

Pradhan Mantri Schools for Rising India (PM SHRI)

❖ Context

- Recently, the Minister of State for Education informed the Lok Sabha about **Pradhan Mantri Schools for Rising India (PM Shri) Scheme**

PM Shri

● About

- The Cabinet approved a new **Centrally Sponsored Scheme** named **PM SHRI** on 7th September 2022.
- Under the scheme, **14,597 existing schools will be selected** from amongst those managed by the Central government, States, Union Territories and local bodies.
- The Centre expects **18 lakh students to directly benefit from the scheme.**

● Key Features of the Scheme

- Schools will be **redeveloped as model institutions**, or PM Shri Schools, to **fulfil the objectives of the NEP 2020.**
- These schools will **deliver quality teaching** for the cognitive development of students and strive to create individuals equipped with key 21st-century skills.
- These schools will be **equipped with modern infrastructure** including labs, smart classrooms, libraries, sports equipment, art room etc.
- These shall also be **developed as green schools** with water conservation, waste recycling, energy-efficient infrastructure and integration of organic lifestyle in curriculum.

● Funding and Implementation

- It will be implemented with a total project cost of ₹27,360 crore, with ₹18,128 crore being the Centre's share, for five years from 2022-23 to 2026-27.
- States or UT will sign a memorandum of understanding agreeing to **“implement the NEP in entirety.**

● Eligibility

- All elementary schools (Classes 1-5 or 1-8).
- Secondary (Classes 1-10 or 6-10).
- Senior secondary schools (Classes 1-12 or 6-12)
- They should be **managed either by the Centre, State, UT, or local bodies** and have a **UDISE+** (Unified District Information for Education Pus) code can apply.

● School Selection Process

- Schools that fulfil the minimum benchmark (by analysis of UDISE+ data) will be shortlisted.
- The last stage will be challenge-based.
- Teams from States, Kendriya Vidyalaya or Jawahar Navodaya Vidyalaya schools will visit the applicant institution to inspect and verify claims.
- They will then recommend the selected schools to the Ministry of Education.
- The Ministry will **select a maximum of two schools** – one elementary and the second either secondary or senior secondary – **from a block or urban local body.**
- **UDISE**
 - It is a platform which **collects information** on a school's profile, physical infrastructure, teachers, enrolments, results, etc. through an online Data Collection Form that contains information on multiple performance indicators.

The Energy Conservation (Amendment) Bill 2022

❖ Context

- The Parliament passed the Energy Conservation (Amendment) Bill-2022 to amend the Energy Conservation Act 2001.

Fuel consumption mandate

- The energy sector is the major contributor to greenhouse gas emissions in India (about **75%** in 2016).
- The bill enables the Union government to specify the minimum amount of non-fossil sources to be used by designated energy consumers.
- The government plans to mandate the use of green hydrogen in sectors like steel, refineries, fertiliser and cement industries, through green hydrogen consumption obligation.
- The bill provides for penalties for violations by industrial units or vessels, and on manufacturers, if a vehicle fails to comply with fuel consumption norms.

Carbon Credit Trading Scheme

- The bill empowers the government to set up a carbon credit trading scheme.
- The **Ministry of Power** will be the nodal Ministry.
- The **Central Electricity Regulatory Commission (CERC)** would be the regulator.
- The **Bureau of Energy Efficiency** under the Ministry of Power will be the implementing agency.
- The carbon price would be determined by the market.



- The obligation target would be set by a body headed by the Cabinet Secretary.
- Energy consumption standards may be specified for vehicles and ships.

The Energy Conservation Building Code

- **Large buildings** — those with a connected load of 100 KW and above or contract demand of 120 KVA — will have to comply with energy conservation and sustainability codes.
- States have been empowered to lower the threshold, up to 50 KW to include a wider section of buildings.
- Those buildings under the 100KW threshold who want to, can voluntarily submit to the energy conservation mechanism.
- The implementation would be through the building by-laws.
- **Currently 24% of energy consumption is from the housing sector.**

Bureau of Energy Efficiency

- The Bureau, a statutory body established under the Act, has a governing council with members between 20 and 26 in number, currently.
- The Bill increases the number of members to between 31 and 37.

