SCIENCE AND TECH.

SPACE

1. Gaganyaan

News:

- India's first manned space flight - Gaganyaan - is expected to send three persons into the space for seven days and the spacecraft will be placed in a low earth orbit of 300-400 km.
- India will launch its second lunar mission on January 3 next year which will land on the moon with a lander and rover
- A MoU has been signed between ISRO and Russian space agency ROSCOSMOS on joint activities in the field of Human Spaceflight Programme-Gaganyaan.

Facts:

- ISRO last month conducted its **first 'pad abort'** test that was successful.
- The **'pad abort'** test or **Crew Escape System** is an emergency escape measure that helps **pull the crew away from the launch vehicle when a mission has to be aborted**.
- The crew will be **selected by Indian Air Force (IAF) and ISRO jointly** after which they will undergo training for two-three years.
- It will conduct microgravity experiment during the mission.
- India will become **fourth nation** in the world after the United States, Russia and China to send astronaut into space after US, Russia and China.
- **Former Indian Air Force (IAF) pilot Rakesh Sharma was first Indian to travel to space**.
- He was part of the Soviet Union's Soyuz T-11 expedition, launched in 1984, as part of the Intercosmos programme.
- Russia has offered a ride to an Indian astronaut to the International Space Station (ISS) for a short training mission in 2022.
- If successful, India will be the 4th nation after US, China and Russia to send a human in space.

Other facts:

- Gaganyaan, India's first human Spaceflight Programme is scheduled for completion by 2022.
- GSLV Mk-III will be used for launch of Gaganyaan.
- The mission will send three-member crew for a period of 5-7 days.
- The spacecraft will be placed in low earth orbit at 300-400 km.

2. Chandrayan II

- Chandrayaan-2 will be ISRO's first time attempt to land a rover on the moon.

3. Green Propellants by ISRO

News: The Indian Space Research Organisation (ISRO) is developing **green propellants for future rockets**, considering the harmful effects of exhausts released by rockets on the earth's atmosphere.

Facts:

- ISRO has developed **eco-friendly solid propellant** based on **Glycidyl Azide Polymer (GAP)** as fuel and **Ammonium Di-Nitramide (ADN)** as oxidizer at the laboratory level, which will eliminate the emission of chlorinated exhaust products from rocket motors.
- The **LOX/LH2 (liquid oxygen – liquid hydrogen) combination** is already being used in the **cryogenic upper stages of GSLV and GSLV Mk-III** launch vehicles.

Other Facts:

- ISRO has successfully developed **ISROSENE**, which is a **rocket grade version of kerosene** as an **alternative to conventional hydrazine rocket fuel**.
- The propellants that are being used now have a very reactive effect on the ozone layer due to the release of chlorinated exhaust products.

4. Electric Propulsion System

News: Recently, ISRO has planned to launch GSAT-20, based on electric propulsion technology which has helped in reducing the weight of the satellite to just 3.5 tonnes.

Facts:

- Electric Propulsion System (EPS) can **reduce the dependence on chemical propellant** thereby increasing the payload capacity of the vehicle.
- Electric Propulsion system helps in **orbit correction of a satellite**.
- It helps in **maintaining a satellite on its path during its entire life duration**.
- This system provides **small but accurate thrust** to a satellite in its orbit.
- The new system **converts solar energy available in the space into electrical energy** and later to kinetic energy by generating thrust that propels a satellite.
- This system has been already tested by Russian space agency and NASA.
- It has immense capability to eventually lower the cost of launches.

5. Two Stage to Orbit (TSTO) Space Transportation System

News: Recently India became the fifth nation to successfully conduct the **flight demonstration of a scaled down version of a winged-body reusable launch vehicle**.

Facts:

- It is a stepping stone towards fully reusable **Two Stage to Orbit (TSTO) space transportation system**.
- TSTO launch vehicle can launch payload to **Lower Earth Orbit (LEO)** with 15 times reusability.
- It also validates the critical technologies such as autonomous navigation, guidance & control, reusable thermal protection system and re-entry mission management

Other Facts:

- Low earth orbit is defined as an orbit within a locus extending from the earth's surface up to an altitude of 1,200 miles.
- Most communication applications use LEO satellites because it takes less energy to place the satellites into LEO.
- Also, they need less powerful amplifiers for successful transmission.
- As LEO orbits are not geostationary, a network of satellites are required to provide continuous coverage.

6. ICESat - 2: (Ice cloud and land elevation satellite-2)

News: NASA has launched ICESat-2 as the benchmark Earth Observing System Mission. It is a sequel to ICESat launched in 2003.

Facts:

Features:

- It is equipped with instrument named ATLAS (Advanced Topographic Laser Altimeter System), a laser divided into 6 beams.
- It uses Photon Counting technique.
- It will survey the height of the earth's cryosphere, forests, lakes, urban areas, cloud cover etc.

7. Polarimetry Doppler Weather Radar:

News: ISRO launched the Polarimetry Doppler Weather Radar at Satish Dhawan Space center, Sriharikota.

Facts:

- It is a radar indigenously developed by the Bharat Electronics Ltd., Bengaluru. under the Make in India project.

Functions:

- It enhances the lead time in case of information regarding natural disasters.
- It provides with detailed information on storm's internal wind flow adding to the capabilities of the conventional radars.
- It also has an improved accuracy of rainfall estimation resulting in early warnings in cases of flash floods.

8. Parker Solar Probe:

News: It was recently made to fly past Venus intentionally in order to slow it down by avoiding the gravitational pull of the sun.

Facts:

- It is a robotic spacecraft launched by NASA in 2018.
- It's the first mission to directly fly into sun's atmosphere called Corona.

- It will probe the outer corona and measure the electric and magnetic fields and help predicting solar flares that can hamper satellite functioning, endanger the astronauts in ISS and dismantle the power grids on Earth.

Other facts:

- This is the only time the spacecraft will have its thermal protection system — made of a 4.5-inch-thick carbon composite that will reach temperatures of 2,500 F while at the Sun — attached until just before launch.
- The Sun's atmosphere has three layers: the photosphere, the chromosphere, and the corona.
- Photosphere is visible surface of the earth, and the outer atmosphere of the sun comprises of the chromosphere and corona.

9. New Horizons probe:

News: Recently the spacecraft crossed Kuiper belt Object- Ultima Thule on 1st January 2019.

Facts:

- With this it sets a record of being the most distant object visited by a spacecraft.
- New Horizons probe is NASA's interplanetary space probe launched under its New Frontiers Programme.
- It was launched in January 2006 to travel to Pluto and Kuiper Belt. It is the first spacecraft to travel up to Pluto.

Other facts:

- Kuiper Belt: It is the zone beyond the Giants planets called the third zone. New Horizon is the first mission to probe into the third zone.
- The Kuiper belt, occasionally called the Edgeworth–Kuiper belt, is a circumstellar disc in the outer Solar System, extending from the orbit of Neptune to approximately 50 AU from the Sun.
- It is wider and massive than the asteroid belt (a circumstellar belt between Mars and Jupiter).
- (486958) 2014 MU_{69}: Nicknamed as Ultima Thule, is a trans-Neptunian object located in the Kuiper Belt. It is a contact binary 31 km long, composed of two joined bodies.

10. Hubble telescope:

News: The Hubble telescope went into the "safe mode" after one of its gyroscopes failed.

