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SATURDAY, 4th OCTOBER 2025

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1. Cryptocurrency and Stablecoins

- **Prelims** - Cryptocurrency and Stablecoins
- **Mains** - GS 3 - Economy

Why in the news?

- Hinting at a possible shift in India's cryptocurrency policy, the Union Finance Minister said countries would have to "prepare to engage" with stablecoins, whether they welcome the change or not.

Cryptocurrency

- **What is it?:** A cryptocurrency is a digital or virtual currency that uses cryptography for security.
- **Features:**
  - ➔ **Digital currency**: Exists only electronically, not as physical bills or coins.
  - ➔ **Decentralized**: Not controlled by any central authority like a government or bank.
  - ➔ **Secured by cryptography**: Uses encryption techniques to ensure secure transactions and prevent counterfeiting.
- **How it works:**
  - ➔ **Transactions**: Recorded on a shared public ledger called a blockchain. This ensures transparency and immutability (transactions can't be altered).
  - ➔ **Mining**: New units of cryptocurrency are created through a process called mining, which involves solving complex mathematical problems with computers.
  - ➔ **Wallets**: Users store their cryptocurrency in digital wallets. These wallets can be software-based or hardware devices.
- **Types**
  - ➔ **Bitcoin (BTC)**: The first and most well-known cryptocurrency.
  - ➔ **Ethereum (ETH)**: A platform that allows for building decentralized applications (dApps).
  - ➔ **Tether (USDT)**: A stablecoin pegged to the value of the US dollar.
- **Benefits:**
  - ➔ **Fast and cheap transfers**: Can enable faster and cheaper international payments compared to traditional banking systems.
  - ➔ **Security**: Encryption makes it difficult to counterfeit or steal cryptocurrency.

- ➔ **Transparency**: Blockchain technology provides a transparent record of all transactions.

- **Challenges:**
  - ➔ **Volatility**: Prices of cryptocurrencies can fluctuate significantly.
  - ➔ **Security risks**: Crypto wallets can be vulnerable to hacking.
  - ➔ **Regulation**: The regulatory landscape for cryptocurrency is still evolving.

Stablecoins

- **What is it?:**
  - ➔ Stablecoins are a category of cryptocurrencies designed to minimize price volatility by pegging their value to a stable asset.
  - ➔ They are usually linked to fiat currencies (e.g., US Dollar, Indian Rupee), commodities (e.g., gold), or use algorithms to maintain stability.
- **Issues:**
  - ➔ **Regulatory Concerns**: Many operate without proper financial oversight.
  - ➔ **Reserves Transparency**: Questions about whether collateral truly backs supply.
  - ➔ **Financial Stability Risk**: A sudden crash (e.g., TerraUSD) can create contagion effects.
  - ➔ **Illicit Use**: Risk of being used in money laundering, terror financing, tax evasion.
- **India's Positions:**
  - ➔ RBI opposes private stablecoins citing financial stability and sovereignty risks.
  - ➔ Promotes Central Bank Digital Currency (CBDC / Digital Rupee) as a safer alternative.
  - ➔ No specific law on stablecoins, but regulated under Foreign Exchange Management Act (FEMA), Prevention of Money Laundering Act (PMLA), and IT Act if linked to illegal activity.

2. Lightning

- **Prelims** - Lightning
- **Mains** - GS 1 - Geography

Why in the news?

- As per the National Crime Records Bureau (NCRB) report Accidental Deaths and Suicides in India, lightning was responsible for the highest number of deaths in 2023, accounting for 39.7% of the 6,444 deaths attributed to 'forces of nature'.

Lightning

- **Definition**: A lightning bolt is a sudden electrostatic discharge during a thunderstorm, which occurs between electrically charged regions within clouds, or between clouds and the ground.
- **Recent Data:**
  - ➔ In the last few years, lightning has emerged as a new climate challenge for India, which has seen a 400 per cent rise in lightning strikes from 2019-20 to 2024-25.
  - ➔ Under lightning strikes, Madhya Pradesh (397), Bihar (345), Odisha (294), Uttar Pradesh (287), and Jharkhand (194) were the biggest victim states/Union Territories (UTs).
- **Formation Process:**
  - ➔ **Charge Separation:**
    - ★ In cumulonimbus clouds, collisions between ice particles cause separation of electric charges.
    - ★ Positive charges gather at the top; negative charges at the base.
  - ➔ **Electric Potential Build-up:**
    - ★ The difference in charge between cloud regions or between cloud and ground becomes intense.
    - ★ Ground beneath the cloud becomes positively charged due to induction.
  - ➔ **Discharge (Lightning Bolt):**
    - ★ When the electric field exceeds the insulating capacity of air (~3 million volts/m), a discharge occurs.
    - ★ Electrons travel downward (stepped leader), then upward streamers rise from the ground.

