

Science and Technology Current Affairs April 2020

Science & Technology

Advanced Extremely High Frequency (AEHF)

Why in the news?

- The **United States Space Force** launched its **first national security mission** called **Advanced Extremely High Frequency** even as the coronavirus pandemic paralyzes much of the country.



About Advanced Extremely High-Frequency satellite

- It is the **sixth military communication satellite**, and the other five were **launched between 2010 and 2019**. The satellite constellation provides **global, survivable, protected communications capabilities** for **strategic command and tactical warfighters** operating on ground, sea and air platforms.
- It provides a **survivable line of communications** to military forces in all **levels of conflict, including nuclear war**.
- The communications will be delivered to the **armed forces of the US** and its **international partners, including the Netherlands, UK and Canada**.
- The **Initiative** will support **land and forest rehabilitation** in post-conflict areas to reduce peace and security challenges stemming from natural resource degradation.

Topic- GS Paper 3–Defence

Source- Outlook

New SunRISE Mission

Why in the news?

- US space agency **National Aeronautics and Space Administration (NASA)** has announced the **Sun Radio Interferometer Space Experiment (SunRISE) Mission**.

The objective of the SunRISE Mission

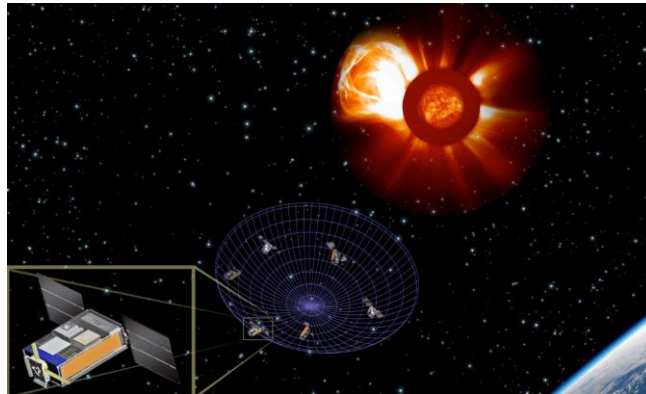
- It will look into how **Sun generates and releases the giant weather storms**, known as the solar particle storms, into space.
- To study how the Sun generates and releases solar particle storms into planetary space.



Unlimited Access to 100+ Mock Tests
UPSC CSE, UPSC EPFO & State PCS Exams

Enrol Now

- SunRISE contains six CubeSats which will observe radio images of low-frequency emission from solar activity and create 3D maps to locate the origin place of a solar particle storm on the Sun.
- Significance: Help in a greater understanding of the solar system and safeguard astronauts from solar storms while they travel to Mars or the Moon



Additional Facts:

- **Solar storms:** Also called geomagnetic storms, they are caused by disturbances in the Sun that send charged particles into space.
- It contains **six CubeSats** which will observe **radio images of low-frequency emission** from **solar activity and create 3D maps** to locate the origin place of a solar particle storm on the Sun.

How it helps NASA?

- The findings would safeguard astronauts from solar storms while they travel to Mars or the Moon.

About Solar storms

- These are also called **geomagnetic storms** and occur when a **variety of eruptions of mass and energy** from the **solar surface**.

Topic- GS Paper 3–Science and Technology

Source- TOI

GRACE-FO Mission

Why in News?

- NASA has released new global maps mapping groundwater, soil wetness using GRACE-FO mission satellites.

Objective

- To map Earth's gravity field every 30 days in order to monitor changes in underground water storage, the amount of water in lakes, soil moisture, ice sheets, glaciers and sea level.

About GRACE-FO Mission

- The Gravity Recovery and Climate Experiment Follow-On (GRACE-FO) mission was launched in 2018.
- It is a successor to the original GRACE mission which orbited Earth from 2002-2017 which was decommissioned in late 2017.

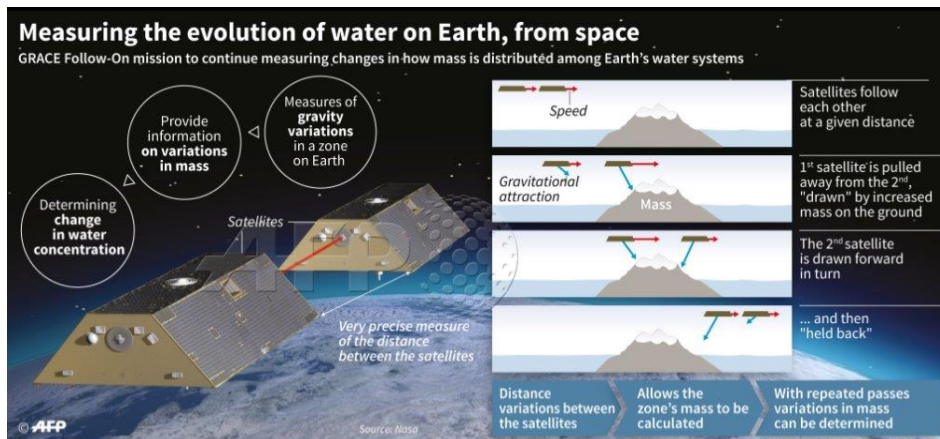


Unlimited Access to 100+ Mock Tests

UPSC CSE, UPSC EPFO & State PCS Exams

Enrol Now

- GRACE was implemented as a joint mission of NASA and the German Aerospace Center.



How it works?

- GRACE-FO's raw data collates a series of measurements showing how far apart two satellites are from each other.
- The twin satellites follow each other in orbit around the Earth, separated by about 137 miles (220 km), constantly send microwave signals to each other to measure the distance between them.
- As the pair circles the Earth, areas of slightly stronger gravity (greater mass concentration) affect the lead satellite first, pulling it away from the trailing satellite.
- All this information from the satellites will be used to construct monthly maps of the Earth's average gravity field, offering details of how mass, in most cases water, is moving around the planet.

Topic- GS Paper 3–Science and Technology

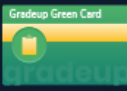
Source- NASA.org

CAWACH - Centre for Augmenting WAR with COVID-19 Health Crisis

Why in the news?

- Recently **Department of Science & Technology**, in a rapid response to **combat COVID-19 global pandemic** approved **setting up of a Centre for Augmenting WAR with COVID-19 Health Crisis**





Unlimited Access to 100+ Mock Tests
UPSC CSE, UPSC EPFO & State PCS Exams

Enrol Now

Objective

- It aims to **scout, evaluate and support** the **innovations and start-ups** that address COVID-19 challenges.

Implementing Agency

- The **Society for Innovation and Entrepreneurship (SINE)**, a technology business incubator at **IIT Bombay** supported by **Department of Science & Technology**.

About CAWACH

- The CAWACH's mandate will be to **extend timely support to potential startups** by way of the **requisite financial assistance** and **fund deployment targeting innovations** that are deployable in the market **within next 6 months**.
- It will identify up to **50 innovations and startups** that are in the area of novel, low cost, safe and effective ventilators, respiratory aids, protective gears, novel solutions for sanitizers, disinfectants, diagnostics, therapeutics, informatics and any effective interventions to control COVID-19.
- It will provide **access to pan India networks for testing, trial and market deployment** of these products and solutions in the identified areas of priority COVID-19 solutions.

Topic- GS Paper 3- Science and Technology

Source- PIB

Intensification of Research in High Priority Area (IRPHA)

Why in the news?

- **Science and Engineering Research Board** had recently invited competitive proposals under its **Intensification of Research in High Priority Area (IRPHA)** scheme.

Objective

- To ramp up national **R&D efforts for epidemiological studies** on **new anti-viral, vaccines, and affordable diagnostic against COVID-19** and related respiratory viral infections.

About the Intensification of Research in High Priority Areas

- It is a program of **Science and Engineering Research Board (SERB)** supports proposals in **high priority areas** from the **viewpoint of advances in fundamental science**.
- The project will be set up around **established research groups led by a Principal Investigator (PI)**.
- The duration of the project is generally for **5 years (3 years for COVID-19)**.

About the Science and Engineering Research Board

- It is a statutory body under the **Department of Science and Technology, Government of India**, established by an **Act of the Parliament of India in 2009**.
- The **Board was set up** for **promoting basic research in science and engineering** and to **provide financial assistance to scientists**, academic institutions, R&D laboratories, industrial concerns and other agencies for such research.

