"SHRESHTA" Scheme

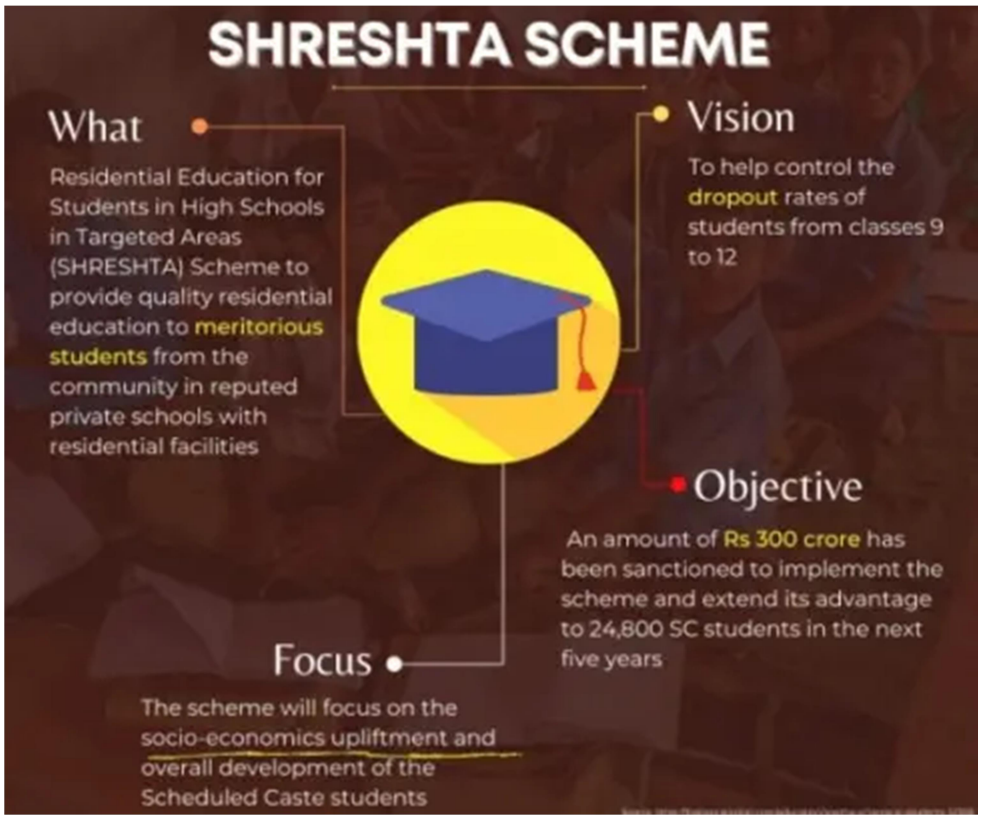
(GS Paper 2, Social Justice)

Why in news?

- Union Minister of social Justice and empowerment launched "SHRESHTA"-Scheme for residential education for students in High school in Targeted Areas.

Objective:

- The **Scheme for Residential Education for Students in Targeted Areas (SHRESHTA)** has been formulated with the objective to provide **quality education and opportunities for even the poorest Scheduled Caste students**, as per the Constitutional mandate.
- The students from the Scheduled Caste communities, for long been subjects to inequality, were kept out of quality education and a situation that perpetuates the disadvantages carried forward for generations of lack of adequate education.



Access to quality education:

- The Governmental efforts to spread educational facilities without discrimination have worked well in achieving near universal access. However, the objective of providing access to quality education that provides a level playing field is still far from reality.
- Accordingly, the Department as a new initiative has introduced the scheme **for providing quality education in top class private Residential Schools** to the meritorious SC students who cannot afford the fee of such schools.

How it will work?

- Scheme for Residential Education for Students in High Schools in Targeted Areas (SHRESHTA) provides for high quality education for meritorious but poor SC students in CBSE-affiliated reputed residential schools across the country.
- Approximately 3,000 seats are provided each year for admission in class 9th and 11th and the entire cost of the school fee and residential charges are borne by the Department.

