

You & Technology Nov-2021



ASPIRE IAS

The Name Associated with Excellence

GOOD MORNING TIMES S&T (NOVEMBER-2021)

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General Studies Paper-3 – S&T – Nov 2021

Kamo'oalewa

- scientists have observed a quasi-satellite named Kamo'oalewa, tracking the Earth's orbit around the Sun, could be a fragment from the moon.
- A mission to collect Kamo'oalewa's samples has been scheduled for a launch in 2025.
- It is one of Earth's quasi-satellites, a space rock that orbits the Sun, but remains relatively close to the planet – in this case about 9 million miles away
- It is in an unusual orbit, one that would be unlikely for objects that had drifted towards Earth from the asteroid belt between Mars and Jupiter
- It could have broken away from the Moon due to a possible impact, and gone on to orbit the Sun rather than the Earth-like its parent does

Preserving Landraces

- Padma Shri award was recently given to Rahibai Popere, popularly known as Seedmother from Maharashtra
- She was awarded for recognition of her work that has helped save hundreds of landraces (wild varieties of commonly grown crops) at the village level.
- A hybrid crop is a result of two different varieties of plant being cross-pollinated to create an offspring or hybrid that contains the best traits of each of the parents.
- Crop improvement through selection and breeding over several decades has narrowed the genetic base of most crops. Biodiversity allows a natural mechanism for crops to develop traits to face challenging situations.
- Landraces refer to naturally occurring variants of commonly cultivated crops.
- These are as opposed to commercially grown crops, which are developed by selective breeding (hybrids) or through genetic engineering to express a certain trait over others.
- Naturally occurring landraces have a large pool of still untapped genetic material, which can provide solutions
- There is a common misconception that landraces have lower yields than hybrids. However, with proper agricultural practices, landraces can give better yield with lower input costs.

Double Asteroid Redirection Test (DART) Mission: NASA

- NASA will launch its first planetary defense test mission named the Double Asteroid Redirection Test (DART). The DART spacecraft will be launched on a SpaceX Falcon 9 rocket.

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- The mission is to test the new technology to be prepared in case an asteroid heads towards Earth in the future
- The target of the spacecraft is a small moonlet called Dimorphos (Greek for “two forms”).


About the Mission:

- It has two solar arrays and uses hydrazine propellant for maneuvering the spacecraft.
- It also carries about 10 kg of xenon which will be used to demonstrate the agency's new thrusters called NASA Evolutionary Xenon Thruster–Commercial (NEXT-C) in space
- The spacecraft carries a high-resolution imager called Didymos Reconnaissance and Asteroid Camera for Optical Navigation (DRACO).
- The spacecraft carries a high-resolution imager called Didymos Reconnaissance and Asteroid Camera for Optical Navigation (DRACO).
- Didymos is a perfect system for the test mission because it is an eclipsing binary which means it has a moonlet that regularly orbits the asteroid and which can be seen when it passes in front of the main asteroid.

Frothing in the Yamuna

- a layer of froth was seen floating over parts of the Yamuna river, which has now become a repeat occurrence in Delhi.

River of foam cuts across Delhi
Every year, as winter sets in, the Yamuna begins to resemble a glacier, as thick sheets of foam blanket the river. This froth is toxic, and can have extremely adverse effects if consumed, or even touched



What is foam or froth formation?
Foam or froth formation is a phenomenon that takes place on many lakes and streams. Foam bubbles are produced when organic matter decomposes. These foam-producing molecules have one end that repels water and another end that attracts water and they work to reduce the surface tension on the water surface. These foam bubbles are lighter than water, so they float on the surface as a thin film that gradually accumulates.

What are the sources of pollution that cause foam formation?

- Untreated sewage may contain soap/detergent particles
- Industrial run-off
- Organic matter from decomposing vegetation
- Presence of filamentous bacteria that let out surfactant molecules
- Pollutants from sugar and paper industries in UP that travel through the Hindon Canal

What is foam made of?
About 1% of the foam is made up of foaming agents like phosphates and surfactants. The remaining 99% is air and water.

Why does foam form in places like the Kalindi Kunj Okhla barrage?
When water with surfactants or detergent-like molecules fall from a height (such as the Okhla barrage), they churn to form bubbles in water. Foam begins to form after monsoon, but intensify as winter approaches, because foam bubbles are much more stable in lower temperatures.

