XI. SCIENCE AND TECHNOLOGY

June

1. A new summer variety of groundnut has been developed by agro-scientists of the Chandra Shekhar Azad Agriculture Technology University (CSA) at Khanpur in Uttarpradesh.
   
2. According to Animal Discoveries 2016 - New Species and Records report by Zoological Survey of India and Plant Discoveries 2016, 499 new species have been discovered from various parts of the country last year. Number of animal species in India for the first time has crossed one lakh to number 1,00,693.
   
3. China successfully tested a solid-fuel variable flow ramjet engine that could enhance the real combat ability of the country's stealth aircraft and boost firing range of missiles. Ramjet engine has advantage of low cost, high power, and high controllability with compact size.
   
4. China launched record breaking swarm (Group) of 119 fixed-wing drones (unmanned aerial vehicles), breaking previous record of a swarm of 67 drones. These drones performed catapult-assisted take-offs and formations in sky.
   
5. China will send mini-ecosystems comprising of potato seeds and silkworm eggs to Moon in 2018, along with Chang'e 4 Satellite.
   
6. 3-kilogramme mini-ecosystem will be developed by research teams under Chongqing University in China.
   
7. Indian Space Research Organisation (ISRO) is working on Electric Propulsion (EP) system - a new propulsion system that may bring new era of cost effective satellite launches. It converts solar energy into electrical energy which is used to change velocity of a satellite in space.
   
8. Indian Space Research Organization (ISRO) successfully launched Cartosat-2E weighing 712 KG (Earth observation satellite) along with 30 co-passenger satellites of various countries, aboard Polar Satellite Launch Vehicle (PSLV) C-38.
   
9. India's latest communication satellite GSAT-17 successfully launched from Kourou in French Guiana (France), with a lift-off mass of about 3,477 kg and payloads in C-band and S-band to provide various communication services.
   
10. Laser Interferometer Gravitational-Wave Observatory (LIGO) detected another merger of 2 black holes forming gravitational waves, Named as GW170104. This time, detection revealed not merely a black hole merger, but also alignment of spins of black holes. This can help in finding out the way black holes were formed.

11. NASA announced to launch James Webb Space Telescope (JWST) in October 2018 -
   
12. James Webb Space Telescope JWST is a joint project of the NASA, the European Space Agency and the Canadian Space Agency. It will be successor of 26-year-old Hubble Space Telescope and is 100 times powerful than Hubble Space Telescope.
   
13. JWST will be the largest telescope ever sent into space. It will have a very large infrared telescope with a 6.5-meter primary mirror with sun shield of 22 metres.
   
14. JWST is named after former NASA administrator James Webb, formerly known as Next Generation Space Telescope (NGST).
   
15. As JWST’s First set of Targets - 2100 observations has been planned by JWST mission handlers.
   
16. Another NASA Spacecraft Orius also cleared Tests. It's meant to carry astronauts to deep space destinations like Moon and Mars.

17. NASA launched world's lightest satellite weighing only 48 grams designed by 18-year-old boy Rifath Sharook from Tamil Nadu.
   
18. Satellite has been named as KalamSat after the former President APJ Abdul Kalam.
   
19. KalamSat is a 3-D printed satellite. This is the first time that 3-D printing technology is used to make satellites. Purpose of launching KalamSat is to demonstrate performance of 3D-printed carbon fibre.

20. NASA tested ROSA (Roll-Out Solar Array) successfully on ISS (International space station) for first time.
   
21. ROSA is an advanced, flexible solar array that rolls out like a tape measure. It is very much flexible ad Light weighted so that it can be adapted to different sizes including very large arrays.
   
22. ROSA will be an asset for satellite radio and television, weather forecasting, GPS and other services used on Earth.
   
23. Unlike Bully and large traditional solar array panels, ROSA can make solar arrays more compact and weigh lighter.

24. NASA will launch Terrier-Improved Malemute sounding rocket that will release blue-green and red artificial clouds, to support space studies.

25. NASA will soon launch Neutron Star Interior Composition Explorer (NICER), world's first ever mission dedicated for studying neutron stars. NICER will focus especially on Pulsars and will also carry out world's first demonstration of X-ray navigation in space.

26. NASA's Kepler Telescope has identified 10 Earth-like planets outside the solar system that are expected to host life due to their right size and temperature. This discovery is part of 219 new planets identified by Kepler telescope as part of the final batch of planets since Kepler was launched in 2009.