Facts:

- NASA's Hubble telescope is world's first space-based optical telescope, which was launched into low earth orbit in 1990, and is still in operation.
- NASA named it after American astronomer Edwin P. Hubble
- It is the largest and the most versatile telescope till date.

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11. NASA's Chandra X-Ray Observatory:

News: This observatory has entered a safe mode due to technical malfunction.

Facts:

- It is a Space observatory launched by NASA in 1999, launched on STS-93.
- Chandra is one of the great observatories, along with the Hubble space telescope, Compton Gamma Ray Observatory and the Spitzer Space telescope.
- It is named after Indian-American astrophysicist and Nobel laureate Subrahmanyan Chandrasekhar.
- It was earlier known as the Advanced X-ray Astrophysics Facility.
- It is sensitive to X-rays andis specially designed to detect X-ray emission from very hot regions of the Universe.

12. NASA's Dawn Spacecraft:

News: The Dawn Spacecraft ran out of fuel recently.

Facts:

- Dawn Mission is the first mission to orbit around a Dwarf planet and the first to orbit two bodies in the main asteroid belt.
- It is NASA's retired space probe. It was launched in 2007 to study two protoplanets in the asteroid belt- Vesta and Ceres.
- It was retired on 1st November 2018, and is currently in an uncontrolled orbit around its second target-Ceres.

13. BepiColombo Mission:

News: It is Europe's first mission to Mercury, which took off in 2018 and will reach there in 2025.

Facts:

- It is a joint mission between European Space Agency (ESA) and Japanese Aerospace Exploration Agency (JAXA), under the ESA leadership.
- The mission comprises of two spacecrafts: Mercury Planetary Orbiter and Mercury Magnetospheric Orbiter.
- The mission will focus on finding out the possibility of presence of water on Mercury.

Other facts:

- Mercury is solar system's smallest planet and the least explored.
- It is closest to the sun, with the surface temperature varying from 450-180 degree Celsius.

Other missions to Mercury:

- NASA's Mariner 10
- US Space Agency's Messenger

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14. Insight Probe:

News: NASA's Mars lander InSight (Interior Exploration using Seismic Investigations, Geodesy and Heat Transport) recently, reached the Red Planet.

Facts:

- It is the first spacecraft designed to explore the interior of Mars.
- The lander has landed at a site is called Elysium Planitia, near the equator of the Planet.

Other Facts:

- It is NASA's 9th attempt to land on Mars since the 1976 Viking Probe.
- NASA's last lander on Mars was Curiosity Rover in 2012.

15. Tiangong:

News: Recently, China presented a replica of its first permanently crewed space station.

Facts:

- Tiangong (Heavenly palace) is a Chinese attempt to place a permanent space station in low earth orbit (LEO) by 2022.

Other Facts:

- The International Space Station (ISS) is a habitable artificial satellite in low earth orbit, operational since 1988.
- It was a collaborative effort between the Space agencies of US, Russia, Canada, Europe and Japan.
- It will be decommissioned in the year 2024.

16. OSIRIS-Rex Mission:

News: OSIRIS-Rex captured the first clear images of the asteroid, Bennu.

Facts:

- NASA's space probe OSIRIS-Rex (Origins, Spectral Interpretation, and Resource Identification-Regolith Explorer) was launched for a near earth asteroid Bennu in 2016.
- 101955 Bennu is a carbonaceous asteroid in the Apollo group discovered by the LINEAR Project in September 1999.
- Unlike most other asteroids that circle the Sun in the asteroid belt between Mars and Jupiter, Bennu's orbit is close in proximity to Earth's, even crossing it.

Other facts:

- The pictures of Bennu have a remarkable similarity with another asteroid Ryugu.
- The pictures of asteroid, Ryugu was obtained by the JAXA Hayabusa Mission.

17. Kordylewski Dust Clouds:

News: Recently, a group of Hungarian scientist confirmed the speculation that earth has three natural satellite/moons.

Facts:

- Kazimierz Kordylewski, a Polish scientist, first discovered these moons for the first time in 1961.
- These are found at Lagrange point L5 of the Earth-Moon gravitational system.
- They are located at the same distance as the moon, from the earth but they reflect light faintly due to the extremely tiny dust particles that make up these moons.

Other Facts:

- Lagrange point is a location in space where the combined gravitational forces of two large bodies, such as Earth and the sun or Earth and the moon, equal the centrifugal force felt by a much smaller third body.

18. GSLV Mk III D2:

News: ISRO launched satellite GSAT-29 through the launcher GSLV Mk III D2.

Facts:

- GSLV Mk III D2 is India's heaviest launch vehicle, which can place satellites up to 4,000 kg into the Geosynchronous Transfer Orbit (GTO) or satellites of up to 10,000 kg to the Low Earth Orbit.
- It is the second launch by the GSLV Mk III D2, which earlier launched the GSAT-19 in 2017.
- It is a three-stage heavy lift rocket with a two solid fuel strap on engines in the first stage, liquid propellant as the second stage and cryogenic engine for the third stage.
- The cryogenic propellant system is called the C25 engine; it is an indigenous engine, which keeps fuel loads on the engine relatively low.

Other facts:

- India is among six nations to possess the cryogenic engine technology, others are US, China, Japan, France, Russia.
- GSAT-29 is a multi-beam, multiband communication satellite of India and is the heaviest satellite launched from India till date.

19. Hyperspectral Imaging Satellite (HysIS):

News: PSLV C34 launched India's first Hyperspectral Imaging Satellite (HysIS) from Satish Dhawan Space Station.

Facts:

- HysIS is ISRO's Earth observation satellite built around ISRO's Mini satellite-2 bus.
- It combines the power of the digital camera and spectroscopy to attain both spatial and spectral information from an object.

- The resultant images can be used to identify, measure and locate different materials and their chemical as well as physical properties.
- It will provide hyperspectral-imaging services to India for a range of applications in agriculture, forestry and in the assessment of geography such as coastal zones and inland waterways, environmental studies, detection of pollution from industries and for military surveillance and anti-terror operations.
- The data will also be accessible to India's defense forces.

Other facts:

- Spectral Imaging was first tried by ISRO in an experimental satellite in 2008 and later on Chandrayaan-1 mission, however it is the first time that a full-fledged hyperspectral imaging satellite has been launched.
- Spectral imaging uses multiple bands across the electromagnetic spectrum like infrared, visible spectrum, UV, x-rays or a combination of these spectrum.
- Hyperspectral camera provides much more detailed information by dividing the spectrum into many more bands than a normal camera.

20. Saturn rings:

News: NASA confirms that Saturn is losing its rings.

Facts:

- The Saturn rings are mostly chunks of water ice. They are held in place due to the centrifugal force of the orbital velocity and centripetal force of Saturn's gravity.
- These rings are being pulled into Saturn as a dusty rain of ice, due to Saturn's magnetic field.
- Cassini spacecraft measured the ring material falling into Saturn's equator and estimated that the rings have less than 100 million years to live.
- Other facts:
- The Cassini–Huygens mission commonly called Cassini, was a collaboration between NASA, the European Space Agency (ESA), and the Italian Space Agency (ASI) to send a probe to study the planet Saturn and its system, including its rings and natural satellites.
- Titan is one of the seven large natural satellites of Saturn.

21. GSAT-11:

News: Ariane 5 Rocket of the European Space Agency (ESA) launched the heaviest satellite built by ISRO from French Guiana.