Topic- GS Paper 3–Science and Technology

Source- PIB

nCoVSENSEs (TM)

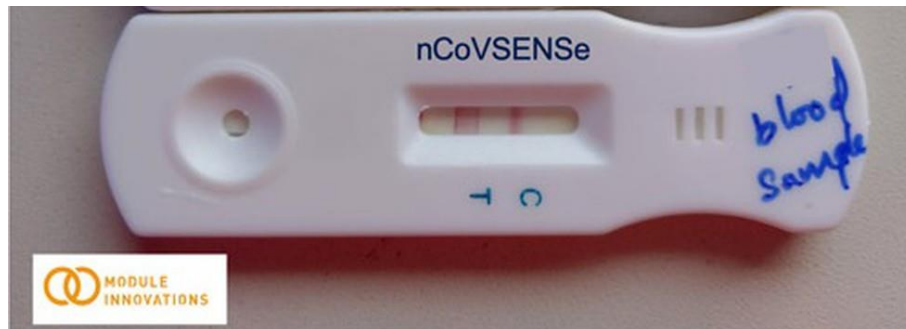


Unlimited Access to 100+ Mock Tests
UPSC CSE, UPSC EPFO & State PCS Exams

Enrol Now

Why in the news?

- The **Union Ministry of Science and Technology** has funded a **Pune-based healthcare startup 'Module Innovations'** to develop '**nCoVSENSEs (TM)**' devices.



About the nCoVSENSEs (TM)

- It is a **rapid test device** that **aimed at detecting the IgG and IgM antibodies generated in the human body** upon the onset of viral infection and are targeted against the Spike proteins making it specific for **COVID 19**.
- The device will help in the **mass-screening of people** in the country and confirm infection in patients.
- It will also **determine the recovery of an infected patient** and identify the stage of infection in the patients.

About IgG and IgM

- **Immunoglobulin G (IgG)**, the most abundant type of **antibody**, is found in all body fluids and protects against bacterial and viral infections.
- **Immunoglobulin M (IgM)**, which is found mainly in the blood and lymph fluid, is the first **antibody** to be made by the body to fight a new infection.

Current Method

- The current **confirmatory method of Real-Time Reverse Transcription Polymerase Chain Reaction (RT-PCR)** though a **gold standard** is **costly and time-consuming**.
- This new rapid test will **help manage the problem** more efficiently at a lesser cost.

Topic- GS Paper 3–Science and Technology

Source- Indian Express

Hydroxychloroquine

Why in the news?

- The compound "Hydroxychloroquine" has been frequently in the news. The government has decided to ease its ban on the **export of hydroxychloroquine**, a drug that has **garnered global interest** in the **treatment and prevention of COVID-19**.

What is hydroxychloroquine?

- It is an **antimalarial drug option**, considered less toxic than chloroquine, and prescribed in some instances. Doctors also prescribe **hydroxychloroquine for patients of rheumatoid arthritis and lupus**.



Unlimited Access to 100+ Mock Tests
UPSC CSE, UPSC EPFO & State PCS Exams

Enrol Now

Other Related Information

- At the end of last month, the **Indian Council of Medical Research (ICMR)** issued an **advisory recommending the use of hydroxychloroquine** in asymptomatic healthcare workers treating COVID-19 patients.
- The drug has since been moved to a **Schedule H1 status**, which means patients who need the drug would have to get a new prescription every time they needed to purchase it.
- The conditions for the sale of drugs specified in Schedule H1 to the Drugs and Cosmetics Rules, 1945.

Topic- GS Paper 3–Science and Technology

Source- Indian Express

Madhuban Gajar

Why in the news?

- Recently, **Madhuban Gajar**, a **biofortified carrot** variety with **high β -carotene and iron content** developed by **Shri Vallabhai Vasrambhai Marvaniya**, a **farmer scientist** from Junagadh district, Gujarat.

What is Biofortification

- It is the process by which the **nutritional quality of food crops** is improved through **agronomic practices, conventional plant breeding, or modern biotechnology**.



About Madhuban Gajar

- The Madhuban Gajar is a **highly nutritious carrot variety** developed through the selection method with **higher β -carotene content and iron content dry basis**.
- It is used for various **value-added products like carrot chips, juices, and pickles**.

Related information

- **National Innovation Foundation (NIF) – India**, an autonomous institute under the **Department of Science and Technology, Government of India** conducted **validation trials** for this variety at **Rajasthan Agricultural Research Institute (RARI), Jaipur**.
- In the trials, it was found that **Madhuban Gajar carrot variety** possesses a **significantly higher root yield and plant biomass** as compared to check variety.



Unlimited Access to 100+ Mock Tests

UPSC CSE, UPSC EPFO & State PCS Exams

Enrol Now

Topic- GS Paper 3–Science and Technology
Source- PIB

Global Initiative on Sharing All Influenza Data

Why in the news?

- **India** has recently shared **nine whole-genome sequences of the coronavirus** with the **Global Initiative on Sharing All Influenza Data (GISAID)**.



About Global Initiative on Sharing All Influenza Data

- The **Global Initiative on Sharing All Influenza Data (GISAID) Initiative** was launched on the occasion of the **61st World Health Assembly in 2008**.
- The aim of this **initiative is to promote international sharing of all influenza virus sequences** related **clinical and epidemiological data** to understand how the viruses evolve, spread and potentially become pandemics.
- Its headquarters in **Munich, Germany**.

Topic- GS Paper 3–Science and Technology
Source- The Hindu

Chitra Acrylosorb Secretion Solidification System

Why in the news?

- Recently, Scientists at **Sree Chitra Tirunal Institute for Medical Sciences and Technology (SCTIMST)** have designed and developed a **super absorbent material** called '**Chitra Acrylosorb Secretion Solidification System**'.

What is Chitra Acrylosorb Secretion Solidification System

- It is a highly efficient **super-absorbent material** for **liquid respiratory** and other **body fluid solidification and disinfection** for the **safe management of infected respiratory secretions**.
- A **super-adsorbent gel** with **embedded disinfecting material** is an **attractive proposition for the safe collection, consolidation, and quarantine of secretions** before their incineration.



Unlimited Access to 100+ Mock Tests

UPSC CSE, UPSC EPFO & State PCS Exams

Enrol Now



How does it work?

- **AcryloSorb** can **absorb liquids at least 20 times** more than its **dry weight and also contains a decontaminant** for in situ disinfection.
- Containers filled with this material will **immobilize the contaminated fluid by solidifying it (gel-like)**, thus **avoiding spillage** and will also disinfect it.

Advantages

- It **minimizes the risk for the hospital staff**, the need for **personnel for disinfecting and cleaning the bottles and canisters for reusing them** and makes the **disposal safer and easier**.
- The **AcryloSorb suction canisters** will collect the **liquid respiratory secretions from ICU patients** or those **with copious secretions treated in the wards**.
- Sealable and disposable **AcryloSorb spit bags** are **provided for solidifying the sputum and saliva** of ambulant **patients with respiratory infections**, which can then be incinerated.

Topic- GS Paper 3–Science and Technology

Source- The Hindu

Active Virosome Technology

Why in the news?

- **Seagull BioSolutions**, a **Pune-based** firm, a **startup working on new biological technologies**, is being funded by the **Department of Science and Technology**, undertaking the development of **Active Virosome (AV)-Vaccine and Immunodiagnostic kits for COVID-19** emergency.
- **Seagull Biosolutions** is the first company the government is financially backing for coronavirus vaccine efforts.



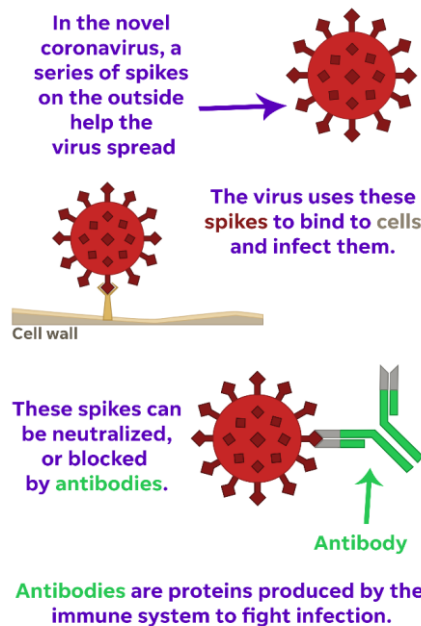
Gradeup Green Card

Unlimited Access to 100+ Mock Tests

UPSC CSE, UPSC EPFO & State PCS Exams

[Enrol Now](#)

Antigens are structural parts of a virus.



