

GEOGRAPHY- PHYSICAL AND ECONOMIC**Moon's Subsurface**

In a new milestone in lunar exploration, NASA said that its Lunar Reconnaissance Orbiter (LRO) spacecraft had found evidence that the Moon's subsurface might have greater quantities of metals such as iron and titanium than thought before.

About:

- The metallic distribution was observed by the Miniature Radio Frequency (Mini-RF) instrument aboard the LRO.
- The LRO's Mini-RF instrument was measuring an electrical property within lunar soil in crater floors in the Moon's northern hemisphere. The property, known as the dielectric constant, is the ratio of the electric permeability of a material to the electric permeability of a vacuum.
- The Mini-RF team observed that the level of this property increased as they surveyed larger craters, and kept rising in crater sizes up to 5 km in diameter. Beyond that size, the value of the dielectric constant levelled off.
- The finding could aid in drawing a clearer connection between Earth and the Moon.

The Moon formation hypothesis

- The most popular theory about the Moon's creation is that a Mars-sized protoplanet collided with newly formed Earth around 4.5 billion years ago, breaking off a piece of our planet that went on to become its satellite.
- The hypothesis is also backed by substantial evidence, such as the close resemblance between the Moon's bulk chemical composition with that of Earth.

CONSTITUTION AND POLITY**Defections And Power Of Speaker**

Manipur Speaker Y Khemchand's decision to disqualify three Congress MLAs ahead of the recently held Rajya Sabha election has raised questions once again on the Speaker's powers to disqualify under the Constitution.

About:

- According to paragraph 2(1)(a) of the Tenth Schedule of the Constitution, an elected member of the house shall be disqualified from being a member if they win the election as a candidate of one party and then join another.
- The power for this disqualification is vested in the Speaker, who is usually a nominee of the ruling party.
- The anti-defection law, referred to as the Tenth Schedule, was added to the Constitution through the Fifty-Second (Amendment) Act, 1985.

INTERNATIONAL AFFAIRS- BILATERAL, GROUPINGS, ORGANISATIONS**Mount Rushmore**

US president Donald Trump chose Mount Rushmore for his Independence Day speech this year. It was symbolic at a time when the country has been rocked by anti-racism protests as part of the Black Lives Matter movement.

About:

- Mount Rushmore National Memorial is centered on a colossal sculpture carved into the granite face of Mount Rushmore in the Black Hills in Keystone, South Dakota, United States.
- The sculpture features the 60-foot heads of U.S. Presidents
 - George Washington (1732–1799),
 - Thomas Jefferson (1743–1826),
 - Theodore Roosevelt (1858–1919), and
 - Abraham Lincoln (1809–1865).
- The four presidents were chosen to represent the nation's birth, growth, development, and preservation, respectively.
- South Dakota historian Doane Robinson is credited with conceiving the idea. Sculptor Gutzon Borglum created the sculpture's design and oversaw the project's execution from 1927 to 1941.

Mount Rushmore, sometimes referred to as the "Shrine of Democracy", was constructed with the intention of symbolizing "the triumph of modern society and democracy."

Seabed 2030 project

The Nippon Foundation-GEBCO Seabed 2030 Project announced that it had finished mapping nearly one-fifth of the world's ocean floor. Since the launch of the project in 2017, the surveying of the ocean bed as per modern standards has gone up from around 6 per cent to 19 per cent.

About:

- Bodies involved: Seabed 2030 is a collaborative project between the Nippon Foundation of Japan and the General Bathymetric Chart of the Oceans (GEBCO).
- Background: The project was launched at the United Nations (UN) Ocean Conference in 2017.
- Objective: It aims to bring together all available bathymetric data to produce the definitive map of the world ocean floor by 2030 and make it available to all.
- Significance: Knowing the depth and shape of the seafloor (bathymetry) is fundamental for understanding ocean circulation, fishing resources, sediment transport, environmental change, underwater geo-hazards, mineral extraction, oil and gas exploration etc.

Related Info :

- The Nippon Foundation of Japan is a non-profit philanthropic organisation active around the world.
- General Bathymetric Chart of the Oceans (GEBCO) is an international group of mapping experts which operates under the joint auspices of the International Hydrographic Organization (IHO) and UNESCO's Intergovernmental Oceanographic Commission (IOC). GEBCO is the only intergovernmental organisation with a mandate to map the entire ocean floor.