Facts:

- It weighs around 5855 kg.
- It is part of ISRO's High Throughout Communication Satellite (HTS), satellites that will take Internet facilities to remotest of areas. It is built to provide throughput data rate of 16 gbps.
- The GSAT 11 carries 40 Ku/Ka band transponders. With this India uses Ka band transponders for the first time.

- The satellite will be placed in a circular geostationary orbit.
- Other facts:
- Ku band transponder ranges between 12-18 Hz while Ka band has greater frequency range of 26.5-40 Hz.
- Ka band has 100 times faster data transmission rate, due to greater frequency.
- The International Telecommunication Union (ITU) does allocation and regulation of electromagnetic spectrum into different frequency bands.

22. SOYUZ:

News: SOYUZ, a rocket carrying astronauts from US, Russia and Canada, was successfully launched.

Facts:

- Soyuz is a Russian spacecraft that carries people and supply to and from the International Space station (ISS).
- The craft has space for three people.
- Currently it is the only spacecraft is in operation to carry people to ISS, as the US space shuttle retired in 2011.
- Soyuz Spacecraft also function as lifeboats and one Soyuz spacecraft is always docked to the space station, so that in case of emergency the crew can return to the earth safely.
- Other facts:
- ISS is in the Low Earth Orbit (LEO), and it is the largest human made body in the LEO and can be seen through naked eyes.
- It is a joint project between five space agencies: NASA (US), Roscosmos (Russia), JAXA (Japan), ESA (Europe) and CSA (Canada).
- Its first component was launched in 1998 and is expected to operate till 2030.
- China launched its first experimental space station in 2011 called the Tiangong-1.

23. VISIONS-2 Missions:

News: NASA launched the Visualizing Ion Outflow via Neutral Atom Sensing-2 (VISIONS-2).

Facts:

- It's a sounding rocket mission, to study the loss of earth's atmosphere into the space.
- The Aurora Borealis is center of the study for this mission as this is an important process of atmospheric escape.

Other facts:

- Sounding rockets are those that take only a brief flight into the space before falling into the earth's atmosphere.
- These rockets are designed to probe into atmospheric conditions and structure between 80 to 160 km of height.
- Auroras: A natural electrical phenomenon characterized by the appearance of streamers of reddish or greenish light in the sky, especially near the northern or southern magnetic pole.

- The effect is caused by the interaction of charged particles from the sun with atoms in the upper atmosphere.
- In northern and southern regions, it is respectively called aurora borealis or Northern Lights and aurora australis or Southern Lights.

MOBILE TECHNOLOGIES

1. 5G

News:

- TRAI gives nod for sale of 5G spectrum
- The government has set up a **high level forum to evaluate roadmaps and formulate a strategy** to adopt 5G in the country by 2020.

Facts:

- 5G is a **wireless communication** and **next generation mobile networks technology** after 4G LTE networks.
- The final standard for 5G will be set up by the **International Telecommunications Union (ITU).**
- India lacks a **strong backhaul** to transition to 5G.
- Backhaul is a network that **connects cells sites to central exchange**\

IT

1. Shakti Microprocessor:

News: IIT Madras developed India's first microprocessor called Shakti.

Facts:

- Shakti is a 64 bit, open-source processor developed by the Reconfigurable Intelligent Systems Engineering (RISE) laboratory, IIT Madras.
- The Union Ministry of Electronics and Information Technology funded the project.
- It is a completely indigenously developed microprocessor.
- The IIT Madras Team is now ready to develop Parashakti, which is an advanced microprocessor for supercomputers.

2. SpiNNaker:

News: The world's largest brain like supercomputer called the Spiking Neural Network Architecture (SpiNNaker) was turned on for the first time.

Facts:

- It mimics the function and working of human brain.
- It has a computational capability of more than 200 million actions per second, which is only 1% of the capability of the Human Brain.

3. BullSequana Supercomputer:

News: French company Atos signed an agreement with C-DAC for designing, building and installing BullSequana Supercomputer in India.

Facts:

- Currently India's fastest and 39th fastest supercomputer in the world, Pratyush is installed in Pune's Indian Institute of Tropical Meteorology. It is used for simulating and predicting ocean and atmospheric systems.
- C-DAC was setup in 1988 under Ministry of Electronics and Information Technology, for indigenous development of Supercomputers.

4. National Mission on Interdisciplinary Cyber-Physical Systems:

News: Cabinet launched the National Mission on Interdisciplinary Cyber-Physical Systems (CPS).

Facts:

- It will be implemented by the Department of Science and Technology for a period of five years.
- CPS is an interdisciplinary field that deals with the deployment of computer-based systems that do things in the physical world.
- The mission would address technology development, application development, human resource development, skill enhancement, entrepreneurship and start-up development in CPS and associated technologies.
- It aims at establishment of 15 numbers of Technology Innovation Hubs, six numbers of Application Innovation Hubs and four numbers of Technology Translation Research Parks (TTRP).
- These Hubs & TTRPs will connect to Academics, Industry, Central Ministries and State Government in developing solutions at reputed academic, R&D and other organizations across the country in a hub and spoke model.
- They mainly focus on four areas: Technology Development, HRD & Skill Development, Innovation, Entrepreneurship & Start-ups Ecosystem Development and International Collaborations.

DISEASES

1. MCR 1 Gene

News: Mcr-1 gene seen in K. pneumoniae bacteria

Facts:

- mobilized colistin resistance (mcr-1) gene that confers **multidrug-resistance** has now been reported in Klebsiella pneumoniae bacteria
- This gene endows **resistance against last hope antibiotic — colistin**
- The mcr-1 gene is **usually found in the plasmid** (small DNA in the cytoplasm)
- Colistin, also known as **polymyxin E**, is an antibiotic produced by certain strains of the bacteria Paenibacillus polymyxa.

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- Colistin has also been used recently to treat **ventilator-associated pneumonia** (VAP) and bacteremia caused by MDR bacteria, such as P. aeruginosa, K. pneumoniae and A. baumannii.

2. Ebola

News: The Ebola virus returned to the Democratic Republic of the Congo (DRC) just days after the World Health Organisation (WHO) announced, on July 24, that the Ebola outbreak had ended there.

Facts:

- In 2014, Ebola first outbreak had struck three West African countries (Guinea, Liberia and Sierra Leone)
- **Ebola**:
  - is a **rare and deadly disease** in people and nonhuman primates
  - located mainly in **sub-Saharan Africa** caused by an infection with a group of viruses within the genus of ebolavirus.

3. Bacteria Wolbachia

News: Recently successful experiments were conducted in Australia, which demonstrated the positive **correlation between presence of Wolbachia bacteria in mosquitoes and reduced spread of diseases such as Malaria and Dengue.**

Facts:

- Wolbachia bacteria is a **tiny bacterium** that is present in up to 60% of all species of insects, including several mosquito species.
- It is one of the world's **most common parasitic microbes** and possibly the most common reproductive parasite in the biosphere.
- But it is usually not present in the Aedes aegypti mosquito, the primary species responsible for transmitting dengue, chikungunya and Zika.
- When present in the mosquito, the viruses (E.g Zika Virus) cannot replicate and hence small numbers of wolbachia-carrying mosquitoes are released in target areas.
- Once Wolbachia carrying mosquitoes are released, they breed with wild mosquitoes and over time, the majority of mosquitoes carry Wolbachia.