About Active Virosome Technology

- Seagull Bio has developed it is **useful for the production of vaccines & immunotherapeutic agents**. The AVT platform is helpful for **producing novel, non-hazardous & economical. Active Virosome agents** are expressing **desired antigens from the target pathogen**.
- These will be used to **develop a novel vaccine for the prevention of COVID-19 infection** and also **immunodiagnostic ELISA kits for COVID-19**.

Difference between PCR diagnostic kits and Immunodiagnostic kits:

- **Polymerase chain reaction (PCR)** based diagnostic kits which are currently available in India **are rapid and enable detection of active COVID-19 infection**.
- It **cannot identify asymptomatic infections** or those people who were exposed to or infected with COVID-19 in the past and may **still be spreading the virus**.
- In contrast, **Immunodiagnostic kits help in detection of antibodies to COVID-19**, which **can identify these infections also**.

Topic- GS Paper 3–Science and Technology

Source- Indian Express

Primordial Black Holes

Why in the news?

- Researchers from **Inter-University Centre for Astronomy and Astrophysics (IUCAA)** have studied **primordial black holes (PBH)** that were born **as a result of a tiny increase in the potential energy levels of the universe**.

About Primordial Black Holes

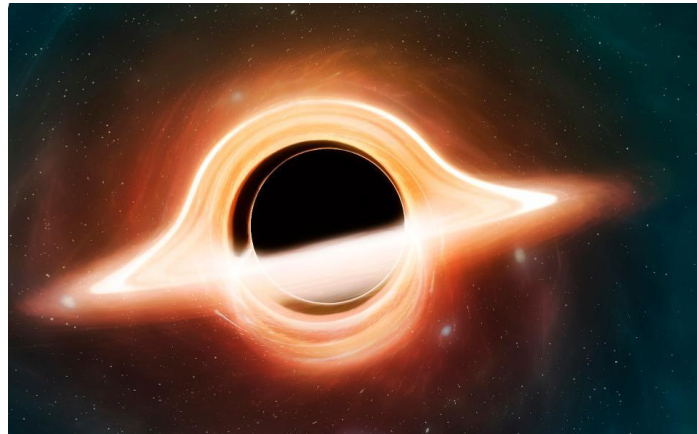
- These were formed during the **Hot Big Bang phase**.



Unlimited Access to 100+ Mock Tests
UPSC CSE, UPSC EPFO & State PCS Exams

Enrol Now

- It is **believed that they are formed as a result of collapsing radiations** as opposed to the **collapse of massive stars**, which is the case of **any other black holes**.
- **Primordial Black Holes** can be **massively massive as 3000kms** or be **extremely tiny like the nucleus of an atom**.



Some highlights

- According to the scientists, as time passes, this uniform energy prevailing in the Inflation Field wanes out.
- But, before the energy dies out completely, there could be a marginal increase in the potential energy for a very brief time in the form of a bump, on to an otherwise dwindling energy-level graph.
- As a result, the universe resumes its normal decelerating rate.
- Approximately 14 billion years ago before the commencement of the Hot Big Bang phase, the very young universe was found to be active and expanding at a highly accelerated rate.
- This exponential growth in its size, experts say, was fuelled by the presence of uniform energy field and density as the universe passed through the Cosmic Inflation phase.
- The universe had expanded to nearly 10^{27} times its original size, that too, within just fraction of a second by the time Cosmic Inflation phase concluded.
- Thereafter, the remnant energy possessed by this gravitational force got converted mainly into photons (light) in addition to protons, electrons, neutrons and other particles.
- As the universe continued to grow exponentially during the Cosmic Inflation phase, it sent across tiny quantum jitters.
- These fluctuations, released in a specific fashion, when sufficiently large, slowly give birth to galaxies and stars.

The research is underway, and further studies could reveal deeper insights as to how the energy was decaying.

About Black holes

- A black hole is a **place in space where gravity pulls** so much that even light cannot get out.
- The **gravity is so strong because the matter has been squeezed into a tiny space** which can happen when a star is dying.



Gradeup Green Card

Unlimited Access to 100+ Mock Tests

UPSC CSE, UPSC EPFO & State PCS Exams

[Enrol Now](#)

- Black holes are **invisible because no light can get out of it**. **Space telescopes with special tools** can help find black holes.
- The **special tools can see how stars that are very close to black holes act differently** than other stars.

Topic- GS Paper 3–Science and technology
Source- Indian Express

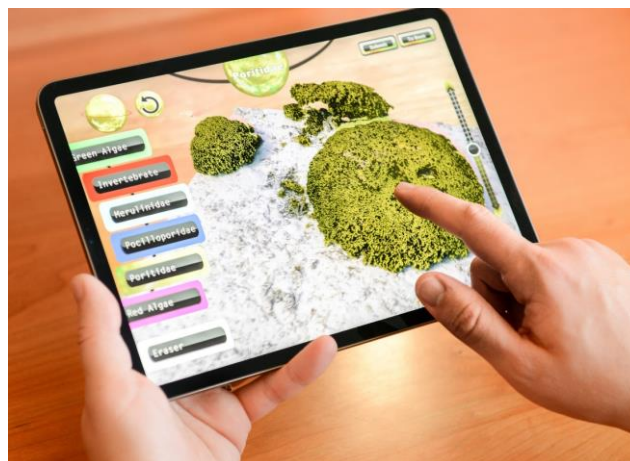
NeMO-Net

Why in the news?

- NASA has recently created a '**NeMO-Net**' **video game** where the players can go on **virtual ocean research expeditions** looking **for coral reefs with real data** for navigation.

About NeMO-Net

- The NeMO-Net is also known as the **Neural Multi-Modal Observation and Training Network**.
- It is a **video game developed by NASA** in which players can **identify and classify corals using 3D images** while virtually navigating the ocean and help NASA to build a coral map.
- The game uses **real NASA data including 3D images** of the **ocean floor with corals, algae, and seagrass**, captured from drones or aircraft on **expeditions to Puerto Rico, Guam, American Samoa, and elsewhere**.



Some highlights

- Anyone, even a first grader, can play this game and sort through these data to help us map one of the most beautiful forms of life we know of. In this manner, the awareness about coral reefs, the giant marine ecosystem, can be spread easily.
- The game is available in the Apple App store and can be played on iPhones, iPads and Mac computers. A version is coming for Android systems.
- In the app, players will go on 'dives' where they interact with real NASA data and images, learning about the different kinds of corals that lie on the ocean floor and highlighting them.



Gradeup Green Card

Unlimited Access to 100+ Mock Tests
UPSC CSE, UPSC EPFO & State PCS Exams

Enrol Now

- The missions will help NASA's supercomputer learn to recognize corals and classify them. The more people who play NeMO-NET, the better the supercomputer's mapping abilities become.

Scientists say corals are at risk from rising ocean temperatures, pollution and ocean acidification.

Topic- GS Paper 3–Science and technology

Source- NASA.org

ICMR suggests pooled testing of samples

Why in the news?

- **Indian Council of Medical Research (ICMR)** has recently issued an **advisory for using pooled samples for testing of COVID-19** in order to **increase the number of tests** conducted by laboratories **across the country**.

• The number of Covid-19 cases in India is rising exponentially. In view of this, it is critical to increase the numbers of tests conducted by laboratories. Positivity rate in cases is still low. Hence, it may help to use the pooled samples for screening.

What is pooled testing?

- **Pool testing** involves up to **five samples in one go**, rather than one at a time. If a **pool comes up positive**, each sample will be **tested individually**.



What is the purpose of pooled testing?

- to increase the capacity of laboratories to screen more samples in the same amount of time without doubling the resources needed.
- **Substantial cost savings** and **reduction in requirement of testing kits**.
- **Pooled screening** can also help in **tracking down the asymptomatic cases** of the disease, thereby tracking community transmission.

Methodology

- The **ICMR advisory** added that the **pool testing algorithm** involves the **Polymerase Chain Reaction (RT-PCR) screening** of a specimen pool, **comprising multiple samples**.
- In case a **pool tests positive**, then each sample will be individually tested.
- The real-time PCR testing for Covid-19 with multiple samples (upto five) is feasible when the prevalence rates of infection are low.
- The **RT-PCR test** is used to determine whether an individual has contracted Covid-19, caused by the SARS-CoV-2 virus.



