

INSIGHT GS TEST SERIES

PRE-CUM-MAINS-2018

MODEL ANSWER
for

PTS-ADVANCE LEVEL

**SCIENCE and
TECHNOLOGY**

(* Only for INSIGHT TEST SERIES STUDENTS)



INSIGHT IAS ACADEMY

India's Best Institute for Civil Services Prep.

CENTRAL DELHI

60/17 Above Subway,
Old Rajinder Nagar, New Delhi - 110060

NORTH DELHI

B-18, Satija House, Main Road,
Dr. Mukherjee Nagar, Delhi-110009



011-45090051

09818333201

09871216382

Email: insightiasacademydelhi@gmail.com

Website : insightiasacademy.com

INSIGHT GEN.STUDIES & CSAT

SCIENCE & TECHNOLOGY (ADVANCE LEVEL)

1. D

First proposed in 1916 by Albert Einstein, gravitational waves are ripples in space and time that are produced when whole black holes collide and stars explode. Through these waves scientists hope to gain valuable insight into the universe because these waves experience no barriers, unlike electromagnetic waves such as radio waves, visible light, infrared light, X-rays, and gamma rays. Black holes, do not emit light, radio waves and the like, but can be studied via gravitational waves. Unlike seismic waves, however, gravitational waves can travel in empty space — and they do so at the speed of light.

Gravitational waves were first predicted in 1916 by Albert Einstein on basis of his Theory of General Relativity. They were detected for by US LIGO laboratory in 2015. Since then three more examples have been detected.

Thus, Option D is correct.

2. C

The National Aeronautics and Space Administration (NASA) has discovered eighth planet circling Kepler-90, a Sun-like star which is 2545 light-years far from Earth. It was dubbed as Kepler-90i. The eight planet was discovered by Researchers Christopher Shallue and Andrew Vanderburg by applying Google's machine-learning technology to data collected by NASA's Kepler Space Telescope.

With eight planets, Kepler-90 system equals our own solar system in terms of number of planets orbiting single star. Astronomers are yet to detect a system with more than eight planets. Kepler-90 star system is like a mini version of our solar system.

Kepler-90i is outermost and eighth planet in Kepler-90 system. It is roughly the same distance from its star as Earth is from Sun. It orbits its star once every 14.4 days. It is around 30% larger than Earth. It is thought to have an average surface temperature of 425 degrees Celsius.

The Kepler-90 planets have a similar configuration to our solar system with small planets found orbiting close to their star, and the larger planets found farther away. In our solar system, this pattern is often seen as evidence that the outer planets formed in a cooler part of the solar system, where water ice can stay solid and clump together to make bigger and bigger planets. The pattern we see around Kepler-90 could be evidence of that same process happening in this system.

Thus, Option C is correct.

3. B

Karnataka's Tirthahalli taluk has come under the grip of Kyasanur Forest Disease (KFD), also known as Monkey Fever. So far, five positive cases, including one death, have been reported in humans.

Central Delhi: 60/17, Above Subway, Old Rajinder Nagar, Delhi - 60
North Delhi: B-18, Satija House, Main Road, Dr. Mukherjee Nagar, Delhi - 09
Ph: 011 - 45090051, 9818333201, 9871216382

INSIGHT GEN.STUDIES & CSAT

Kyasanur Forest Disease or Monkey Fever is tick-borne viral diseases caused by Kyasanur forest disease virus (KFDV), a member of the virus family Flaviviridae, which also causes dengue and yellow fever. It is endemic to South Asia and was first detected in 1957 in Kyasanur Forest of Karnataka.

Monkey fever is so named because it primarily affects black-faced langurs and red-faced bonnet monkeys and result in their death. KFD causes seasonal outbreaks between December and May along Western Ghats mostly striking farmers in Goa, Karnataka, Kerala, Tamil Nadu and Maharashtra.

The vector responsible for its transmission is ticks (*Hemaphysalis spinigera*). These ticks are known to thrive in the Western Ghats and transmit the disease to humans. Humans contract KFD infection from the bite of nymphs of the tick.

Thus, Option B is correct.

4. B

The India Indian Space Research Organisation (ISRO) is set to launch first solar mission Aditya-L1 in 2019. It will be India's first dedicated scientific mission to study sun. The mission aims to put 1,500-kg heavy class Aditya-L1 satellite into halo orbit around Lagrangian point L1, a point between Sun and Earth. This point is at a distance of about 1.5 million km from earth.

The mission is a joint venture between ISRO and physicists from various institutes including Indian Institute of Astrophysics (Bengaluru), Tata Institute of Fundamental Research (Mumbai) and Inter University Centre for Astronomy and Astrophysics (Pune). Aditya L1 satellite will be launched by using PSLV XL. The satellite will be programmed to orbit L1 point and image sun's magnetic field from space for very first time in world. Scientists hope to capture close-ups of sun from here, uninterrupted by eclipses for years.

Objectives of mission

- Study dynamic nature of sun's outer most layers, the corona and the chromosphere, and collect data about Coronal Mass Ejections (CME).
- Study on origin of solar storms and their path through the interplanetary space from the Sun to the Earth.
- The studies will also focus on collection of information for space weather prediction.

About Lagrange Point

Lagrange point is position in space where combined gravitational forces of two large bodies, such as Earth and Sun or Earth and moon equal centrifugal force felt by a much smaller third body. The interaction of these forces creates point of equilibrium where spacecraft may be "parked" to make observation.

Thus, Option B is correct.

5. D

6. B

- Presently India is heading towards second stage of its nuclear programme. Prototype Fast Breeder Reactor (PFBR) is a reactor, which produce more fuel than it consumes. PFBR is using Uranium-238 not

Central Delhi: 60/17, Above Subway, Old Rajinder Nagar, Delhi - 60

North Delhi: B-18, Satija House, Main Road, Dr. Mukherjee Nagar, Delhi - 09

Ph: 011 - 45090051, 9818333201, 9871216382

INSIGHT GEN.STUDIES & CSAT

thorium, to breed new fissile material, in a sodium cooled fast reactor design with no moderators required. Indira Gandhi Centre for Atomic Research (IGCAR) is responsible for the design of this reactor.

- A breeder reactor is one that breeds more material for a nuclear fission reaction than it consumes. The PFBR will be fuelled by a blend of plutonium and uranium oxide, called MOX fuel.
- 500Mwe Prototype Fast Breeder Reactor (PFBR) at Kalpakkam (Tamil Nadu) is getting ready to be commissioned.
- It will signal India's triumphant entry into the second stage of its three stage nuclear power programme.
- This will make India the second country, after Russia, in the world to operate a Fast Breeder Reactor.

Thus, Option B is correct.

7. A

The National Aeronautics and Space Administration (NASA) will launch two missions — GOLD and ICON later this year. They will team up to explore the ionosphere, located 96 km above Earth's surface.

The Global-scale Observations of the Limb and Disk (GOLD) mission was launched in January 2018 and Ionospheric Connection Explorer (ICON) will be launched later this year.

The two missions will be complementary to each other. ICON will be launched in low-Earth orbit (LEO) located at 560 km above Earth, like a close-up camera. GOLD was launched in geostationary orbit over Western Hemisphere, about 35,398 km above earth. It will help in full-disk view of ionosphere and upper atmosphere beneath it every half hour.

The two missions can cooperate with each other when ICON passes through GOLD's field of view and each mission can get snapshot of same region. This overlap in their data will make it easier to identify reasons for changes in upper atmosphere at a given time.

One of missions' goals is to measure how upper atmosphere changes in response to hurricanes and geomagnetic storms. GOLD will also explore how upper atmosphere reacts to geomagnetic storms, which are temporary disturbances of Earth's magnetic field caused by solar activity.

At night, GOLD will examine disruptions in ionosphere, which are mainly dense, unpredictable bubbles of charged gas that appear over equator and tropics, sometimes interfere with radio communications.

Thus, Option A is correct.