India's Goals

- As per India's commitments under the United Nations Framework Convention on Climate Change (UNFCCC) given at COP-26 last year, the goal is
 - To cut **emission intensity by 45%**.
 - To achieve 50% of the installed capacity of electricity generation from non-fossil fuel sources.

National Policy of Rare Diseases

❖ Context

- A Rajya Sabha member had raised concerns in the Parliament that the benefits of the National Policy of Rare Diseases are not reaching the patients.

About the policy

- It was notified by the **Ministry of Health and Family Welfare** in **March-2021** for the treatment of rare disease patients.

Rare Diseases

- The rare diseases have been identified and categorised into 3 groups:
- **Group 1:** Disorders amenable to one-time curative treatment.
- **Group-2:** Diseases requiring long term/lifelong treatment having relatively lower costs of treatment and benefits have been documented in literature and annual or more frequent surveillance is required.
- **Group 3:** Diseases for which definitive treatment is available but challenges are to make optimal patient selection for benefit, very high cost and lifelong therapy.

Salient features

- Provision for **financial support of up to Rs. 50 lakhs** to the patients suffering from any category of Rare Diseases.
- Treatment in any of the **eight Centre of Excellence (CoE)** identified for diagnosis, prevention and treatment of rare diseases.
- **Five Nidan Kendras** have been set up for genetic testing and counselling services.

Other initiatives

- The **Department of Pharmaceuticals** has initiated the implementation of the Production Linked Incentive Scheme for Pharmaceuticals.
- The Scheme provides for **financial incentives** to manufacturers for domestic manufacturing of various product categories, including **Orphan drugs**.
- An orphan drug is a pharmaceutical agent developed to treat medical conditions which, because they are so rare, would not be profitable to produce without government assistance.
- The **Department of Revenue** has given **exemption from Basic Customs Duty** to drugs or medicines, which are used in the treatment of Rare Diseases when imported by Centres of Excellence (CoEs).

Laser-Based Nuclear Fusion

❖ Context

- Scientists in the United States have, for the first time, achieved a net gain in energy from a nuclear fusion reaction using laser beams.

Key Highlights

- Researchers produced **3 Megajoules (MJ)** of energy from an input of **2 MJ**.
- They directed **192 laser beams** toward a fusion target measuring the size of a peppercorn.

Current techniques

- There are at least two different ways in which fusion reactions are being experimented with - **Magnetic fusion and Laser-based fusion**.
- In Magnetic fusion, strong magnetic fields are used to create t extreme heat.



- It heated a capsule of the two isotopes of hydrogen—deuterium and tritium — to over **3 million degrees Celsius**.

Advantages of Fusion

- In fusion, nuclei of two lighter elements are made to fuse to form the nucleus of a heavier atom.
- The energy released in fusion is substantially more than one released in fission.
- The fusion of two nuclei of a heavier isotope of hydrogen, called tritium, **produces at least four times as much energy as the fission** of a uranium atom.
- It is also a **carbon-free** source of energy, and has **negligible radiation risks**.
- Attempts to master the fusion process have been going on at least since the 1950s, but it is incredibly difficult and is still at an experimental stage.

Challenges

- Fusion reactions happen **only at very high temperatures, 10 times the temperature that exists at the core of the Sun**.
- Creating such an extreme environment in a laboratory requires huge amounts of energy.
- So far, the energy released in such experimental fusion reactions has been lower than what is consumed to create the enabling high temperatures.