27. NASA's Mars rover Opportunity found rocks at edge of Endeavour Crater that might have been a lake of liquid water. Opportunity has been investigating near Endeavour Crater since 2011, which is about 22 km across.

28. Scientists at USA's University of Nebraska-Lincoln created brightest light ever produced on Earth, shining a billion times stronger than surface of sun.
   
29. Normally an electron scatters just 1 photon of light at a time but the new light beam produced saw over 1000 photons scattered at a time.
   
30. It could be used as a new type of X-ray and also by engineers, scientists and for security purposes.

31. Scientists discovered a new species of flying squirrel named Glaucomys Oregonsis in North America, that had been hiding in plain sight for over hundreds of years. Known as Humboldt's flying squirrel, this new species resides in the Pacific Coast region of North America.

32. Scientists discovered hottest known exoplanet - KELT-9b.
   
33. Exoplanet is a planet that does not orbit the Sun and instead orbits a different star.
   
34. The Planet orbits a massive star KELT-9 with day temperature approx 4,326 degree Celsius.

35. Scientists reportedly solved centuries-old unexplained mystery of bright nights, the unusual glow that appears in sky after dark and lets observers see distant mountains, read a newspaper or check their watch.

36. Researchers suggest that when waves in upper atmosphere converge over specific locations on Earth, it amplifies naturally occurring aurorae, a faint light in the night sky that often appears green due to the activities of atoms of oxygen in the high atmosphere.

37. US Space exploration firm SpaceX's Falcon rocket lifted off carrying Dragon capsule, which was loaded with nearly 6000 pounds of scientific research and station supplies. It is the second time the Dragon has been sent to ISS, becoming First ever Recycled Supply Ship sent to ISS.

38. World's first hybrid 'aerobot' which has been built by an Indo-Russian joint venture unveiled at an event by Russia's Skolkovo Foundation. It is capable of travelling on land, water, snow and sand and is capable of moving at the speed of around 150 kmph or more on water.

39. World's oldest fossil mushroom discovered in Brazil, dating back zpprox 115 million years. It has been named as Gondwanag. Aritices Magnificus and Coaching For: BANK PO / CLERK, NEET, JEE, TNPSC Gr-I, II, III, IV & V, YAO, SSC, RRB, TET, TRB, MAT, POLICE, SI, NIC- AO, LIC-AO & AO, TANCET AND ENTRANCE EXAMS
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July

1. Canadian scientists identified a new bird-like species of dinosaur that lived nearly 71 million years ago and was about the size of a person. It has been named as the Albertavenator curriei, in honour of famous Canadian palaeontologist Philip J. Currie.

2. A group of scientists started a new expedition aimed at unlocking secrets of lost continent 'Zealandia', which is mostly submerged and believed to have sunk after breaking away from Australia 60 - 85 million years ago.
   1. Expedition is called Expedition 371 and is funded by National Science Foundation and the International Ocean Discovery Program.
   2. Team includes over 30 scientists aboard JOIDES Resolution, a massive scientific drilling ship. Duration of trip will be approx 2 months.

3. According to study at University of Hyderabad, Castor bean plants can prove very useful in fighting soil pollution as these plants can absorb toxic heavy metals from soil from these polluted areas due to industrial pollution.

4. An Australian Researchers discovered a new species of giant ocean snailfish, heaviest type of bony fish that can weigh over two tonnes and grow to 3 metres long. It has been named as hoodwinker (mola tecta).

5. India’s 2nd and Tamil Nadu’s First Zika Virus Case has been reported (First in Ahmedabad in May 2017).

6. Zika virus is vector borne disease transmitted primarily by Aedes aegypti mosquitoes, same mosquito that transmits dengue. It is also sexually transmissible. It can cause serious birth defects Including neurological disorders and foetal deformation (Microcephaly) in which infants are born with abnormally smaller heads.

7. Indian astronomers from Pune Based Inter University Centre for Astronomy and Astrophysics (IUCAA) and Indian Institute of Science Education and Research (IISER) identified extremely large supercluster of galaxies located in the direction of constellation Pisces, named as Saraswati. Saraswati supercluster is 4 billion light years away from Earth and may contain mass equivalent of 20 million billion suns.