4. Staphylococcus Epidermidis:

News: It is a superbug resistant to all the antibiotics known to spread undetected through hospitals across the world.

Facts:

- It is a bacterium related to MRSA (methicillin Resistant Staphylococcus aureus).
- It is naturally found on human skin.
- It commonly affects elderly or patients who have prosthetic material implanted.

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Other facts:

- When microorganisms become resistant to most of the antimicrobials they are referred to as Superbugs.

5. Middle East Respiratory Syndrome (MERS):

News: An Emirates flight from Dubai was quarantined in New York suspecting that the passengers are infected by MERS.

Facts:

- Middle East Respiratory Syndrome is a viral respiratory disease.
- It is caused by novel coronavirus (MERS-CoV), first identified in Saudi Arabia in 2012.
- MERS-CoV is a zoonotic virus, a virus that is transmitted between animals and humans.
- Dromedary camels are the reservoirs of this coronavirus.
- No vaccine is currently available.
- Affected regions: Saudi arabia, UAE, Republic of Korea.

6. Polio Virus:

News: Ministry of Health and Family Affairs ordered an enquiry into type-2 poliovirus contamination of the vials used for immunization in U.P, Maharashtra, Telangana.

Facts:

- Poliomyelitis (polio) is a highly infectious viral disease.
- Children are more prone to this disease.
- The virus is transmitted from person to person mainly through the faecal-oral route.
- Polio can only be prevented through immunization.

Other facts:

- There are 3 types of poliovirus strains: P1, P2, P3.
- In 2014 India was poliovirus free by eradicating P1 and P3.
- September 2015, type 2 was also declared eliminated, officially.
- Types of polio vaccine:
    - Inactivated polio vaccine (IPV): produced from wild type poliovirus strain that have been killed using formalin. It is an injectable vaccine.
    - Oral Polio vaccine (OPV): this is weakened poliovirus, which activates the immune system to develop antibodies. The vaccine is safe,but sometimes results in vaccine derived poliovirus (VDPV).

7. WHO TB Report:

News: World Health Organization in collaboration with UN's first high-level meeting on TB released World TB Report 2018.

Facts:

- TB is a communicable disease, caused by bacteria called bacillus Mycobacterium tuberculosis.
- It is both pulmonary (affects the lungs) and extrapulmonary (affects areas other than lungs) in nature.
- Drug resistant TB is a rising concern where the bacteria are increasingly becoming resistant to the antibiotics. There are three types of drug resistant TB:

Multidrug resistant TB (MDR)	***Extensively Drug resistant TB (XDR)***	***Total drug resistant TB (TDR-TB)***
It doesn't respond to the first line of drugs- isoniazid and rifampicin.	Here the bacteria are at least resistant to 4 anti-TB drugs.	Bacteria are resistant to all the first line as well as second line TB drugs.

Other facts:

- Moscow Declaration (2017): It is the outcome of the first global ministerial conference on ending TB, held in 2017.

8. Integrated Health Information Programme (IHIP):

News: An Integrated Health Information Programme was launched in 7 states, as the part of the Integrated Disease surveillance Programme (IDSP).

Facts:

- IHIP aims at creating an interoperable Electronic Health Record, which can be made available and accessible throughout the country.
- It will also include the information from the tuberculosis control programme, maternal and child health programme, non-communicable diseases programme.

Other facts:

- IDSP is a disease surveillance scheme under the National Health Mission, under the Health Ministry, assisted by the World Bank.
- The aim is to set up Central and State Disease Surveillance Unit to collect and analyze data on diseases.

GOVT INITIATIVES

1. Digital North East Vision 2022:

News: Ministry of Electronics and Information Technology (MeitY) recently released The Digital North East Vision 2022 in Guwahati, Assam.

Facts:

- The vision document emphasizes on **leveraging digital technologies to transform lives** of people of north east and enhance ease of living.

- It **identifies eight digital thrust** areas namely, Digital Infrastructure, Digital services, Promotion of Electronics Manufacturing, Digital empowerment, Promotion of IT and ITes including BPOs, Digital Payments, Innovation & Startups and Cyber security.

2. IMPRINT – II

News: Union Ministry of Human Resource Development (MHRD) has approved 122 new research project proposals worth Rs 112 crore for funding under its IMPRINT-II scheme.

Facts:

- IMPRINT is a **first-of-its-kind Pan-IIT and IISc joint initiative** to develop a (a) New Education Policy, and (b) Roadmap for Research.
- To **solve major engineering and technology challenges** in selected domains needed by the country.

Other Facts:

- Initially, under **IMPRINT-I, IITs and IISC, were asked to identify major areas where India is facing engineering and technology challenges**.
- Now its scope also has been **expanded to include private institutions** along with IITs and IISc under IMPRINT-II.

3. Fixed Dose Combinations(FDCs):

News: Ministry of Health and Family Welfare under the Drugs and Cosmetics Act,1940 banned the manufacture, sale or distribution of 328 FDCs for human use and has made the manufacture, sale and distribution of 6 FDCs conditional claiming that they are unsafe and irrational.

Facts:

- FDCs: Cocktail of 2 or more drugs packed in a single dose. These drugs are not covered under the ambit of price control regime.

Concerns:

- Dosing mismatches in FDCs can cause toxicity.
- Pharma companies fail to prove safety, compatibility and rationality of FDCs.
- Wrong dosage by physicians can result in resistance to treatment.
- India has become the dumping ground for the FDCs disapproved for consumption in other countries.

Committees that earlier recommended ban on FDCs:

- ChandrakanthKokate Committee 2015
- NilimaShirsagar Committee formed under the direction of the Drugs Technical Advisory Board (DTAB).

Related organizations and authorities:

Organization/Authority	
Central Drug Standard Control Organization	• Under ministry of Health and Family Welfare. • It approves new drugs for manufacture and import.
Drugs Technical Advisory Board(DTAB)	• Under Ministry of Health and Family Welfare. • It is a statutory body under Drugs and Cosmetics Act 1940. • Highest decision making body on technical matters.
State Drug Authority:	• It is a licensing authority for marketing drugs.

4. Guidelines on food fortification:

News: Food Safety and Standards (Fortification of Food) regulations 2018 has been notified in the Gazette of India.

Facts:

- Food fortification: Food Fortification is a scientifically proven, cost-effective, scalable and sustainable global intervention that addresses the issue of micronutrient deficiencies.

FSSAI (Fortification of Foods) Regulations 2018:

- It has prescribed standards for fortification of various food products.
- Quality assurance to be undertaken by every manufacturer and packer of fortified food.
- Random testing of fortificants and fortified food.
- Every package of fortified food should have name of the fortificant and the logo (+F logo).
- Food authority to take steps to encourage production, manufacturing, distribution, sale and consumption of fortified food.

Other facts:

- FSSAI is an autonomous body under the Ministry of Health and Family Welfare, established under the Food Safety and Standards Act,2006.

5. Train 18 (T18):

News: Indian Railways' first engine-less train made its inaugural trial run.

Facts:

- The maximum train speed is up to 180 kmph (semi high speed train), and is referred to as the successor of Shatabdi Express.
- It has been christened as the Vande Bharat Express.
- It is fully air conditioned, manufactured by Integral Coach Factory, Chennai.