Unlimited Access to 100+ Mock Tests
UPSC CSE, UPSC EPFO & State PCS Exams

[Enrol Now](#)

- The **test is only prescribed to be used in areas with low prevalence of the infection**, i.e., with a positivity rate of **less than 2 per cent**.
- This means that of **1,000 samples in an area**, if **less than 20 have tested positive for Covid-19**, the area is said to have a low positivity rate and will **qualify for pool testing**.

What are the advantages of this initiative?

This method is effective in two ways:

- it increases the capacity of testing
- it saves a lot of resources — time, cost and manpower

The **Andaman and Nicobar administration** has been pool testing samples to reduce the number of test kits used, as the country faces an acute shortage.

Which areas can perform pool testing?

- Apart from areas with a low prevalence of Covid-19, which will be initially decided based on existing data, the advisory suggests pool testing in areas with positivity of 2-5 per cent.
- Pooling of samples is not recommended in areas or populations with positivity rates of greater than 5 per cent.

Note: It is unclear, though, whether pool testing will be used only in areas where tests have already been conducted.

Topic- GS Paper 3–Science and Technology

Source- The Hindu + ICMR

Coronavirus can pass from mother to foetus

Why in the news?

- Recently the **Indian Council of Medical Research (ICMR)** has released a report called 'the Guidance for Management of Pregnant Women in COVID-19 Pandemic'.
- The guidelines also call for the **use of personal protective equipment for hospital staff**, especially at the time of delivery.

What is vertical transmission?

- A **vertically transmitted infection** is an infection caused by pathogens (such as bacteria and viruses) that use **mother-to-child transmission**.
- The transmission occurs directly from the mother to an embryo, foetus or baby during pregnancy or childbirth.
- It can occur when the mother gets an infection as an intercurrent disease in pregnancy (**concurrent, concomitant** or, in most cases, **pre-existing**).
- The nutritional deficiencies may exacerbate the risks of perinatal (relating to time, usually a number of weeks, immediately before and after birth) infections.

About the Report

- As per the ICMR, it is possible for a **pregnant woman who is positive for COVID-19 to pass on the virus to her child**.
- The emerging evidence now suggest that there is a possibility of **vertical transmission** (transmission from mother to baby **antenatally [before birth]** or **intrapartum [during labour]**).
- As per the US Centers for Disease Control and Prevention, mother-to-child transmission of coronavirus during pregnancy is unlikely, but after birth, a newborn is susceptible to person-to-person spread.
- There are instances when an infected mother has given birth to a perfectly healthy child, but the child contracted it soon after the birth.



Unlimited Access to 100+ Mock Tests

UPSC CSE, UPSC EPFO & State PCS Exams

Enrol Now

- Special protection guidelines are recommended for health workers and the baby who come in contact with the mother's body fluids.
- There are scientific guidance documents that prescribe separation of the mother and child in such cases immediately after birth.
- Further research is underway. But advisory regarding precautions has been released by ICMR.

Quick glance at the diseases where vertical transmission (mother to child) is possible

a. Rubella

- Rubella, also known as **German measles**, is an **infection caused by the rubella virus**.
- Rubella can **cross the placenta** from an infected pregnant woman to her developing **embryo or fetus after the first week of incubation**.

b. Syphilis

- It is a **sexually transmitted infection** caused by the **bacterium Treponema pallidum**.
- **Congenital syphilis**, which is passed from **mother to child during fetal development** or at birth.

c. HIV

- **Acquired immunodeficiency virus** is a serious infection **caused by the human immunodeficiency virus (HIV)**.
- During pregnancy, the **foetus is infected by HIV crossing the placenta**.

Zika virus

- The **Zika virus infection** during pregnancy can cause infants to be **born with microcephaly** and other congenital malformations, known as congenital Zika syndrome.

Topic- GS Paper 3–Science and Technology

Source: ICMR

[CovidGyan: A Science-based website on COVID 19](#)

Why in the news?

- With the ongoing viral outbreak **fear striking the nation** at an **exponential rate**, **scientists and engineers** brings the **CovidGyan**.

About CovidGyan

- It is a **multi-institutional, multi-lingual science communication initiative** which helps to bring the **scientific and factual aspects** of this **pandemic outbreak on to public domain**.
- The initiative is the **brainchild of Tata Institute of Fundamental Research (TIFR), Indian Institute of Science (IISc), and Tata Memorial Centre (TMC)**.



Objective

 **Unlimited Access to 100+ Mock Tests**
UPSC CSE, UPSC EPFO & State PCS Exams [Enrol Now](#)

- The primary objective of this website is **to create public awareness and bring in a holistic approach** to the understanding of this disease and potential means to mitigate it.

Some highlights

- The **topics covered** range from the exact behaviour of the **novel coronavirus (SARS-CoV-2), transmission dynamics of the Corona flu** and its **diagnostics to innovative technologies** to scale up the fight, **means of coping up** with physical distancing, and **critical assessment of communications**.
- This website also named **CovidGyan serves as a hub to bring together** a collection of resources in **response to the COVID-19 outbreak**.
- These resources are generated by **public supported research institutions in India and associated programs**.
- It is designed with **multi-faceted aspects to 'right information'** through talks from **eminent scientists in audio/podcast formats, infographics, posters, videos, FAQs and mythbusters**, and even links to **scientific papers**.
- The facilities include a **campus email helpdesk**, a campus **messaging service**, a **phone helpline**, and a **peer support line**, which is likely to stay for the campus in the years to come.
- The group of young researchers has also set up various **volunteer groups** to address **student needs during the lockdown**, as well as an **ongoing effort to match specific research/programming/design skills** with various **short term and long-term scientific challenges**.

Topic- GS Paper 3–Science and Technology

Source- PIB

Integrated geospatial platform

Why in the news?

- The **Department of Science and Technology** has created an **Integrated Geospatial Platform** to help decision making during the current COVID-19 outbreak.

Objective:

- **Integration of demographic information with geospatial data is essential for decision making, governance, and development.** In the context of COVID-19 spread, this effort will be a **special digital enabler** for **platforms** such as **AAROGYA-SETU**.

About Integrated Geospatial Platform

- It has been developed out of **available geospatial datasets, standards-based services, and analytic tools**.
- It is aimed at **helping decision making** during the current COVID-19 outbreak.
- It will also help in **devising area-specific strategies** to handle the **socio-economic impact** in the **recovery phase**.
- It is expected to **strengthen the public health delivery system** of the **State and Central Governments** and provide the **necessary geospatial information support** to **citizens and agencies**.



Unlimited Access to 100+ Mock Tests
UPSC CSE, UPSC EPFO & State PCS Exams

Enrol Now



About SAHYOG app

- It is a **mobile application**, prepared & managed by the **Survey of India (SoI)**. It has been **customized to collect COVID-19 specific geospatial datasets through community engagement**.
- It is created to augment the response activities by the Government of India to the pandemic.
- **Information parameters** required as per the **Government of India strategy and containment plan for large outbreaks** have been incorporated in the SAHYOG application.
- This mobile application will **complement the "AAROGYA-SETU" mobile app** launched by the Government of India for **Contact tracing, public awareness, and Self-assessment objectives**.

How will it impact?

- The **Department of Science and Technology (DST)**'s efforts in **integrating geospatial information** can **help the country in taking rapid spatial information-based decisions** to face the **multi-layered crisis** that the pandemic and brought and spread the **impact of such decisions** through the country.
- It will **strengthen the Nation's health emergency management** due to the COVID-19 outbreak and **support the socio-economic recovery process** through the seamless provision of spatial data, information, and linkage between human, medical, technological, infrastructural and natural resources.
- The **State Spatial Data Infrastructure (SSDI)** in **Madhya Pradesh, Odisha, Punjab, and Jammu & Kashmir** have been **providing collateral standards-based geospatial data** services to the **State and District Level Authorities** in the **respective States through State Geoportals for integration with related health data sets towards combating COVID-19 pandemic**.

Topic- GS Paper 3–Science and Technology
Source- PIB

Truenat

Why in the news?

- Recently, the **Indian Council of Medical Research (ICMR)** has recommended the **use of Truenat beta CoV test on Truelab workstation**. It is **validated as a screening test** by the apex medical body.