8. India’s first dedicated space observatory AstroSat along with Chandra and Hubble Space Telescope have detected a massive coronal explosion on Proxima Centauri, sun’s closest star neighbour.

9. Ministry of Science and Technology launched SOHUM, an indigenously developed low-cost hearing screening device for newborns. It has been developed by School of International Biodesign (SIB) startup Sohum Innovation Labs India. Sohum aims to minimise or reverse hearing loss damage and uses brain-stem auditory evoked response.

10. NASA is developing Double Asteroid Redirection Test (DART) as first-ever mission that will deflect a near-Earth asteroid, to be built and managed by John Hopkins Applied Physics Laboratory (APL).

11. It will work on kinetic impactor technique, that involves sending one or more large, high-speed spacecraft into path of an approaching near-earth object to shift its orbit to defend against future impact.

12. Target for DART is an asteroid called Didymos that will have a distant approach to Earth in October 2022 and then again in 2024. Asteroid Didymos (Greek word for twin) is an asteroid binary system that consists of Didymos A (780 metres), and Didymos B (160 metres).

13. NASA’s Juno spacecraft became first space probe to successfully complete a flyby into Jupiter’s giant storm known as Great Red Spot.

14. Great Red Spot on Jupiter is a massive storm (cyclone) measuring about 16,000 km in diameter. It is largest known storm in solar system.

15. NASA’s New Horizons spacecraft unveiled a set of new maps of Pluto and its largest moon Charon on occasion of 2 year anniversary of its flyby around Pluto.

16. Researchers at Indian Institute of Science Education and Research (IISER) Kolkata have developed an organic-inorganic hybrid material which is fire and rust resistant. It was synthesised by combining polynoligomer silsesquioxane (POSS) and diphenylalanine.

17. Researchers at UK’s Cardiff University have produced world’s most detailed scan of brain’s internal wiring.
   1. Scan shows fibres in white matter called axons (brain’s wiring which carry billions of electrical signals).
   2. Scan showed direction of messaging and also density of brain’s wiring.
   3. This detailed scan of brain’s wiring will help increase understanding of a range of neurological disorders and can be used instead of invasive biopsies.

18. Researchers at University of Edinburgh (UK) stated that surface of Mars has chemical compounds called perchlorates that can kill bacteria, when exposed to ultraviolet (UV) light. This has given a blow to hopes of finding alien life on surface of Mars.

19. Researchers discovered a very distant galaxy, which is over 1000 times brighter than our Milky Way Galaxy. To measure this galaxy, researchers used Gran Telescopio Canarias (GTC) in Spain.

20. Researchers from San Antonio Catholic University of Spain discovered novobiocin compound that could be used as a potential drug to fight Zika virus infection. Researchers found that novobiocin compound shown phenomenal recovery results in mice with 100 % cure rate.

21. It was also found that commonly used malaria drug hydroxychloroquine can block Zika virus from crossing placenta and getting into the foetus and damaging its brain.

22. Researchers in UK produced specific human antibodies in laboratory by treating patient-derived B cells with tiny nanoparticles coated with both CpG oligonucleotides and an antigen, paving way for rapid development of new vaccines to treat a wide range of infectious diseases.

23. Scientists at Purdue University in USA (including Karthik Ramani of India) have developed new artificial intelligence (AI) software called SurfNet that can create three-dimensional images from 2D photographs. It can be of great use in robotics, object recognition and even self-driving cars.

24. Scientists discovered new species of glow-in-the-dark shark living 1,000 feet below Pacific Ocean off coast of northwestern Hawaiian islands. It is named Etmopterus lailae and belongs to lanternshark family.

25. Scientists from Cornell University (USA) announced that world’s 6 smallest spacecrafts dubbed as Sprites ever launched are successfully travelling in low Earth orbit and communicating with systems on Earth.

26. Sprites were launched on June 23, 2017 by Indian rocket Polar Satellite Launch Vehicle (PSLV) as part of Breakthrough Starshot project designed to test technologies that would eventually be used for interstellar missions. These are smallest spacecrafts to establish contact with ground stations. Sprites are built on a single 3.5*3.5 centimetre circuit board and weigh 4 grams each.

27. Breakthrough Starshot space program is launched under US $100 million Breakthrough Initiatives, announced by Yuri Milner and Stephen Hawking to develop and launch practical interstellar space missions. It aims to demonstrate proof of concept for light-propelled spacecraft that could fly at 20 % of light speed. Its main objective is to send one-gram chips to star systems beyond the solar system in search of extraterrestrial intelligence.