- It is a 100% Made in India project.
- It is driven by self-propulsion module without a separate locomotive.
- It employs regenerative braking system.
- It made its maiden journey from Delhi to Varanasi.

6. Ask Disha Chatbot:

News: The Indian Railways Catering and Tourism Corporation (IRCTC) launched Ask Disha Chatbot for improving customer service for passengers.

Facts:

- It is an artificial intelligence powered chatbot.
- IRCTC becomes the first and the only government corporation in India to launch a chat enabled helpdesk service.
- IRCTC and CoRover Private Limited have jointly developed it.
- It will be functional in several regional languages, and will be voice enabled.
- It will soon be integrated with the IRCTC android app.

Other facts:

- CoRover Private Ltd. is a Bengaluru based startup that develops AI and machine learning based chatbots pertaining to travel and tourism.
- Chat bot is a combination of a chat and robot. It is based on AI which conducts text or audio conversations like humans.

7. AcinetobacterJunii:

News: Researchers from University of Delhi (DU) and Indian Institute of Technology (BHU) successfully degraded toluene into a less toxic byproducts by using a bacteria called AcinetobacterJunii.

Facts:

- The degradation was by the way of general aerobic degradation.
- Toluene is a petrochemical waste released without treatment from refineries, paint, rubber etc.
- It has adverse impact on health of aquatic life and genotoxic and carcinogenic effect on human health.

8. DigiYatra

News: DigiYatra platform has been created by Ministry of Civil Aviation to create a digitally unified experience for air travellers.

Facts:

- It plans to bring together the entire aviation industry, to result into a seamless and paperless service experience.

The platform is built on 4 key pillars:

- Connected Passengers
- Connected Airports
- Connected Flying
- Connected Systems

9. India International Science Festival (IISF):

News: The Ministry of Science and Technology, Ministry of Earth Sciences and Vijnana Bharati jointly conducted the 4th edition of India International Science Festival in Lucknow.

Facts:

- It is aimed at collectively working towards "Vigyan se Vikas", for the making of the new India.
- The theme of the festival was Science for Transformation.
- It brings together students, researchers, innovators and general public to celebrate science achievements.
- It encourages young minds in the field of science and to come up with innovative ideas to overcome the problems faced by our country in the 21st century.

Other facts:

- The 1st IISF was held at Indian Institute of Technology (IIT), New Delhi 2015.

10. India Based Neutrino Observatory:

News: National Green Tribunal (NGT) upheld the environmental clearance granted to India-based Neutrino Observatory (INO).

Facts:

- It is a major experimental particle physics projects undertaken in India.
- The proposed site for the INO is in Theni district of Tamil Nadu.
- The project includes:
    - Construction of an Underground laboratory
    - Construction of an Iron Calorimeter Detector for studying neutrinos
    - National Centre for high Energy Physics at Madurai for the maintenance and operation of the underground laboratory.

Other facts:

- Other Neutrino study projects are- LAGUNA in Europe, Hyper Kamiokande Detector at Kamiko Observatory in Hida, Japan and DUNE in South Dakota in US.
- Neutrinos interact very less with anything and hence it's hard to detect them.
- They have no electrical charge and negligible mass.
- They occur in 3 different flavors based on the mass: electron-neutrino, muon-neutrino, tau-neutrino.

ENERGY

1. Repurpose used cooking oil (RUCO)

News: The Food Safety and Standards Authority of India (FSSAI) has launched RUCO (Repurpose Used Cooking Oil).

Facts:

- It is an initiative that will enable **collection and conversion of used cooking oil to bio-diesel**.

Other Facts:

- **Total Polar Compounds (TPC)** - TPC is used to measure the quality of oil, level of TPC increases every time oil is re-heated.
- Higher level of TPC in cooking oil leads to health issues like hypertension, atherosclerosis, Alzheimer's disease and liver disease.

2. Thermal Battery Plant:

News: India became home to the world's **first-ever thermal battery plant** which was inaugurated recently in Amravati, Andhra Pradesh.

Facts:

- It aims to create a **new energy storage form** that is expected to have commercial applications, while also maintaining a low carbon footprint, and being less dependent on external factors like weather.
- It will be owned by Bharat Energy Storage Technology Private Limited (BEST).
- It will have a **battery capacity of 1000MW** which is expected to be upgraded to a **10GW** capacity by 2025.
- It could provide energy solutions for electrical grids, transport and telecom services (help boost signal strength).
- It is **considered to be even better than solar energy** which cannot be charged or utilised to their optimum potential after sunset or even when the skies are densely clouded.

Other Facts:

- Conventional battery technology work on basis of electrical energy and is based on system of **charging and discharging cycles** that are **driven by electricity**.
- Thermal battery uses **thermal energy to operate i.e. energy created by temperature differences**.
- The energy transfer in in this battery helps to store heat when heat travels from one part of battery setup to other.
- For this transmission, thermal battery consists of two parts viz. **cool zone** (sink) and **hot source** (source).

3. CoradiaiLint:

News: CoradiaiLint is world's maiden hydrogen fuel cell powered trains launched by Germany and nicknamed as Hydrail.

Facts:

- It is manufactured by Alstom, Europe's largest manufacturer of railways.
- It is world's first noise free and zero emission train.
- Hydrogen fuel cell combines hydrogen and oxygen to produce electricity and gives out only water and steam as by-products.

DEFENCE

1. iDEX

News: Ministry of Defence (MoD) has introduced **"Innovations for Defence Excellence"** (iDEX) initiative to foster innovation in defense sector.

Facts:

- iDEX is aimed at creating an ecosystem which **fosters innovation and encourages technology development** in Defence by engaging R&D institutes, academia, industries, Startups and even individual innovators.
- iDEX will be funded and managed by a 'Defence Innovation Organisation (DIO)'.
- iDEX will **function as the executive arm of DIO**, carrying out all the required activities while DIO will provide high level policy guidance to iDEX.

2. Mid-air refuelling of LCA Tejas:

News: Indian Air Force was successful in mid-air refuelling of indigenously developed Light Combat Aircraft Tejas.

Facts:

- With this India joins the elite group of countries with air to air refuelling capacity.
- This will increase the aircraft's range, endurance and will do away with the need to stop at locations enroute.

Other facts:

- LCA Tejas is a single seat, multi role jet fighter.
- It is powered by a single engine.
- It is world's lightest and smallest supersonic aircraft.
- Designed, developed and manufactured by HAL (Hindustan Aeronautics Ltd.) as part of its LCA programme 1980s.
- Tejas has a range slightly higher than 400-km.
- It is mainly used for close air to ground operations.
- It is armoured with air-to air missiles, bombs and precision guided missiles.

3. Smart Border Fence:

News: Recently Union Home Minister inaugurated a pilot project of Smart Border Fencing under the Comprehensive Integrated Border Management System(CIBMS).

Facts:

- It is a technological solution devised for addressing the gaps in the border security issues in border states.
- Two pilot projects of 5-km each are installed at the Indo-Pak border in Jammu.
- This hi-tech surveillance system will create invisible electronic barrier on land, water, air and even underground.

Other facts:

- CIBMS is a system which integrates human resource, weapons and hi-tech surveillance for border security.
- Three main components of CIBMS are: New hi-tech surveillance devices, Satellite Communication network, Command and Control Center for a comprehensive picture of the security situation.
- Border Protection Grid: it is set up in Indian states bordering Bangladesh to strength Indo-Bangladesh border security.

