast across the **Sulu Sea**).
- **Vietnam** (to the north across the **South China Sea**).

Surrounding Water Bodies:

- **Strait of Malacca** (One of the world's busiest maritime trade routes).
- **Celebes Sea** (Southeast of East Malaysia, crucial for biodiversity).
- **South China Sea** (Vital for trade, energy resources, and maritime disputes).

Geographical Features of Malaysia:

Highest Peak:

- **Mount Kinabalu** (**4,095 meters / 13,435 feet**), located in **Sabah**, **East Malaysia** — A popular site for **mountaineering and biodiversity research**.

Important Rivers:

- **Rajang River:** Longest river in **Malaysia**, located in **Sarawak**, East Malaysia.
- **Kinabatangan River:** Renowned for **wildlife diversity**, situated in **Sabah**, East Malaysia.
- **Pahang River:** Longest river in **Peninsular Malaysia**, essential for **agriculture and water resources**.

Additional Insights:

- **Biodiversity Hub:** Malaysia is part of the **Coral Triangle**, known for its **rich marine biodiversity**.
- **Economic Centers:** Kuala Lumpur (capital city), Putrajaya (administrative capital), and George Town (UNESCO World Heritage Site).
- **Energy Infrastructure:** Incidents like the **Putra Heights pipeline burst** raise concerns over **energy infrastructure safety and maintenance**.

5 Vibe Coding: Revolutionizing App Development Through AI

Context: Vibe Coding has become a hot topic in Silicon Valley, quickly gaining attention after being coined by **Andrej Karpathy**, co-founder of **OpenAI** and former head of AI at **Tesla**. This revolutionary concept is reshaping how apps are developed, making the process more accessible than ever before.

What is Vibe Coding?

Vibe Coding refers to using **Generative AI** not only to assist in coding but to **generate entire codebases for apps** through natural language interactions. The process involves **prompting Large Language Models (LLMs)** like **ChatGPT** to produce application code based purely on user instructions.

How It Works:

1. **Natural Language Interaction:** Users communicate their app ideas and requirements to AI using simple, natural language prompts.
2. **Automated Code Generation:** The AI generates complete codebases, handling everything from backend logic to frontend design.
3. **Instant Prototyping:** Rapid development without deep technical knowledge of programming languages or frameworks.

Why It Matters:

- **Accessibility:** Lowers the barrier to entry for non-coders, allowing **innovators and entrepreneurs** to bring their ideas to life without technical expertise.
- **Speed:** Drastically reduces development time, enabling faster prototyping and iteration.
- **Scalability:** Offers potential for rapid scaling of applications without expanding human developer teams.

Potential Risks & Challenges:

Despite its promise, **Vibe Coding** presents certain challenges:

- **Security Risks:** Generated code may have **vulnerabilities** due to lack of contextual understanding by AI systems.
- **Maintenance Issues:** The code produced could be **inefficient or costly** to maintain, especially when scaled.
- **Quality Control: AI-generated code** may lack optimization, thorough testing, or adherence to industry standards.

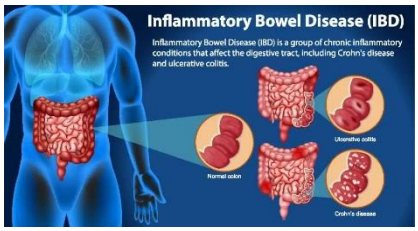
Extra Insights:

- **AI Dependence:** While **Vibe Coding** can accelerate development, it risks making developers overly reliant on AI tools without fully understanding the underlying codebases.
- **Human-AI Collaboration:** The ideal approach may be to combine **AI-driven code generation with expert oversight**, ensuring quality, efficiency, and security.

The Future of Vibe Coding: As AI continues to evolve, **Vibe Coding** could become a cornerstone of software development. However, ensuring that AI-generated code is **secure, efficient, and maintainable** will be crucial for its long-term success.

GS Paper 1 – Health and Education

6 Inflammatory Bowel Disease (IBD): Understanding and Managing a Chronic Condition



Context: The Jawaharlal Institute of Postgraduate Medical Education and Research (**JIPMER**) recently launched a **support group for patients with Inflammatory Bowel Disease (IBD)**, aiming to provide guidance, emotional support, and improved management strategies.

What is Inflammatory Bowel Disease (IBD)?

Inflammatory Bowel Disease (IBD) is a collective term for conditions that cause **chronic inflammation and swelling** of the digestive tract's tissues. It primarily includes two types:

1. **Ulcerative Colitis:**
    - Involves **inflammation and ulcers** (open sores) along the **lining of the colon and rectum**.
    - Symptoms often include **bloody diarrhea, abdominal pain, and fatigue**.
2. **Crohn's Disease:**
    - Causes **inflammation of the digestive tract lining**, often affecting **deeper layers of the intestinal wall**.
    - Commonly impacts the **small intestine**, but can also affect the **large intestine** or, less frequently, the **upper gastrointestinal tract**.
    - Symptoms may include **persistent diarrhea, weight loss, and abdominal pain**.

Common Symptoms of IBD:

Patients with **IBD** may experience a range of symptoms, often varying in severity. These include:

- **Abdominal Pain**
- **Diarrhea** (which may be bloody)
- **Rectal Bleeding**
- **Severe Fatigue**
- **Weight Loss**

What Causes IBD?

The **exact cause** of **Inflammatory Bowel Disease** remains unclear, but research points to several contributing factors:

- **Immune System Dysfunction:**
    - The body's immune system may **incorrectly react to environmental triggers**, such as **bacteria or viruses**, causing **inflammation of the gastrointestinal tract**.
- **Genetic Predisposition:**
    - Those with a **family history of IBD** are at a higher risk of developing the condition, suggesting a **hereditary component**.

Treatment Options for IBD:

While **IBD** is a **chronic condition**, various treatments are available to **manage symptoms and prevent flare-ups**. These include:

1. **Medications:**
    - **Anti-inflammatory drugs** (e.g., corticosteroids, aminosalicylates).
    - **Immune system suppressors** to reduce inflammation.
    - **Biologics** that target specific proteins involved in inflammation.
2. **Surgical Options:**
    - **Resection:** Removing the damaged portion of the digestive tract.
    - **Ileostomy or Colostomy:** Creating an opening for waste to exit the body, if necessary.

Living with IBD:

Managing **IBD** often involves a **combination of medical treatment, dietary adjustments, and lifestyle changes**. **Support groups**, such as the one launched by **JIPMER**, provide valuable assistance through **education, peer support, and practical advice** for managing symptoms.