Unlimited Access to 100+ Mock Tests

UPSC CSE, UPSC EPFO & State PCS Exams

Enrol Now



About Truenat

- It is a **device which is small, battery-operated and requires minimal training** and is usable even in lower settings such as the **Primary Health Centre**.
- It is a **Diagnostic machine** used to test **drug-resistant tuberculosis**.
- It uses a chip-based technology and takes just up to **60 minutes for a test, screening or confirmatory**.

Topic- GS Paper 3–Science and Technology

Source- AIR

Post-intensive care syndrome (PICS)

Why in the news?

- After leaving the ICU, the COVID-19 Patient, suffer from what is known as post-intensive care syndrome (PICS), which can **happen to any person who has been in the ICU**.

What is post-intensive care syndrome?

According to an article in the **Journal of Translational Internal Medicine**, **PICS comprises impairment in cognition, psychological health and physical function of a person** who has been in the ICU.

- It is defined as **a new or worsening impairment in physical** (ICU-acquired neuromuscular weakness), **cognitive** (thinking and judgment), or **mental health status** is arising after **critical illness and persisting beyond discharge** from the acute care setting.
- Further, such patients **may experience neuromuscular weakness**, which can manifest itself in the **form of poor mobility and recurrent falls**.
- **A psychological disability** may arise in a person in the **form of depression, anxiety, and post-traumatic stress disorder (PTSD)**. PICS may be induced if a **person** was on **prolonged mechanical ventilation, experienced sepsis, multiple organ failure** and a **prolonged duration of “bed-restore deep sedation”**.

Symptoms

- These are generalized **weakness, fatigue, decreased mobility, anxious or depressed mood, sexual dysfunction, sleep disturbances and cognitive issues**.
- These symptoms **may last for a few months or many years after recovery**, according to the authors.

Treatment



Unlimited Access to 100+ Mock Tests
UPSC CSE, UPSC EPFO & State PCS Exams

[**Enrol Now**](#)

- It is recommended that to **avoid PICS, patients' use of deep sedation** is limited, and early mobility is encouraged, along with giving them **"aggressive" physical and occupational therapy**.
- Such patients should be given the **lowest dose of pain medications** when possible. They should be **put on lung or cardiovascular rehabilitation treatments** along with **treatments for depression, anxiety, and PTSD**.

Topic- GS Paper 2–Health Issue
Source- Indian Express

Past pandemics

Why in the news?

- The world is coping with the ongoing viral outbreak, which is taking a toll on the global economy. We, as a global citizen, do not even know the solutions to cope with it as the research and methodologies are underway. Applying specific measures like quarantine and lockdown, the further spread can be stopped.
- In such prevailing circumstances, it becomes essential to re-visit the deadliest pandemics of the past and how the world coped with them before COVID-19.



Various pandemics which have had significant influence in shaping human society and politics throughout history are as follows:

(i) **Justinian Plague:** It is one of the **deadliest pandemics** that **broke out in the sixth century in Egypt** and **spread fast to Constantinople, the capital of the Eastern Roman (Byzantine) Empire**.

- The plague was named after the then **Byzantine Emperor Justinian**.
- The **outbreak spread from Constantinople** to both the **West and East**, had **killed up to 25 to 100 million people**.

(ii) **Black Death**

- The **Black Death, or pestilence**, that **hit Europe and Asia** in the **14th century** was the **deadliest pandemic recorded in human history**. It killed some 75 to 200 million people.
- The **plague arrived in Europe in 1347**, where **up to 50% of the population died of the disease**.



Gradeup Green Card

Unlimited Access to 100+ Mock Tests

UPSC CSE, UPSC EPFO & State PCS Exams

[Enrol Now](#)

(iii) **Spanish Flu**

- Spanish Flu broke out during the last phase of the **First World War** and was the **deadliest pandemic of the previous century** that **killed up to 50 million people**.
- One of the **significant impacts of the outbreak** was the **result of the war**. Though **the Flu hit both sides**, the **Germans and Austrians** were **affected badly**, and the outbreak derailed their offensives.

(iv) **Influenza Virus:**

a. **H1N1 virus**

- 1918 influenza pandemic was the most severe in recent history.
- An H1N1 virus caused it with genes of avian origin. It spread worldwide during 1918-1919.
- It is regarded as the deadliest pandemic of the 20th century.

b. **H2N2 Virus**

- In 1957, a new influenza A (H2N2) virus emerged in East Asia, triggering a pandemic ("Asian Flu").
- This H2N2 virus was comprised of three different genes from H2N2 infection.
- These originated from an avian influenza A virus, including the H2 hemagglutinin and the N2 neuraminidase genes.

c. **H3N2 virus**

- In 1968 pandemic was caused by an influenza A (H3N2) virus.
- The H3N2 virus comprised of two genes from an avian influenza A virus, including a new H3 hemagglutinin, but also contained the N2 neuraminidase from the 1957 H2N2 virus.
- It was first noted in the United States in September 1968. It continues to circulate worldwide as a seasonal influenza A virus.
- Seasonal H3N2 viruses, which are associated with severe illness in older people, undergo regular antigenic drift.

d. **H1N1 virus**

- In 2009, a novel influenza A (H1N1) virus emerged.
- It was detected first in the United States and spread quickly across the United States and the world.
- This new H1N1 virus contained a unique combination of influenza genes not previously identified in animals or people.
- This virus was designated as **influenza A (H1N1) pdm09 virus**.

The 10-year commemoration of the 2009 H1N1 flu pandemic is an opportunity to reflect on that event in history as well as to acknowledge the importance of ongoing efforts to improve domestic and global capacity to detect and respond to novel flu viruses. Since 2009, substantial advances have been made in influenza science and preparedness.

Topic- GS Paper 2–Health Issue

Source- The Hindu and Centre for Disease Control and Prevention, US

Remdesivir

Why in the news?



Unlimited Access to 100+ Mock Tests
UPSC CSE, UPSC EPFO & State PCS Exams

Enrol Now

• According to **World Health Organization**, the drug '**Remdesivir**' has been under the spotlight as a **possible treatment for critical cases** of novel **coronavirus disease (COVID-19)**.

What is remdesivir?

- It is a **drug with antiviral properties** that was **manufactured by US-based Biotechnology Company in 2014**, to treat Ebola cases.
- It was also **tried in patients of MERS and SARS**, both caused by members of the coronavirus family.
- It is a **nucleotide analog**, specifically an adenosine analogue, which inserts into **viral RNA chains**, causing their premature termination. It is being studied during 2020 as a possible **post-infection treatment for COVID-19**.



Working of Remdesivir

- Coronaviruses have a **single-strand RNA** as their **genetic material**.
- When the **novel coronavirus SARS-CoV2** enters a human cell, an **enzyme called RdRP** helps the **virus replicate**.
- **Remdesivir** works by **inhibiting the activity of RdRP**.

What does India's stand on remdesivir?

- The **Indian Council of Medical Research (ICMR)** has said it can consider using the drug if local manufacturers are willing to procure it.
- The **ICMR plans** to wait and watch for the **results of WHO's Solidarity trials** to make an assessment on the efficacy of '**Remdesivir for COVID-19 treatment**'.
- Remdesivir is **currently not available in India**.

What are the other lines of treatment being investigated?

a. Hydroxychloroquine

- It is an anti-malarial drug, is undergoing multiple trials to assess if it can be used to treat severe COVID-19 cases.
- It works by decreasing the acidity in parts of the cell where the virus is present, thereby inhibiting it.

b. Ritonavir and lopinavir

- These are two antiviral drugs used for treatment of HIV.
- These too work by inhibiting the virus's RNA. Specifically, they target the enzyme that helps the virus split proteins.
- These two drugs are being used in India and several countries for seriously ill patients.

Topic- GS Paper 3–Science and technology

Source- Indian Express



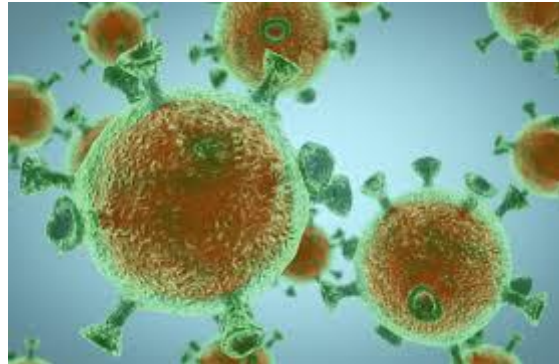
Unlimited Access to 100+ Mock Tests
UPSC CSE, UPSC EPFO & State PCS Exams

Enrol Now

Types of human coronaviruses

Why in the news?