4. ParakramParv:

News: A three-day (September 28-30) celebration to mark the second anniversary of the surgical strike carried out by the Indian army across LoC.

Facts:

- This event showcased the courage, valour and the sacrifice of the armed forces.

5. Astra:

News: Indian Air Force successfully test fired indigenously developed beyond the visual range air-to-air missile Astra from Su-30mki.

Facts:

- Astra is an all-weather missile, developed by DRDO.
- It is India's first air-to-air missile.
- It has the capability to engage with targets at varying range-short term range of 20-km and long term range targets upto 80-km.

6. VC 11184:

News: Hindustan Shipyard Limited is ready to undertake sea trials of India's first missile tracking ship, currently referred to as VC 11184.

Facts:

- It has two objectives: tracking missiles using onboard sensors and collecting electronic intelligence.
- With this India joins the elite club of other countries having such a vessel in their arsenal viz. United States, China, Russia and France.

7. Defence Offset Fund

News: To fund **promising defence start-ups**, the defence ministry intends to canalise money that accrues from the discharge of offsets into a Defence Offsets Fund (DOF), and leverage that with market funding.

Facts:

- Defence offset policy initially mandated foreign suppliers to spend at least 30% of the contract value in India. The offset limit has now been increased from Rs 300 crore to Rs 2,000 crore.
- The Ministry of Defense introduced the offset policy following recommendations **from a panel headed by former finance secretary Vijay Kelkar**
- The policy now **allows the private sector to compete** in the production of surveillance vessels, such as inshore and offshore patrol vessels, with defense shipyards

8. BARAK 8 Missile

News: In a boost to India's maritime prowess, the Navy has successfully test-fired the nearly **Barak 8** from INS Kolkata.

Facts:

- 70 KM range Surface to Air Missile, **developed jointly by India and Israel,**
- **Long Range Surface to Air Missile (LR SAM)** is a significant milestone in enhancing Indian navy's anti-air warfare capability.
- The system includes a **Multi-Functional Surveillance and Threat Alert Radar (MF STAR)** for detection, tracking and guidance of the missile.
- Designed to defend against a variety of **short-to-long -range airborne threats**
- Barak-8 incorporates phased **array multi-mission radar**, **two-way data link**, and a **flexible command and control system**, enabling users to simultaneously engage multiple targets day and night.

9. Supersonic endo – atmospheric interceptor missile

News: India successfully test-fired its indigenously developed supersonic interceptor missile

Facts:

- Full-fledged **multi-layer Ballistic Missile defense (BMD) system**, capable of destroying any incoming hostile ballistic missile
- It is single stage solid rocket propelled guided missile. It equipped with navigation system, a hi-tech computer and an electro-mechanical activator
- The BMD consists of **two interceptor missiles**, the Prithvi Defence Vehicle (PDV) for exo – atmospheric ranges and Advanced Area Defence (AAD) missile for endo – atmosphere for lower latitudes.

10. Operation Madad and Operation Sahyog

News: Indian Navy has launched Operation Madad and Indian Army also has launched Operation Sahyog to res to rescue people in flood-hit Kerala

Facts:

- For assisting the state administration and undertaking disaster relief and rescue operations during Kerala floods.

11. Defence Industrial Corridor

News: Uttar Pradesh Defence Industrial Corridor took off to a great start with an announcement of **investment over Rs. 3700 crores in defence production** at Industry Meet organized at Aligarh.

Facts:

- Defence manufacturing has been identified as one of the 25 key sectors under Make in India initiative.
- Announcement of setting up two corridors – Tamil Nadu and Uttar Pradesh exclusively for defence manufacturing in the current years' budget.

12. Smart Anti Airfield Weapon (SAAW)

News: The latest round of SAAW were carried out at the Chandan Firing Range near Pokhran in Rajasthan.

Facts:

- It is a **precision-guided glide bomb** specialised at making runways and airfields unsuitable for take-off and landing operations.
- designed for **deep penetration and is armed with a high-explosive warhead**
- is India's attempt at building an **indigenous weapon for the specialised operation**

13. Anti – Tank Guided Missile (ATGM) 'HELINA'

News: An Indian Army helicopter successfully test fired the **third-generation anti-tank guided missile** (ATGM) HELINA at the Pokhran test range in the Thar Desert region.

Facts:

- A **fire and forget** air-launched variant of the Nag missile
- guided by an Infrared Imaging Seeker (IIR)
- Helicopter – Launched Nag (HELINA)

Other Facts:

- Nag is developed under the Indian Ministry of Defence's integrated guided missile development programme (IGMDP)
- Agni, Akash, Trishul and Prithvi are also being developed under integrated guided missile development programme (IGMDP)

14. India's Nuclear Triad Completed:

News: The successful deterrence patrol of the INS Arihant completed India's Nuclear Triad.

Facts:

- A nuclear triad refers to the three components of Atomic weapon delivery: strategic bombers, Intercontinental ballistic missiles and Submarine launched ballistic missiles.
- Land vector includes Prithvi II and Agni I-VI.
- Air vector includes Sukhoi-30MKI, Mirage 2000 and Jaguar fighters modified to deliver nuclear bombs.
- Sea vector includes INS Arihant codenamed as S-2.

Other facts:

- The then PM Indira Gandhi sanctioned the submarine Arihant after the first nuclear test in 1974. It took 11 years to complete its construction.
- It is part of Indian Navy's Secretive Advanced Technology Vessel (ATV) project.
- INS Arihant was built at the Ship building Center, Visakhapatnam.

NUCLEAR

1. APSARA-U:

News: An indigenously developed swimming pool type research reactor has been made operational at Trombay, Bhabha Atomic Research Center(BARC).

Facts:

- Apsara-U is an upgraded version of Apsara research reactor.
- Apsara was the first research reactor in Asia (1956-2009).
- It uses plate type dispersion fuel element made of low enriched Uranium.
- It has increased indigenous production of radioisotopes due to higher neutron flux.
- It produces neutrons for use in agriculture, medicine, industry, forensics etc.
- It will be for research in nuclear physics, material science and radiation shielding.

Other research reactors operational in India:

- KAMINI: Only reactor operating at 233U Fuel produced by Thorium fuel cycle.
- DHRUVA: India's largest research reactor and primary source for weapon-grade plutonium.

2. Military Exercises

A. KAKADU 2018

News: Indian Naval ship Sahyadri reached Darwin, Australia for exercise KAKADU 2018.

Facts:

- Biennial exercise hosted by the **Royal Australian Navy (RAN)** and supported by the **Royal Australian Air Force (RAAF)**
- Australia's largest maritime exercise

B. Pitch Black – 18

News: Ex Pitch Black was hosted by Royal Australian Air Force (RAAF) from 24 Jul 18 to 18 Aug 18 in Darwin, Australia.

Facts:

- Biennial exercise hosted by the **Royal Australian Air Force (RAAF)**
- the first time that IAF participated with air assets in the Exercise Pitch Black (PB-18). India had participated with observer status prior to this.
- The exercise hosts up to **4000 personnel and up to 140 aircraft** from around the globe and utilises the **largest training airspace areas in the world** — Bradshaw Field Training Area and Delamere Air Weapons Range

C. Maitree Exercise

News: Exercise Maitree 2018, a two-week **long platoon level joint military exercise** was conducted between **Indian Army and Royal Thai Army**.