8. D

A fuel cell is a device that converts chemical potential energy (energy stored in molecular bonds) into electrical energy. A PEM (Proton Exchange Membrane) cell uses hydrogen gas (H_2) and oxygen gas (O_2) as fuel. The products of the reaction in the cell are water, electricity, and heat.

Fuel cells are highly efficient power-generating systems that produce electricity by combining fuel (hydrogen) and oxygen in an electrochemical reaction. Fuel cells are electrochemical devices that convert the chemical energy of a fuel directly and very efficiently into electricity (DC) and heat, thus doing away with combustion.

Central Delhi: 60/17, Above Subway, Old Rajinder Nagar, Delhi - 60

North Delhi: B-18, Satija House, Main Road, Dr. Mukherjee Nagar, Delhi - 09

Ph: 011 - 45090051, 9818333201, 9871216382

INSIGHT GEN.STUDIES & CSAT

Hydrogen and phosphoric acid are the most common type of fuel cells, although fuel cells that run on methanol, ethanol, and natural gas are also available. The most suitable fuel for such cells is hydrogen or a mixture of compounds containing hydrogen. A fuel cell consists of an electrolyte sandwiched between two electrodes. Oxygen passes over one electrode and hydrogen over the other, and they react electrochemically to generate electricity, water, and heat.

Thus, Option D is correct.

9. C

There are various advantages of LED Lights:

- **Longer life spans:** LED lamps last 35,000 hours - 30 times longer than incandescent, 25 times longer than halogen and 10 times longer than compact fluorescent lamps.
- **High efficiency:** Saves users up to 80% on energy usage compared to standard dichroic low-wattage halogen and incandescent lamps, lowering electricity bills.
- **Zero UV Emissions:** LED illumination produces little infrared light and close to no UV emissions. Because of this, LED lighting is highly suitable not only for goods and materials that are sensitive to heat due to the benefit of little radiated heat emission, but also for illumination of UV sensitive objects or materials such as in museums, art galleries, archeological sites etc.
- **Durable Quality:** LEDs are extremely durable and built with sturdy components that are highly rugged and can withstand even the roughest conditions. Because LED lights are resistant to shock, vibrations and external impacts, they make great outdoor lighting systems for rough conditions and exposure to weather, wind, rain or even external vandalism, traffic related public exposure and construction or manufacturing sites.

Thus, Option C is correct.

10. C

LiDAR, which stands for Light Detection and Ranging, is a remote sensing method that uses light in the form of a pulsed laser to measure ranges (variable distances) to the Earth. These light pulses—combined with other data recorded by the airborne system— generate precise, three-dimensional information about the shape of the Earth and its surface characteristics.

A LiDAR instrument principally consists of a laser, a scanner, and a specialized GPS receiver. Airplanes and helicopters are the most commonly used platforms for acquiring LiDAR data over broad areas. Two types of LiDAR are topographic and bathymetric.

- Topographic LiDAR typically uses a near-infrared laser to map the land, while
- Bathymetric lidar uses water-penetrating green light to also measure seafloor and riverbed elevations.

Thus, Option C is correct.

Central Delhi: 60/17, Above Subway, Old Rajinder Nagar, Delhi - 60
North Delhi: B-18, Satija House, Main Road, Dr. Mukherjee Nagar, Delhi - 09
Ph: 011 - 45090051, 9818333201, 9871216382

INSIGHT GEN.STUDIES & CSAT

11. B

Andhra Pradesh is planning to develop a 160 MW solar-wind hybrid project with battery back-up facility. The mega project would be built over a land area of 1000 acres. The project is expected to entail an investment of approximately INR 1000 crores (\$155 million). The World Bank has agreed to provide funding for the project.

This hybrid solar wind project will be jointly developed by Solar Energy Corporation of India (SECI), the renewable energy agency of Andhra Pradesh, NREDCAP, and Andhra Pradesh Transco.

The project is expected to have 120 megawatts of solar power and 40 megawatts of wind energy capacity installed and will be equipped with a battery storage system to ensure it remains operational even during nighttime when there is no sun and decline in wind speed.

Thus, Option B is correct.

12. C

ISGAN is an agreement under International Energy Agency (IEA) and consists of representatives from 25 countries across the globe. India is one of the founding Member of ISGAN and Joint Secretary (Distribution), Ministry of Power, is the member representative of India. ISGAN creates a mechanism for multilateral government-to-government collaboration to advance the development and deployment of smarter electric grid technologies, practices and systems.

Thus, Option C is correct.

13. C

14. A

First Generation Biofuels: First Generation biofuels are produced directly from food crops by abstracting the oils for use in bio-diesel or producing bio-ethanol through fermentation. Crops such as wheat and sugar are the most widely used feedstock for bio-ethanol while oil seed rape has proved a very effective crop for use in biodiesel. However, first generation biofuels have a number of associated problems. There is much debate over their actually benefit in reducing green-house gas and CO₂ emissions due to the fact that some biofuels can produce negative Net energy gains, releasing more carbon in their production than their feedstock's capture in their growth.

Second Generation Biofuels: Second Generation biofuels have been developed to overcome the limitations of first generation biofuels. They are produced from non-food crops such as wood, organic waste, food crop waste and specific biomass crops, therefore eliminating the main problem with first generation biofuels. Second Generation biofuels are also aimed at being more cost competitive in relation to existing fossil fuels. Life cycle assessments of second-generation biofuels have also indicated that they will increase 'net energy gains' over coming another of the main limitations of first generation biofuels.

The **Third Generation of biofuels** is based on improvements in the production of biomass. It takes advantage of specially engineered energy crops such as algae as its energy source. The algae are cultured to act as a low-cost, high-energy and entirely renewable feedstock. It is predicted that algae will have the potential to produce more energy per acre than conventional crops. Algae can also be grown using land and water unsuitable for food

Central Delhi: 60/17, Above Subway, Old Rajinder Nagar, Delhi - 60

North Delhi: B-18, Satija House, Main Road, Dr. Mukherjee Nagar, Delhi - 09

Ph: 011 - 45090051, 9818333201, 9871216382

INSIGHT GEN.STUDIES & CSAT

production, therefore reducing the strain on already depleted water sources. A further benefit of algae based biofuels is that the fuel can be manufactured into a wide range of fuels such as diesel, petrol and jet fuel.

Thus, Option A is correct.

15. A

When the surrounding atmosphere heats up, plants will often release excess water into the air from their leaves through the process of transpiration. By releasing evaporated water, plants cool themselves and the surrounding environment. Thus, the process of transpiration cools the plant.

Transpiration will take place in presence of high air flow through the stomata. Rate of transpiration increases during windy conditions. Increase in the rate of transpiration increases the water absorption also because when transpiration occurs, it will create a transpiration pull and more water absorption will take place.

Thus, Option A is correct.

16. C

The Government intends to set up the India-based Neutrino Observatory (INO) in West Bodi Hills, Theni District of Tamil Nadu. It is an underground project, jointly supported by the Department of Atomic Energy (DAE) and the Department of Science and Technology (DST).

Thus, Option C is correct.

17. D

18. C

Bluetooth and near field communication share several features, both being forms of wireless communication between devices over short distances. NFC is limited to a distance of approximately four centimeters while Bluetooth can reach over thirty feet. While it may seem that Bluetooth is superior in this regard, both Bluetooth and NFC technology have their advantages and disadvantages compared to one another and can work together to meet users' needs.

NFC technology consumes little power when compared to standard Bluetooth technology. Only when NFC has to power a passive, unpowered source such as an NFC tag does it require more power than a Bluetooth transmission.

Another benefit of NFC technology comes in its ease of use. Bluetooth requires users to manually set up connections between smartphones and takes several seconds. NFC connects automatically in a fraction of a second, so fast it seems instantaneous. Though the users must be close to one another to use NFC technology, it is faster and easier to set up than a Bluetooth connection.

Thus, Option C is correct.

19. C

GSAT-3, known as EDUSAT was a communication satellite meant for distant class room education from school level to higher education. This was the first dedicated "Educational Satellite" that provide the country with satellite based two way communication to class room for delivering educational materials.