Health hazards

- Short-term exposure can lead to skin irritation, allergies
- Ingestion may cause gastrointestinal problems and diseases like typhoid
- Long term exposure to heavy metals in industrial pollutants can cause neurological issues and hormonal imbalances

How can froth formation be stopped?

IN THE SHORT-TERM

- Rid Okhla pondage of water hyacinth
- Detergents must be biodegradable so they do not persist and lose their ability to cause foam

IN THE LONG TERM

- UP, Haryana, Delhi need to upgrade sewage treatment plants
- Industrial pollution to be stopped
- Increasing the flow of the river

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Molnupiravir: A Drug for Covid-19

- It belongs to a class of broad spectrum antiviral drugs called nucleoside analogues.
- They act by interfering with the function of viral RNA (Ribonucleic Acids) polymerases – which are enzymes that make new viral RNA in infected cells.
- It works by causing viruses to make errors when copying their own RNA, introducing mutations that inhibit replication.
- These drugs work by preventing the process of replication of the virus inside human cells.

SUBMARINE 'VELA

- The submarines in the Project-75 Scorpene Class are powered by diesel-electric propulsion systems.
- Scorpene is capable of undertaking multifarious missions including anti-surface ship warfare, antisubmarine warfare, intelligence gathering, mine laying, and area surveillance

Project 75: □

- It is a programme by the Indian Navy that entails building six Scorpene Class attack submarines. The design of the Kalvari class of submarines is based on the French Scorpene class of submarines.
- The Mazagon Dock limited (MDL) is manufacturing six Scorpene submarines with technology assistance from Naval Group of France
 - Two submarines, Kalvari and Khanderi, have been commissioned into the Indian Navy.
 - The Scorpene 'Vagir' is under trials.
 - The sixth one, INS Vagsheer, is under construction.

Ocean Research Vessel – Sagar Nidhi

- It was commissioned in 2008 for the country's marine research programme. It is the third research vessel after Sagar Purvi and SagarPaschimi
- The vessel is capable of carrying out geo-scientific, meteorological and oceanographic research, and is designed with blue-water capability with ranges of up to 10,000 nautical miles (19,000 km) for voyages lasting up to 45 days.
- MoES has, at present 6 ships, SagarNidhi, SagarManjusha, SagarKanya, SagarSampada, Sagar Tara & SagarAnveshika, which are used for many ocean studies and applications including ocean observations

Ministry of Earth Sciences (MoES)

- It has the mandate of providing weather, climate, Ocean and seismological services and to harness living and non-living resources.
- It is also involved in development of relevant Ocean Technology and Ocean Survey of the Exclusive Economic Zone (EEZ) and deep oceans for minerals and energy.

Norovirus

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- a highly contagious virus named Norovirus has been detected in Kerala
- It is a group of viruses that leads to gastrointestinal illness
- Norovirus is resistant to many disinfectants and can heat up to 60°C. The virus can primarily be transmitted from orofaecal.
- Therefore, merely steaming food or chlorinating water does not kill the virus. The virus can also survive many common hand sanitisers
- While there is no specific treatment available to cure the virus, generic medications for diarrhoea and vomiting can help cure the disease

Tundra Satellite System: Russia

- Russia has successfully placed into orbit a military satellite. The satellite is part of Russia's early warning anti-missile system named Kupol or dome.
- It carries a secure emergency communications payload to be used in case of a nuclear war

Anti-Missile Defence Systems With India:

- India has S-400 TRIUMF, which also caters to the three threats (rockets, missiles and cruise missiles). □ □
 - It is a mobile, surface-to-air missile system (SAM) designed by Russia.
- Prithvi Air Defence and Advance Air Defence is a double-tiered system consisting of two land and sea-based interceptor missiles, namely the Prithvi Air Defence (PAD) and the Advanced Air Defence (AAD) Missile for lower altitude interception.
 - It is able to intercept any incoming missile launched 5,000 kilometres away.
- Ashwin Advanced Air Defence Interceptor Missile is also an indigenously produced Advanced Air Defence (AAD) interceptor missile developed by Defence Research and Development Organisation (DRDO).
 - It is the advanced version of the low altitude supersonic ballistic interceptor missile

Tsirkon Hypersonic Missile: Russia

- Russia has fired its Tsirkon (Zircon) Hypersonic Cruise Missile from a warship in the north of the country.
- The Tsirkon Cruise Missile will join Avangard glide vehicles and the air-launched Kinzhal (Dagger) missiles in Russia's hypersonic arsenal.