Facts:

- Annual event designed to strengthen the partnership between Royal Thai Army, Indian Army in the Thailand.

D. Peace Mission 2018

News: The joint exercise is being conducted by the Central Military Commission of Russia at Chebarkul, Russia.

Facts:

- Mega anti-terror drill of the Shanghai Cooperation Organisation (SCO)
- First military exercise involving the **militaries of India and Pakistan**

3. S-400:

News: S-400 deal was a major breakthrough in the 19th India-Russia annual bilateral summit despite US sanctions under Countering America's Adversaries through Sanctions Act (CAATSA).

Facts:

- Russian built S-400 Triumf (known as SA-21 Growler by NATO) is world's most dangerous long-range surface-to-air missile defence system.
- It can be deployed in five minutes and is capable of firing three types of missiles to create a layered defense system.

Other facts:

- THAAD (Terminal High Altitude Area Defense System) is a similar missile defense system developed by US. It is ananti-ballistic missile defensesystem designed to shoot down short-, medium-, and intermediate-range ballistic missiles in their terminal phase by intercepting with a hit-to-kill approach.
- CAATSA is a United States federal law which imposes sanctions against adversaries of US viz. Russia, North Korea and Iran. In particular, it was enacted to punish Russia by

sanctioning countries engaging in business transactions with Russian Defence Sector, to prevent revenue flows to the Russian government.

4. Avangard Hypersonic System:

News: Russia successfully test fired the Avangard Missile.

Facts:

- It is liquid fuelled, intercontinental ballistic missile (ICBM) of Russia.
- It can fly at a speed of Mach 20 (hypersonic) and carry nuclear and conventional warheads.
- It has maneuverable gliding feature to adjust to both altitude and direction and to avoid most missile defence systems.
- It will soon become the first operational hypersonic glide vehicle system.
- Other facts:
- Subsonic cruise missile flies at a speed lesser than the speed of sound. E.g. Nirbhay Missile
- Supersonic cruise missile travels at a speed of 2-3 Mach. E.g. Brahmos missile
- Hypersonic cruise missile travels at a speed of more than 5 Mach.

5. Reconstitution of Strategic Policy Group (SPG):

News: The government through a notification, reconstituted the Strategic Policy Group (SPG).

Facts:

- It was set up in 1999 to make policy recommendations to the National Security Council (NSC).
- It is mandated to publish National Defense Review charting out India's long term and short-term security threats and matters for consideration of NSC.
- The Cabinet Secretary headed the SPG earlier.

Salient features of the notification:

- National Security Advisor replaces Cabinet Secretary as the Chairperson of SPG.
- Other members will include Vice Chairman of NITI Aayog, Cabinet Secretary, three services chief, RBI Governor, secretaries of External Affairs, Home, Defense, Finance, Defense Production, Department of Revenue, Atomic Energy, Space and National Security Council Secretariat, Scientific Advisor to Defense Minister, Secretary (R) in Cabinet Secretariat and the IB chief.
- The new mandate of the Cabinet Secretary is to coordinate the implementation of the SPG decisions by the Union and the states.

Other facts:

- NSC is the top executive body of India, which advises the PM on national security and strategic matters.
- It was established in 1988.
- It has a three tier organizational structure including SPG, National Security Advisory Board and National Security Council Secretariat.

6. Missile Prahaar:

News: India successfully test fired missile Prahaar off the Odisha Coast.

Facts:

- It is a surface-to-surface short-range tactical ballistic missile developed by DRDO.
- Its strike range is 150-km.
- It can carry a warhead up to 200 kg.
- It uses solid propellant and travels at a speed of Mach 2.03 (2160 km/h).

OTHER ISSUES

1. Necessity of Two Time Zones in India:

News: National Physical Laboratory published an article demanding two time zones.

Facts:

- Benefits of two time zones in India
  - Energy saving
  - Ecological and environmental benefits
  - Enhance people's productivity
  - Health benefits due to proper leisure time and sleep
- Since 1947 India is following the IST for the whole country, i.e. India follows a single time zone based on the longitude passing through 82 degree 30 minutes East.
- There is a spread of approximately 30 degrees between the westernmost and easternmost point of India, resulting in a 2-hours gap in time.
- Pre independent India had two time zones Calcutta time in the East and Bombay time in the West, abandoned in 1948 and 1955 respectively.
- The British colonialists introduced "chaibagaan time" or "bagaan time", a time schedule observed by tea planters of Assam, which was one hour ahead of IST.

Other facts:

- Time Zone: A time zone is a region on the globe that observes a uniform standard time for legal, commercial, and social purposes.
- Countries with multiple time zones: France: 12, United States of America: 11, Russia: 11, United Kingdom: 9.
- National Physical Laboratory: It was established in 1947, to maintain standards of SI units in India and to calibrate the national standards of weights and measures.
- Its parent agency is Council of Scientific and Industrial Research (CSIR) and it is headquartered at New Delhi.

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2. NOBEL PRIZE

Nobel Prizes 2018:

Physics	***Chemistry***	***Medicine***
The Nobel Prize in Physics 2018 was awarded "for groundbreaking inventions in the field of laser physics" with one half to Arthur Ashkin "for the optical tweezers and their application to biological systems". The other half was jointly awarded to Gérard Mourou and Donna Strickland "for their method of generating high-intensity, ultra-short optical pulses".	The Nobel Prize in Chemistry 2018 was awarded with one half to Frances H. Arnold "for the directed evolution of enzymes". The other half was jointly awarded to George P. Smith and Sir Gregory P. Winter "for the phage display of peptides and antibodies."	The Nobel Prize in Physiology or Medicine 2018 was awarded to James P. Allison and TasukuHonjo "for their discovery of cancer therapy by inhibition of negative immune regulation." The Laureates have shown how different strategies for inhibiting the brakes on the immune system can be used in the treatment of cancer. Their discoveries are a landmark in our fight against cancer.

Other facts:

- The Royal Swedish Academy of Sciences confers Nobel prize for Physics, Chemistry and Economics.
- The Karolinska Institute confers the nobel for Physiology/Medicine.

3. Earth Biogenome Project:

News: The International community of scientist has launched an ambitious Earth Biogenome Project.

Facts:

- It aims to sequence, catalogue and characterize the genomes of all the earth's eukaryotic biodiversity, over a period of 10 years.
- It involves projects of various countries like the US, China, Global Ant genome Project of UK etc.
- The Project will generate at least 1 Exabyte of data, which is to be shared online for free.
- The initiative will produce database for biological information that will help in scientific research, biodiversity conservation and environmental protection.
- The participating institutions would raise their own funding as far as possible, however the World Economic Forum (WEF) will back their funding.

Other facts:

- All human genes together are called Genome.

- Human Genome Projects: The Human Genome Project is an international scientific research project with the goal of determining the sequence of nucleotide base pairs that make up human DNA, and of identifying and mapping all of the genes of the human.
- This project was only concerned with genes of one species called the Homo sapiens, between 1990-2003.
- The Celera Genomics, a Technology Company conducted this project.
- Eukaryotes are organisms whose cells have a nucleus enclosed within a membrane, unlike prokaryotes.

4. Human Microbiome:

News: The Human Microbiome initiative has been put up for approval.

