

Current Affairs search results for tag: science-and-technology

1. China launches 2nd space station module (July 25, 2022)

China launched the second of three modules needed to complete its new space station on July 24 as part of the latest step in the ambitious space program.

Important facts

- According to the China Manned Space Agency (CMSA), the giant Long March-5B Y3 carrier rocket, Wentian, was successfully launched from the Wenchang spacecraft launch site off the coast of the southern island province of Hainan.
- The new module will serve as a backup to the core module, Tianhe, and as a powerful scientific experiment platform in the space station currently being built by China.
- In the coming weeks, the Wentian will be transformed by a robotic device from a forward docking port to a lateral port, where it will remain and be ready for long-term operation.
- The construction of China's Tiangong space station is expected to be completed by the end of this year.
- This will complete the construction of Tiangong, the space station taking shape in China's space.
- With the establishment of this space station, China will be the third country in the world to have its own space station.

Tianhe module

- It was launched in April 2021, and the Mengtian module is set to be launched in October this year.
- About 18 meters (60 ft) long and weighing 22 tons (48,500 lb), the new module has three sleeping areas and space for scientific experiments.
- It will combine with Tiangong's already dispatched modules to shape the space station.

Tiangong Space Station

- This is a Chinese space station being built in low Earth orbit between 340 and 450 kilometres above the earth.
- It is part of China's manned space program and is the country's first long-term space station.

2. ISRO inaugurates Human Space Flight Expo in Bengaluru (July 23, 2022)

Indian Space Research Organisation, ISRO Chairman S Somanath inaugurated the Human Space Flight Expo in Bengaluru to commemorate the Amrit Festival of Independence.

Important facts

- ISRO is soon launching its first unmanned mission Gaganyaan and the exhibit showcases the Crew Module, GSLV Mark III Manned-Rated Launch Vehicle and Crew Escape System.
- The expo is being organised in association with Planetarium and Bangalore Association for Science Education (BASE).
- The expo includes a number of exhibitions including scaled models of various Indian satellites and launch vehicles as well as scaled models of the proposed India space station.
- The expo also includes an interactive model of Gaganyaan, the first Indian crewed spacecraft, to be launched soon.

About ISRO

- It is India's leading space exploration agency, headquartered in Bangalore.
- ISRO was formed in the year 1969 with a view to develop and exploit space technology while pursuing planetary exploration and space science research.
- The first Indian satellite Aryabhata was built by ISRO which was launched on 19 April 1975 with the help of the Soviet Union.

Upcoming Missions

- Gaganyaan Mission: India's first space mission, Gaganyaan, will be launched in the year 2023.
- Chandrayaan-3 Mission: Chandrayaan-3 is likely to be launched during the third quarter of 2022.

3. Discovery of a new ozone hole over the tropics (July 18, 2022)

According to a recent study, a new ozone hole has been detected in tropical regions from 30 degree south latitude to 30 degree north latitude.

Facts from the study

- The tropical ozone hole is about seven times larger than that of the Antarctic.
- The tropical ozone hole is visible in all seasons, while the ozone hole over the Antarctic is visible only in spring.
- Scientists estimate that it is so large that it can affect 50 percent of the world's population.
- According to scientists, this hole has been present in the tropical region since 1980.
- Like the Antarctic ozone hole, ozone values in the centre of this tropical ozone hole have been found to be 80 percent below normal.

- This has the potential to cause skin cancer, cataracts and other negative effects on the health ecosystem in tropical regions.

Ozone layer

- It is a special form of oxygen that has the chemical formula O₃.
- Most of the ozone lies 10 to 40 km above the Earth's surface. This region is called the stratosphere and contains about 90% of the total ozone found in the atmosphere.

Classification

Good Ozone

- Ozone occurs naturally in Earth's upper atmosphere (stratosphere) where it forms a protective layer. This layer protects us from the harmful ultraviolet rays of the sun.
- This ozone is slowly being destroyed due to man-made chemicals called ozone depleting substances (ODS). Ozone depleting substances include chlorofluorocarbons (CFCs), hydrochlorofluorocarbons (HCFCs), halons, methyl bromide, carbon tetrachloride, and methyl chloroform.

Bad Ozone

- Ozone is formed in Earth's lower atmosphere (troposphere) near ground level when pollutants emitted by cars, power plants, industrial boilers, refineries, chemical plants, and other sources react chemically in the presence of sunlight.
- Surface level ozone is a harmful air pollutant.

Initiatives taken to protect the ozone layer

Vienna Convention

- The 1985 Vienna Convention for the Protection of the Ozone Layer was an international agreement in which the members of the United Nations recognized the fundamental importance of preventing the depletion of the ozone layer of the stratosphere.
- India became a party to the Vienna Convention for the Protection of the Ozone Layer on 18 March 1991.