Hypersonic Technology: □

- Speed: 5 or more times the Mach or speed of sound. □
- Mach Number: It describes an aircraft's speed compared with the speed of sound in air, with Mach 1 equating to the speed of sound i.e. 343 metre per second. □
- Technology Used: Most hypersonic vehicles primarily use the scramjet technology, which is a type of Air Breathing propulsion System.

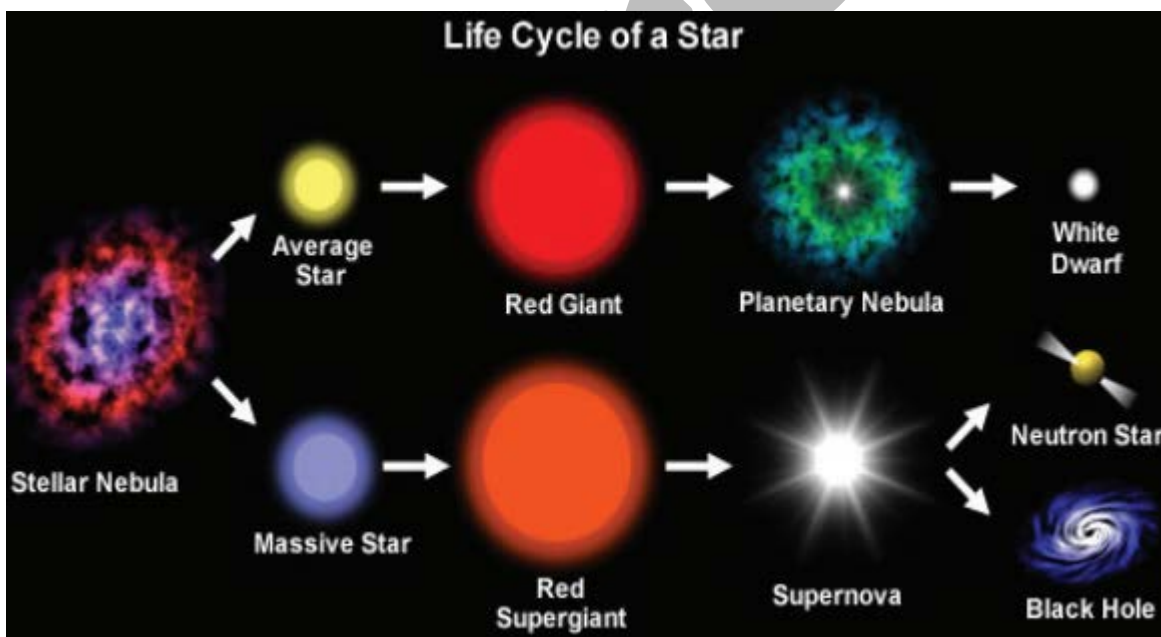
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- India, too, is working on hypersonic technologies. India has already proved its capabilities through the test of ASAT under Mission Shakti
- Recently, DRDO has successfully flight-tested the Hypersonic Technology Demonstrator Vehicle (HSTDV), with a capability to travel at 6 times the speed of sound

Fastest Spinning White Dwarf: J0240+1952

- It is part of a binary star system; under the influence of the magnetic propeller system, its immense gravity is pulling material from its larger companion star in the form of plasma
- White dwarfs are stars that have burned up all of the hydrogen they once used as nuclear fuel.
- Under the magnetic propeller system, the white dwarf attracts plasma from the binary star system. However, the magnetic field of white dwarf acts as a protective barrier, causing most of the falling plasma to be propelled away from the white dwarf.
- Black Dwarf: Eventually—over tens or even hundreds of billions of years—a white dwarf cools until it becomes a black dwarf, which emits no energy
- Those white dwarfs which have enough mass reach a level called the Chandrasekhar Limit
- At this point the pressure at its center becomes so great that the star will detonate in a thermonuclear supernova.
- Chandrasekhar Limit is the maximum mass theoretically possible for a stable white dwarf star.



