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Current affairs summary for prelims

27 September, 2024

National Supercomputing Mission (NSM)

Context: *Recently, PM dedicated three PARAM Rudra Supercomputers under the National Supercomputing Mission (NSM).*

Overview:

- PM dedicated **three PARAM Rudra Supercomputers**, valued at approximately **Rs 130 crore**, developed under the **National Supercomputing Mission (NSM)**.
- These supercomputers have been deployed in **Pune, Delhi, and Kolkata**, aimed at enhancing research in various fields, including physics, earth sciences, and cosmology.

- Japan to build '**Zeta-class**' Supercomputer, set to be 1,000 times faster than current models

About National Supercomputing Mission (NSM)

- The NSM aims to establish a vast supercomputing grid across India, encompassing over **70 high-performance computing facilities**.
- These facilities will be interconnected via the **National Knowledge Network (NKN)**, enhancing access to computational resources for academic and R&D institutions.
- The mission also emphasises developing a skilled workforce to meet the challenges of high-performance computing applications.

What are supercomputers?

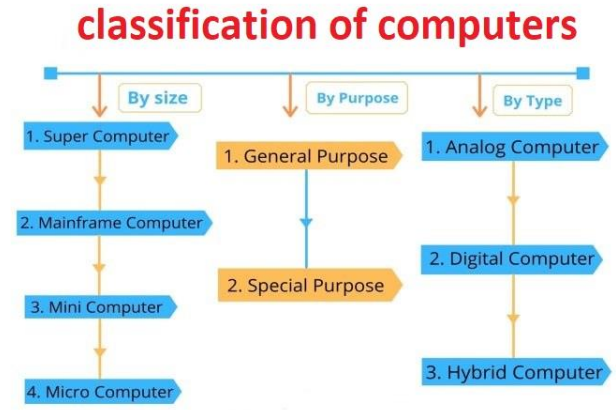
- **Supercomputers** represent the pinnacle of high-performance computing (HPC), enabling organisations to tackle complex problems that conventional computers cannot manage.

Features of Supercomputers

- **Parallel Processing**: Supercomputers utilise multiple CPUs to achieve extremely high computational speeds, addressing the limitations of traditional computers.
- **High Storage Capacity**: They have extensive storage capabilities to support rapid data retrieval necessary for complex calculations.
- **Advanced Cooling Techniques**: Innovations, such as cryogenic cooling, enhance operational efficiency by maintaining optimal temperatures for components.
- **Multi-user Access**: They support simultaneous access for multiple users, facilitating collaborative research.

Applications of Supercomputers

- **Defence**: Virtual testing for military applications, including nuclear simulations and weapon ballistics.
- **Data Mining**: Extracting valuable insights from large datasets for industries like insurance and marketing.
- **Weather Forecasting**: Used extensively in meteorology for precise climate modelling and predictions, enabling timely alerts for natural disasters.
- **Healthcare**: Assist in diagnosing diseases and optimising treatment strategies through advanced simulations.
- **Scientific Research**: Crucial for analysing complex datasets in fields such as astrophysics and nuclear research.
- **Climate Studies**: Analysing climate patterns and impacts, contributing to environmental research and policy-making.
- **Financial Markets**: Play a pivotal role in high-frequency trading and financial modelling.
- **Automotive Industry**: Creating simulated environments for vehicle testing, enhancing safety and performance evaluations.



Notable Supercomputers in India

- **AIRAWAT**
  - **Rank**: 75th fastest in the world
  - **Location**: C-DAC, Pune
  - **Performance**: 13,170 teraflops
  - **Focus**: Largest AI supercomputer, part of the National Program on AI.
- **PARAM Siddhi-AI**
  - **Rank**: 131st globally
  - **Location**: C-DAC, Pune
  - **Features**: Advanced NVIDIA DGX A100 systems.
- **Pratyush**
  - **Rank**: 169th globally
  - **Location**: Indian Institute of Tropical Meteorology
  - **Purpose**: Meteorological computations.