28. Scientists from ETH Zurich in Switzerland developed a 3D-printed soft silicone heart that closely resembles and functions like human heart. It is...
22. Scientists from Indian Institute of Science, Education and Research (IISER) Thrissur have developed gelator that can suck up oil and clean oil spills with a simple, efficient and cost-effective method.

23. Scientists from NASA for first time will chase shadow of moon using two of NASA's WB-57F research jets during upcoming total solar eclipse in USA, to capture clearest ever images of Sun's outer atmosphere (Cora).

13. It is needed as Corona of sun (gaseous envelope surrounding sun) is heated to millions of degrees, but lower atmospheric layers like photosphere are only heated at a few thousand degrees.

14. Total solar eclipse will provide rare opportunity for scientists to study the sun's atmosphere. During this eclipse, moon will completely cover the sun and perfectly blocking its light so that faint corona is easily seen against dark sky.

24. Scientists from New Zealand claimed that vaccine can protect against the sexually transmitted infection gonorrhoea. They found that Men B jab vaccine originally developed to stop an outbreak of meningitis B can protect from gonorrhoea.

25. Scientists from Northwestern University (USA) created miniature versions of Saturn, complete with rings, by electrospraying tiny droplets of fluids.

15. When a drop of electrically conductive liquid is exposed to an electric field, droplet forms two electrically charged poles that can get pulled towards sources of electric field, taking on cone shapes. If pull is strong enough, tips of the cones can spray jets of droplets.

26. This effect is known as electrospraying.

27. Scientists from Oregon Health and Science University (USA) successfully edited genes of human embryos to correct defective DNA that cause inherited diseases, using CRISPR-Cas9 genome editing technology to alter human DNA in single-cell embryos, which allows specific sections of DNA to be altered or replaced.

28. Scientists from Physikalisch-Technische Bundesanstalt (PTB) in Germany developed world's most sharpest and Precise laser, that can be useful for various applications such as optical atomic clocks, radioastronomy, precision spectroscopy, testing theory of relativity and carry out new precision measurements on ultracold atoms.

29. Theoretically, laser light has only 1 colour, wavelength or frequency. In reality, however, there is always a certain linewidth. This newly developed laser has linewidth of only 10 milliHertz (0.01 Hz), closer to ideal laser than ever before.

30. Scientists from USA's Harvard Medical School for first time encoded a small movie clip in DNA of living bacterial cells and then played it back. They used CRISPR gene-editing technology to encode and retrieve reconstructed frames of a classic 1870s racehorse in motion sequence of photos into genome of common bacteria E. coli. Film stored in DNA of bacteria was also well preserved and was intact even in new generation of bacteria.

31. Scientists from USA's Harvard University have developed a super strong, flexible adhesive material inspired by glue secreted by slugs that sticks to biological tissues without causing toxicity. It is biocompatible and binds to tissues with a strength comparable to the body's own resilient cartilage.

32. University of Cambridge (UK) developed super-stretchy and strong artificial (synthetic) spider silk, almost entirely (90%) composed of water. Spider silk is one of strongest materials for applications such as making eco-friendly textiles and sensors.

33. Scientists from University of Cambridge spotted smallest star discovered so far, named as EBLM J0555-57Ab.

17. It was identified by SuperWASP, a planet-finding experiment run by several universities. EBLM J0555-57Ab is located about 600 light years away and is slightly larger than Saturn in size.

18. It is as small as stars can possibly become as it has just enough mass to enable the fusion of hydrogen nuclei into helium at its centre.

34. Tata Motors unveiled India's first Bio-CNG (bio-methane) bus at Urja Utsav bio-energy programme organised by Ministry of Petroleum and Natural Gas.

19. Biomethane is a naturally occurring gas which is produced by anaerobic digestion of organic matter such as dead animal and plant material, manure, sewage, organic waste, etc.

35. University of Hyderabad and IIT Bombay stated that extreme El Nino conditions and warming of Bay of Bengal had resulted in unprecedented heavy rainfall in Chennai between November 30th to December 2nd in 2015.

20. El Nino causes less than normal rainfall in case of south-west monsoon but does reverse in case of the northeast monsoon.