Multisystem Inflammatory Syndrome in Children

- MIS-C is a condition where various organs of the body are affected by inflammation.
- It is a rare but severe hyperinflammatory condition in children and adolescents that typically occurs 2-6 weeks after a Covid-19 infection.

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- It is suggested to use corticosteroids in addition to the standard of care for Kawasaki disease. Kawasaki Disease is an acute inflammatory disease of the blood vessels and usually occurs in children below the age of five.
- Commonly referred to as steroids, corticosteroids are a type of anti-inflammatory drug.

Project SWADESH

- the Department of Biotechnology (DBT)- National Brain Research Centre (DBT-NBRC) has developed Project SWADESH, for managing Neurological disorders.
- It is the first large-scale multimodal neuroimaging database designed specifically for the Indian population with big-data architecture and analytics for various disease categories under one platform.
- It will be useful in conducting multimodal brain studies to understand Alzheimer's disease and several neurological disorders.
- Neurological disorders are diseases of the central and peripheral nervous system.

2 types:

- Non-Communicable Neurological Disorders: Stroke, Headache disorders, Epilepsy, Cerebral palsy, Alzheimer's disease and other dementias, Brain and central nervous system cancer, Parkinson's Disease.
- Communicable Neurological Disorders: Encephalitis, Meningitis, Tetanus.

Shakti: Advanced Electronic Warfare Suite

- The Prime Minister handed over the Advanced Electronic Warfare (EW) Suite 'Shakti' to the Indian Navy at a ceremony held as part of Rashtra Raksha Samarpan Parv
- It will provide an electronic layer of defence against modern radars and anti-ship missiles
- It will help in finding accurate direction and interception of modern radars.

Light Combat Helicopter

- LCH is a new addition to Hindustan Aeronautics Limited (HAL's) helicopter division.
- The LCH is the only attack helicopter in the world that can land and take off at an altitude of 5,000 m with a considerable load of weapons and fuel.
- LCH will eventually be deployed along the Line of Actual Control with China, in addition to the AH-64E Apache helicopters in service

'Matosinhos Manifesto' to accelerate the use of Space in Europe

- European Space Agency has adopted a resolution that lays down a vision for the continent in terms of maintaining and expanding its activities in space.
- The resolution defines three "accelerators" to further advance Europe's space ambitions.
 - Space for a Green Future
 - Rapid and Resilient Crisis Response
 - Protection of Space Assets

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LASER INTERFEROMETER GRAVITATIONAL-WAVE OBSERVATORY (LIGO) PROJECT

- In 2016, central government had given approval to LIGO-India (a Joint India-US detector) for research on gravitational waves
- Major operations required for LIGO India has been distributed among the four lead institutions:
 - Directorate of Construction Services and Estate Management (Mumbai),
 - Raja Ramanna Center for Advanced Technology (Indore),
 - the Institute for Plasma Research (Gandhinagar), and
 - the Inter-University Centre for Astronomy and Astrophysics (Pune).
- Project will be funded by Department of Atomic Energy (DAE) and Department of Science and Technology (DST).
- LIGO was designed for direct detection of gravitational waves predicted by Einstein's General Theory of Relativity.

General Theory of Relativity holds that what we perceive as the force of gravity arises from the curvature or warping of space and time. The more massive an object, the more it warps the space around it

- It is being operated at two sites in US (Washington and Louisiana).
- Also, there are 3 LIGO's sisters' facilities: Virgo in Italy, GEO600 in Germany and KAGRA (Kamioka Gravitationalwave Detector) in Japan and LIGO- India
- LIGO use laser interferometry to measure the minute ripples in space-time caused by passing gravitational waves from cataclysmic cosmic events such as colliding neutron stars or black holes, or by supernovae
- Unlike optical or radio telescopes, LIGO does not see electromagnetic radiation (e.g., visible light, radio waves, microwaves) as gravitational waves are not part of the electromagnetic spectrum.

Gravity Waves

- Gravitational Waves are 'ripples' in space-time travelling at speed of light caused by some of most violent and energetic processes in Universe.
- They carry with them information about their cataclysmic origins, as well as invaluable clues to nature of gravity itself.