Facts:

- This initiative is led by the National Center for Microbial Research (NCMR) and National Center for Cell Sciences (NCCS) in India.
- The Human Microbiome Project is a research initiative of US's National Institute of Health to identify and study the human microbial fauna and studies their impact on human health and diseases.
- The project uses two methods:
    - Metagenomics
    - Whole Genome Sequencing

Other facts:

- The collective genome of all the microorganisms inside a human body is called Human Microbiome. It includes bacteria, fungi, viruses and protists.

5. Change in the SI units:

News: The 26th General Conference on Weights and Measures (CGPM) redefined the international standard definitions of Kilogram, Ampere, Kelvin and Mole.

Facts:

- The SI system was adopted in 1960.
- The International Bureau of Weights and Measures, the executive wing of CGPM, has the responsibility of defining the International Systems of Units.
- There are 7 fundamental units (Meter, Kilogram, Second, Ampere, Kelvin, Mole, Candela) and every other unit of measurement can be derived from those seven.

Seven fundamental units of measurement	***Quantity measured***
• Meter	• Distance

• Kilogram	• Mass
• Second	• Time
• Ampere	• Current
• Kelvin	• Temperature
• Mole	• Amount of substance
• Candela	• Luminous intensity

Other facts:

- The General Conference on Weights and Measures is the highest body in the world for accurate and precise measurements.
- The body meets once every four years.
- India became a signatory in the year 1957.

6. Surveillance by Government Agencies:

News: Ministry of Home Affairs issued an order authorizing 10 central government agencies to intercept, monitor and decrypt any information generated, transmitted, received or stored in any computer.

Facts:

- The order is derived from the Section 69 of the IT Act 2000 and its 2009 rules.
- The agencies named in the order are:
    - Intelligence Bureau
    - Narcotics Control Bureau
    - Enforcement Directorate
    - Central Board of Direct Taxes
    - Directorate of Revenue Intelligence
    - Central Bureau of Investigation
    - National Investigation Agency
    - Cabinet Secretariat (R&AW)
    - Directorate of Signal Intelligence
    - Commissioner of Police, Delhi
- According to the orders any person or service provider who is in-charge of the computer resource is bound to cooperate with the 10 agencies, failing to do so will invite 7-year imprisonment and fine.
- Other facts:

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- Telephonic surveillance in India is authorized under the Section 5 of Telegraph Act 1885, it allows disclosure of call data records including time, duration, number, date of the call.
- Electronic surveillance in India is authorized under the Section 69 IT Act 2000.

7. Permanent Chairman of the Chiefs of Staff Committee:

News: The three services have agreed on appointing a Permanent Chairman of the Chief of Staff Committee (CoSC).

Facts:

- CoSC is a platform for important military discussions across the three services.
- A four-star military officer equivalent to the chiefs of the army, navy and air force will head the CoSC. The post will be known as the Chief of Defence Staff.
- He will head the Chief of Staff Committee meetings.
- He will look into the joint issues of the services such as joint operations, acquisitions and troops.
- He would be in charge of the tri-services command at the Andaman and Nicobar Island.
- Committees recommending a permanent chairman:
- Kargil Review committee headed by K. Subramanian
- Naresh Chandra committee 2011
- Other facts:
- In the current structure the Chief of Staff Committee consists of the Army, Navy and Air Force Chiefs.
- It is headed by the senior-most of the three chiefs, (until his retirement) in rotation.

8. Information Fusion Centre-Indian Ocean Region:

News: Indian Navy inaugurated the Information Fusion Centre-Indian Ocean Region (IFC-IOR).

Facts:

- It will serve as a 24x7 Information sharing center.
- It is established at the Indian Navy's Information Management and Analysis Centre (IMAC).
- The center will improve maritime domain awareness in the Indian Ocean by sharing information on white shipping.
- The countries who have already signed a white shipping agreement with India are its members.
- IFC-IOR will host liaison officers from foreign countries to enable better interconnection and quicker analysis.
- The center will undertake exercises and training capsules in maritime information collection and sharing.

9. International Rice Research Institute:

News: PM inaugurated the 6th International Rice Research Institute South Asia Regional Centre (IRRI SARC) in Varanasi.

Facts:

- The institute was founded in 1960, as an independent and not for profit research and educational institute.
- The institute is headquartered at Los Banos, Philippines.
- It is world's premier institute working towards reducing poverty and hunger through rice science, improving health and welfare of rice farmers and develop sustainable ways of rice farming.

10. Sunspot Cycle:

News: The scientist at the Indian Institute of Science Education and Research have developed ways to predict the intensity of activity in the next solar cycle (2020-2031).

Facts:

- The amount of magnetic flux that rises up to the Sun's surface varies with time in a cycle called the solar cycle. This cycle lasts 11 years on average. This cycle is sometimes referred to as the sunspot cycle.
- Sunspots are darker, cooler and magnetically strong areas on sun's photosphere.
- The study is important to understand the long-term impact of sun's activities on earth.
- Other facts:
- India will soon launch its first solar probe Aditya L1 Mission to study the solar corona, magnetic field and solar winds.

11. International Centre for Automotive technology:

News: International Centre for Automotive technology (ICAT) launched strict certification norms with high security features to prevent use of forged certificates.

Facts:

- This step is the first such step by any automotive certification agency in India to enhance security of Central Motor Vehicles Rules (CMVR) certificates that includes vehicle, engine and components certificates.
- The unique security features of the certificate will include, Ultraviolet ink, Troy mark, Microprint, Pantograph, Secure code, Print code and Digitally printed stamp and seal of ICAT.
- Other facts:
- The International Centre for Automotive Technology (ICAT) was established in 2006 at Manesar, Haryana, India.
- ICAT is a certification agency authorized by the Ministry of Road Transport and Highways for providing testing and certification services to vehicle and component manufacturers within India and abroad.

12. National Medical Devices Promotion Council:

News: The National Medical Devices Promotion Council will be set up under Department of Industrial Policy and Promotion (DIPP) to give a fillip to the medical devices sector.

Facts:

- Secretary, DIPP, will head the Council and it will also have representatives from health care industry and quality control institutions.
- It will act as a facilitating and promotion & developmental body for the Indian Medical Devices Industry (MDI) and boost to domestic manufacturing and for exports.
- It will simplify the approval processes in the medical device industry and at the same time ensure global standards of the manufacturing of medical devices.

Other facts:

- Medical Devices Rules, 2017
- The Ministry of Health and Family Welfare has notified Medical Devices Rules, 2017 on 31.01.2017. The new Rules have been framed in conformity with Global Harmonization Task Force (GHTF) framework and conform to best international practices.
- Under these rules National Pharmaceutical Pricing Authority (NPPA) is allowed to notify 15 medical devices as drugs.
- The National Pharmaceutical Pricing Authority (NPPA) is a government regulatory agency that controls the prices of pharmaceutical drugs in India.
- It is under the Department of Pharmaceuticals, Ministry of Chemicals and Fertilizers.

13. Telerobotic surgery:

News: India became the first country to successfully perform telerobotic coronary intervention.

Facts:

- Telerobotic coronary intervention refers to the robotic method of performing heart surgery with the help of Internet and robotic assistance.
- It enables doctors to perform surgeries from a distance and removes geographical barriers to access medical facilities in cases of emergency.

Other facts:

- Space exploration, telepresence and videoconferencing and marine explorations are some other applications of Telerobotics.