Thus, Option C is correct.

Central Delhi: 60/17, Above Subway, Old Rajinder Nagar, Delhi - 60

North Delhi: B-18, Satija House, Main Road, Dr. Mukherjee Nagar, Delhi - 09

Ph: 011 - 45090051, 9818333201, 9871216382

INSIGHT GEN.STUDIES & CSAT

20. C

21. C

PSLV earned its title 'the Workhorse of ISRO' through consistently delivering various satellites to Low Earth Orbits, particularly the IRS series of satellites. It can take up to 1,750 kg of payload to Sun-Synchronous Polar Orbits of 600 km altitude. Due to its unmatched reliability, PSLV has also been used to launch various satellites into Geosynchronous and Geostationary orbits, like satellites from the IRNSS constellation.

GSLV's primary payloads are INSAT class of communication satellites that operate from Geostationary orbits and hence are placed in Geosynchronous Transfer Orbits by GSLV. Further, GSLV's capability of placing up to 5 tonnes in Low Earth Orbits broadens the scope of payloads from heavy satellites to multiple smaller satellites.

Thus, Option C is correct.

22. D

The Scramjet Engine works on the Air-breathing Propulsion System. The system uses natural oxygen present in the atmosphere to burn the fuel stored in the rocket. It reduces the amount of Oxidiser to be carried along with the fuel, bringing down launch costs.

India is the fourth country to demonstrate the flight testing of Scramjet Engine after the United States, Russia and European Space Agency.

Thus, Option D is correct.

23. C

Fungi lack chlorophyll; consequently, they cannot synthesize their own food. In order to feed fungi, release digestive enzymes that break down food outside their bodies. The fungus then absorbs the dissolved food through their cell walls. Ringworm, Athletes foot and Madura foot are human diseases caused by fungi.

Thus, Option C is correct.

24. D

25. B

The world's first negative emissions plant under the CarbFix Project to turn atmospheric carbon dioxide (CO₂) into stone has begun operations in Hellisheidi, Iceland. It is intended to lock away carbon dioxide by reacting it with basaltic rocks. Work on the project began in 2007.

In it, the CO₂ is captured from ambient air, bound to water, and sent to more than 700 meters underground. There, the CO₂ reacts with the basaltic bedrock using enhanced weathering process and forms solid minerals, creating a permanent storage solution.

Currently, the system captures only 50 metric tons CO₂, each year, about same emitted by a single US household. It can remove an estimated 50 metric tons of CO₂ from the air in a year. It pumps the collected gas deep into the island's volcanic bedrock, where it reacts with basalt and essentially turns into limestone.

Thus, Option B is correct.

Central Delhi: 60/17, Above Subway, Old Rajinder Nagar, Delhi - 60

North Delhi: B-18, Satija House, Main Road, Dr. Mukherjee Nagar, Delhi - 09

Ph: 011 - 45090051, 9818333201, 9871216382

INSIGHT GEN.STUDIES & CSAT

26. D

Cereals include a wide variety of food like wheat etc. If we shift our diet from grain to meat then the demand of cereals would increase, rather than decrease. It is because it takes about 3-10 Kg of grains to produce just 1 Kg of meat by animal farming. The statement is true for reducing the demand but has no direct correlation with declining productivity gains.

It is a well known that genetic engineering can be used for altering crop genes which can be helpful in overcoming the declining productivity of cereals/grains.

There is an emerging consensus among the scholars that 'single cell protein' (SCP) can be used for overcoming malnutrition due to lack of food grains. SCP are produced by growing some types of microbes on waste water. These are helpful from two ways - meeting protein demand and reducing environmental impact.

Thus, Option D is correct.

27. D

Researchers including one of Indian origin from North Carolina State University in US have found that antibiotic resistance can be passed between bacteria found in the soil. They also have found that spreading manure on ground as fertiliser can also spread antibiotic resistance to bacteria in the soil.

Reasons for spread of antibiotic resistance through soil

Bacteria contain small DNA molecules known as plasmids. These plasmids are separate from bacteria's actual DNA and can pick up and exchange genes between bacteria. Thus, these plasmids in bacteria are responsible for antibiotic resistance in soil also.

Antibiotic resistance

Antibiotics are medicines used to prevent and treat bacterial infections. Antibiotic resistance occurs when bacteria change in response to use of these medicines. Antibiotic resistance occurs naturally, but misuse of antibiotics in humans and animals is accelerating the process. Poor infection prevention and control further accelerate it.

Thus, Option D is correct.

28. B

Pulsars are types of neutron stars; the dead relics of massive stars. What sets pulsars apart from regular neutron stars is that they're highly magnetized, and rotating at enormous speeds. Astronomers detect them by the radio pulses they emit at regular intervals.

Thus, Option B is correct.

29. C

Trans-fats are unsaturated fats which are uncommon in nature but can be created artificially. Trans fats raise LDL "bad" cholesterol and make you more likely to get heart disease. They also lower HDL "good" cholesterol.

Thus, Option C is correct.

Central Delhi: 60/17, Above Subway, Old Rajinder Nagar, Delhi - 60
North Delhi: B-18, Satija House, Main Road, Dr. Mukherjee Nagar, Delhi - 09
Ph: 011 - 45090051, 9818333201, 9871216382

INSIGHT GEN.STUDIES & CSAT

30. C

31. A

- Red Rot Disease – Sugarcane
- Panama Disease – Banana

Thus, Option A is correct.

32. D

33. C

- Anti-Tank Guided Missile (ATMG) Nag is one of five missile systems developed indigenously by DRDO under integrated guided missile development programme (IGMDP). The other four missiles are Agni, Akash, Trishul and Prithvi. It is manufactured by India's sole missile producer, state-owned Bharat Dynamics Limited. The Nag missile is third generation ATMG which works on "fire and forget" principle. It has operational range of 500m to 4km (Land version) and 7-10 km. It is equipped with highly advanced Imaging Infrared Radar (IRR) seeker along with integrated avionics. This technology is possessed by very few nations.
- Agni I is MRBM (Medium Range Ballistic Missile) while Agni II, III and IV comes under the category of IRBM (Intermediate Range Ballistic Missile) and Agni V and VI are ICBM (Inter-Continental Ballistic Missiles).
- Nirbhay is India's first indigenously designed and developed Long Range Sub-Sonic Cruise Missile.

Thus, Option C is correct.

34. C

The information that describes the data source and the time, place and conditions under which the data was created. Metadata informs the user of who, when, what, where, why, and how data were generated. Metadata allows the data to be traced to a known origin and know quality.

Thus, Option C is correct.

35. B

India's first Hyperloop project will come up in Andhra Pradesh, connecting its city centres, Vijayawada and Amaravati. In this regard, Andhra Pradesh Economic Development Board (APEDB) has inked memorandum of understanding (MoU) with Hyperloop Transportation Technologies (HTT) for developing the project.

The first of its kind project in India will use a Public Private Partnership (PPP) model with funding primarily from private investors. In its first phase, HTT will conduct six-month feasibility study, following which it will construct and build HTT's first Hyperloop in India. The proposed hyperloop will cover 35 km distance between Vijayawada and Amaravati only in five minutes.

Hyperloop Technology is brainchild idea of technology entrepreneur Elon Musk who dubs it as fifth mode of transportation. It is system of magnetically levitating capsules (pods) that are sent at high speeds through low-

Central Delhi: 60/17, Above Subway, Old Rajinder Nagar, Delhi - 60

North Delhi: B-18, Satija House, Main Road, Dr. Mukherjee Nagar, Delhi - 09

Ph: 011 - 45090051, 9818333201, 9871216382

INSIGHT GEN.STUDIES & CSAT

pressure tubes. It envisages tube modular transport system that runs free of friction. It uses linear Induction motors in it to control speed of pods. It is still in trial stages indifferent countries and not been implemented for practical use anywhere in world yet.