- **Mihir**
  - **Rank**: 316th globally
  - **Purpose**: Weather forecasting.
- **Saga-220**
  - **Developer**: ISRO
  - **Performance**: 450 teraflops.

➢ **Indigenous Development**

- The NSM emphasises developing supercomputers with a significant portion of indigenous components. The first fully assembled supercomputer, **PARAM Shivay**, was inaugurated at IIT (BHU), fostering a self-sufficient high-performance computing ecosystem in India.

Classification of Indian Supercomputers

➢ **By Performance Capacity**

- **Petaflop Systems**
  - **Mihir**: 2.5 petaflops for weather forecasting.
  - **Pratyush**: Works alongside Mihir.
- **Teraflop Systems**
  - **Saga-220**: 450 teraflops, developed by ISRO.

➢ **By Development and Purpose**

- **Upgraded Systems**
  - **PARAM 8600**: Upgrade from PARAM 8000, featuring enhanced node structure.
- **AI-Powered Systems**
  - **PARAM Siddhi**: Focused on AI applications.
- **Next-Generation Systems**
  - **PARAM YUVA-II**: Successor to earlier PARAM systems.
- **Most Powerful Systems**
  - **PARAM Pravega**: Recognized as one of India's top supercomputers.
- **Hybrid Systems**
  - **PARAM ISHAN**: Launched in 2016 at IIT Guwahati.
- **Recent Inaugurations**
  - **PARAM Rudra**: Tailored for weather and climate research.
  - **'Arka' and 'Arunika'**: High-Performance Computing systems for specific research applications.

➢ **Globally Fastest Supercomputers**

- **Frontier (USA)**
- **Aurora (USA)**
- **El Capitan (USA)**
- **Fugaku (Japan)**

Foreign Exchange Management Act (FEMA)

Context: *Various recent analyses indicate the need for a dedicated law beyond FEMA to address national security risks from Chinese FDI and international trade.*

➢ **Overview:**

- FEMA lacks explicit provisions for FDI related to national security, as it focuses on foreign exchange.
- India's international treaty practice highlights the legal vacuum in the country's domestic system.

➢ **About Foreign Exchange Management Act (FEMA)**

- FEMA is a regulatory mechanism that enables the Reserve Bank of India to pass regulations and the Central Government to pass rules relating to foreign exchange in tune with the Foreign Trade policy of India.
- **Enactment**: Introduced in 1999.

➢ **Purpose**:

- Consolidates and amends foreign exchange regulations.
- Aims to liberalise and facilitate international trade.

Replacement: Supersedes the restrictive Foreign Exchange Regulation Act (FERA) of 1973.

➢ **Key Objectives of FEMA**:

- **Facilitate External Trade**: Simplifies processes for international transactions.
- **Promote Orderly Development**: Supports the growth of the foreign exchange market in India.
- **Liberalizes** foreign exchange rules.

➢ **Key Features**:

- **Simplified Structure**: Consists of **49 sections** (vs. FERA's 81).
- **Expanded Definitions**: Clarifies terms like Capital Account Transaction and Authorised Person.
- **Regulatory Bodies**: Governed by the Reserve Bank of India (RBI) and the Central Government, with enforcement by the Directorate of Enforcement.

➢ **Transactions Classification**:

- **Capital Account Transactions**:
  - Involves changes to assets or liabilities (e.g., FDI, ECB).
- **Current Account Transactions**:
  - Day-to-day transactions are largely free from restrictions.

➢ **Regulatory Changes**:

- Permits **compounding of offences** (not allowed under FERA).
- Most **current account transactions** do not require prior permissions.

➢ **Foreign Exchange Regulation Act (FERA)**
- Introduced in **1973** to regulate foreign exchange and curb illegal activities.

➢ **Key Features**:
- **Restrictive Framework**: Imposed stringent regulations and punitive measures.
- **Focus on Compliance**: Heavy penalties for violations aimed at preventing illegal forex activities.