Montreal Protocol

- The Montreal Protocol is an international environmental agreement to protect the Earth's ozone layer by eliminating the use of ozone-depleting substances.
- Adopted on September 15, 1987, this protocol is the only United Nations treaty to date that has been ratified by all 197 member states of the United Nations by every country on earth.
- India became a party to the Montreal Protocol on 19 June 1992 on substances that damage the ozone layer.

4. Agnikul Cosmos opens India's first private rocket engine factory in Chennai (July 15, 2022)

Space tech startup Agnikul Cosmos on 13 July inaugurated India's first-ever facility to manufacture 3D-printed rocket engines in Chennai.

Important facts

- Space tech startup Agnikul Cosmos on 13 July inaugurated India's first-ever facility to manufacture 3D-printed rocket engines in Chennai.
- It was inaugurated by N. Chandrasekaran, Chairman of Tata Sons and S. Somanath, Chairman, Indian Space Research Organisation (ISRO).
- On this occasion Pawan Goenka, chairman of Indian National Space Promotion and Authorization Centre (IN-SPACe) was also present.
- The facility will house world-class machinery, including a 400 mm x 400 mm x 400 mm metal 3D-printer from EOS, and several other machines that will enable end-to-end manufacturing of rocket engines under one roof.
- Agnikul had entered into an agreement with EOS in 2021 as the 3D printing partner for the engines.

Rocket Agnibaan

- It is building India's first private small satellite launch vehicle whose name is Agnibaan, a rocket that enables plug-and-play configuration and is capable of carrying up to 100 kg of payload to low Earth orbits.
- This on-demand rocket can be completely customized to the needs of the customer at an affordable cost.
- Agnibaan will be launched in 2022.

Agnikul Cosmos

- Agnikul Cosmos is a group of enthusiasts, rocket scientists, engineers, programmers etc.
- It was founded in 2017 by Srinath Ravichandran, Moin SPM and S R Chakravarthy (from IIT Madras).
- Agnikul became the first Indian company to sign agreement with ISRO in December 2020.

5. DCGI grants marketing authorization to SII's qHPV Vaccine (July 14, 2022)

The Drugs Controller General of India (DCGI) granted market authorisation to Serum Institute of India (SII) to manufacture India's first Quadrivalent Human Papillomavirus vaccine (qHPV) which is indigenously developed against cervical cancer.

Important facts

- qHPV is the first indigenous vaccine developed in India against cervical cancer which is likely to be launched by the end of this year.
- It will be an Indian vaccine for the treatment of cervical cancer in women that is both affordable and accessible.

What is Cervical Cancer?

- Cervical cancer starts in the cells of the cervix, the lower part of the uterus.
- The cervix connects the body of the uterus to the vagina.
- Cancer starts when cells in the body grow out of control.
- Most cases of cervical cancer are caused by infection of the human papillomavirus (HPV), which is preventable with a vaccine.
- Cervical cancer grows slowly, so it usually has time to be detected and treated before it causes serious problems.
- Women between the ages of 35 and 44 are most likely to get this disease.

Drugs Controller General of India (DCGI)

- It comes under the Central Drugs Standard Control Organization (CDSCO).
- It is responsible for approval of licences of specified categories of drugs like blood and blood products, vaccines, IV fluids and sera in India.
- It sets the standards and quality of the manufacture, sale, import and distribution of drugs in India.

6. Indian scientists develop novel mechanism to inactivate SARS-CoV-2 (July 14, 2022)

Indian Scientists have developed an innovative system to inactivate the SARS-CoV-2 virus by preventing the entry of the SARS-CoV-2 virus into the cells of the body, reducing its infection capacity.

Important facts

- For this, the researchers have informed about the design of a new class of synthesized peptides.
- This peptide can not only inhibit the entry of SARS-CoV-2 virus into cells, but can also entangle virus particles together in a manner that reduces their ability to infect.
- This new effort provides an alternative mechanism to inactivate viruses such as SARS-CoV-2 and promises a new class of peptides as antivirals.

- The research was supported under the COVID-19 IRPHA call of the Science and Engineering Research Board (SERB), a statutory body of the Department of Science and Technology (DST).

What is the new innovative system?

- The developed peptides are helical and hairpin-like in shape.
- Each of these is able to associate with another of its kind, which is known as a dimer.
- Each dimeric 'bundle' presents two surfaces for interaction with the two target molecules.
- Scientists from the Indian Institute of Science, in collaboration with researchers from the CSIR-Institute of Microbial Technology, have taken advantage of this approach to design these peptides.
- The team of researchers used a peptide called SIH-5 to target the interaction between the SARS-CoV-2 receptors of SARS-CoV-2's spike(S) protein and SARS-CoV-2's ACE2 protein in human cells.

What is the sars-cov-2 virus?

- It is responsible for causing the coronavirus disease (Covid-19).
- SARS means Severe Acute Respiratory Syndrome.
- For the first time in 2019, it was reported that SARS-CoV-2 can infect people as well.
- It is believed that the virus spreads from person to person through droplets released when an infected person coughs, sneezes or talks.
- Coronaviruses are a specific family of viruses, some of which cause less-severe damage, such as the common cold, while others cause respiratory and intestinal diseases.