Hyperloop is two-to-three times faster than fastest high-speed rail and claimed to have speeds even greater than commercial air travel. It has smaller civil engineering footprint, with no direct emissions or noise compared to railways. Hyperloop system's capital cost per mile is 60% that of high-speed rail, and is less expensive to operate. Furthermore, Hyperloop departures could happen with a low frequency of a pod every 20 seconds which is not possible in railways.

Thus, Option B is correct.

36. B

- Use of Neem coated urea would help us for increase of production of crops and reduction in production cost of the crops.
- Neem coated urea is helpful in reducing the pollution of water, soil and air. This is because normal uncoated urea not only results in degradation of soil but also gets released in the atmosphere and pollutes the air. During rain some uncoated urea mixes with the river water.
- It will decrease India's dependence on imported urea as because of coating of urea by the neem that urea would be provided to farmer only. And black supply to urea to industry would get prohibit.

Thus, Option B is correct.

37. A

In India, Ministry of Environment through its Department of Genetic Engineering Appraisal Committee gives the concerned approval.

Thus, Option A is correct.

38. A

A gene can't easily be inserted directly into the cells. Rather it usually has to be delivered using a carrier, called vector. The most common gene therapy vectors are viruses because they can recognize certain cells and carry genetic material into the cells genes.

Thus, Option A is correct.

39. A

40. C

Graphene is a crystalline allotrope of carbon with 2-dimensional properties. In graphene, carbon atoms are densely packed in a regular sp²-bonded atomic-scale chicken wire (hexagonal) pattern.

Thus, Option C is correct.

Central Delhi: 60/17, Above Subway, Old Rajinder Nagar, Delhi - 60
North Delhi: B-18, Satija House, Main Road, Dr. Mukherjee Nagar, Delhi - 09
Ph: 011 - 45090051, 9818333201, 9871216382

INSIGHT GEN.STUDIES & CSAT

41. B

- NASA's Mercury Surface, Space Environment, Geochemistry and Ranging mission, better known as MESSENGER, was designed to map the surface composition, study the magnetic field and interior structure of our solar system's smallest and innermost planet - Mercury.
- The Cassini spacecraft orbited Saturn from June 30, 2004, until Sept. 15, 2017, when the probe ended its life with a plunge into the ringed planet's atmosphere.
- Orion ("o-rie-un") is a new NASA spacecraft for astronauts. The spacecraft will play an important part in NASA's journey to Mars. Orion will carry astronauts farther into the solar system than ever before. Orion will carry astronauts into deep space and then return them home to Earth. Orion will be able to travel to an asteroid or even Mars.

Thus, Option B is correct.

42. D

43. B

Naturally occurring fertile materials that can be converted into a fissile material by irradiation in a reactor include:

- Thorium-232 which converts into Uranium-233
- Uranium-234 which converts into Uranium-235
- Uranium-238 which converts into Plutonium-239

Artificial isotopes formed in the reactor which can be converted into fissile material by one neutron capture include:

- Plutonium-238 which converts into Plutonium-239

Thus, Option B is correct.

44. C

- Nanovaccines are not being developed for Zika virus.

Thus, Option C is correct.

45. D

TeamIndus is the only Indian team competing for the Google Lunar XPRIZE. The \$30M Google Lunar XPRIZE is a global competition to challenge and inspire engineers and entrepreneurs to develop low-cost methods of robotic space exploration. To win, a privately funded team must successfully place a robot on the Moon that explores at least 500 meters and transmits high-definition video and images back to Earth.

Thus, Option D is correct.

46. A

It gives birth to three parent baby. It does not prevent communicable diseases, rather prevents the mitochondrial diseases from being transferred from mother to the baby.

Thus, Option A is correct.

Central Delhi: 60/17, Above Subway, Old Rajinder Nagar, Delhi - 60

North Delhi: B-18, Satija House, Main Road, Dr. Mukherjee Nagar, Delhi - 09

Ph: 011 - 45090051, 9818333201, 9871216382

INSIGHT GEN.STUDIES & CSAT

47. A

A hydrogen bomb or H-bomb is the colloquial term for a two-stage thermonuclear bomb, which uses a primary atomic bomb to trigger a secondary, much larger explosion.

The first stage is based on nuclear fission, splitting atoms, while the second is based on nuclear fusion, producing a much more powerful explosion than traditional atomic bombs.

Once nuclear fusion is started, fast neutrons are created which once again trigger nuclear fission of uranium inside the bomb, causing explosions to double and triple, greatly increasing its explosive power.

It is named as hydrogen bomb as it involved fusion of hydrogen isotopes in secondary reaction.

Thus, Option A is correct.

48. C

Exoplanet: It is a planet that does not orbit the Sun and instead orbits a different star, stellar remnant, or brown dwarf. It is also termed as extrasolar planet.

Goldilocks Zone: It refers to a habitable zone in space where the temperature is neither too high nor too low. Such conditions could allow for the presence on the planet's surface of liquid water – a key ingredient for life.

Thus, Option C is correct.

49. C

Nuclear power plants in commercial operation or operable

Reactor type	Main countries	Number	GWe	Fuel	Coolant	Moderator
Pressurised water reactor (PWR)	US, France, Japan, Russia, China	292	275	enriched UO ₂	water	water
Boiling water reactor (BWR)	US, Japan, Sweden	75	73	enriched UO ₂	water	water
Pressurised heavy water reactor (PHWR)	Canada, India	49	25	natural UO ₂	heavy water	heavy water
Gas-cooled reactor (AGR & Magnox)	UK	14	8	natural U (metal), enriched UO ₂	CO ₂	graphite
Light water graphite reactor (RBMK & EGP)	Russia	11 + 4	10	enriched UO ₂	water	graphite
Fast neutron reactor (FBR)	Russia	3	1.4	PuO ₂ and UO ₂	liquid sodium	none

50. D

Fiber optics, or optical fiber, refers to the medium and the technology associated with the transmission of information as light pulses along a glass or plastic strand or fiber. Fiber optics transmit data in the form of light particles -- or photons -- that pulse through a fiber optic cable.

Central Delhi: 60/17, Above Subway, Old Rajinder Nagar, Delhi - 60

North Delhi: B-18, Satija House, Main Road, Dr. Mukherjee Nagar, Delhi - 09

Ph: 011 - 45090051, 9818333201, 9871216382

INSIGHT GEN.STUDIES & CSAT

Optical fibers have largely replaced copper wire communications in core networks in the developed world, because of its advantages over electrical transmission. Here are the main advantages of fiber optic transmission.

- **Extremely High Bandwidth:** No other cable-based data transmission medium offers the bandwidth that fiber does. The volume of data that fiber optic cables transmit per unit time is far greater than copper cables.
- **Longer Distance:** in fiber optic transmission, optical cables are capable of providing low power loss, which enables signals can be transmitted to a longer distance than copper cables.
- **Resistance to Electromagnetic Interference:** in practical cable deployment, it's inevitable to meet environments like power substations, heating, ventilating and other industrial sources of interference. However, fiber has a very low rate of bit error (10^{-13}), as a result of fiber being so resistant to electromagnetic interference. Fiber optic transmission is virtually noise free.
- **Low Security Risk:** the growth of the fiber optic communication market is mainly driven by increasing awareness about data security concerns and use of the alternative raw material. Data or signals are transmitted via light in fiber optic transmission. Therefore there is no way to detect the data being transmitted by "listening in" to the electromagnetic energy "leaking" through the cable, which ensures the absolute security of information.

Thus, Option D is correct.

51. D

- The Japan Aerospace Exploration Agency (JAXA) successfully launched Michibiki-4 satellite (QZSS-4) onboard of H-IIA rocket from Tanegashima Space Centre. It was fourth satellite in Michibiki series i.e. Quasi-Zenith Satellite System (QZSS), which is a satellite-based high-precision global positioning system similar to US operated GPS. Moreover, it was 36th H-IIA vehicle to be launched so far and fifth launch of an H-IIA rocket in 2017.

Michibiki-4 is third QZSS satellite to be launched in 2017 and once operational it will bring the constellation of QZSS to its operating capacity of four until a planned expansion to 8 satellites occurs around 2023.