➢ **Key Restrictions**:
- Limited foreign investments and controls on capital movements.
- Required licences for various foreign exchange transactions.

➢ **Transition to FEMA**:
- FERA was replaced by FEMA in **1999**, marking a shift towards a more liberalised and facilitative approach to foreign exchange management.

FERA Act	FEMA Act
• Its goal was the protection of Foreign Exchange	• Its aim is the management of Foreign Exchange
• Created in 1973	• Replaced on 29th December 1999
• It has 81 Sections	• It has 49 Sections
• It was created with the idea that Foreign Exchange is a Rare Fund	• It was created with the idea that Foreign Exchange is an asset
• It was to control Foreign Payments in India	• It was to promote and boost Foreign Trade in India
• In FERA, the definition of Authorized Person was limited	• At FEMA, the definition of Authorized Person is broad
• Banking Units were not licensed	• Banking Units are permitted
• It was a Criminal Offense to break FERA Rules	• It is a Civil Offense to break FEMA Rules

Prevention of Money Laundering Act (PMLA)

Context: *Recently, the Supreme Court emphasised expeditious case disposal under special statutes like the PMLA.*

➢ **Overview:**
- The Supreme Court highlighted PMLA's seriousness, emphasising expeditious trials due to its financial threats.
- The court stated that a scheduled offence is essential to prove proceeds of crime under PMLA

➢ **The Prevention of Money Laundering Act (PMLA), 2002**
- **Enacted**: 2002, to combat money laundering linked to illegal activities like drug trafficking and terrorism financing.
- **Objective**: To Prevent money laundering and facilitate confiscation of properties derived from such activities.

➢ **What is Money Laundering?**
- Concealing the origins of illegally obtained money to make it appear legitimate.
- **Stages**:
  - **Placement**: Introducing illicit funds into the financial system.
  - **Layering**: Conducting complex transactions to obscure the money's origin.
  - **Integration**: Reintroducing laundered funds into the economy.

➢ **Key Provisions of PMLA**
- **Offences and Penalties**: Defines money laundering and imposes severe penalties, including imprisonment.
- **Attachment of Property**: Allows confiscation of properties involved in money laundering.
- **Reporting Requirements**: Banks and financial institutions must report suspicious transactions to the Financial Intelligence Unit (FIU).
- **Designated Authority**: Established to aid investigations and prosecutions.

➢ **Amendments of 2023**
- **Definition of Politically Exposed Persons (PEPs)**: The new rules define PEPs as individuals entrusted with prominent public functions by foreign countries, aligning with the RBI's 2008 circular and **FATF** norms.
- **Identification of Beneficial Owners**: The threshold for identifying beneficial owners has been lowered from over 25% to more than 10% of shares or profits.
- **Non-Profit Organisations Registration**: Reporting entities must register non-profit organisations on the DARPAN portal of NITI Aayog and maintain records for five years post-relationship.
- **Due Diligence Requirements**: Due diligence documentation has expanded beyond basic KYC, requiring more comprehensive client information.
- **Inclusion of Virtual Digital Assets (VDA)**: Crypto exchanges must maintain KYC records and report suspicious transactions, addressing the unregulated status of cryptocurrencies in India.
- **Legal Clarity**: These changes aim to clarify legal positions for both investigators and users of digital currencies, preventing misuse for money laundering.

➢ **Significance of FATF-related Changes**

- **Preparation for FATF Assessment**: The amendments are crucial as India anticipates an assessment from the Financial Action Task Force (FATF) later this year.
- **Legal Uniformity**: The goal is to ensure consistency in legal frameworks and eliminate ambiguities prior to the FATF assessment.
- **Enhanced Monitoring**: The inclusion of cryptocurrencies aims to monitor and curb illicit financial flows, strengthening compliance with international standards.

NEWS IN BETWEEN THE LINES

Ethanol

Recently, Food and Public Distribution Minister Pralhad Joshi announced that India is now the world's third-largest ethanol producer and consumer.