ENVIRONMENT- CONSERVATION, BIO-DIVERSITY AND ISSUES

Desert Locust Situations

India should remain on high alert against locust attack for the next four weeks, the Food and Agriculture Organization (FAO) has warned amid the country facing the worst locust attack in 26 years.

About:

- The FAO has three categories of Desert Locust situations: outbreak, upsurge, and plague.
- The current locust attack (2019-2020) has been categorised as an upsurge. The last major plague was in 1987-89 and the last major upsurge was in 2003-05.

Criteria

- An outbreak occurs when locusts rapidly increase in number and form groups, bands and swarms in an area of about 50 km by 50 km in one part of a country.
- An upsurge usually occurs when locusts are able to breed uncontrolled for several successive seasons. This causes the formation of further hopper bands and adult swarms. This generally affects an entire region.
- A plague is defined as a period of one or more years of widespread and heavy infestations, the majority of which occur as bands or swarms. A major plague exists when two or more regions are affected simultaneously.

Eulophia Obtusa

A rare orchid species — *Eulophia obtusa* — also known as ground orchid has been rediscovered in India after 118-year hiatus in Dudhwa Tiger Reserve.

About:

- In India, the species — listed as “critically endangered” in the IUCN Red List of endangered species — was last recorded in Pilibhit in 1902.
- The species was originally described from Uttarakhand in the 19th century. It was collected by botanists from Gangetic plains but there have been no sightings in the past 100 years. In 2008, the plant species was sighted in Bangladesh for the first time.

SCIENCE AND TECHNOLOGY- EVERYDAY SCIENCE, SPACE, NUCLEAR, DEFENCE ETC

Elyments

The Vice President of India launched an indigenous mobile app ‘Elyments’, a new social media platform under Aatmanirbhar Bharat campaign.

About:

- The new Made in India app, created by Sumeru Software Solutions, is available for download worldwide both on iOS and Android platforms.

- The app is available in eight different regional languages. The app lets the users make audio and video calls including conference calls. Elyments has basic features of popular social networking apps such as feeds, the discover option where you can follow celebrities.
- The app also aims to promote Indian brands on the platform, similar to the Facebook marketplace along with Elyments Pay for secure payments.
- One of the main selling points of the app is privacy. Elyments' creators claim that their data will not be shared with third party without the user's consent.

Related Info : A day before Elyments launch, Prime Minister Narendra Modi launched the 'Atmanirbhar Bharat App Innovation Challenge' urging the Indian tech community and start-ups to create homegrown apps and create an Indian ecosystem of apps.

Kawasaki Disease

In India and elsewhere, a new illness, with some symptoms common with the rare Kawasaki disease, has been affecting children with Covid-19.

Multisystem Inflammatory Disorder

- The first such cases started getting reported since April, from the US and Europe.
- Doctors in India have started seeing such cases over the last few weeks. Last month, the World Health Organization (WHO) termed this new illness "multisystem inflammatory disorder".

Kawasaki disease

- Kawasaki disease affects children.
- Its symptoms include red eyes, rashes, and a swollen tongue with reddened lips — often termed strawberry tongue — and an inflamed blood vessel system all over the body. There is constant high fever for at least five days. The disease also affects coronary functions in the heart.
- The disease derives its name from a Japanese paediatrician, Tomisaku Kawasaki, who reported the first case in 1961. The doctor, 95, died on June 5 this year in Tokyo.
- What causes Kawasaki disease is not yet known. What we do know is that it is an immunological reaction to an infection or a virus. A child's immunity system responds to a particular infection and develops these symptoms.

PRELIMS SPECIFIC FACTS- INDICES, DAYS, EVENTS, AWARDS ETC

SDG Index 2020

Sweden is placed at the top of the latest SDG index for year 2020 with an overall score of 84.7.