August

1. 100 million year old damselfly species, discovered in Myanmar has been named as Mesosticta davidatennboroughi, after British naturalist David Attenborough. There has been a long list of animals that are named after David Attenborough - a carnivorous plant, a butterfly, a tiny spider, a Peruvian frog and a Namibian lizard.

2. 2 new species of Cycas Tree discovered by researchers in Acharya Jagadish Chandra Bose Indian Botanic Garden (West Bengal), taking Total number of Cycas species found in India to 14. Cycas are among most ancient plants whose fossils date to the Jurassic period.

3. A Group of USA Scientists has developed an artificial womb that can be used to save extremely premature human babies. Research showed that preterm lambs were successfully maintained in a healthy condition with significant growth for up to a week, using ex-vivo uterine environment (EVE) therapy.

4. According to Japanese scientists, delicate mosses found on rocks and trees in cities can be used as low-cost bioindicator to monitor urban pollution and to measure impact of atmospheric change. Mosses respond to pollution or drought-stress by changing its shape, density or disappearing.

5. According to recent report by NASA's Orbiting Carbon Observatory-2 (OCO-2) satellite, the monster El Nino of 2014-16 caused over 3 billion tonnes of carbon to get released into the atmosphere, pushing carbon dioxide (CO2) concentration to record levels.

6. According to study by a Group of Indian Scientists, black carbon (BC) ejected by aeroplanes is affecting monsoon, depleting ozone layer and quickening glacier melt.

7. Earlier it was believed that airborne BC is unlikely to travel upward of 4 km and dissipate and settle down in few months under influence of wind and rain. However, this study shows that such particles exist up to 18 km into the stratosphere, a stable region of the atmosphere.

8. After successful launch of India's first indigenous developed robot BRABO, TATA Motors Owned TAL Manufacturing launched Robo Whiz. It will provide students hands-on experience and help develop skills needed for effective use and management of Robotics and Automation Technology.

9. An Indian Institute of Technology (IIT) Delhi team developed a new drug delivery platform using nanoparticles, with ability to boost efficacy of antibiotics at the cellular level and improve chances of recovery from cancer-related bacterial infections.

10. An unusual breed of fruit bat (discovered in Papua New Guinea) is now officially recognised as a new species. This bat was previously nicknamed 'Yoda' and has now been renamed Happy 'tube-nosed fruit bat'.

As per study, newly found solar system TRAPPIST-1 star is between 5.4 and 9.8 billion years old, twice as old as our own solar system (4.5 billion years old).
Canada researchers discovered fossils of a new species of arrow-shaped marine animals that have translucent bodies making them difficult to spot. These 51-cm cold-water species are much bigger than their modern counterparts, largest being 10 cm long.

Chilesaurus (Dinosaur species recently discovered in southern Chile) has been reported to be missing link that fills gap between 2 of major dinosaur groups - plant-eating herbivores and carnivores.

European Space Agency (ESA) and NASA Researchers discovered that Sun’s core is rotating four times faster than its surface, using 16 years of observations from an instrument called GOLF (Global Oscillations at Low Frequency) on a spacecraft called Solar and Heliospheric Observatory (SOHO).

Indian Institute of Science (IISC) Bengaluru researchers developed a highly sensitive and low-cost nanometre-scale carbon monoxide (CO) sensor, with potential applications in environmental pollution monitoring. Carbon Monoxide is a colorless, odorless gas and is harmful when inhaled in large amounts.

Indian Space Research Organisation (ISRO) will launch a niche Earth observation (EO) satellite - Hyperspectral Imaging Satellite (HySIS), with critical chip called optical imaging detector array. It will also ISRO to enter operational hyperspectral imaging from earth orbit.

Hyperspectral imaging or hyperspace imaging combines power of digital imaging and spectroscopy. It collects and processes information from across the electromagnetic spectrum. It enables distinct identification of objects, materials or processes on Earth by reading spectrum for each pixel of a scene from space.

HySIS satellite of ISRO can see in 55 spectral or colour bands from 630 km above ground. It can be used for a range of applications from remote sensing environment, crops, looking for oil and minerals, military surveillance.

Indian scientists discovered Nasikabatrachus bhopalensis, a new species of frog with a snout-shaped nose like a pig, near Srvilliputhur Grizzled Giant Squirrel Sanctuary in Tamil Nadu. It has been named after the Indian herpetologist S. Bhupathy.