About Ethanol:

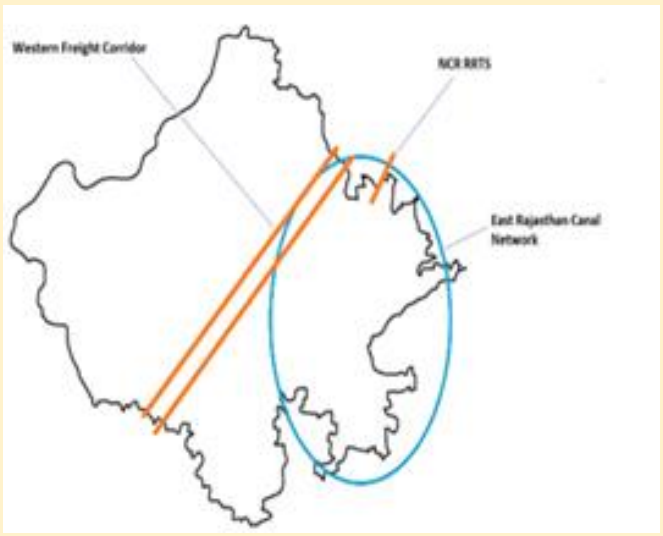
- Ethanol (C_2H_6O), also **known as ethyl alcohol** or **grain alcohol**, is a **flammable**, **colourless** chemical compound.
- It is a **natural byproduct of plant fermentation** and can also be produced through petrochemical processes.
- Ethanol is primarily produced through the **fermentation of sugars** by yeasts.
- It can also be produced via petrochemical methods, making it versatile in its production processes.
- Ethanol can be derived from a variety of sources including **sugarcane**, **corn**, **rice**, **wheat** and **biomass**.
- Ethanol is used as an ingredient in **alcoholic beverages** such as beer, wine and brandy.
- More importantly, it is **used as a biofuel**, where it is blended with petrol to create a cleaner fuel alternative, helping to reduce harmful emissions.
- Ethanol offers several benefits, including its **potential to reduce air pollution** and **improve air quality**.
- The Indian government has announced an ambitious plan to achieve **20% ethanol-blended petrol** across the country **by 2025**.

Eastern Rajasthan Canal Project

Rajasthan and Madhya Pradesh will sign an agreement soon to link the Eastern Rajasthan Canal Project (ERCP) with the Parvati, Kali Sindh, and Chambal rivers for optimal water use in the Chambal basin.

About Eastern Rajasthan Canal Project:

- The Eastern Rajasthan Canal Project (ERCP) is a **water transfer project** that aims to provide drinking and industrial water to 13 districts in eastern Rajasthan.
- The **project uses surplus water** from the **Chambal River** and its tributaries during the rainy season to provide water to areas that are water-scarce.
- The project diverts water from the **Kalisindh**, **Parvati**, **Mej**, and Chakan sub-basins into the **Banas**, **Gambhiri**, **Banganga** and Parbati sub-basins.
- The project will benefit the districts of Alwar, Bharatpur, Dholpur, Karauli, Sawai-Madhopur, Dausa, Jaipur, Ajmer, Tonk, Bundi, Kota, Baran and Jhalawar.



- This project is **planned to meet drinking and industrial water needs** of the southern and south eastern Rajasthan, for humans and Livestock till the year **2051**.
- The **Central Water Commission approved the** project in **2017**, but the **Jal Shakti Ministry** has put it on hold until inter-state issues between Rajasthan and Madhya Pradesh are resolved.

SASTRA Ramanujan Prize

Recently, the 2024 SASTRA Ramanujan Prize was announced to be awarded to Alexander Dunn from the Georgia Institute of Technology, U.S.