Eligibility criteria:

- The students, belonging to Scheduled Castes, studying in class 8th and 10th in the current academic year are eligible for availing the benefits of scheme are selected through a transparent mechanism through a National Entrance Test for SHRESHTA (NETS), which is conducted by the National Testing Agency (NTA) for admission in class 9th and 11th. Students belonging to marginalized income group within the SC community, whose parental annual income is upto Rs.2.5 Lakh are eligible.
- Successful candidates, after following the e-counselling process, are given admission in the school of their choice anywhere in the Country for their academic persuasion.

Financial aspect:

- The Department shall bear the total cost of the school fee and hostel charges until completion of their academic up to class 12th. There after the students of the scheme may avail benefits of other schemes of the Department for their higher education.

Way Forward:

- The Scheme will be beneficial for SC students those who could not reach for higher quality education. This initiative will bring a drastic change for the betterment of their life.

IISc researchers devise strategy to make solid-state batteries last longer

(GS Paper 3, Science and Technology)

Why in news?

- Researchers at the Indian Institute of Science and their collaborators have discovered how next-generation solid-state batteries fail and devised a novel strategy to make them last longer and charge faster.

How solid-state batteries are a promising alternative to conventional lithium-ion batteries?

- Conventional lithium-ion batteries the kind that one can find in smartphone or laptop, contain a liquid electrolyte sandwiched between a positively charged electrode (cathode) made of a transition metal (such as iron and cobalt) oxide and a negatively charged electrode (anode) made of graphite.

- When the battery is charging and discharging (using up power), lithium ions shuttle between the anode and cathode in opposite directions.
- These batteries have a major safety issue the liquid electrolyte can catch fire at high temperatures. Graphite also stores much less charge than metallic lithium.
- A promising alternative, therefore, is solid-state batteries that switch out the liquid for a solid ceramic electrolyte and swap graphite with metallic lithium.
- Ceramic electrolytes perform even better at higher temperatures, which is especially useful in tropical countries like India.
- Lithium is also lighter and stores more charge than graphite, which can significantly cut down the battery cost.

Issue with the Solid-state batteries:

- Solid-state batteries are poised to replace the lithium-ion batteries found in almost every portable electronic device. But on repeated or excessive use, they develop thin filaments called 'dendrites' which can short-circuit the batteries and render them useless.
- The researchers have identified the root cause of this dendrite formation the appearance of microscopic voids in one of the electrodes early on.

Basics of the research:

- To investigate this phenomenon, artificially induced dendrite formation by repeatedly charging hundreds of battery cells, slicing out thin sections of the lithium-electrolyte interface, and peering at them under a scanning electron microscope.
- When they looked closely at these sections, the team realised that something was happening long before the dendrites formed microscopic voids were developing in the lithium anode during discharge.
- The team also computed that the currents concentrated at the edges of these microscopic voids were about 10,000 times larger than the average currents across the battery cell, which was likely creating stress on the solid electrolyte and accelerating the dendrite formation.
- To ensure this, the researchers introduced an ultrathin layer of a refractory metal a metal that is resistant to heat and wear between the lithium anode and solid electrolyte.

Key findings:

- They collaborated with researchers at Carnegie Mellon University in the US, who carried out computational analysis which clearly showed that the refractory metal layer indeed delayed the growth of microscopic lithium voids.
- Applying extreme pressure that can push lithium against the solid electrolyte can prevent voids and delay dendrite formation, but that may not be practical for everyday applications.
- Other researchers have also proposed the idea of using metals like aluminium that alloy or mix well with lithium at the interface. But over time, this metal layer blends with lithium, becoming indistinguishable, and does not prevent dendrite formation.

Way Forward:

- The researchers claim that the findings are a critical step forward in realising practical and commercial solid-state batteries.
- Their strategy can also be extended to other types of batteries that contain metals like sodium, zinc and magnesium.