India’s first calf delivered by a surrogate cow through In Vitro Fertilisation (IVF) technology carried out in a mobile laboratory in Pune (Maharashtra). Purpose of producing surrogate calf was to protect indigenous cow breeds in its original form that have been destroyed due to cross-breeding.

Kenya Anthropologists discovered 1.3 acre old baby ape skull, revealing what common ancestor of all living humans and apes would have looked like. The skull belongs to a newly identified species of early ape named Nyanzapeithuesalesi, that existed in Africa for over 1 crore years.

Ministry of Human Resource Development (HRD) launched Swasth Bache, Swasth Bharat Programme, as an initiative of Kendriya Vidyalaya Sangathan (KVS) to prepare a physical Health and Fitness Profile Card for more than 12 lakhs of Kendriya Vidyalaya students.

NASA rocket named WINDY (Waves and Instabilities from a Neutral Dynamo) will form night-time white artificial clouds visible by residents of Republic of Marshall Islands. It will study a phenomenon that occurs in ionosphere (Layer of charged particles in upper atmosphere).

NASA’s Cassini spacecraft started its final mission - five ultra-close orbits around Saturn. It would be spacecraft’s last mission of its 20-year-long journey, before plunging into atmosphere of Saturn.

NASA’s Curiosity rover completed 5 years of its MARS Exploration Mission.

NASA’s Hubble Space Telescope has discovered strongest evidence to date for a stratosphere on a planet outside our solar system, WASP-121b. Stratosphere is a layer of atmosphere in which temperature increases with higher altitudes.

Purdue University (USA) Researchers designed a micropropulsion system called a Film-Evaporation MEMS Tunable Array (FEMTA) thruster that uses liquid water as a propellant for orbital maneuvering of tiny satellites called Cubesats.

Cubesats are miniature satellites weighing under 2 Kgs and have potential to carry out tasks like imaging and remote-sensing currently performed by heavier satellites.

Cubesat at present cannot totally replace larger satellites as they are incapable of changing orbit or performing complex manoeuvres as they do not have a propulsion system.

Cubesat having such system would allow such tiny satellites to correct their orbit or maintain their altitude, thereby prolonging their operating life in space before becoming space debris.

Researchers form CSIR-Institute of Genomics and Integrative Biology (CSIR-IGIB) and National Centre for Disease Control (NCDC) have developed an ultrasensitive DNA chip based sensor for quick pathogen detection. The sensor can detect S. pyogenes bacterium in about 30 minutes, that causes a wide range of diseases.

Researchers from Indian Institute of Technology (IIT) Guwahati created an implantable bioartificial pancreas model grown within 3D silk scaffold, that encapsulates insulin-producing beta cells and is capable of naturally producing insulin in sustained manner. After Trials, it can be used for treating people with Type 1 diabetes that arises when body’s immune system kills insulin-producing beta cells.

Researchers from IIT Bombay and Indore jointly developed a biosensor that makes it possible to detect kidney disorders in under 8 minutes. It can accurately measure pH and urea concentration with a single drop of urine.

Researchers from US-based Rice University have found new tectonic microplate off Ecuador’s coast in the eastern Pacific Ocean. It has been named Malpelo plate, after a Colombian island and an oceanic ridge it contains. It is overall 57th tectonic microplate to be discovered so far and the first in nearly a decade. Microplates are tectonic plates with an area less than 1 million km2.

Scientists at Indian Institute of Technology (IIT) Guwahati developed a 3D cardiac tissue patch using silk protein membranes seeded with heart muscle cells. The patch can be used for regenerating damaged heart tissues and sealing holes in heart.

Scientists at Los Alamos National Laboratory (USA) discovered a potential new state of matter that may help explain phenomena like superconductivity. It was discovered in the high-magnetic-field state of the heavy fermion superconductor CeRhIn5.

In new state, material’s electrons are aligned in such a way that they reduce symmetry of original crystal. This electronic alignment in a prototypical heavy-fermion superconductor is called nematic behaviour, common among superconducting materials in high magnetic fields.

Superconductivity is ability of certain materials to conduct electric current with zero resistance. For a material to behave as a superconductor, critically low temperatures are required. Superconductivity was first observed in 1911 by H. K. Onnes (Dutch physicist).