The Michibiki system can cover the Asia-Oceania region and works with the US-operated GPS to provide higher level of precision than previously possible with fewer satellites in visible range. It will become operation in 2018 with four satellites focusing on country and wider region. It will provide global positioning and timing services across frequencies ranging from 1575.42 MHz to 2 GHz.

- Compass is a global navigation system currently being developed in China. It is the second generation of its regional BeiDou Satellite Navigation System (BDS), also known as BeiDou-2.
- Galileo is Europe's Global Satellite Navigation System (GNSS), providing improved positioning and timing information with significant positive implications for many European services and users.

Thus, Option D is correct.

Central Delhi: 60/17, Above Subway, Old Rajinder Nagar, Delhi - 60
North Delhi: B-18, Satija House, Main Road, Dr. Mukherjee Nagar, Delhi - 09
Ph: 011 - 45090051, 9818333201, 9871216382

INSIGHT GEN.STUDIES & CSAT

52. C

The World Health Organisation (WHO) has published its first ever list of antibiotic resistant 'priority pathogens' - a catalogue of 12 families of bacteria that pose the greatest threat to human health. This is bad news for India as most of these 12 superbugs are present in the country.

Thus, Option C is correct.

53. B

World's longest Quantum communication line is being launched by China. The technology allows one to distribute sequence of random bit whose randomness and secrecy are secured by the laws of quantum physics. Hence this mode of communication guarantees greater security to data transmission. Quantum communications is the associated branch of Quantum Physics which is totally different from Classical Physics.

Thus, Option B is correct.

54. A

A person having blood group AB have both A and B antigens on the surface of their RBCs, and their blood plasma do not contain any antibodies against either A or B antigen.

Hence, an individual with type AB blood can receive blood from any group (with AB being preferable), but cannot donate blood to either A or B group. They are known as universal recipients/ universal receiver.

Antigen: Antigen is a toxin or other foreign substances which induces an immune response in the body.

Antibody: A blood protein produced in response to and counteracting a specific antigen. Antibodies combine chemically with substances which the body recognizes as alien, such as bacteria, viruses, and foreign substances in the blood.

Thus, Option A is correct.

55. C

- Recombinant DNA (rDNA) molecules are formed by laboratory methods of genetic recombination to bring together genetic material from multiple sources, creating sequences that would not otherwise be found in the genome.
- Recombinant DNA is possible because DNA molecules from all organisms share the same chemical structure. Thus, it can be done for different species of plants.

Thus, Option C is correct.

56. B

Kala Azar, Malaria, Amoebiasis and Sleeping sickness are diseases caused by Protozoans. AIDS, Chicken Pox, Small Pox, Chikungunya, Cold, influenza (flu), Dengue fever, Ebola, Foot and Mouth Disease, Hepatitis B, Measles, Polio and Zika are diseases caused by virus. Cholera, Anthrax, Diphtheria, Pneumonia, Tuberculosis etc. are caused by bacteria.

Thus, Option B is correct.

Central Delhi: 60/17, Above Subway, Old Rajinder Nagar, Delhi - 60

North Delhi: B-18, Satija House, Main Road, Dr. Mukherjee Nagar, Delhi - 09

Ph: 011 - 45090051, 9818333201, 9871216382

INSIGHT GEN.STUDIES & CSAT

57. B

Air Independent Propulsion (AIP) is a technology that allows Diesel Submarines to operate without having to surface or use a snorkel to access atmospheric oxygen. Allowing a submarine to remain submerged for extended periods, without the need to surface, augments range and improves underwater endurance, at a cost lower than nuclear propulsion, while at the same time preserving the advantages of conventional diesel electric power. This helps Diesel submarines to carry out operations in a stealthy manner reducing their chances of being detected by anti submarine ships and aircrafts.

It will have both anti-surface and antisubmarine warfare viz. vertical launched BrahMos for the sea & land targets + Tube launched torpedoes for antisubmarine warfare. There are six Diesel submarines with Air Independent Propulsion System (AIP) technology for Indian Navy by 2022.

Thus, Option B is correct.

58. B

- Department of Atomic energy comes under Prime Minister Office.

Thus, Option B is correct.

59. D

It is a star, approximately the size of the earth that has undergone gravitational collapse and is in the final stage of evolution for lowmass stars beginning hot and white and ending cold and dark.

Thus, Option D is correct.

60. B

- Bio-CNG is a compressed form of bio-methane
- Biogas is produced by breakdown of organic matter (for example, cow dung) in the absence of Oxygen
- Initially, the Methane (CH₄) content of biogas is only 50 per cent
- In order to use it as a fuel, it is made to a gas containing 100 per cent Methane
- The resulting bio-methane is subsequently brought to a high-pressure stage
- In this stage, it is called bio-CNG, whose quality is similar to that of natural gas
- Bio-CNG can be used as a standalone vehicle fuel without blending with CNG
- Landfill (LFG) gas can be used to prepare Bio-CNG
- LFG is generated during the natural process of bacterial decomposition of organic material contained in municipal solid waste (MSW) landfills
- LFG is about 50 percent methane (CH₄) and 50 percent carbon dioxide (CO₂) and water vapour.

Thus, Option B is correct.

61. D

Government of India approved a new program titled Global Initiative of Academic Networks (GIAN) in Higher Education aimed at tapping the talent pool of scientists and entrepreneurs, internationally to encourage their

Central Delhi: 60/17, Above Subway, Old Rajinder Nagar, Delhi - 60

North Delhi: B-18, Satija House, Main Road, Dr. Mukherjee Nagar, Delhi - 09

Ph: 011 - 45090051, 9818333201, 9871216382

INSIGHT GEN.STUDIES & CSAT

engagement with the institutes of Higher Education in India so as to augment the country's existing academic resources, accelerate the pace of quality reform, and elevate India's scientific and technological capacity to global excellence.

GIAN is envisaged to catalyse higher education institutions in the country and that it will initially include all IITs, IIMs, Central Universities, IISc Bangalore, IISERs, NITs and IIITs subsequently cover good State Universities where the spinoff is vast. GIAN is an evolving scheme which will initially include participation of foreign faculty in Institutes as Distinguished / Adjunct / Visiting faculty / Professors of Practice, etc., to participate in delivering Short or Semester-long Courses. Other activities will be included in due course.

The First Global Initiative on Academic Network GIAN course on Sustainable Urban planning using remote sensing and Geographic Information System, GIS has been launched at Indian Institute of Technology Kanpur's outreach center in NOIDA. Principal Adviser, NITI Aayog, Ratan P. Watal, inaugurated the course at a function in NOIDA on 15th January, 2018.

Thus, Option D is correct.

62. C

Cobalt -60 is commonly used in radiation therapy because it emits Gamma rays.

This gamma radiation is ideal for:

- Sterilization of single use medical supplies such as syringes, implants, surgical gloves, gauze and more
- Elimination of organisms from pharmaceuticals such as ointments and solutions
- Sterilization of tissue/biological based products
- Sterilization in the automotive industry

Thus, Option C is correct.

63. B

INS Karanj (2018) is the third submarine of the first batch of six Kalvari-class submarines for the Indian Navy. It is a diesel-electric attack submarine based on the Scorpène class, designed by French naval defence and energy group DCNS and manufactured by Mazagon Dock Limited, an Indian shipyard in Mumbai. The ship was launched on 31 January 2018

A total of six submarines are going to be built at the MDL. The submarines are being built in collaboration with French shipbuilding major Naval Group (formerly DCNS). Prime Minister Narendra Modi has commissioned the first of the six Scorpene-class submarine Kalvari into the Indian Navy and said its induction was a big step in the country's defence preparedness. Defence Minister Nirmala Sitharaman had then said that submarine building is a sophisticated and exacting craft which very few countries possess in their industrial capacity.

Thus, Option B is correct.

64. D

GSLV Mk III is a three-stage heavy lift launch vehicle developed by ISRO. The vehicle has two solid strap-ons, a core liquid booster and a cryogenic upper stage.