Two new missions to study surface and mysterious domes on Moon

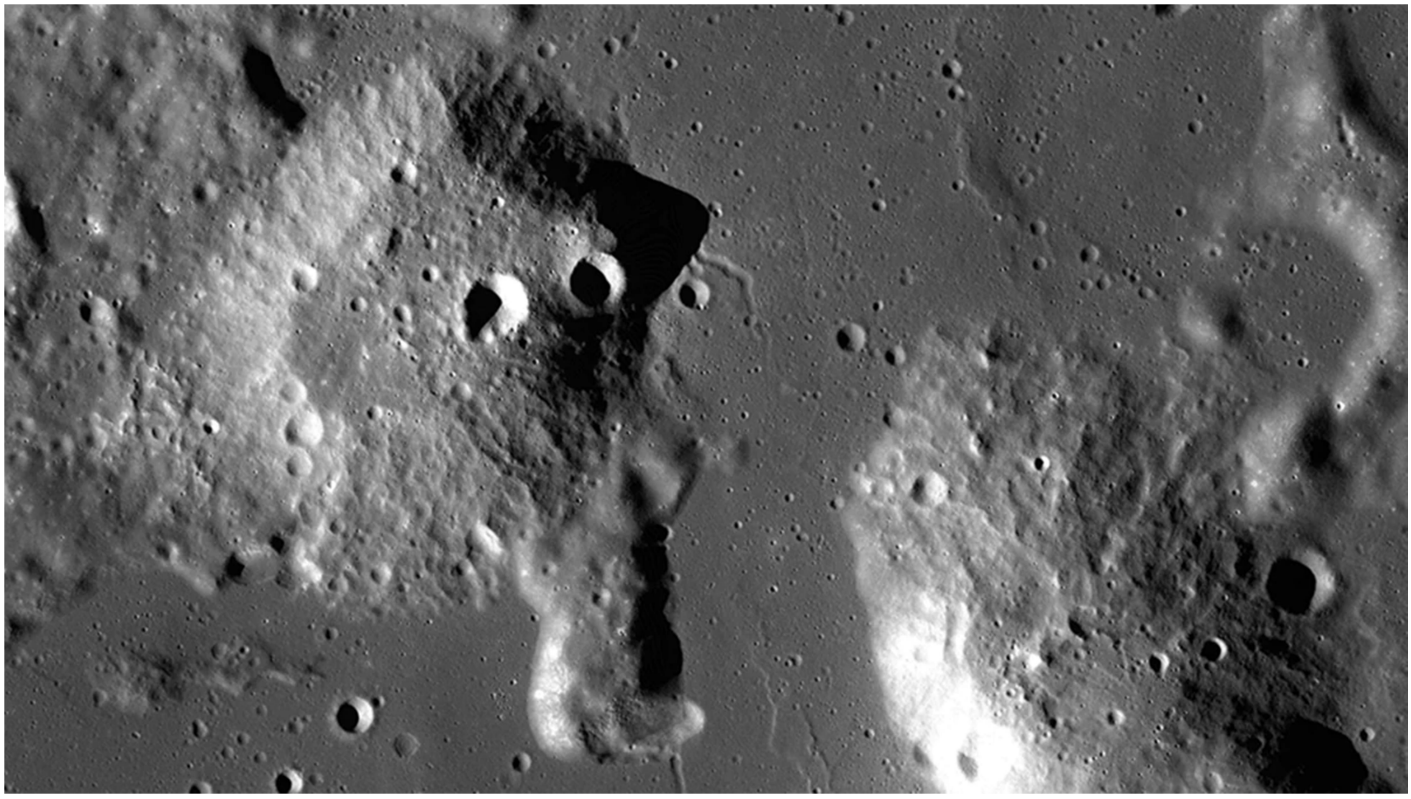
(GS Paper 3, Science and Technology)

Why in news?

- NASA has selected two new missions to launch to the Moon that will decode the lunar surface and the mysterious Gruithuisen Domes.