Scientists at Stanford University (USA) developed a cost-effective and highly sensitive blood test to detect cancer. Called single colour digital PCR, it can detect genetic mutations in minute amounts of DNA released from cancer cells into blood.

Scientists discovered 2 new species of earthworm belonging to primitive family Moniligastridae in Western Ghats ranges of Kerala, named as Dwaradi polydiverticulata and Drawadi thomasi. There are about 200 species of earthworm known in genus Drawadi.

Scientists from CSIR’s National Institute for Interdisciplinary Science and Technology (Thiruvananthapuram) developed new technique to produce bioethanol from discarded cotton-stalks. It will help produce bioethanol (a clean fuel) from cotton stalk wastes.

It is vital as India has about 9.4 million hectares under cotton cultivation and every hectare generates 2 million tonnes of cotton stalk wastes.

Scientists from Edinburgh University (UK) discovered largest volcanic region (91 Volcanoes) discovered on earth so far, under west Antarctica. Largest volcano stands at almost 4000 metres.
1. A new species of non-venomous aquatic snake named Aquatic Rhabdops has been described as a new species from northern Western Ghats in Maharashtra, Goa and North Karnataka. Earlier this species was considered as variant of Olive Forest Snake, first described in 1863.

2. According to researchers from University of Southampton (UK), extreme global warming event named Palaeocene-Eocene Thermal Maximum (PETM) that occurred 56 million years ago was driven by massive CO2 emissions from volcanoes during formation of North Atlantic Ocean. 1. This caused doubling of CO2 in less than 25 thousand years because of CO2 emissions from volcanoes. PETM was most rapid and extreme natural global warming event of last 66 million years and lasted for around 150 thousand years. It increased global temperatures by at least 5 degrees Celsius.

3. As per Massachusetts Institute of Technology (USA)’s study titled Thresholds of catastrophe in the Earth System, Earth’s sixth mass extinction may become a reality by 2100 due to increasing carbon pressure on oceans.

4. In past 540 million years, Earth has seen 5 mass extinction events. By 2100, about 310 gigatons of carbon will have been added to oceans, a potential “tipping point” for ecological disaster.

5. Bengaluru-based biotech startup Bugworks Research became India’s and Asia’s first to receive international CARB-X (Combating Antibiotic Resistant Bacteria Biopharmaceutical Accelerator) grant for its antibiotic research and development.

6. CARB-X has an international partnership set up in 2016 to focus on innovations to improve diagnosis and treatment of drug-resistant infections. It grew out of Barack Obama’s 2015 Combating Antibiotic-Resistant Bacteria (CARB) initiative.

7. Breakthrough Listen project detected 15 Fast Radio Bursts (FRBs) coming from a dwarf galaxy about 3 million light years away from earth, with help of Green Bank Telescope (GBT) in West Virginia.

8. FRB is brief, bright pulse of radio emission from distant galaxies. It was first detected in 2007 with help of Parkes Telescope in Australia.

9. CSIR scientists developed an ultra-thin wireless device that mimics plant leaves to produce hydrogen fuel using water and sunlight, paving way for clean energy for powering eco-friendly cars in future.

10. At present, hydrogen is produced from fossil fuels by steam reforming. In this process large amount of CO2 is emitted. This new green method of generating Hydrogen from Water may be a great reform in coming times.

11. When visible light wavelengths, electrons move in one direction and produce electric current. The current almost instantaneously splits water into hydrogen making it one of cleanest forms of fuel as its main byproduct is water.

12. Department of Science and Technology (DST) will fund a project to develop quantum computers in order to tap into next big advance in computing technology.

13. Quantum computer uses principles of quantum physics to increase computational power beyond attainable limits of traditional computer. It employs complex principles of quantum mechanics to store information in ‘qubits’ (quantum bit) instead of the typical binary ‘bits’ of 1 and 0.

14. ISRO’s Mars Orbiter Mission (Mangalyaan) completed 3 years in Martian orbit, already having outlived its original lifespan. Mangalyaan was launched on board of PSLV C25 rocket on November 5, 2013 and entered Mars orbit on September 24, 2014.

15. Indonesian scientists from Lambung Mangkurat University found world’s smallest squirrel in Borneo rain forest, named Borneoan pigmy. It is 73 mm long and weighs about 17 grams.