Central Delhi: 60/17, Above Subway, Old Rajinder Nagar, Delhi - 60

North Delhi: B-18, Satija House, Main Road, Dr. Mukherjee Nagar, Delhi - 09

Ph: 011 - 45090051, 9818333201, 9871216382

INSIGHT GEN.STUDIES & CSAT

GSLV Mk III is designed to carry 4 ton class of satellites into Geosynchronous Transfer Orbit (GTO) or about 10 tons to Low Earth Orbit (LEO), which is about twice the capability of GSLV Mk II. The two strap-on motors of GSLV Mk III are located on either side of its core liquid booster.

The cryogenic upper stage (designated as C25) is powered by the CE-20 engine developed by ISRO. CE-20 is the first cryogenic engine developed by India which uses a Gas Generator compared to the Staged Combustion engines used in GSLV.

Indian Space Research Organisation, today, launched its monster rocket, Geosynchronous Satellite Launch Vehicle Mark III (GSLV Mk III), with 3,136 kg communication satellite GSAT-19 from the spaceport of Sriharikota, in Andhra Pradesh. The launch will give India self-reliance in delivering large **payloads and also prepare the country for its attempt to put astronauts into space.**

Thus, Option D is correct.

65. A

Stem cells are undifferentiated biological cells that can differentiate into specialized cells and can divide to produce more stem cells. They are found in multicellular organisms. In mammals, there are two broad types of stem cells: embryonic stem cells and adult stem cells. Embryonic stem cells can be isolated from the inner cell mass of blastocysts and adult stem cells are found in various tissues which can act as a repair system for the body, replenishing adult tissues.

Scientists from Duke University in North Carolina, US for first time have developed working human skeletal muscle from stem cells in the laboratory.

Thus, Option A is correct.

66. D

DNA profiling is most commonly used as a forensic technique in criminal investigations to identify an unidentified person or whose identity needs to be confirmed, or to place a person at a crime scene or to eliminate a person from consideration. DNA profiling has also been used to help clarify paternity, in immigration disputes, in parentage testing and in genealogical research or medical research. DNA fingerprinting has also been used in the study of animal and floral populations and in the fields of zoology, botany, and agriculture.

Thus, Option D is correct.

67. D

Most solar modules are currently produced from crystalline silicon (c-Si) solar cells made of multi-crystalline and mono-crystalline silicon. In 2013, crystalline silicon accounted for more than 90 percent of worldwide PV production, while the rest of the overall market is made up of thin-film technologies using cadmium telluride, CIGS and amorphous silicon. Emerging, third generation solar technologies use advanced thin-film cells.

They produce a relatively high-efficiency conversion for the low cost compared to other solar technologies. Also, high-cost, high-efficiency, and close-packed rectangular multi-junction (MJ) cells are preferably used in solar panels on spacecraft, as they offer the highest ratio of generated power per kilogram lifted into space. MJ-cells

Central Delhi: 60/17, Above Subway, Old Rajinder Nagar, Delhi - 60

North Delhi: B-18, Satija House, Main Road, Dr. Mukherjee Nagar, Delhi - 09

Ph: 011 - 45090051, 9818333201, 9871216382

INSIGHT GEN.STUDIES & CSAT

are compound semiconductors and made of gallium arsenide (GaAs) and other semiconductor materials. Another emerging PV technology using MJ-cells is concentrator photovoltaics (CPV).

Thus, Option D is correct.

68. D

The Human Genome Project, through its sequencing of the DNA, can help us understand diseases including: genotyping of specific viruses to direct appropriate treatment; identification of mutations linked to different forms of cancer; the design of medication and more accurate prediction of their effects; advancement in forensic applied sciences; biofuels and other energy applications; agriculture, animal husbandry, bioprocessing; risk assessment; bioarcheology, anthropology and evolution. Another proposed benefit is the commercial development of genomics research related to DNA based products, a multibillion-dollar industry.

Thus, Option D is correct.

69. D

The BrahMos is a medium-range ramjet supersonic cruise missile that can be launched from submarine, ships, aircraft, or land. It is the fastest supersonic cruise missile in the world. It is a joint venture between the Russian Federation's NPO Mashinostroyeniya and India's Defence Research and Development Organisation (DRDO) who together have formed BrahMos Aerospace. It is based on the Russian P-800 Oniks cruise missile and other similar sea-skimming Russian cruise missile technology. The name BrahMos is a portmanteau formed from the names of two rivers, the Brahmaputra of India and the Moskva of Russia. Russia supplies 65% of the BrahMos' components, including its ramjet engine and radar seeker.

Thus, Option D is correct.

70. D

A circadian rhythm is any biological process that displays an endogenous, entrainable oscillation of about 24 hours. These 24-hour rhythms are driven by a circadian clock, and they have been widely observed in plants, animals, fungi, and cyanobacteria.

The formal study of biological temporal rhythms, such as daily, tidal, weekly, seasonal, and annual rhythms, is called chronobiology. Processes with 24-hour oscillations are more generally called diurnal rhythms; strictly speaking, they should not be called circadian rhythms unless their endogenous nature is confirmed.

In 2017, the Nobel Prize in Physiology or Medicine was awarded to Jeffrey C. Hall, Michael Rosbash and Michael W. Young "for their discoveries of molecular mechanisms controlling the circadian rhythm".

Thus, Option D is correct.

71. C

Himadri is not an Antarctica research station. It is an Arctic research station.

The Indian Antarctic Program is a multi-disciplinary, multi-institutional program under the control of the National Centre for Antarctic and Ocean Research, Ministry of Earth Sciences, Government of India.

Central Delhi: 60/17, Above Subway, Old Rajinder Nagar, Delhi - 60

North Delhi: B-18, Satija House, Main Road, Dr. Mukherjee Nagar, Delhi - 09

Ph: 011 - 45090051, 9818333201, 9871216382

INSIGHT GEN.STUDIES & CSAT

Research stations of India:

In 1981 the Indian flag unfurled for the first time in Antarctica, marking the start of Southern Ocean expeditions under the environmental protocol of the Antarctic Treaty.

Dakshin Gangotri

The first permanent settlement was built in 1983 and named Dakshin Gangotri. In 1989 it was excavated and is being used again as supply base and transit camp.

Maitri

The second permanent settlement, Maitri, was put up in 1989 on the Schirmacher Oasis and has been conducting experiments in geology, geography and medicine.

Bharati

It is established in 2015. This newest research station for oceanographic research will collect evidence of continental breakup to reveal the 120-million-year-old ancient history of the Indian subcontinent.

Himadri

It is India's first Arctic research station located at Svalbard, Norway. It was inaugurated on the 1st of July, 2008 by the Minister of Earth Sciences. It was set up during India's second Arctic expedition in June 2008.

Thus, Option C is correct.

72. C

73. D

74. C

Russia launched Sibir (Siberia), the world's largest nuclear-powered icebreaker ship built under Project 22220 into the water at the Baltic Shipyard in St Petersburg.

Sibir is second of three icebreakers of new class of biggest nuclear powered icebreakers ever constructed under Project 22220. The first one was Arktika (Arctic) was put in service in June 2016. Third icebreaker Ural is set to be completed in 2019.

Thus, Option C is correct.

75. D

- The International Space Station (ISS) is a space station, or a habitable artificial satellite, in low Earth orbit.
- The ISS is the largest human-made body in low Earth orbit and can often be seen with the naked eye from Earth.
- The ISS serves as a microgravity and space environment research laboratory in which crew members conduct experiments in biology, human biology, physics, astronomy, meteorology, and other fields.

Central Delhi: 60/17, Above Subway, Old Rajinder Nagar, Delhi - 60
North Delhi: B-18, Satija House, Main Road, Dr. Mukherjee Nagar, Delhi - 09
Ph: 011 - 45090051, 9818333201, 9871216382

INSIGHT GEN.STUDIES & CSAT

- The ISS programme is a joint project among five participating space agencies: NASA, Roscosmos, JAXA, ESA, and CSA.
- On 28 March 2015, Russian sources announced that Roscosmos and NASA had agreed to collaborate on the development of a replacement for the current ISS.