- In the **last two decades**, more **aggressive coronaviruses have emerged** that can cause **serious illness and even death in humans**.
- Till date, **seven different types of coronaviruses** have been **identified that infects humans** include **SARS-CoV, MERS** and **now SARS-CoV-2**.



What are coronaviruses?

- Coronaviruses are **a large family of single-stranded RNA viruses** that **cause diseases in animals and humans**.
- The viruses usually **cause mild to moderate upper-respiratory tract illnesses** such as the **common cold**.

Common human coronavirus

- a. 229E (alpha coronavirus)
- b. NL63 (alpha coronavirus)
- c. OC43 (beta coronavirus)
- d. HKU1 (beta coronavirus)

People around the world commonly get infected with human coronaviruses 229E, NL63, OC43, and HKU1.

Other human coronavirus (zoonotic)

Sometimes coronaviruses that **infect animals can evolve and make people sick** and become a new human coronavirus. Three recent examples of this are 2019-nCoV, SARS-CoV, and MERS-CoV.

- a. MERS-CoV (the beta coronavirus that causes Middle East Respiratory Syndrome, or MERS)
- b. SARS-CoV (the beta coronavirus that causes severe acute respiratory syndrome, or SARS)
- c. SARS-CoV-2 (the novel coronavirus that causes coronavirus disease 2019, or COVID-19)

Discovery and Identification of coronavirus

a. 229E: One of the **first coronaviruses strains** to be described in the **mid-60s**, possibly by **D Hamre and JJ Procknow in 1966**.

b. OC43

- Discovered **in 1967** according to the **Journal of Virology**.



Unlimited Access to 100+ Mock Tests
UPSC CSE, UPSC EPFO & State PCS Exams

[Enrol Now](#)

- However, a **paper in Virology Journal** has described it as the **first human coronavirus to be discovered in 1965**, citing a **1966 paper** written by **Tyrrell and Bynoe** who **worked with the nasal swab** titled **B814**.

c. NL63 and HKU1

- **First identified** in the **Netherlands in 2004**, probably after it was **isolated from a seven-month-old infant** showing **respiratory symptoms**.
- During this time, there was **an increase in research on human coronaviruses**, which led to the **discovery of NL63 and HKU1 in Hong Kong in early 2005**.

d. SARS-CoV

- It was **identified after the 2003 outbreaks in China**.
- It is thought to have **come from an as yet unknown animal source**, probably bats.
- **Bats thought to have given it to other animals**, probably **civet cats**.
- **Symptoms of SARS** include **cough, shortness of breath, diarrhea**.
- In severe cases, **the symptoms can progress to respiratory distress**, which may **require intensive care**.

e. MERS

- It is another **viral respiratory disease** caused by a **human coronavirus**.
- It was **first identified in Saudi Arabia in 2012**.
- It was **transmitted by dromedary camels**
- Typical symptoms include **fever, cough, and shortness of breath**.

f. SARS-CoV-2:

- It was **first identified in Wuhan, in 2019**
- Source of the **virus is not yet known**, possibly bats.
- Symptoms: **Fever, Tiredness and Dry cough**.
- Further, while **SARS-CoV-2 is milder than SARS-CoV and MERS**, it is especially **difficult to control its outbreak**, given its **high infectiousness**.

Topic- GS Paper 3–Science and Technology

Source- Indian Express

Blazar emission

Why in the news?

- Researchers from the **Indian Institute of Astrophysics (IIA), Bangalore**, have recently conducted the **first systematic study on the gamma-ray flux variability** nature on **different types of blazars**.
- The study could **provide clues to the processes happening close to the black hole**, not visible through direct imaging.



About Blazars

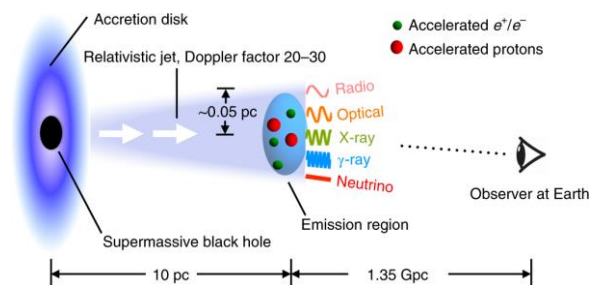


Unlimited Access to 100+ Mock Tests

UPSC CSE, UPSC EPFO & State PCS Exams

Enrol Now

- These are the **most luminous and energetic objects** in the known **universe** were found to be **emitters of gamma-rays** in the 1990s.
- **Blazars are AGN** whose **jets are aligned with the observer's line** of sight.
- Some blazars are thought to **host binary black holes** in them and could be **potential targets** for future gravitational-wave searches.



About Blazar Emission

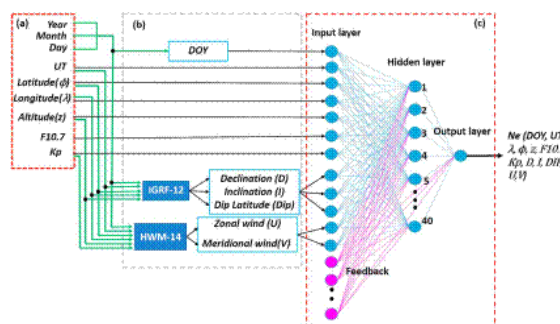
- At the **centre of most galaxies**, there is a **massive black hole** that can have a **mass of millions or even billions of Suns** that accrete gas, dust, and stellar debris around it.
- As this material falls towards the **black hole**, their **gravitational energy** gets converted to **light forming active galactic nuclei (AGN)**.
- A **minority of AGN (~15%)** emit **collimated charged particles** called **jets travelling at speeds** close to the **speed of light**.

Topic- GS Paper 3–Science and Technology
Source- PIB, The Guardian

Artificial Neural Networks based global Ionospheric Model

Why in the news?

- Researchers from **the Indian Institute of Geomagnetism (IIG)** have developed **Artificial Neural Networks based global Ionospheric Model**.



About Artificial Neural Networks based global Ionospheric Model

- It is a **global model to predict the ionospheric electron density**, which can **help communication/navigation**. The **Global Ionospheric Model (ANNIM)** has been **developed using long-term ionospheric** observations to predict the ionospheric electron density and the peak parameters.
- The ANNIM also captured the **general morphological features** of the ionosphere during the **disturbed space weather periods**, such as **geomagnetic storms** which

Unlimited Access to 100+ Mock Tests
UPSC CSE, UPSC EPFO & State PCS Exams

Enrol Now

occurs when the **magnetic cloud originated from Sun** (known as **Coronal Mass Ejection (CME)**) interacts with the Earth's magnetosphere.

Significance

- It will help predict the **ionospheric electron density** with larger data coverage which is crucial for **communication and navigation**.

About Ionosphere

- It is defined as **the layer of the Earth's atmosphere** that is **ionized by solar and cosmic radiation**.
- It lies **75-1000 km above the Earth**.
- It has **practical importance** because it **influences radio propagation to distant places on the Earth**.

Topic- GS Paper 3–Science and Technology

Source- The Hindu

World Wide Help

Why in the news?

- Recently, **IIT Bombay** has developed a platform named **Worldwide Help (WWH)** which can be used to **connect people seeking medical help with helpers**, such as doctors.

About World Wide Help

- It is an **Information Technology solution** to help with **physical distancing**. The **World Wide Help** platform can be used **with an app or a phone**.
- It aims to **connect people seeking medical help** with helpers, such as doctors.
- It is a **system to generate e-tokens** that can be **deployed by local markets and small vendors** to ensure physical distancing.

Topic- GS Paper 3–Science and technology

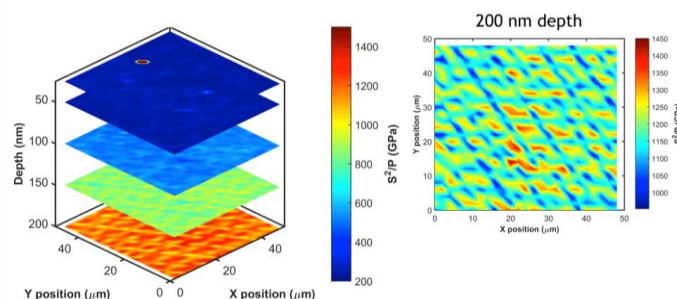
Source- The Hindu

NanoBlitz 3D

Why in the news?