Details:

- NASA has selected two missions that will **study volcanism and the effects of low gravity and radiation environment on yeast**.
- The instruments have been selected under the **Payloads and Research Investigations on the Surface of the Moon (PRISM)** call.
- The first will study the **geologic processes of early planetary bodies that are preserved on the Moon**, by investigating a rare form of lunar volcanism.
- The second will study the **effects of the Moon's low gravity and radiation environment on yeast**, a model organism used to understand DNA damage response and repair.



Lunar Vulkan Imaging and Spectroscopy Explorer (Lunar-VISE) mission:

- The Lunar Vulkan Imaging and Spectroscopy Explorer (Lunar-VISE) mission over a course of 10 days will explore the summit of one of the Gruithuisen Domes that are suspected to have been formed by a sticky magma rich in silica, similar in composition to granite.
- The Lunar-VISE mission will give a suite of five instruments, two of which will be mounted on a stationary lander and three mounted on a mobile rover.

Lunar Explorer Instrument for space biology Applications (LEIA):

- The Lunar Explorer Instrument for space biology Applications (LEIA) is a small CubeSat-based device that will provide biological research on the Moon which cannot be simulated or replicated with high fidelity on the Earth or International Space Station by delivering the yeast Saccharomyces cerevisiae to the lunar surface and studying its response to radiation and lunar gravity.

Way Forward:

- NASA said that the data returned by LEIA, in conjunction with previously existing data from other biological studies, could help scientists answer a decades-old question of how partial gravity and actual deep-space radiation in combination influence biological processes.

Keep ESZ of 1 km around forests: SC

GS Paper 2, Judiciary / GS Paper 3, Changes in the Industrial Policy)

Why in news?

- The Supreme Court directed that every protected forest, national park and wildlife sanctuary across the country should have a **mandatory eco-sensitive zone (ESZ) of a minimum one km** starting from their demarcated boundaries.

Background:

- The judgment came on a petition instituted for the protection of forest lands in the Nilgiris district of Tamil Nadu. Subsequently, the scope of that writ petition was enlarged by the court so as to protect such natural resources throughout the country.
- In a series of directions, the court held that in case any national park or protected forest already has a buffer zone extending beyond one km, that would prevail.
- In case the question of the extent of buffer zone was pending a statutory decision, then the court's direction to maintain the one-km safety zone would be applicable until a final decision is arrived.

Mandate:

- The purpose of declaring ESZs around national parks, forests and sanctuaries is to **create some kind of a "shock absorber" for the protected areas.**
- These zones would **act as a transition zone from areas of high protection** to those involving lesser protection.

Key Highlights of the judgement:

- No permanent structure will be allowed within the ESZ.
- It also directed the Chief Conservator of Forests of all states and UTs to prepare a list of existing structures within the ESZs and submit a report to it within a period of three months.
- For this purpose, such authorities can take assistance from governmental agencies for satellite imaging or photography using drones.

POSOCO signs MoU with IMD for better electricity grid management

(GS Paper 3, Indian Economy)

Why in news?

- National grid operator POSOCO signed a memorandum of understanding with India Meteorological Department (IMD).
- Under it, both the parties agreed that weather information provided by IMD will be used by the Power System Operators across the India for better management of Indian Power System and for the purpose of analysis.

Data to be provided by IMD:

- IMD will make available current weather information every hour or at lesser intervals.
- It will provide weather forecasts of temperature, humidity, wind speed, wind direction, rainfall up to next 36 hours for the identified stations.
- It will also provide the snowfall forecast of hilly States and also along the route of important transmission lines passing through hilly terrains.
- It will provide weather parameters forecast at Renewable Energy plant locations.

About POSOCO:

- Power System Operation Corporation is a wholly owned Government of India Schedule A enterprise under the Union Ministry of Power.
- It is responsible to ensure the integrated operation of the National Electricity Grid in a secure manner.
- It consists of five Regional Load Despatch Centres (RLDCs) and the National Load Despatch Centre (NLDC) under The Electricity Act, 2003.