★ Upon connection, a return stroke travels back up, producing the visible lightning bolt.

- **Types of Lightning:**
  - ➔ **Cloud-to-Ground (CG)**: Most dangerous to life and property.
  - ➔ **Intra-Cloud (IC)**: Most common, occurs within the same cloud.
  - ➔ **Cloud-to-Cloud (CC)**: Between two separate clouds.
  - ➔ **Ground-to-Cloud (GC)**: Rare upward-moving lightning.
- **Associated Phenomena:**
  - ➔ **Thunder**: Sound caused by the rapid expansion of air due to intense heat (~30,000°C).
  - ➔ **Electromagnetic Disturbances**: Can disrupt radio, navigation, and power systems.
- **Impacts**:
  - ➔ **Hazards**:
    - ★ Fatal to humans and animals.
    - ★ Causes forest fires, power outages, structural damage.
  - ➔ **Scientific Utility**: Lightning helps fix atmospheric nitrogen into usable nitrates for plants.
- **Mitigation and Safety:**
  - ➔ Use lightning rods for buildings.
  - ➔ Follow "30-30 Rule": If thunder is heard within 30 seconds of lightning, seek shelter.
  - ➔ Avoid open fields, water bodies, and tall isolated trees during a storm.

3. Poland

- **Prelims -** Location of Poland
- **Mains -** GS 1 - Geography

Poland

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Why in the news?

- A quarter of a century after it joined NATO and amid rising tension Russia, Poland will finally join the alliance's fuel pipeline network.

Poland

- **Location:** Country in **central Europe**.
- **Capital:** Warsaw
- **Border countries:** Lithuania, Russia, Belarus, Ukraine, Slovakia, Czech Republic and Germany
- **Maritime Border:** Adjoins **Baltic Sea.**
- **Climate:** Transitional Temperate Climate.

4. Vietnam

- **Prelims -** Location of Vietnam
- **Mains -** GS 1 - Geography

Vietnam

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Why in news?

- The coastal region of Vietnam was hit by Typhoon Bualoi .

Vietnam

- **Location:** Vietnam is a country in Southeast Asia locate in Indochinese Peninsula.
- **Capital:** Hanoi
- **Border Countries:** China, Laos and Cambodia.
- **Maritime Borders**
  - Thailand through the Gulf of Thailand
  - Philippines, Indonesia, and Malaysia through the South China Sea.
- **River Delta:** Red river delta , Mekong river delta
- **Climate:** Tropical Climate
- **Associated Groupings:** ASEAN , Non Alignment Movement
- **Island Dispute:** Spartly island dispute with China

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5. Mission for Aatmanirbharta in Pulses

- **Prelims -** Mission for Aatmanirbharta in Pulses
- **Mains -** GS 3 - Economy

Why in the news?

- The Union cabinet has given approval to the Mission for Aatmanirbharta in Pulses.

Mission for Aatmanirbharta in Pulses

- **What is it?:** The mission is launched with an aim to drive pulse production to 350 lakh tonnes by 2030-31, reducing India's dependence on imports.
- **Financial Outlay:** The mission has a total estimated investment of **₹11,440 crore**.
- **Mission Life:** Deployment over **6 years** (2025-26 to 2030-31).
- **Key Features:**
  - ➔ **100% procurement** of Tur, Urad, and Masoor from farmers (for the next 4 years) under the Price Support Scheme (PSS) of PM-AASHA.
  - ➔ NAFED and NCCF will undertake 100% procurement in participating states for the next four years from farmers who register with these agencies and enter into agreements.
  - ➔ Distribution of **88 lakh free seed kits** to farmers.
  - ➔ Setting up 1,000 **processing units** to reduce post-harvest losses.
  - ➔ Focus on certified seed distribution, improved varieties, regional trials, etc.
  - ➔ Use of cluster-based approach, convergence with existing programs (soil health, mechanization), and promoting intercropping and diversification.

6. Road Accidents in India

- **Prelims -** Road Accidents in India
- **Mains -** GS 2 - Polity

Why in the news?

- As per the National Crime Records Bureau (NCRB) 2023, India recorded 4,64,029 road accidents, leading to 1,73,826 deaths and 4.47 lakh injuries.

