

### INDIA'S QUANTUM LEAP: THE PROMISE IN INDIA'S NATIONAL QUANTUM MISSION

#### Context

- To realise the vision of building a **self-reliant technology base**, the **National Quantum Mission** could be a game changer.
- However, like any other technology, quantum technology will also need material innovation - R&D in “Quantum Materials.”

#### The National Quantum Mission (NQM)

- India is the **sixth country to have a dedicated quantum mission** after the US, Austria, Finland, France, and China.
- NQM will fund **R&D in quantum computing technology** and associated applications and will have **defined milestones** that are expected to be achieved **over the course of eight years (2023-24 to 2030-31)**.
- **Four thematic hubs/T-Hubs** with a focus on quantum computing, communication, sensing and metrology, and materials and devices **will be established in India's leading academic and national R&D institutes**.

#### Objectives of the Mission:

- **Create intermediate-scale quantum computers** with 50-1000 qubits in the next eight years.
- **Establish satellite-based secure quantum communications** between ground stations within India, as well as with other countries, covering a range of 2000 km.
- It will look to **provide inter-city quantum key distribution** over 2000 km, **multi-node quantum network** with quantum memories.
- It will help to **advance atomic technology** with highly sensitive magnetometers and precision atomic clocks that serve communication, navigation, and timing.
- It will aid in designing and **synthesising quantum materials**, including superconductors, novel semiconductor structures, and topological materials for the fabrication of quantum devices.

## Challenges Associated with the Investment

- **Less focus on Manufacturing**
  - Currently nearly 12 per cent start-ups are deep tech-related. This represents an early 35 times increase between 2016 and 2019.
  - However **less than 3 per cent of these involve manufacturing materials.**
- **Lack of Infrastructure:** India lacks enough infrastructure that can support the entire chain of operation from working out the proof-of-principle to developing working prototypes.
- **Sub-critical size of R&D community**
  - The sub-critical size of the country's R&D community
  - **In 2018, India had 253 full-time equivalent researchers per million of its population, about 11 percent of there searcher density of Italy.**
- **Scattered Workforce:** The workforce is distributed across the country.

## Conclusion

- **Material domains in all aspects of quantum technology;** computing, communications, and sensing **are still developing.**
- A well-balanced focus on R&D, timely investment and efficient management with fundamental and futuristic objectives will bring assured outcomes for India.

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## INDIAN RENEWABLE ENERGY DEVELOPMENT AGENCY (IREDA)

The Ministry of Finance recently invited bids to select an advertising agency for listing and partial disinvestment in the Indian Renewable Energy Development Agency (IREDA).



### About Indian Renewable Energy Development Agency (IREDA):

- It was set up as a **specialized non-banking finance agency for the renewable energy sector.**
- It is a **Public Limited Government Company** established as a **Non-Banking Financial Institution** in 1981.

- REDA has been notified as a “Public Financial Institution” under section 4 ‘A’ of the Companies Act, 1956 and registered as Non-Banking Financial Company (NBFC) with Reserve Bank of India (RBI).
  - It is formed for promoting, developing and extending financial assistance for setting up projects relating to new and renewable sources of energy and energy efficiency/conservation.
  - Objectives:
    - To give financial support to specific projects and schemes for generating electricity and/ or energy through new and renewable sources and conserving energy through energy efficiency.
    - To maintain its position as a leading organization to provide efficient and effective financing in renewable energy and energy efficiency/ conservation projects.
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## HIMALAYAN CHANDRA TELESCOPE

The Himalayan Chandra Telescope in Hanle recently joined hands with 10 other global observatories to observe the brightening of a blazar, one of the most powerful objects in the universe.



### About Himalayan Chandra Telescope:

- It is a 2 meter optical-infrared telescope named after Nobel laureate Subramaniam Chandrasekhar.
- Location: It is at the Indian Astronomical Observatory (IAO) in Hanle near Leh in Ladakh.
- It is currently the tenth highest optical telescope in the world, situated at an elevation of 4,500 meters.
- The telescope remotely operated using a dedicated satellite communication link from the Centre for Research & Education in Science & Technology (CREST), Indian Institute of Astrophysics (IIA), Bangalore.
- Imaging instruments include a Faint Object Spectrograph, a near infra-red and an optical CCD camera.

What is a Blazer?

- It is a **type of galaxy** that is powered by a **humongous black hole** and is among one of the **brightest and most powerful objects in the universe**.
  - They are known for **emitting highly energetic particles and radiation, including gamma rays, X-rays, and radio waves**.
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## GREEN DEPOSIT: WHAT ARE RBI REGULATIONS ON GREEN DEPOSIT?

### Why in News?

- Recently, the Reserve Bank of India (RBI) came up with a **regulatory framework for banks to accept green deposits** from customers.
- Under the new framework, banks that accept green deposits will have to disclose more information on **how they invest these deposits**.

### What are Green Deposits?

- **Green deposits are not very different from the regular deposits** that banks accept from their customers.
  - **The only major difference** is that banks promise to earmark the money that they receive as green deposits towards **environment-friendly projects**.
  - **For example**, a bank may promise that green deposits will be used towards financing renewable energy projects that fight climate change.
  - A green deposit is just one product in a wide array of other financial products such as green bonds, green shares, etc., **that help investors put money into environmentally sustainable projects**.
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## ARE ARTIFICIAL SWEETENERS HARMFUL?

