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PARAM RUDRA SUPERCOMPUTERS



Recently, the Prime Minister of India virtually launched three Param Rudra Super Computing Systems and a High Performance Computing (HPC) system for weather and climate research.

- It is designed to tackle complex computational challenges across various scientific and engineering domains.
- Three Param Rudra supercomputers have been developed indigenously under the National Supercomputing Mission.
- They have been deployed at three key locations: Delhi, Pune and Kolkata.
- In Pune, the Giant Metre Radio Telescope (GMRT) will leverage the supercomputer to explore Fast Radio Bursts (FRBs) and other astronomical phenomena.
- In Delhi, Inter University Accelerator Centre (IUAC) will enhance research in fields like material science and atomic physics.
- In Kolkata, S N Bose Centre will use supercomputing technology to drive advanced research in areas such as physics, cosmology, and earth sciences.

What is a High-Performance Computing (HPC) system?

- It is tailored for weather and climate research.
- It is located at two key sites, the Indian Institute of Tropical Meteorology (IITM) in Pune and the National Center for Medium Range Weather Forecast (NCMRWF) in Noida, this HPC system has extraordinary computing power.
- The new HPC systems are named 'Arka' and 'Arunika,' reflecting their connection to the Sun.



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- Significance: These high-resolution models will significantly enhance the accuracy and lead time of predictions related to tropical cyclones, heavy precipitation, thunderstorms, hailstorms, heat waves, droughts, and other critical weather phenomena.

Key facts about the National Supercomputing Mission

- It was launched in 2015 to provide the country with supercomputing infrastructure to meet the increasing computational demands of academia, researchers, MSMEs, and startups.
- It aims to create a network of advanced computing systems across India.
- It is a collaboration between the Ministry of Electronics and Information Technology (MeitY) and the Department of Science and Technology (DST).

It is implemented by the Centre for Development of Advanced Computing (C-DAC), Pune and the Indian Institute of Science (IISc), Bengaluru.

CENTRAL SILK BOARD



Recently, the Union Minister of Textiles unveiled the Commemorative coin, celebrating the Platinum Jubilee of the Central Silk Board (CSB) at Mysuru.

- It is a Statutory Body established in 1948, by an Act of Parliament.
- It functions under the administrative control of the Union Ministry of Textiles, Government of India.
- It comprises 39 members appointed as per the powers and provisions conferred by Sub-Section 3 of Section 4 of the CSB Act 1948, for a period of 3 years.
- The Chairperson of the Board to be appointed by the Central Government.
- Functions



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- It advises the Central Government on all matters relating to production, supply, distribution, trade and commerce in silk-worm seed, the development of the silk industry and its products including export and import.
- It has established 6 Regional Offices at New Delhi, Mumbai, Kolkata, Hyderabad, Bhubaneswar and Guwahati.
- Headquarters: Bengaluru

Silk Production in India

- India has the unique distinction of being the only country producing all the five known commercial silks, namely, mulberry, tropical tasar, oak tasar, eri and muga.
- India is the second largest producer of silk in the world.

EAST RAJASTHAN CANAL PROJECT (ERCP)



The Rajasthan Chief Minister recently said that the Eastern Rajasthan Canal Project (ERCP) is significant for the State and both Rajasthan and Madhya Pradesh are working together to complete it.

- It is an ambitious project of Rajasthan State to harvest the excess water present in the rivers, especially in southern Rajasthan, and use that water for drinking and irrigation purposes in south-eastern Rajasthan, where there is scarcity.
- It envisages intra-basin transfer of water within the Chambal Basin by utilising surplus monsoon water available in Kalisindh, Parvati, Mej, and Chakan sub-basins and diverting it into water deficit sub-basins of Banas, Gambhiri, Banganga, and Parbati to provide drinking and industrial water to 13 districts of eastern Rajasthan.
- The project also envisages irrigation in about 2.82 lakh hectare area.
- The project will also supply water to the Delhi-Mumbai Industrial Corridor and take care of the flood and drought situation in the area.