They are created when

- objects move at very high speeds,
- a star explodes asymmetrically (called a supernova),
- two big stars orbit each other,
- two black holes orbit each other and merge

Autosomal DNA technique

- All of us are born with 23 pairs of chromosomes(with few exceptions) that were passed down from parents

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- X and Y chromosomes are part of the 23rd pair of chromosomes which determine what biological sex a person is born with.
- The rest of the 22 pairs are called autosomal chromosomes.
- Hence Autosomal DNA is contained in the 22 pairs of chromosomes not involved in determining a person's sex.
- Autosomal DNA recombines in each generation, and new offspring receive one set of chromosomes from each parent.
- These are inherited exactly equally from both parents Usage of this technique
- Autosomal DNA tests can tell us a lot about our ancestry with a pretty high level of accuracy.
- It can be used even when very limited genetic data are available.
- The technique could also be used in forensic investigations

Indian SARSCoV-2 Genomic Consortia (INSACOG)

- Coordinated by: Department of Biotechnology (DBT) along with MoH&FW, ICMR, and CSIR
- The consortium will ascertain the status of a new variant of SARS-CoV-2 in the country.
- INSACOG will have a high level Inter-Ministerial Steering Committee.
- It will have a Scientific Advisory Group for scientific and technical guidance.
- Aim: To monitor the genomic variations in the SARS-CoV-2 on a regular basis through a multi-laboratory network.
- This vital research consortium will also assist in developing potential vaccines in the future.
- The consortium will also establish a sentinel surveillance for early detection of genomic variants with public health implication, and determine the genomic variants in the unusual events/trends (super-spreader events, high mortality/morbidity trend areas etc.)

Zika virus

- Zika virus is a mosquito-borne flavivirus that was first identified in Uganda in 1947 in monkeys.
- It was later identified in humans in 1952 in Uganda and the United Republic of Tanzania.
- ZVD is caused by a virus transmitted primarily by Aedes mosquitoes (AM), mainly Aedes aegypti. This is the same mosquito that transmits dengue, chikungunya and yellow fever.
- Transmission: From mother to fetus during pregnancy, through sexual contact, transfusion of blood and blood products, and organ transplantation.
- According to WHO, a majority of those infected with Zika virus disease either remain asymptomatic (up to 80%) or show mild symptoms
- Zika virus infection during pregnancy can cause infants to be born with microcephaly (smaller than normal head size) and other congenital malformations, known as congenital Zika syndrome.
- Treatment: There is no vaccine or medicine for Zika.

PNS Tughril

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- China recently delivered to Pakistan's Navy Chinese warship, to be deployed by Pakistan in the Indian Ocean
- The delivery of the Type 054A frigate is the latest example of increasingly close military cooperation.
- It has been named PNS Tughril by the Pakistani Navy, and it is "the first hull of four Type 054 frigates being constructed for the Pakistan Navy".

NCRA astronomers discover rare radio stars

- A team of astronomers from the Pune-based National Centre for Radio Astrophysics (NCRA-TIFR) have used the upgraded Giant Metrewave Radio Telescope (uGMRT) to discover eight stars belonging to a rare category called 'Main-sequence Radio Pulse' emitters or MRPs.
- The MRPs are stars hotter than the Sun with unusually strong magnetic fields, and are much stronger than stellar winds (a continuous flow of gas from a star's upper atmosphere).

PM-WANI framework

- Launched by: Department of Telecommunications
- Aims to setup Public Wi-Fi Networks by Public Data Office Aggregators (PDOAs) to provide public Wi-Fi services through Public Data Offices (PDOs) spread across length and breadth of the country to accelerate proliferation of Broadband Internet services.
- As per the National Digital Communication Plan, the Central government has set a target of setting up of 10 million Wi-Fi hotspots by 2022 and the PM-WANI scheme will facilitate this

Women's Involvement in Science and Engineering Research (WISER) program

- A first-of-its-kind programme to promote women in the field of research and development through lateral entry has been launched
- Women's Involvement in Science and Engineering Research (WISER) program by Indo-German Science & Technology Centre (IGSTC) for encouraging women researchers in joint R&D projects.
- Will support women scientists holding regular/long term research positions in academia or research institutes/industry.
- The involvement in the program will be possible through lateral entry.
- There is neither requirement of break-in-career nor any age limit, and it will enable easy participation.
- IGSTC is going to support the awardees with a maximum amounting to Rs. 39 L from the Indian side & €48000 from the German side.
- WISER program offers 20 awards per year.