Thus, Option D is correct.

76. D

- The International Space Station (ISS) is a space station, or a habitable artificial satellite, in low Earth orbit.
- The ISS is the largest human-made body in low Earth orbit and can often be seen with the naked eye from Earth.
- The ISS serves as a microgravity and space environment research laboratory in which crew members conduct experiments in biology, human biology, physics, astronomy, meteorology, and other fields.
- The ISS programme is a joint project among five participating space agencies: NASA, Roscosmos, JAXA, ESA, and CSA.
- On 28 March 2015, Russian sources announced that Roscosmos and NASA had agreed to collaborate on the development of a replacement for the current ISS.

Thus, Option D is correct.

77. A

Mission SAMPARK was also launched to trace those who are Left to Follow Up and are to be brought under Antiretroviral therapy (ART) services aimed at eradicating HIV/AIDS by 2030. Mission SAMPARK was also launched to trace those who are Left to Follow Up and are to be brought under Antiretroviral therapy (ART) services. Mission SAMPARK will further aid to will help in fast-tracking the identification of all who were HIV positive and subsequently linking to ART programme. Presently, about 11.5 lakh People Living with HIV (PLHIVs) are taking free ART through 536 ART centres in the country. It is big challenge to trace those who are Left to Follow Up and needed to be brought under ART services.

Thus, Option A is correct.

78. B

President Ram Nath Kovind inaugurated Andhra Pradesh Fibre Grid project, aimed at providing affordable high-speed internet service to every household in the state at a nominal rate. Fibre Grid project also termed as Triple Play2 Services envisages to provide internet, television and telephone services to more than one lakh households in the state at a nominal price. The Fibre Grid project aims to connect over 1.45 crore households, 60000 schools, 12198 Panchayats, 10000 government offices, 670 mandal Offices, 96 municipalities, 14 corporations, 6000 Public Health Centres (PHCs) with high speed internet. The internet services provided under this project will be available at very high speed of 15Mbps to 100Mbps, television services will provide infotainment with 250 plus channels and telephone services will be completely rental-free.

Thus, Option B is correct.

Central Delhi: 60/17, Above Subway, Old Rajinder Nagar, Delhi - 60

North Delhi: B-18, Satija House, Main Road, Dr. Mukherjee Nagar, Delhi - 09

Ph: 011 - 45090051, 9818333201, 9871216382

INSIGHT GEN.STUDIES & CSAT

79. D

Statement I is correct: Bio informatics is the application of computer technology to the management of Biological information. It came into existence or developed after the completion of Human Genome Project. Bioinformatics develops certain tools for easy and efficient access to the huge information gathered during Human Genome Project. Through new algorithms and statistical methods scientist can establish relationship between genome of various species, which in turn helps in predicting protein structure, nature and their functions. This knowledge further can be used in developing drought resistant or pest resistant plant species.

Statement II is also correct as bio informatics is all about collecting information regarding biomolecules like DNA, RNA, Protein or chromosomes and using them to develop crops rich in good Protein or mineral. It is very helpful in identifying both good and bad side of a species and hence prompt its judicial use.

Statement III is also correct as through bioinformatics scientist can identify diseases causing bio organism and Proteins which protect them or help them in reproduction. After which they can develop vaccines which prohibit their growth.

Thus, Option D is correct.

80. B

AC was used primarily because its voltage could be stepped up easily using an AC transformer and it could be transmitted over long distance with high efficiency.

Thus, Option B is correct.

81. C

Supercritical carbon dioxide is a fluid state of carbon dioxide where it is held at or above its critical temperature and critical pressure. Carbon dioxide usually behaves as a gas in air at standard temperature and pressure (STP), or as a solid called dry ice when frozen.

Indian scientists have developed a super critical carbon dioxide Brayton test loop facility that would help generate clean energy from future power plants including solar thermal. This next generation technology loop was developed indigenously by Indian Institute of Science, Bangalore.

This is India's first test-bed for next generation, efficient, compact, waterless super critical carbon dioxide Brayton cycle test loop for power generation. The technology is perhaps the first test loop coupled with solar heat source in the world.

Supercritical CO₂ is becoming an important commercial and industrial solvent due to its role in chemical extraction in addition to its low toxicity and environmental impact. The relatively low temperature of the process and the stability of CO₂ also allow most compounds to be extracted with little damage or denaturing. In addition, the solubility of many extracted compounds in CO₂ varies with pressure, permitting selective extractions.

Thus, Option C is correct.

Central Delhi: 60/17, Above Subway, Old Rajinder Nagar, Delhi - 60

North Delhi: B-18, Satija House, Main Road, Dr. Mukherjee Nagar, Delhi - 09

Ph: 011 - 45090051, 9818333201, 9871216382

INSIGHT GEN.STUDIES & CSAT

82. D

It is a mechanism to redress the complaints against NBFCs. It will provide a cost-free and expeditious complaint redressal mechanism relating to deficiency in the services by NBFCs.

The offices of the NBFC ombudsmen will function at four metro centres - Chennai, Kolkata, Mumbai and New Delhi. The Scheme will cover all deposit-taking NBFCs.

"In exercise of the powers conferred by Section 45L of the Reserve Bank of India Act, 1934, the RBI being satisfied that for the purpose of enabling it to promote conducive credit culture among the NBFCs and to regulate the credit system of the country to its advantage, it is necessary to provide for a system of ombudsman for redressal of complaints against deficiency in services concerning deposits, loans and advances and other specified matters, hereby directs that the NBFCs... should comply with the provisions of the Ombudsman Scheme for Non-Banking Financial Companies, 2018," the notification stated.

Any customer or person can file a complaint with the ombudsman on various grounds like non-payment or inordinate delay in payment of interest, non-repayment of deposits, lack of transparency in loan agreement, non-compliance with RBI directives on fair practices code for NBFCs, levying of charges without sufficient notice to the customers and failure or delay in returning the securities documents despite repayment of dues among others.

Thus, Option D is correct.

83. C

Transparency International (TI) has published the Corruption Perceptions Index (CPI) since 1996, annually ranking countries "by their perceived levels of corruption, as determined by expert assessments and opinion surveys." The CPI generally defines corruption as "the misuse of public power for private benefit". The CPI currently ranks 176 countries "on a scale from 95 (very clean) to 5 (highly corrupt)". Transparency International (TI) is an international non-governmental organization which is based in Berlin, Germany, and was founded in 1993.

India's ranking in the annual corruption index, released by Berlin-based non-government organisation Transparency International (TI), **slid to 81 among a group of 180 countries**. The Corruption Perception Index 2017 also singled out India as one of the "worst offenders" in the Asia-Pacific region.

In 2016, India was in the 79th place among 176 countries. India's ranking in the index had plummeted in 2013 and 2014 in the wake of the spectrum and coal scams. The ranking has improved since then, but seems to be showing signs of weakening.

New Zealand and Singapore scored the highest scores with 89 and 84 out of 100, respectively. Somalia was found to be the most corrupt country in the world. A majority of the world's countries scored below 50 on the index with the global average score coming at around 43. India's score of 40 in 2017 puts it below the global average.

Thus, Option C is correct.

Central Delhi: 60/17, Above Subway, Old Rajinder Nagar, Delhi - 60

North Delhi: B-18, Satija House, Main Road, Dr. Mukherjee Nagar, Delhi - 09

Ph: 011 - 45090051, 9818333201, 9871216382

INSIGHT GEN.STUDIES & CSAT

84. B

The opening ceremony of the 6th edition of the Annual Garuda Shakti exercises between the Special Forces of the Indian Army and the Indonesian Army was held at Bandung 19th Feb morning. The joint exercises which commenced would be held till 04 March 2018.

The Indian and Indonesian armies began the sixth edition of their annual military exercise named 'Garuda Shakti' in Bandung, Indonesia. It is a two-week long joint Military drill. The exercises will include experience sharing in counter-terrorism operations, close quarter combat, and other areas of special operations.