### Why in News?

- The World Health Organisation has recommended against using artificial sweeteners to achieve weight loss and prevent lifestyle diseases such as diabetes.

### What are Low-Calorie/Artificial Sweeteners?

- Low-calorie sweeteners (LCS) are **sweeteners that contain few to no calories but have a higher intensity of sweetness per gram** than sweeteners with calories—like table sugar, fruit juice concentrates, and corn syrups.
- Other names for LCS are non-nutritive sweeteners, artificial sweeteners, sugar substitutes, and high-intensity sweeteners.
- LCS sometimes carry the label “**sugar-free**” or “**diet**”. Some LCS can be used as general purpose sweeteners.
- LCS are found in many beverages and foods like frozen desserts, yogurt, candies, baked food items, chewing gum, breakfast cereals, gelatins, and puddings.

### Common Low-Calorie/Artificial Sweeteners:

Name of LCS	Source
1. Sucralose	<ul style="list-style-type: none"> <li>• Made from adding chlorine to sugar molecules.</li> </ul>
2. Saccharin	<ul style="list-style-type: none"> <li>• The oldest artificial sweetener.</li> <li>• Made from benzoic sulfonimine and is up to 700 times sweeter than table sugar.</li> </ul>
3. Acesulfame	<ul style="list-style-type: none"> <li>• Made from acesulfame potassium.</li> </ul>
4. Aspartame	<ul style="list-style-type: none"> <li>• Made from the amino acids phenylalanine and aspartic acid. Also includes methanol.</li> </ul>
5. Neotame	<ul style="list-style-type: none"> <li>• Similar to aspartame and made from phenylalanine and aspartic acid.</li> </ul>
6. Stevia	<ul style="list-style-type: none"> <li>• Extracted from the leaves of the stevia plant.</li> <li>• The extracts are processed before they're packaged and sold, put them in the same category as an artificial sweetener.</li> </ul>
7. Sugar alcohols	<ul style="list-style-type: none"> <li>• Sugar molecules with an alcohol attached. Naturally occur in some fruits.</li> </ul>

### How Your Body Reacts to an Artificial Sweetener?

- When you eat regular sugar, your blood transports the sugar to your cells, where it’s either turned into energy or put into storage for later use.
- Sugar can be stored as **glycogen** (the body’s storage form of sugar) or turned into fatty acids and deposited into fat cells.
- On the other hand, **most artificial sweeteners are man-made chemicals that the human body wasn’t designed to process.**
- That said, our bodies are unable to absorb some artificial sweeteners.
- For example, sugar alcohols like xylitol or sorbitol don’t get absorbed. They sit in the GI tract, where they can cause gas, bloating or diarrhoea.
- If the artificial sweetener is absorbed, the body recognizes it as a foreign substance or toxin.
- Instead of going to different cells in our body, artificial sweeteners travel straight to our liver.
- The liver then has to get rid of them, similar to how your liver responds to drinking alcohol.

### Benefits of Artificial Sweeteners:

- Sweetness without sugar –
- Calorie control –
- Used in weight-loss diet –
- Diabetics/Pre-diabetics –

#### Disadvantages/Side Effects of Artificial Sweeteners:

- Possible link to diseases –
- May lead to more sugar cravings –

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### SC UPHOLDS VALIDITY OF JALLIKATTU

#### Why in news?

- A five-judge Bench of the Supreme Court upheld the amendments made by the legislatures of Tamil Nadu, Maharashtra, and Karnataka to The Prevention of Cruelty to Animals (PCA) Act, 1960.
- The amendments allowed bull-taming sports like jallikattu, kambala, and bullock-cart races.

#### Jallikattu

- **Jallikattu**, also known as **eruthazhuvuthal**, is a bull-taming sport traditionally played in Tamil Nadu as part of the Pongal harvest festival.
- The festival is a celebration of nature, and thanksgiving for a bountiful harvest, of which cattle-worship is part.
- It is popular in Madurai, Tiruchirappalli, Theni, Pudukkottai and Dindigul districts — known as the Jallikattu belt.
- The practice of jallikattu has long been contested, with animal rights groups and the courts expressing concern over:
  - cruelty to animals and
  - the bloody and dangerous nature of the sport that sometimes causes death and injuries to both the bulls and human participants.

## Importance of Jallikattu

- **Old cultural tradition**
  - A tradition over 2,000 years old, Jallikattu is a competitive sport as well as an event to honour bull owners who rear them for mating.
  - It is a violent sport in which contestants try to tame a bull for a prize; if they fail, the bull owner wins the prize.
- **Way to protect these male animals**
  - Conservationists and peasants argue that Jallikattu is a way to protect these male animals which are otherwise used only for meat if not for ploughing.
  - This becomes significant at a time when cattle breeding is increasingly becoming an artificial process.