16. International Astronomical Union (IAU) named 2 mountain ranges on icy dwarf planet Pluto as Tenzing Montes and Hillary Montes, after Tenzing (Nepal) Norgay and Edmund Hillary (New Zealand) who were first mountaineers to reach summit of Mount Everest in 1953. These are amongst 14 other names officially approved for naming 14 geographical features on Pluto.

17. International Union for Conservation of Nature (IUCN) has downgraded conservation status of snow leopard from “endangered” to “vulnerable”, that was continuing since 1972.

18. Species are endangered if they are fewer than 2,500 with high rate of decline. Vulnerable Species are those with population under 10,000 and declining at rate of 10% over 3 generations.


20. NASA’s Solar Dynamics Observatory (SDO) captured images of 2 significant Solar Flares emitted by Sun, powerful bursts of radiation classified as X2.2 flare and 2nd is X9.3 flare.

21. X9.3 flare was the largest flare in the current solar cycle which began in December 2008 and heading towards Solar Minimum.

22. Solar Minimum is such phase of the solar cycle when these eruptions on the sun are increasingly rare, but they can be intense.

23. NASA’s asteroid-chasing spacecraft Osiris-Rex (Origins, Spectral Interpretation, Resource Identification, Security, Regolith Explorer) successfully swung by Earth to put it on desired trajectory towards near earth asteroid Bennu using Earth’s gravity.

24. Osiris-Rex mission was launched in September 2016 for studying 101955 Bennu, a carbonaceous asteroid as NASA’s first asteroid sampling mission.

25. Researchers discovered a new species of edible freshwater fish while exploring Pampa river in Pathanamthitta in Kerala. Newly found fish could
possibly be farmed on a commercial scale. It has been named Labeo filiferus (L.filiferus) and belongs to Labeo genus.

16. Scientists at University of California (USA) identified 27 distinct types of human emotions, instead of earlier just 6 possible emotions - happiness, sadness, anger, surprise, fear and disgust.

17. Scientists discovered an underwater natural city built by octopuses and named it as Octlantis, in Australia. Octlantis was found where octopuses were found gathering for fights in 2009.

18. Scientists for first time observed optical polarisation phenomenon (polarised light emitted by rapidly rotating stars), using High Precision Polarimetric Instrument (HIPPI).

12. It was predicted by Indian astrophysicist and Nobel laureate Subrahmanyan Chandrasekhar in 1946.

13. Optical polarisation phenomenon is a measure of the orientation of the oscillations of a light beam to its direction of travel.

14. HIPPI was used to detect polarised light from Regulus, one of brightest stars in night sky about 79 light years away. It was observed that Regulus is rotating so quickly with a spin rate of 96.5% of angular velocity (approximately 320 kilometres per second).

15. Subrahmanyan Chandrasekhar was awarded the 1983 Nobel Prize for Physics with William A. Fowler for his theoretical studies of physical processes of importance to structure and evolution of stars.

19. Scientists from Brown University (USA) created first map of water trapped in uppermost layer of Moon’s soil, using NASA’s Moon Mineralogy Mapper onboard of India’s Chandrayaan-1 spacecraft. Map builds on initial discovery of water and related molecule – hydroxyl (consists 1 atom each of hydrogen and oxygen) in lunar soil in 2009.

20. Scientists from Cardiff University (UK) discovered a new way to produce methanol from methane using oxygen from the air. Methanol is an important chemical often used as fuel in vehicles. New technique uses freely available air, inexpensive chemicals and an energy efficient methanol production process.

21. Scientists from University of Manchester (UK) created world’s first molecular robot - millions of a millimetre in size. It is made up of just 150 carbon, hydrogen, oxygen and nitrogen atoms which are basic building blocks required to form molecules. Such molecular robots can be used for medical purposes, advanced manufacturing processes and even building molecular factories and assembly lines.

22. Scientists successfully detected gravitational waves for 4 time coming from merger of 2 massive black holes. It was for first time, these waves were simultaneously detected by US-based Laser Interferometer Gravitational-wave Observatory (LIGO) and Italy-based Virgo detectors. First 2 detections were made in September and December 2015 and 3rd time it was detected in January 2017.

23. US Food and Drug Administration (USFDA) approved a new leukemia treatment, called Kymriah. Each dose of Kymriah contains patient’s own immune cells that are genetically modified using a virus. This therapy is known as chimeric antigen receptor T-cell therapy (CAR-T), gives the cells the ability to recognize and kill the source of cancer.