7. Ola Electric Unveils Indigenous Lithium-Ion Cell (July 13, 2022)

Electric vehicle company Ola Electric has unveiled its indigenously developed lithium-ion cell, the NMC 2170.

Important facts

- The specialty of this cell of Ola is that it can store more energy than the ordinary lithium cell used in an e-vehicle.
- Apart from this, its life cycle is also long, due to which it can be used for a long time.
- Ola Electric claims that this new cell will help in increasing the range of electric vehicles.
- Ola will start mass production of SAIL from its Gigafactory by 2023.
- Ola is building the world's most advanced cell research centre that will enable us to rapidly expand and innovate and manufacture the most advanced and cost-effective EV products in the world.

- The company said it is committed to invest in research and development to create
- indigenous advanced SAIL technologies, strengthen manufacturing capabilities and create an integrated Ola electric vehicle hub.

About Ola Electric

- Ola Electric Mobility is an Indian electric two-wheeler manufacturer, based in Bangalore.
- Its manufacturing plant is located in Krishnagiri, Tamil Nadu, India.
- Ola Electric launched its first electric vehicle in August 2021 and has set up the world's largest 2W manufacturing facility in India.
- Founder & CEO - Bhavish Aggarwal

8. First images from James Webb Space Telescope released by NASA (July 13, 2022)

NASA on July 12 released the deepest and most accurate infrared image of the universe ever taken from NASA's James Webb Space Telescope.

What is the image about?

- Webb's first deep field galaxy cluster is SMAC 0723 which is filled with thousands of galaxies including the weakest objects seen in the infrared.
- The image of Webb is about the size of a grain of sand held on a hand, a tiny piece of the vast universe.
- The collection also includes fresh images of another galaxy cluster known as Stephen's Quintet, first discovered in 1877.

James Webb Space Telescope

- NASA's James Webb Space Telescope was launched by rocket on 25 December 2021 from South America's north-eastern coast.
- It is the most powerful infrared telescope ever launched by NASA.
- It has been built in collaboration with NASA, the European Space Agency (ESA) and the Canadian Space Agency.
- It has opened a new era of astronomy.
- Its goal is to search for the first galaxies that formed after the Big Bang.
- It will reveal new and unexpected discoveries, and help to understand the origins of the universe and the human position.
- It reached its destination in solar orbit about 1.6 million km from Earth after travelling 2 weeks in space.

- It is also considered a successor of the Hubble Telescope which was launched into low Earth orbit in 1990.

9. IIT Madras researchers develop AI tool to identify cancer-causing genes (July 12, 2022)

An Artificial Intelligence-based tool named 'PIVOT' has been developed by researchers from the Indian Institute of Technology Madras (IIT Madras).

- **PIVOT**

- PIVOT is designed to predict genes that are responsible for causing cancer.
- This AI-based tool will help in developing strategies for personalised cancer treatment.
- PIVOT is able to predict cancer-causing genes in patients.
- The PIVOT tool was developed based on the machine learning model, which categorises genes as tumour oncogenes, suppressor genes or neutral genes.
- It successfully predicted oncogenes as well as tumour-suppressor genes such as TP53, and PIK3CA.

- **How does this work?**

- PIVOT is a machine learning tool.
- It uses a variety of data, including mutations and gene expression, to predict cancer-causing genes.
- These genes are called driver genes.
- It helps in formulating personalised cancer treatment strategies.

10. Around 60 StartUps registered with ISRO (July 12, 2022)

Nearly 60 startups have registered with the Indian Space Research Organization (ISRO) since the recent opening of the Indian space sector to the private sector by Prime Minister Narendra Modi.

- **Important facts**

- Some of the registered start-ups are working on projects related to space debris management.
- This information was given by the Union Minister of State for Science and Technology, Dr Jitendra Singh after inaugurating the ISRO System for Safe and Sustainable Operation at ISRO Control Center in Bengaluru on July 11.
- Other startups have different offerings from nano-satellites, launch vehicles, ground systems, research, etc.

Earlier on June 10, Prime Minister Narendra Modi had said during the inauguration of IN-SPACE that the space policy would be announced soon.

- The policy will define the role that private companies can play in space missions, providing access to infrastructure and services owned by ISRO.

- **Indian National Space Promotion and Authorization Centre (IN-SPACE)**

- IN-SPACE at Bopal in Ahmedabad, Gujarat, was inaugurated by PM Modi on June 10.
- It will be the nodal agency that will allow space activities and use of Department of Space-owned facilities by non-government private entities and ensure greater private participation in the sector.

- **Indian Space Research Organisation (ISRO)**

- ISRO was set up on 15 August 1969
- Chairman of ISRO: S Somnath
- Headquarters of ISRO : Bengaluru, Karnataka
- Space Station from where ISRO launches rockets - Satish Dhawan Space Centre (SDSC) SHAR, Sriharikota, Andhra Pradesh