Defence Technology and Trade Initiative (DTTI)

- Created in 2012, under the Obama administration.

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- Aim: To enhance cooperation between India and the USA in the defence production and trade sectors by overcoming impediments due to “unique national bureaucratic structures, acquisition models, and budget processes.
- It involves bilateral dialogues and engagements between senior-level representatives from India and the US.
- Four Joint Working Groups focused on land, naval, air and aircraft carrier technologies had been established under the DTTI to promote mutually agreed projects.
- The two sides recently signed the first project agreement for Air-Launched Unmanned Aerial Vehicle under the Joint Working Group Air Systems

India's first Virtual Science Lab for children

- India's first Virtual Science Lab for children under CSIR Jigyasa programme, which will also connect students with scientists across the country has been launched.
- This will not only take science to all segments of students in every corner of the country, but it is also in tune with the National Education Policy (NEP), where students are allowed to choose any subject and the concept of streams has been disbanded
- CSIR has partnered with IIT Bombay to develop a Virtual Lab platform under CSIR Jigyasa programme, which facilitates classroom learning with laboratory research for school students.
- The main aim of the Virtual Lab is to provide quality research exposure and innovative pedagogy for school students to drive their scientific curiosity based on an online interactive medium with simulated experiments, pedagogy based content, videos, chat forums, animations, gaming, quiz, facility sharing, webinars etc.
- Will enable curiosity driven research based concepts, encourage higher order thinking skills, promote entrepreneurship and develop passion about science

The International Commission to Reignite the Fight Against Smoking

- A report on smoking was recently released by “The International Commission to Reignite the Fight Against Smoking”, which makes specific recommendations to achieve the goal of ending smoking worldwide.
- The commission has members from the U.S., the U.K., South Africa, Indonesia and India.
- India is among countries with the lowest quit rates for smoking. The quit rates for men are less than 20%
- Tobacco prevalence in India is three times higher among men than women. India also accounts for some of the highest rates of smokeless tobacco use and oral cancer in the world

Indian Bio-Jet Fuel Technology

- CSIR-IIP Dehradun's home-grown technology to produce bio-jet fuel has been formally approved for use on military aircraft of the Indian Air Force (IAF).

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- Biojet fuel is prepared from “non-edible tree borne oil” and is procured from various tribal areas of India.
- This fuel is made from Jatropha oil sourced from Chattisgarh Biodiesel Development Authority (CBDA) and then processed at CSIR-IIP, Dehradun.
- Generally, it is made from vegetable oils, sugars, animal fats and even waste biomass, and can be used in existing aviation jet engines without modification.
- Jatropha oil is suitable for conversion to jet fuel. This biojet fuel has received wide acceptance from the airline industry.
- Currently, Aviation Sector contributes to 2% of global greenhouse gas emissions.

Categorisation of Biofuels

- First Generation: Produced from food crops like maize, corn, sugar cane, rapeseed, palm, and soybean into ethanol and biodiesel, using a similar process to that used in beer and wine-making.
- Second Generation: Produced from non-food crops and organic agricultural waste, which contain cellulose
- Third Generation: Derived from algae. Also known as green hydrocarbons
- Fourth Generation: Produce sustainable energy as well as capture and store CO₂ by converting biomass materials, which have absorbed CO₂ while growing, into fuel.

INTERNET PROTOCOL VERSION 6 (IPv6)

DoT fixed 30 June 2022 as deadline for complete transition to IPv6 for government organisations and December 2022 for internet service providers

IPv4	IPv6
Deployed 1981	Deployed 1998
32-bit IP address	128-bit IP address
4.3 billion addresses	7.9×10^{28} addresses
Addresses must be reused and masked	Every device can have a unique address
Numeric dot-decimal notation 192.168.5.18	Alphanumeric hexadecimal notation 50b2:6400:0000:0000:6c3a:b17d:0000:10a9 (Simplified - 50b2:6400::6c3a:b17d:0:10a9)
DHCP or manual configuration	Supports autoconfiguration

IPv6 is the most recent version of the Internet Protocol (IP) to provide an identification and location system for computers on networks and routes traffic across the Internet known as IP address

- IP is a set of requirements for addressing and routing data on the Internet.