Inertial Fusion

- Scientists use high-energy laser beams to achieve high temperatures. This is also called '**inertial fusion**'.
- It is relatively easier to attain break-even energy levels through inertial fusion compared to magnetic fusion.
- However, currently, the fusion reactions using laser beams run for shorter times than one using magnetic energy.
- This technology can also be used to **develop fusion-based nuclear weapons** that would be far more powerful and devastating than the current nuclear weapons.

About International Thermonuclear Experimental Reactor (ITER)

- The ITER project is expected to demonstrate the viability of a commercially scalable nuclear fusion reactor between 2035 and 2040, **using magnetic fusion**.
- It is being designed to run for 3,000 seconds. At its full power, it is expected to produce five times more energy than it would consume.
- When operational, it would become the biggest machine anywhere in the world, more complex than the Large Hadron Collider at CERN, or the LIGO project to detect gravitational waves.
- **India joined the ITER project in 2005.**
- **The Institute for Plasma Research in Ahmedabad**, a laboratory under the Department of Atomic Energy, is the lead institution from the Indian side participating in the project.

News in Between the Lines

Geminids Meteor Shower



❖ Context

- It is that time of the year when the universe puts up its **easiest-to-view meteor shower, the Geminids**. This year, the Geminids will peak around December 13-14.

❖ Causes of Meteor Showers

- According to NASA, "**Meteors come from leftover comet particles** and bits from **asteroids**."
- When these objects come around the Sun, they leave a **dusty trail** behind them. Every year Earth passes through these debris trails, which allows the **bits to collide with our atmosphere** where they disintegrate to create fiery and colorful streaks in the sky.

❖ Geminids

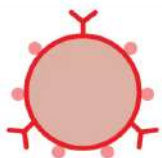
- The Geminids are unique because unlike most meteor showers, they **originate** not from a comet, but from an **asteroid, the 3200 Phaethon**.
- The 3200 Phaethon was discovered on October 11, 1983.
- It takes 1.4 years to complete one round of the Sun.
- As the 3200 Phaethon moves close to the Sun while orbiting it, the rocks on its surface heat up and break off.
- **When the Earth passes through the trail of this debris, the Geminids are caused.**



Base Editing

How does the treatment work?

1 Alyssa had T-cell leukaemia



T-cells, a type of white blood cell, destroy threats in the body

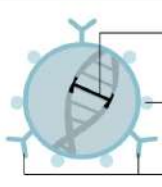
Alyssa's were out of control

2 Doctors used 'base editing' to engineer her therapy



Base editing changes one letter in the genetic code

3 Donor T-cells were edited in three ways

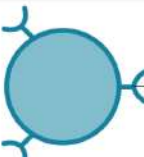


DNA altered to resist chemotherapy

Markings removed to protect donor T-cells

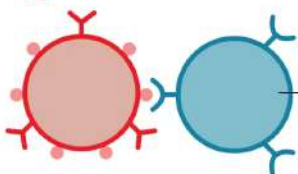
Receptors removed to prevent donor T-cells attacking the body

4 T-cells further modified to attack cancer



T-cell rearmed with new receptors

5 Battle of the T-cells



Modified T-cells find and destroy cancerous T-cells

Source: BBC research

BBC

❖ Context

➤ For the first time, a new **gene editing technology** called base editing was used to modify immune cells and successfully treat a teen with **treatment-resistant leukemia (T-cell acute lymphoblastic leukaemia (T-ALL))**

❖ Key Highlights

➤ The treatment is a modification of **chimeric antigen receptor, or CAR, T-cell therapy**.

➤ But instead of using the **CRISPR gene editing** technique to modify the patient's immune cells, the clinicians used the more precise base editing technique to alter donor immune cells.

❖ About Base Editing

➤ Bases are the language of life.

➤ The **four types of base - Adenine (A), Cytosine (C), Guanine (G) and Thymine (T)** - are the building blocks of our genetic code.