- Recently, the scientists from **the International Advanced Research Centre for Powder Metallurgy and New Materials (ARCI)** have developed an **advanced tool** called 'NanoBlitz 3D'.

4D mechanical property mapping of multilevel chip





Unlimited Access to 100+ Mock Tests
UPSC CSE, UPSC EPFO & State PCS Exams

Enrol Now

About NanoBlitz 3D

- It is **jointly developed** by **ARCI** and **Nanomechanics Inc.**, Oak Ridge, USA.
- It is an **advanced tool for mapping nano-mechanical properties of materials** like multi-phase alloys, composites, and multi-layered coatings.
- The tool called **NanoBlitz 3D** has also been found to **yield excellent results** on a **wide range of material systems**, including glass-fibre-reinforced polymer composites, dual-phase steels, softwood and shale.
- It enables the **performance of a large array**, typically **consisting of 1000s high-speed nano-indentation tests**, wherein each **indentation tests** takes less than **one second to measure hardness and elastic modulus** of a given material.
- It provides capabilities to **carry out advanced data analysis**, such as **identifying and quantifying the mechanical properties** of constituent phases, features or components of multi-phase alloys, composites, multi-layered coatings and so on.
- The **high-speed mapping capabilities of the tool** can also be used to **quickly establish structure-property linkages at a micrometre length scale or higher**, which can help to understand multi-scale mechanics and aid in the development of hierarchical materials.

Topic- GS Paper 3–Science and Technology

Source- PIB

Feluda: A paper-strip test

Why in the news?

- Scientists at the **Council of Scientific & Industrial Research – Institute of Genomics and Integrative Biology (CSIR-IGIB)** have developed a **low-cost, paper-strip test** which can detect the new **coronavirus within an hour**.



About the Feluda

- The test, named **Feluda** after a **fictional detective character** created by **Satyajit Ray**, is expected to **cost around Rs 500 against the RT-PCR test that costs Rs 4,500 in private labs**. The test is based on a **bacterial immune system** protein called **Cas9**.
- It uses **cutting-edge gene-editing tool CRISPR-Cas9** system.
- The team has repurposed it for **diagnosis of COVID-19** genetic material.



Unlimited Access to 100+ Mock Tests
UPSC CSE, UPSC EPFO & State PCS Exams

Enrol Now

- This technology is not limited to **COVID-19** and can work on any **DNA-RNA or single mutations, disease mutations** etc.

About CRISPR-Cas9

- **CRISPR technology** is a **gene-editing technology** that can be used to alter the **genetic expression or change the genome of an organism**.
- The technology can be used for **targeting specific stretches of an entire genetic code or editing the DNA** at locations.

Significance

- **CRISPR technology** is a simple yet **powerful tool for editing genomes** which allows researchers to alter DNA sequences and modify gene function easily.
- Its **many potential applications include** correcting **genetic defects, treating and preventing the spread of diseases and improving crops**. However, its promise also raises ethical concern.

Topic- GS Paper 3–Science and Technology

Source- Indian Express

Favipiravir

Why in the News?

- As per the **Drug Controller General of India (DCGI)**, 'Favipiravir' looks promising as a drug against COVID-19 due to in-vitro results.
- The CSIR Director-General has informed that the synthesis process of 'Favipiravir' has been completed and the DCGI will now take a call on introducing it for testing as COVID-19 treatment.



About Favipiravir

- It is an **anti-viral agent** that selectively and potently **inhibits the RNA-dependent RNA polymerase (RdRp) of RNA viruses**.
- It was **discovered through screening chemical library for anti-viral activity against the influenza virus by Toyama Chemical Co., Ltd.** Favipiravir is **effective against a wide range of types and subtypes of influenza viruses**, including strains resistant to existing anti-influenza drugs.



Unlimited Access to 100+ Mock Tests
UPSC CSE, UPSC EPFO & State PCS Exams

[Enrol Now](#)

- It shows **anti-viral activities against other RNA viruses** such as **arenaviruses, bunyaviruses and filoviruses**, all of which are known to **cause fatal hemorrhagic fever**.
- These **unique anti-viral profiles** will make favipiravir a **potentially promising drug** for specifically **untreatable RNA viral infections**.

Topic- GS Paper 3–Science and Technology

Source- Indian express and NCBI

GW190412: First merger of two black holes with unequal masses detected

Why in the news?

- Recently, the **gravitational wave observatories at LIGO scientific collaboration** have detected a **merger of two unequal-mass black holes**.

About GW190412

- The event, **dubbed GW190412**, was **detected nearly a year ago**, and this is **almost five years** after the **first-ever detection of gravitational-wave signals** by **these powerful detectors**. Subsequent **analysis of the signal** coming from the **violent merger** showed that it involved **two black holes of unequal masses coalescing**, one of which was **some 30 times the mass of the Sun** and the other which had a **mass nearly 8 times** the solar mass.
- The actual merger took place at **2.5 billion light years away**.

Features

- The detected **signal's waveform** has **special extra features** in it when **it corresponds to the merger of two unequal-sized black holes** as compared with a **merger of equal-sized black holes**.
- These **features make it possible to infer** many more things about the characters in this **celestial drama**, namely, a **more accurate determination of the distance** from the event, the **spin or angular momentum** of the **more massive black hole** and the **orientation of the whole event** concerning **viewers on Earth**.

About Laser Interferometer Gravitational-Wave Observatory

- The **Laser Interferometer Gravitational-Wave Observatory (LIGO)** is a **large-scale physics experiment and observatory to detect cosmic gravitational waves** and to **develop gravitational-wave observations** as an **astronomical tool**.
- Two large observatories were built in the **United States to detect gravitational waves by laser interferometry**.
- These can detect a change in the **4 km mirror spacing of less than a ten-thousandth the charge diameter of a proton**.

LIGO India

- **LIGO India** will **come up in Maharashtra**, which will also have **two arms of 4 km length**.
- The project **aims to move one Advanced LIGO detector** from Hanford to India.
- This project is a collaboration between the **LIGO Laboratory and three leading institutions** in the **IndIGO consortium: Institute of Plasma Research (IPR) Gandhinagar, Inter-University Centre for Astronomy and Astrophysics (IUCAA), Pune and Raja Ramanna Centre for Advanced Technology (RRCAT), Indore**.



Unlimited Access to 100+ Mock Tests
UPSC CSE, UPSC EPFO & State PCS Exams

[Enrol Now](#)

- It is an **ultra-high precision large-scale apparatus**, which is expected to show a **unique “temperament”** determined by the **local site characteristics**.

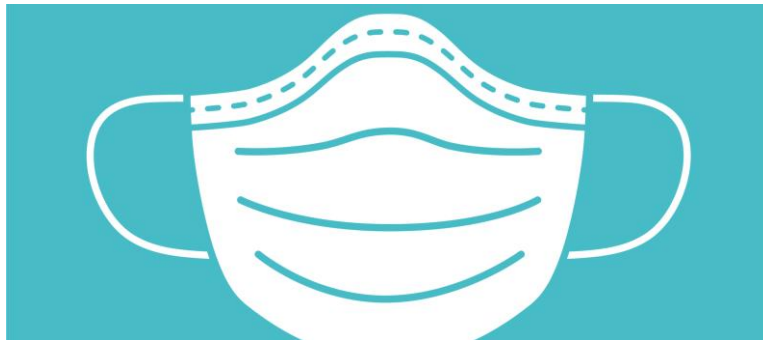
Topic- GS Paper 3–Science and Technology

Source- The Hindu

Asymptomatic, Presymptomatic and Symptomatic Transmission

Why in the news?

- Two recent figures were given out on separate days by the **Indian Council of Medical Research (ICMR)** about people without symptoms **testing positive for novel coronavirus disease (COVID-19)**.
- The WHO recognises **three stages of COVID-19 transmission** – **asymptomatic, presymptomatic and symptomatic**.



Symptomatic transmission

- Symptomatic transmission refers to **transmission from a person** while they are **experiencing symptoms**. Data from published **epidemiology and virologic studies** provide evidence that **COVID -19 is primarily** transmitted from **symptomatic people to others** who are in close contact through **respiratory droplets**, by **direct contact with infected persons**, or by **contact with contaminated objects and surfaces**.
- The incubation period of the **virus ranges between 5-14 days**.