Key Facts about Chambal River:



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- It is a tributary of the Yamuna River in central India and thus forms part of the greater Gangetic drainage system.
 - Course:
 - Origin: It originates at the Singar Chouri peak on the northern slopes of the Vindhya mountains.
 - The river flows north-northeast through Madhya Pradesh, running for a time through Rajasthan, then forms the boundary between Rajasthan and Madhya Pradesh before turning southeast to join the Yamuna in Uttar Pradesh.
 - The basin is bounded by the Vindhyan mountain ranges and the Aravallis.
 - The Hadauti plateau in Rajasthan occurs in the upper catchment of the Chambal River to the southeast of the Mewar Plains.
 - It is one of the most pollution-free rivers in India.
 - Tributaries: Banas, Kali Sindh, Sipra, Parbati, etc.
 - Major Dams on the River: Gandhi Sagar Dam, Rana Pratap Sagar Dam, Jawahar Sagar Dam.
 - The National Chambal Sanctuary is situated along the river Chambal on the tri-junction of Rajasthan, Madhya Pradesh, and Uttar Pradesh.
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WHAT IS A SPIRAL GALAXY?

NASA Hubble Space Telescope recently shared a stunning video of a spiral galaxy known as Caldwell 45, or NGC 5248.

- Spiral galaxies are twisted collections of stars and gas that often have beautiful shapes and are made up of hot, young stars.
- In a spiral galaxy, the stars, gas, and dust are gathered in spiral arms that spread outward from the galaxy's center.
- Most of the galaxies that scientists have discovered so far are spiral galaxies, as opposed to the other two main categories of galaxy shapes—elliptical and irregular.



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- Approximately 60% of all galaxies are thought to be spiral galaxies.
 - The Milky Way, the galaxy that includes Earth and our solar system, is an example of a spiral galaxy.
 - Structure:
 - Most spiral galaxies contain a central bulge surrounded by a flat, rotating disk of stars.
 - The bulge in the center is made up of older, dimmer stars and is thought to contain a supermassive black hole.
 - Approximately two-thirds of spiral galaxies also contain a bar structure through their center, as does the Milky Way.
 - The disk of stars orbiting the bulge separates into arms that circle the galaxy.
 - These spiral arms contain a wealth of gas and dust and younger stars that shine brightly before their quick demise.
 - The majority of spiral galaxies rotate in the sense that the arms trail the direction of the spin.
 - The visible portion of spiral galaxies contains only a small fraction of the total mass of the galaxy, and that spiral galaxies are surrounded by an extensive halo consisting mostly of dark matter.
 - Spiral galaxies are thought to evolve into elliptical galaxies as the spirals get older.
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DEEPTech: REVOLUTIONIZING THE FUTURE OF TECHNOLOGY

Introduction:

- Deeptech, or deep technology, refers to cutting-edge innovations rooted in scientific and engineering breakthroughs.
- Unlike traditional tech companies that often focus on software or app development, deeptech ventures delve into complex technologies that have the potential to disrupt industries and address significant global challenges.
- These technologies include **artificial intelligence (AI), robotics, quantum computing, biotechnology, blockchain, advanced materials**, and more.



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Key Characteristics of Deeptech:

- **Scientific and Engineering Foundations:** Deeptech is built on scientific research, engineering advancements, and sophisticated algorithms. It often involves long-term research and development (R&D) and requires a deep understanding of the underlying science.
- **High Entry Barriers:** Deeptech ventures typically have high entry barriers due to the need for specialized knowledge, substantial capital investment, and complex development processes.
- **Significant Impact Potential:** Deeptech solutions aim to solve critical problems in various sectors such as healthcare, energy, manufacturing, and agriculture. They have the potential to create substantial economic value and drive societal change.
- **Extended Development Timelines:** Unlike typical tech startups that can scale rapidly, deeptech companies often face extended timelines due to the need for rigorous testing, prototyping, and validation before reaching the market.

Present Challenges Facing Deeptech:

- **High R&D Costs:** The development of deeptech solutions requires significant investment in research, infrastructure, and talent, making it difficult for startups to secure funding.
- **Commercialization Barriers:** Converting deeptech innovations into market-ready products involves overcoming technical, regulatory, and market acceptance hurdles.
- **Talent Shortage:** There is a growing need for specialized talent in fields such as quantum computing, AI, and biotechnology, but the supply of skilled professionals is limited.
- **Long Time-to-Market:** The extended timelines for development and regulatory approval can deter investors looking for quicker returns.