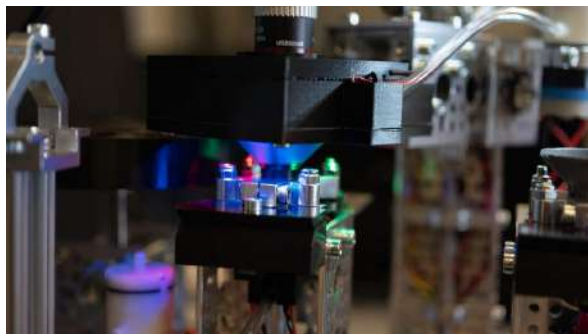
➤ Just as letters in the alphabet spell out words that carry meaning, the billions of bases in our DNA spell out the instruction manual for our body.

➤ Base editing **allows scientists to zoom to a precise part** of the genetic code and then **alter the molecular structure of just one base**, converting it into another and changing the genetic instructions.

➤ A team at the Great Ormond Street Hospital managed to use base-editing to **create a new type of T-cell** from a healthy donor that would not attack other cells in teen's body, not kill each other, survive chemotherapy and finally, hunt down all other T-cells in teen's body (healthy and cancerous).

➤ After this therapy worked in its initial stages, teen was given another bone marrow transplant to restore her immunity.

Forabot



❖ Context

➤ Researchers in the USA have developed and demonstrated a unique robot.

❖ Key Highlights

➤ The robot's AI uses images for sorting, manipulating and identifying microscopic marine fossils called Foraminifera.

➤ **Foraminifera, also called forams**, are very simple micro-organisms that secrete a tiny shell, a little longer than a millimetre.

➤ The organisms have existed in the oceans for more than 100 million years. When forams die, they leave behind their shells.

➤ Examining their shells give scientists insights into the characteristics of the oceans from a time when the forams were alive.

➤ Thus, they are key to understanding the world's oceans and climate of today and in the prehistoric past.

➤ Forabot has an accuracy rate of 79 per cent for identifying forams, which is better than most trained humans.

Abalone, Dugong and Pillar Coral

➤ Context

■ A list of threatened species was released by IUCN at the 15th Conference of Parties (COP15) to the United Nations Convention on Biological Diversity (CBD) in Montreal, Canada recently.

➤ Key Highlights

■ According to the list, of the 150,388 species assessed, 42,108 species are threatened with 902 species extinct, 84 species extinct in the wild, 9,251 species critically endangered and 16,364 species as endangered.





■ Abalone shellfish

- They are marine shells.
- They are among the world's most expensive seafoods and are considered a culinary delicacy.
- As many as 44 per cent of all abalone shellfish species are now threatened with extinction.

■ Dugong

- It is a marine mammal, commonly known as sea cow.
- They graze on sea grasses in shallow coastal waters of the Indian and western Pacific Oceans.
- Dugong populations in east Africa and New Caledonia have entered the IUCN Red List as Critically Endangered and Endangered respectively; the species remains Vulnerable globally.

■ Pillar Coral

- It is a hard coral found in the western Atlantic Ocean and the Caribbean Sea.
- The species has moved from Vulnerable to Critically Endangered.
- Its population shrunk by over 80 per cent across most of its range since 1990.
- They are affected by the contagious Stony Coral Tissue Loss Disease.

Hakuto R Mission



❖ Context

- A Japanese space startup launched a mission to the moon from Cape Canaveral, Florida, USA.

❖ Key Highlights

- The name HAKUTO refers to the **white rabbit** that lives on the moon in Japanese folklore. Next year is the **Year of the Rabbit** in the Asian calendar.
- The mission consists of the **M1 lander**.
- The M1 lander will deploy **two robotic rovers** - one made by Japan's JAXA space agency and the other **Rashid explorer, the UAE's first lunar rover**.
- The craft, assembled in Germany, is expected to land on the moon in late April.
- The privately funded company has a contract with NASA to ferry payloads to the moon from 2025 and is aiming to build a permanently staffed lunar colony by 2040.

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