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- An IP address is a unique identifier assigned to a device or domain that connects to the Internet.
- As compared to IPv4, it is fast, more secure and offers 340 undecillion unique address spaces through its 128 bit address scheme.

NOTIFICATION ON FOOD SAFETY & STANDARDS (GENETICALLY MODIFIED OR GENETICALLY ENGINEERED FOODS) REGULATIONS, 2021

- proposed by Food Safety and Standards Authority of India (FSSAI) under the Food Safety and Standards Act (2006)
- will apply to:
 - Genetically Modified Organisms (GMOs) or Genetically Engineered Organisms (GEOs) or Living Modified Organisms (LMOs) intended for direct use as food or for processing

Key provisions

- Prior Approval from FSSAI for manufacture, storage, distribution, sale and import etc. of any food or food ingredient derived from GMOs.
- If GMOs or GEOs contain LMOs, it requires prior approval from Genetic Engineering Appraisal Committee to get FSSAI approval and direct approval from FSSAI if no LMOs.
- Specifies the requirements for Food Laboratories to be designated for GM foods testing.
- Labelling Standards for GM foods if GEI is 1% or more

Earlier FSSAI notified draft Food Safety and Standards (Vegan Food) Regulations 2021 which includes following key provisions:

- Define plant-based food products or what constitutes vegan food,
- Introduce new vegan food logo to identify such products,
- No animal testing of vegan food to ensure 100% animal-free and vegan-friendly products

NEW EXOPLANET-TOI 1789B OR HD 82139

- An exoplanet is any planet beyond our solar system. Most orbit other stars, but free-floating exoplanets, called rogue planets, orbit the galactic center and are untethered to any star.
- Ahmedabad-based Physical Research Laboratory (PRL), has discovered a new exoplanet with a mass of 1.5 times that of Sun and located 725 light years away.

ZYCOV-D, THE WORLD'S FIRST NEEDLE-FREE COVID-19 VACCINE

- This is world's first needle-free plasmid DNA vaccine, administer in first two layers of the skin using a needlefree applicator.
- This same technology is used in diabetic patent for insulin
- Plasmid DNA vaccine
- A piece of DNA encoding the antigen (part of the disease-causing pathogen that induces an immunity response from our bodies) is inserted into a bacterial plasmid.

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- This DNA plasmids carrying the antigen are injected into the muscle. Once the DNA gets inside our cells, they start producing antigens, which triggers an immune response.
- DNA vaccines can be easily manufactured, are inexpensive and safer

WOLBACHIA BACTERIA

- Wolbachia are common bacteria that occur naturally in almost 60% of insect species, including some mosquitoes, fruit flies, moths, dragonflies and butterflies. Wolbachia are safe for humans.
- Wolbachia does not occur naturally in Aedes aegypti mosquito species that spreads dengue and other diseases such as chikungunya, Zika and yellow fever.
- Recently, an Indonesian research showed reduction in dengue cases (as much as 77%) after breeding dengue mosquitoes with Wolbachia Bacteria.

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**ASPIRE IAS UPCOMING
EXCLUSIVE sessions FOR
MAINS-2022
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(Seats are limited). *FOR FRESHERS AS WELL AS THOSE WHO WANT TO SCORE 450+ IN MAINS 2019*

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- For the last 5 years favourite programme among students.
- Where you are lacking we are working upon like, Paper-2 in contemporary and geographical manner, Mapping and its application, special emphasis on Thoughts-Regional planning and biogeography.
- Full coverage of geography with writing skill development
- 2013 when the average score was 140 in Geo our students scored 200+ (Isha Dhuna, Nitin Agarwal and Aditya uppal)
- 2014 when average score is 230 our students scored 280-300 (Aditya uppal RANK-19 309 marks)
- Same trend in 2015-18
- Starts after 7 days of PT examination

2. Our best and SUCCESS GRADE course Newspaper analysis and writing skill programme.

** Our TM and most successful programme start 7 days of PT exam with the coverage of last 3 years issues highly helpful in P-2&3

3. Writing skill development, enhancement and management programme.

- Best developed programme to enhance the writing skills at individual level
- Yield a fantastic result: RANK-22 (Saloni Rai) and Rank 1 Nandani others....

33 sessions with same day discussion, feedback and evaluation of the copies.

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All the Best to all my Economics students...

Hope this material will help you.

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