About:

- The Sustainable Development Report 2020 presents the SDG Index and Dashboards for all UN member states. It was prepared by teams of independent experts at the Sustainable Development Solutions Network (SDSN) and the Bertelsmann Stiftung.
- The SDG index frames the implementation of 17 SDG goals among UN member states in terms of six broad transformations: (1) Education and skills, (2) health and wellbeing, (3) clean energy and industry, sustainable land use, sustainable cities, and digital technologies.
- Among 193 countries for which the SDG index was prepared, India stands at the 117th position with an overall score of 61.92. China is ranked at 48, Brazil at 53 and Russia at 57.
- In south Asia, Maldives is ranked at 91, Sri Lanka at 94, Nepal at 96 Bangladesh at 109 and Pakistan at 134.

DAILY ANSWER WRITING PRACTICE

Q. What is nanotechnology? Discuss the recent developments in applications of nanotechnology in India.

Nanotechnology is the use and the developments of techniques to study physical phenomena and develop new material and devices structures in the physical size range from 1 to 100 nanometres (nm). Nanotechnology influences almost all areas of our lives, including manufacturing, electronics, computers and information technologies, medicine, the environment and energy storage, chemical and biological technologies and agriculture.

Some of the recent developments in the application of nanotechnology in India are listed below:

Medical and Healthcare applications-

- Nanotechnology is already broadening itself in the areas of medical tools, knowledge, and therapies currently available to clinicians.

- Nanomedicine, the application of nanotechnology in medicine, draws on the natural scale of biological phenomena to produce precise solutions for disease prevention, diagnosis, and treatment.
- For example, better imaging and diagnostic tools enabled by nanotechnology are paving the way for earlier diagnosis, more individualized treatment options, and better therapeutic success rates.

Electronics and IT Applications-

- Nanotechnology has greatly contributed to major advances in computing and electronics, leading to faster, smaller, and more portable systems that can manage and store larger and larger amounts of information.

Energy Applications-

- Nanotechnology is finding application in traditional energy sources and is greatly enhancing alternative energy approaches to help meet the world's increasing energy demands.
- For example, Nanotechnology is improving the efficiency of fuel production from raw petroleum materials through better catalysis. It is also enabling reduced fuel consumption in vehicles and power plants through higher-efficiency combustion and decreased friction

Environment remediation-

- In addition to the ways that nanotechnology can help improve energy efficiency, there are also many ways that it can help detect and clean up environmental contaminants
- For example, Nanotechnology could help meet the need for affordable, clean drinking water through rapid, low-cost detection and treatment of impurities in water.

Future Transportation Benefits-

- Nanotechnology offers the promise of developing multifunctional materials that will contribute to building and maintaining lighter, safer, smarter, and more efficient vehicles, aircraft, spacecraft, and ships. In addition, nanotechnology offers various means to improve the transportation infrastructure

Everyday Materials and Processes-

- Nanoscale additives to or surface treatments of fabrics can provide lightweight ballistic energy deflection in personal body armor, or can help them resist wrinkling, staining, and bacterial growth.
- Clear nanoscale films on eyeglasses, computer and camera displays, windows, and other surfaces can make them water- and residue-repellent, anti-reflective, self-cleaning, resistant to ultraviolet or infrared light, anti-fog, antimicrobial, scratch-resistant, or electrically conductive.

Nanotechnology In India

- The emergence of nanotechnology in India has witnessed the engagement of a diverse set of players, each with their own agenda and role.
- Presently nanotechnology in India is mostly government-led initiative. Industry participation has very recently originated.
- Nanotechnology R&D barring a few exceptions is largely being ensued at public-funded universities as well as research institutes.
- Scientific experts from all over the country came together at the National Conference - Nano India 2019 to discuss ways of using nanotechnology for the development of products and processes for national development, especially in areas of national relevance like safe drinking water, materials development, sensors development, and drug delivery.

Conclusion

- Nanotechnology is helping to considerably improve technology in sectors like information technology, homeland security, medicine, transportation, energy, food safety, and environmental science.
- Because of their small size, much concern has been expressed about the potential for adverse health effects arising from the ability of nanoparticles to penetrate cell walls and the blood-brain barrier. These concerns also include possible detrimental health effects during manufacturing and transportation. Therefore, there is a need to identify key gaps in knowledge and areas where further research may be targeted in order to efficiently exploit the technology.