Road Accidents in India

- **Magnitude of Problem:**
  - ➔ Around 476 deaths daily highlight the scale of the crisis.
  - ➔ Two-wheelers accounted for 46% of victims, showing the vulnerability of motorcyclists.
  - ➔ **State-wise patterns:**
    - ★ Tamil Nadu: Highest two-wheeler accident deaths (11,490).
    - ★ Uttar Pradesh: Reported 8,370 two-wheeler deaths, the maximum fatalities on National Highways (7,041 deaths), and the highest deaths involving SUVs and trucks.
    - ★ Other high-burden states: Maharashtra, Karnataka, Madhya Pradesh.
  - ➔ **National Highways:** Only 2% of road length, but account for nearly one-third of deaths.
- **Causes of Road Accidents:**
  - ➔ **Human Factors:**
    - ★ Over-speeding (cause of nearly two-thirds of fatalities).
    - ★ Driving under the influence of alcohol or drugs.
    - ★ Distractions (mobile phone use, fatigue).
    - ★ Weak compliance with helmets and seat belts.
  - ➔ **Vehicle & Equipment Factors:**
    - ★ Poor maintenance, overloading.
    - ★ Lack of advanced safety features in low-cost vehicles.
    - ★ Sub-standard helmets and limited use of airbags/ABS.
  - ➔ **Road & Infrastructure Factors:**
    - ★ Poor road design, potholes, inadequate lighting.
    - ★ Absence of pedestrian crossings and sidewalks.

★ Accident-prone black spots and missing crash barriers.

➔ **Institutional & Systemic Gaps:**

★ Weak enforcement of traffic laws.

★ Delayed emergency response and poor trauma care.

★ Under-reporting and lack of integrated accident data.

★ Fragmented responsibilities across departments.

- **Impacts:**
  - ➔ **Human:** Lives lost, permanent disabilities, psychosocial trauma.
  - ➔ **Economic:** Estimated loss of 3–5% of GDP due to lost productivity, medical costs, property damage.
  - ➔ **Public Health Burden:** Strain on emergency care and trauma centres.
  - ➔ **Social Inequality:** Poorer households are more affected due to reliance on two-wheelers and lack of insurance.
- **Government Measures:**
  - ➔ **Legislation:** Motor Vehicles Act (Amendments, 2019) – higher penalties, licensing reforms, vehicle recall provisions.
  - ➔ **Policies:** National Road Safety Policy, National Road Safety Strategy aligned with UN Decade of Action for Road Safety.
  - ➔ **Institutional Mechanisms:** National Road Safety Council, State Road Safety Cells.
  - ➔ **Technology:** e-DAR (electronic accident reporting), Intelligent Transport Systems, automated enforcement.
  - ➔ **Infrastructure:** Black spot identification, safer highways, pedestrian facilities.
  - ➔ **Post-Crash Care:** Trauma centres, ambulance networks, Good Samaritan Law.
  - ➔ **Awareness:** Campaigns on helmets, seat belts, anti-drunk driving.
- **Challenges:**
  - ➔ Enforcement gaps and corruption.
  - ➔ Infrastructure growth not matched with safety upgrades.
  - ➔ Data under-reporting and lack of real-time analysis.
  - ➔ Funding limitations.
  - ➔ Poor coordination between police, transport, and health departments.
  - ➔ Public apathy towards safety rules.

7. SARAL(Simplified and Automated Research Amplification and Learning) Tool

- **Prelims -** SARAL(Simplified and Automated Research Amplification and Learning) tool
- **Mains -** GS 3 - Science and Technology

Why in the news?

- The Anusandhan National Research Foundation (ANRF) has introduced the SARAL tool to make scientific research papers easier to understand.

SARAL(Simplified and Automated Research Amplification and Learning) tool

- **What is it?:**
  - ➔ SARAL (Simplified and Automated Research Amplification and Learning) is an AI-driven platform designed to simplify complex research papers into clear, accessible summaries.
  - ➔ It uses AI to generate layperson summaries and make research more accessible to society.
- **Launched by:** Developed under the **Anusandhan National Research Foundation (ANRF)** initiative.
- **Objective:**
  - ➔ To democratize scientific knowledge by making it inclusive and accessible, thereby enabling citizens, policymakers, industry, and academia to interpret and apply research findings effectively.
- **Features:**
  - ➔ Employs Artificial Intelligence to extract core insights from academic publications.
  - ➔ Creates diverse outreach formats such as videos, podcasts, posters, and presentations.
  - ➔ Integrated with the development of an **AI Science and Engineering Open India Stack**, supporting fields like drug discovery, aerospace, climate science, and advanced materials.

- **Significance:**
  - ➔ Acts as a bridge between science and society by simplifying technical research for non-specialists.
  - ➔ Enhances research dissemination and accelerates innovation adoption in both academia and industry.
  - ➔ Strengthens the ₹1 lakh crore **Research Development and Innovation (RDI) Scheme**, aligning with India's goal of nurturing deep-tech start-ups and achieving global R&D leadership.