## News Summary: SC upholds validity of Jallikattu

- While delivering its verdict for a batch of pleas challenging Tamil Nadu and Maharashtra laws allowing the traditional bull-taming sport Jallikattu, the Supreme Court upheld the validity of the laws.

## What did the court hold?

- **Tamil Nadu Amendment Act is not a piece of colourable legislation**
  - The top court held that the Tamil Nadu Amendment Act is not a piece of colourable legislation.
  - Doctrine of Colourable Legislation means that if a legislature lacks the jurisdiction to enact laws on a specific subject directly, it cannot make laws on it indirectly. In simple words, the doctrine checks if a law has been enacted on a subject indirectly when it is barred to legislate on that topic directly.
  - It relates to **Entry 17 of List III of the Seventh Schedule** to the Constitution which relates to the prevention of cruelty to animals.
- **Observations regarding 2017 amendment**
  - The 2017 amendment “minimises cruelty to animals in the concerned sports”.
  - Once it is implemented and read with the rules, the sports will not come under the definition of cruelty defined in the 1960 Act.

- The amendment has received Presidential assent; hence, there is no flaw in the state action.
  - **Jallikattu has historical context**
  - As per the legislatures of Tamil Nadu, Jallikattu has been going on in Tamil Nadu for the last few centuries and forms a part of its cultural heritage.
  - In this context, the court clarified that it did not want to disrupt the legislature's view.
  - **2017 amendment does not violate Fundamental duties and Fundamental Rights**
  - The court also said that the 2017 amendment does not violate Articles 51-A (g) and 51-A (h).
    - 51-A (g) impose duties on Indian citizens to protect the environment.
    - 51-A (h) deals with developing a scientific temper, humanism, spirit of inquiry, and reform.
  - It also held that the amendment didn't violate Articles 14 (Right to Equality) and 21 (Right to Life) of the Constitution.
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## ELECTIONS AND THE AIRWAVES

### Why in news?

- In the recently-concluded Karnataka Assembly elections, political parties were provided free airtime on public broadcasters, All India Radio (Akashvani) and Doordarshan during elections.

### News Summary: Elections and the airwaves

- The six recognised national parties and one recognised State party were provided free airtime on public broadcasters during recently concluded Karnataka Assembly elections.
- The parties were allocated a base time of 45 minutes and additional slots based on performance in previous polls.
- A total of 630 minutes of free airtime was issued under this allotment.

### Rationale behind the scheme

- **Airwaves are public property**
- The Supreme Court, in 1995, held that airwaves are public property and its use should serve the greater public good.
  - SC delivered this judgement in The Secretary, Ministry of Information and Broadcasting vs Cricket Association of Bengal and ANR case 1995.
- Elections are the lifeblood of a democracy. Hence, political parties are given free airtime.



- **To ensure fair and equitable coverage of political campaigns**
    - The concept of providing free airtime is based on the principle of giving every party an equal platform to present their policies, ideas, and vision to the electorate.
    - It helps to level the playing field and prevent any party from dominating the media landscape due to its financial resources or influence.
  - **To add more diversity and colour to the electoral process**
    - In the Indian media landscape, due to the pattern of ownership of media houses, the public generally identify a broadcaster as being affiliated with one political party or the other.
    - In this regard, State-sponsored airtime provides more diversity and colour to the electoral process.
    - E.g., - The guidelines by the Election Commission of India require that a maximum of two panel discussions are also aired by Akashvani and DD.
    - These discussions provide an excellent platform for parties, both big and small, to debate and criticise each other's policies and manifestos, and in general promote an informed citizenry.
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## PALAMU TIGER RESERVE (PTR)

Railways is all set to relocate 11-km stretch of the railway track, which goes through the middle of the core area of Palamu Tiger Reserve (PTR).



### About Palamu Tiger Reserve (PTR):

- **Location:**
    - It is located in the western side of Latehar district on the Chhotanagpur plateau in Jharkhand.
  - The reserve forms a **part of the Betla National Park**.
  - It is **one of the first 9 tiger reserves created** in the country at the inception of 'Project Tiger'.
  - It is the **first reserve in the world** in which a tiger census was carried out as a pugmark count, as early as 1932 under the supervision of J.W. Nicholson
  - **Terrain:** It is **undulating with valleys, hills and plains**.
  - **Rivers:**
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# CROSS & CLIMB ROHTAK



- Three rivers namely **North Koyal, Auranga and Burha** flow through the valleys.
  - The area is draught prone with **Burha being the only perennial river.**
  - The Reserve is very **rich in minerals like Bauxite and Coal.**
  - **Vegetation:**
    - It is primarily dominated by **Northern Tropical Dry Deciduous Sal forest** and its associates.
    - Smaller patches of **Northern tropical Moist Deciduous forests** exist too in the Reserve.
  - **Flora:** *Shorea robusta*, *Acacia catechu*, *Madhuca indica*, *Terminalia tomentosa*, *Butea monosperma*, *Pterocarpus marsupium*, *Anogeisus latifolia*, *Indigofera pulchela* etc.
  - **Fauna:** Some keystone and principal species found in the reserve include **Tiger, Asiatic Elephant, Leopard, Grey wolf, Wild dog, Gaur, Sloth bear** and **Four horned antelope.**
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