Asymptomatic transmission

- It refers to **the transmission of the virus from a person** who does not develop symptoms.
- There are few reports of **laboratory-confirmed cases** that are **genuinely asymptomatic**, and to date, there has been no **documented asymptomatic transmission**.
- **Asymptomatic cases** have been reported as **part of contact tracing efforts** in some countries.

Presymptomatic transmission

- Presymptomatic transmission is when a person spreads the disease before symptoms appear, and eventually develops symptoms themselves.

Note:

- The **US Centers for Disease Control and Prevention (CDC)** is clear that both presymptomatic and asymptomatic transmission of the virus is possible.
- **SARS-CoV-2 RNA** may be detectable in the upper or lower respiratory tract for weeks after illness onset, similar to **infections with MERS-CoV and SARS-CoV**.



Unlimited Access to 100+ Mock Tests

UPSC CSE, UPSC EPFO & State PCS Exams

Enrol Now

Topic- GS Paper 3–Science and Technology

Source- Indian Express

Mobile BSL-3 VRDL Lab

Why in the news?

- Defence Minister has recently **inaugurated through videoconference a mobile virology research and diagnostics laboratory (MVRDL)** called **Mobile BSL-3 VRDL Lab**.
- The **MVRDL** is the **combination of a bio-safety level (BSL)-3 lab and a BSL-2 lab**.

About Mobile BSL-3 VRDL Lab

- The design of **Mobile BSL-3 VRDL Lab** has been **developed by DRDO scientists**, whereas specification of the lab has been given by **ESIC Medical College & Hospital, Sanathnagar, and Hyderabad**.
- The project has been executed and constructed by **three industry partners of DRDO**.
- It will be **first of its kind facility** in the **country for Covid-19** and other related testing and research purposes.

Topic- GS Paper 2–Health Issues

Source- Economics Times

CIM-Paushak

Why in the news?

- Recently, the researchers at **the Central Institute of Medicinal and Aromatic Plants (CIMAP), Lucknow** have **developed 'CIM-Paushak' and 'Herbal Cough Syrup'**.

About CIM-Paushak

- These are the **herbal products found to be effective in boosting the immunity** of a person.
- **Twelve valuable herbs**, including **Puranva, Ashwagandha, Mulethi, Harad, Baheda and Sataver** compounds, have been used in both these products.
- **CIM-Paushak** has also been found to be **cheap, safe and effective in the animal trials** conducted in the institute.
- **Herbal Cough Syrup** is developed based on **the latest guidelines of the AYUSH ministry**, and it has been prepared based on the **'Tridosha' principle of Ayurveda**.



Unlimited Access to 100+ Mock Tests
UPSC CSE, UPSC EPFO & State PCS
Exams

Enrol Now

About the Tridosha Theory

- When the **five eternal substances** – **space, air, fire, water** and **earth** combine to form the **human body**, they do so by **creating three vital energies**, or **doshas**.
- These are the forces that **govern all psycho-physiological functions** in the **body and mind**, respectively.
- They **construct the body and serve to maintain** it in a **dynamic state of health**.
- However, when these **vital forces are aggravated**, due to **improper gross or subtle factors**, the **body-mind connection** begins to suffer, and the **disease process begins**.
- The three vital energies are:
 - a. **Vata:** It is the most powerful among the doshas, which is formed by the interaction of space and air.
 - b. **Pitta:** The interaction of fire and water form it. It regulates body metabolism and transformations in the body's form.
 - c. **Kapha:** It is formed by the structural properties of earth, with water in its role as a lubricant to different tissues of the body, which also aids strength and adds stamina to the body.

Topic- GS Paper 3- Science and Technology
Source- PIB

Multi-system inflammatory state

Why in news?

- UK's **Paediatric Intensive Care Society** said it had **observed an "apparent rise"** in the number of **children, of all ages**, with a **"multi-system inflammatory state requiring intensive care"** which the doctors believe it could be **coronavirus related**.

What is multi-system inflammatory state?

- This is a **rare illness cause's inflammation** of the **blood vessels**, which leads to **low blood pressure**.
- It **affects the entire body** as it **causes a build-up of fluid** in the **lungs and other organs**.
- This **condition is similar to Kawasaki disease**.
- **Patients suffering** from it **require intensive care** to support the lungs, heart and other organs.





Unlimited Access to 100+ Mock Tests
UPSC CSE, UPSC EPFO & State PCS Exams

[Enrol Now](#)

What are the symptoms?

- **Children** were **showing abdominal and gastrointestinal symptoms** as well as **cardiac inflammation**. According to PICS, there were also **overlapping symptoms of toxic shock syndrome** and **atypical Kawasaki disease**.

About Toxic shock syndrome

- It is a **rare life-threatening condition** caused when **certain bacteria** enter the body and **release harmful toxins**.
- If not **treated in time**, the **condition could be fatal**.

Symptoms

- It **includes high temperature, flu-like symptoms including headache, sore throat, cough, diarrhea, dizziness or fainting, difficulty breathing and confusion**.

About Kawasaki disease

- It is an **acute inflammatory disease** of the **blood vessels** and usually **occurs in children below the age of five**.
- The **inflammation caused by the disease** affects **many parts of the body** but has a more **serious effect on the heart** since it **causes inflammation in the coronary arteries** that are **responsible for supplying blood to the heart**.
- This results in **enlargement or in the formation of aneurysms** that **can lead to heart attacks**.
- **Symptoms include fever, changes in extremities, rashes, and redness of the cornea, red and cracked lips, a red tongue and lymph node enlargement of the neck**.

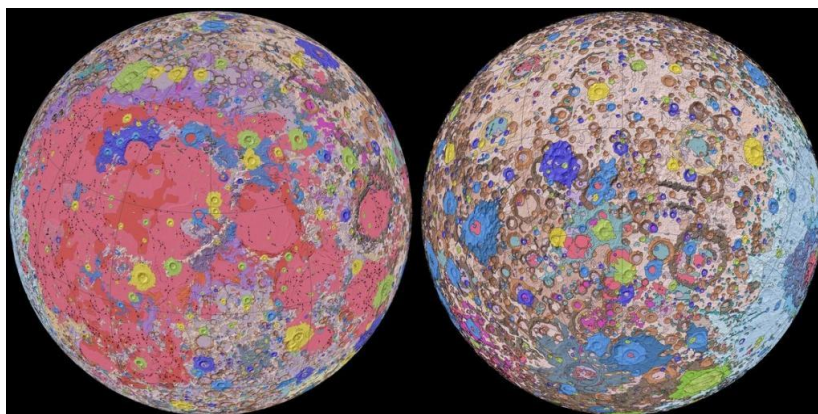
Topic- GS Paper 3–Science and Technology

Source- Indian Express

First-ever digital geological map of moon released by US Geological Survey


Why in the news?

- The **first-ever digital, unified, global, geological map of the moon** was released **virtually by the United States Geological Survey (USGS), National Aeronautics and Space Administration** and the **Lunar Planetary Institute**.



About the digital geological map

- The map is a '**seamless, globally consistent, 1:5,000,000-scale geologic map**'.



Unlimited Access to 100+ Mock Tests
UPSC CSE, UPSC EPFO & State PCS Exams

Enrol Now

- It is also called the '**Unified Geologic Map of the Moon**'.
- It will serve as a **blueprint for future human missions** and a **source of research and analysis** for the **educators and the general public interested in lunar geology**.
- The **final map** consists of **43 geologic units** across the **entire lunar surface, broken down into groups** based on **characteristics like materials of craters, basins, terra, plains and volcanic units**.

Note:

- The **Indian Space Research Organisation (ISRO) Chandrayaan 2** is an **active mission** that targets the **Lunar South Pole for exploration**.
- The **moon's South Pole** is especially interesting because **the area is much larger than the North Pole** and there could be **the possibility of the presence of water in these permanently shadowed areas**.
- Further, the **South Pole region** also contains the **fossil record of the early Solar System**.

Topic- GS Paper 3–Science and Technology

Source- The Hindu



Unlimited Access to 100+ Mock Tests
UPSC CSE, UPSC EPFO & State PCS Exams

Enrol Now

Science and Technology Current Affairs April 2020