About the SASTRA Ramanujan Prize:

- The SASTRA Ramanujan Prize is an **annual award,** instituted in **2005.**
- It is **given to young mathematicians** who have made outstanding contributions to the field of mathematics.
- The SASTRA Ramanujan Prize is considered **one of the top awards for mathematics in the world.**
- The prize is presented by the **Shanmugha Arts**, **Science, Technology & Research Academy (SASTRA) on the birthday of Srinivasa Ramanujan,** December 22, at SASTRA University in **Kumbakonam**, **Tamil Nadu.**
- The age limit for the award is **32 years,** the same age Ramanujan was when he died.
- The award includes a cash prize of **$10,000 and a citation**.

Personality in News

Bhagat Singh

27th September marked the 117th birth anniversary of Bhagat Singh.

Bhagat Singh (27 September 1907– 23 March 1931):

Bhagat Singh, an Indian anti-colonial revolutionary freedom fighter, was born in Lyallpur, Punjab, which is now in Pakistan.

Contributions:

- Bhagat Singh was deeply impacted by significant events such as the **Jallianwala Bagh massacre in 1919** and the violence against **unarmed Akali protestors** in **1921**.
- In **1924**, he became a **member of the Hindustan Republican Association** and **founded the Naujawan Bharat Sabha in 1926** to promote revolutionary ideas.
- In **1928**, **he co-founded the Hindustan Socialist Republican Association** (HSRA), which aimed to achieve independence through armed struggle.
- Bhagat Singh was involved in the **Kakori Case** and was **arrested in 1927**.
- He later assassinated police officer J.P. Saunders in **1928** as retaliation for the death of Lala Lajpat Rai.
- In April **1926**, Bhagat Singh established contact with Sohan Singh Josh and through him the **'Workers and Peasants Party'** which brought out the **monthly magazine Kirti** in Punjabi.
- He was sentenced to death along with Sukhdev and Rajguru, and the execution took place on **March 23, 1931.**
- He authored the book "**Why I am an Atheist**," and he is remembered for his powerful quotes on revolution and freedom.

Honours:

March 23 is observed as **Martyrs' Day** in memory of Bhagat Singh and his associates.

Place in News

Uzbekistan

Recently, Finance Minister Nirmala Sitharaman met with Uzbekistan President Shavkat Mirziyoyev on the sidelines of the 9th Annual Meeting of the Asian Infrastructure Investment Bank (AIIB) Board of Governors in Samarkand.

Uzbekistan (Capital: Tashkent)

Location: Uzbekistan is a **doubly landlocked country** located in Central Asia.

Political Boundaries: Uzbekistan shares its borders with **Kazakhstan** (North), **Kyrgyzstan** (Northeast), **Afghanistan** (South), **Tajikistan** (Southeast) and **Turkmenistan** (Southwest).

Physical Features:

- The highest point in Uzbekistan is **Alpomish Peak**.
- The major rivers in Uzbekistan include the **Amu Darya** and the **Syr Darya**.
- Uzbekistan has a **continental climate**.
- Uzbekistan is rich in **gold**, **uranium**, **natural gas**, **coal**, **copper** and **silver**.

Membership: Uzbekistan is a member of several international organizations, including **United Nations** (UN), **Commonwealth of Independent States** (CIS), **Shanghai Cooperation Organization** (SCO), **Organization of Islamic Cooperation** (OIC).

POINTS TO PONDER

- Recently, scientists discovered more than 300 never-before-seen Nazca Lines in which country? **– Peru**
- Recently, in which wildlife sanctuary did the collision of two cyclones cause the flattening of thousands of trees? **– Eturnagaram Wildlife Sanctuary**
- Recently, astronomers have mapped the differential rotation of the Sun's Chromosphere using data from which solar observatory? **– Kodaikanal Solar Observatory**
- Recently, which organization announced the launch of the Unified Logistics Interface Platform Hackathon 2.0? **– NICDC Logistics Data Services Ltd. (NLDSL)**
- Recently, which organization released the Periodic Labour Force Survey (PLFS) for the period between July 2023 and June 2024? **– Labour Bureau**