Future of Deeptech:



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- The future of deeptech is promising, with increasing investment and support from governments, academia, and private sectors.
 - As deeptech continues to evolve, it will play a pivotal role in shaping industries and enhancing human life.
 - Governments and private investors are recognizing the importance of supporting deeptech ventures through funding, incubators, and policy frameworks.
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BILKIS BANO CASE - SUPREME COURT DISMISSES GUJARAT REVIEW PLEA

What is Bilkis Bano Case?

- In the aftermath of the Godhra riots in Gujarat in 2002, Bilkis Bano and her family were attacked by a group of people.
- Bilkis was brutally gangraped and seven of her family members were murdered.
- Her case was taken up by the National Human Rights Commission (NHRC) and Supreme Court, which ordered an investigation by the CBI.
- Due to persistent death threats, the trial was moved out of Gujarat to Mumbai where charges were filed against these people.
- In January 2008, a special CBI court in Mumbai had sentenced the 11 accused to life imprisonment.
- **Release of these convicts**
 - In 2022, one of the convicts named Radheshyam Shah, after completing 15 years and four months of his life term, moved to the SC for early release.
 - In May 2022, the SC passed this case to the Gujarat government.
 - It asked the Gujarat government to consider Shah's application for premature release, as per the state's 1992 remission policy.
 - On August 15, 2022, the Gujarat government released all 11 convicts in the gangrape case under its remission policy.

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- However, this decision sparked a major public backlash, and prompted petitions from opposition MPs.
 - **Review petition by Bilkis Bano**
 - Bilkis Bano in 2022 filed an appeal in the Supreme Court to review the decision of the Gujarat government ordering release of the 11 gangrape convicts.
 - **January 8 judgement of Supreme Court**
 - In response to the review petition filed by Bilkis Bano, the apex court, on January 8, **overturned** the Gujarat government's decision to release the 11 convicts.
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STORMS BREWING IN EAST, SOUTH CHINA SEAS

Significance of East China Sea (ECS) and South China sea (SCS)

- **Significance for China**
 - **Geopolitical Control**
 - Both seas are crucial for China's defense and military positioning. Control over these waters allows China to project power in the region and safeguard its national security interests.
 - The SCS is part of China's "first island chain" defense strategy, forming a buffer against external threats.
 - **Territorial Claims**
 - China views the ECS and SCS as integral parts of its territorial sovereignty, with ongoing disputes over islands like the Diaoyu/Senkaku in the ECS and several islets and reefs in the SCS.
 - In its 2019 Defence White Paper, China declares that the South China Sea islands and Diaoyu Islands are integral parts of its territory.
 - **Trade Routes**
 - South China Sea is one of the world's busiest maritime trade corridors, with an estimated \$3.4 trillion in annual trade passing through it.



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- Control over this region gives China potential leverage over international shipping routes.
- **Fisheries and Resources**
 - Both the ECS and SCS are rich in fish stocks, a critical resource for China's food security and economy.
 - The seas also provide livelihoods for millions in neighboring countries.
- **Energy Resources**
 - The South China Sea is believed to hold significant reserves of oil and natural gas.
 - Securing these resources is vital for China's growing energy demands and for other nations relying on the region's resources.

Significance for other countries

- **Key maritime route**
 - The key maritime trade routes in East Asia pass through these two seas. Taiwan Strait is a critical maritime choke point.
 - **Vital for digital economy**
 - The region is home to undersea cables that are important for the global digital economy.
 - **Vital for energy security**
 - As per the U.S. Energy Information Administration, in 2023, 10 billion barrels of petroleum and petroleum products and 6.7 trillion cubic feet of liquefied natural gas passed through the South China Sea.
 - It is also home to vast reserves of untapped oil and natural gas.
 - **Global Security**
 - The East and South China Seas are flashpoints for potential conflict. It is drawing global attention from powers like the U.S., which conducts Freedom of Navigation Operations (FONOPs) to challenge China's maritime claims.
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