Thus, Option B is correct.

85. A

Rajiv Kumar committee:

The Government has constituted a high-level committee for proper management of water resources in North Eastern Region (NER). The Committee is tasked to facilitate optimising benefits of appropriate water management in form of agriculture, bio-diversity conservation, hydro-electric power, reduced flood damage erosion, inland water transport, forestry, fishery and eco-tourism.

Y H Malegam committee

Reserve Bank of India (RBI) has constituted an expert committee to look into the entire gamut of issues relating to classification of bad loans, effectiveness of audits and rising incidents of frauds. The committee will be headed by Y H Malegam, The committee will look into reasons for high divergence observed in asset classification and provisioning by banks vis-à-vis RBI's supervisory assessment. It will suggest steps needed to prevent it, factors leading to increasing incidence of frauds in banks and measures (including IT interventions) needed to curb and prevent it.

N Gopaldaswami committee

The Government has constituted Empowered Expert Committee (EEC) to select 20 Institutions of Eminence from among 104 institutions (public or private) that have applied for the status. The committee will be headed by former Chief Election Commissioner (CEC) N Gopaldaswami. Its other members are Professor Tarun Khanna, director of South Asia Institute at Harvard University, Renu Khator, president of University of Houston and former director of IIM Lucknow, Pritam Singh.

Thus, Option A is correct.

86. D

Artificial intelligence (AI, also machine intelligence, MI) is intelligence demonstrated by machines, in contrast to the natural intelligence (NI) displayed by humans and other animals.

India's first Artificial Intelligence (AI) centre will be set up by the Maharashtra Government in Mumbai. Chief Minister Devendra Fadnavis will launch the plan for the institute during the Magnetic Maharashtra Summit and at the Global Economic Conference in Canada in March 2018. The AI institute will give a fresh impetus to the

Central Delhi: 60/17, Above Subway, Old Rajinder Nagar, Delhi - 60

North Delhi: B-18, Satija House, Main Road, Dr. Mukherjee Nagar, Delhi - 09

Ph: 011 - 45090051, 9818333201, 9871216382

INSIGHT GEN.STUDIES & CSAT

fourth industrial revolution, and promote Mumbai as an investment destination in innovations and data analysis. The main aim of the centre is to integrate artificial intelligence in the field of social development.

Thus, Option D is correct.

87. D

The National Banana Festival (NBF) 2018 from 17 to 21 February is took place at Kalliyoor, Thiruvananthapuram, Kerala. The festival is organised by Centre for Innovation in Science and Social action (CISSA) in partnership with Kalliyoor Grama Panchayat and a host of National and State organisations.

Banana is the one of the oldest fruits known to mankind and is one of the most widely consumed fruits in the world. Availability, affordability, varietal range, taste, nutritive and medicinal value make it the favourite fruit among all classes of people. Our country stands first in banana production in the world. In fact, bananas we have today are the products of thousands of years of careful selection for specific traits by our farmers. This precious diversity has to be protected in the contest of dominating market driven mono cultures.

Thus, Option D is correct.

88. A

NPC is a constituent of the Tokyo-based Asian Productivity Organisation, an Inter Governmental Body, of which the Government of India is a founder member. It works for accelerating productivity, enhancing competitiveness, increasing profits and ensuring better quality.

It is an autonomous, multipartite, non-profit organization with equal representation from employers' & workers' organizations. The National Productivity Council observed National Productivity Day on February 12 and National Productivity Week till 18th February. It is the 60th Anniversary of the National Productivity Council and is being celebrated as Diamond Jubilee Year. "Industry 4.0 Leapfrog Opportunity for India " has been selected as the theme for the National Productivity Week -2018.

Thus, Option A is correct.

89. B

Defence Acquisition Council (DAC)

To counter corruption and speed up decision- making in military procurement,the government of India in 2001 decided to set up an integrated DAC. **It is headed by the Defence Minister.**

The objective of the DAC is to ensure expeditious procurement of the approved requirements of the Armed Forces, in terms of capabilities sought, and time frame prescribed, by optimally utilizing the allocated budgetary resources.

The DAC is responsible to give policy guidelines to acquisitions, based on long-term procurement plans. It also clears all acquisitions, which includes both imported and those produced indigenously or under a foreign license.

Thus, Option B is correct.

Central Delhi: 60/17, Above Subway, Old Rajinder Nagar, Delhi - 60

North Delhi: B-18, Satija House, Main Road, Dr. Mukherjee Nagar, Delhi - 09

Ph: 011 - 45090051, 9818333201, 9871216382

INSIGHT GEN.STUDIES & CSAT

90. B

The environment ministry has released the India State of Forest Report (ISFR) 2017. **The ISFR report is published every two years.** The India State of Forest Report 2017 is the 15th such report in the series. The report, however, for the first time contains information on decadal change in water bodies in forest during 2005-2015, forest fire, production of timber from outside forest, state wise carbon stock in different forest types and density classes.

Highlights of the report:

India's forest cover increased by 6,778 sq km over the last two years. The increase based on satellite data and subsequent 'ground truthing', has put the total forest cover at 7,08,273 sq km which is 21.54% of the country's geographical area. Andhra Pradesh, Karnataka, Kerala, Odisha and Telangana saw increase in their green footprint during the last two years though there is a worrying decline in six northeastern states, including a shrinkage of 630 sq km in the eastern Himalayas. While overall green cover, including tree patches outside recorded forest areas, reported an incremental 1% increase (8,021 sq km) over the last assessment year in 2015, the quality of forests remain a hotly debated subject even as satellite monitoring has increased availability of data.

Thus, Option B is correct.

91. A

The scheme is aimed at efficient management of available water resources and strengthening of recharge mechanism through community participation. The emphasis of the scheme will be on recharge of ground water sources and efficient use of water by involving people at the local level.

Funding: Rs 6,000 crore has been earmarked for this ambitious plan. Half of the total cost of this central **scheme will be supported by the World Bank as loan** while the remaining half (Rs 3,000 crore) will be funded by the government through budgetary support.

Implementation: The government plans to give 50% of the money to states, including gram panchayats, as incentives for achieving targets in groundwater management. That's a first-ever move to encourage community participation and behavioural changes. The remaining 50% of the funds will be given to states for strengthening institutional arrangements such as providing a strong database and scientific approach to help them accomplish sustainable management of groundwater.

Thus, Option A is correct.

92. A

ASTROSAT is India's first dedicated multi wavelength space observatory. This scientific satellite mission endeavours for a more detailed understanding of our universe. One of the unique features of ASTROSAT mission is that enables the simultaneous multi-wavelength observations of various astronomical objects with a single satellite. ASTROSAT observes universe in the optical, Ultraviolet, low and high energy X-ray regions of the electromagnetic spectrum, whereas most other scientific satellites are capable of observing a narrow range of wavelength band. Multi-wavelength observations of ASTROSAT can be further extended with co-ordinated

Central Delhi: 60/17, Above Subway, Old Rajinder Nagar, Delhi - 60

North Delhi: B-18, Satija House, Main Road, Dr. Mukherjee Nagar, Delhi - 09

Ph: 011 - 45090051, 9818333201, 9871216382

INSIGHT GEN.STUDIES & CSAT

observations using other spacecraft and ground based observations. All major astronomy Institutions and some Universities in India are participating in these observations.

NASA is instrumental in others observatories.

Thus, Option A is correct.

93. D

Open Acreage Licensing Programme (OALP)

Context: To handhold and apprise the prospective investor community about the salient features of Hydrocarbon Exploration & Licensing Policy(HELP) framework and details about the e-bidding process, the government of India successfully concluded a facilitation workshop under Open Acreage Licensing Programme (OALP) in Ahmedabad recently.

Open Acreage Licensing Policy (OALP):The OALP, a part of the government's Hydrocarbon Exploration and Licensing Policy(HELP), gives exploration companies the option to select the exploration blocks on their own, without having to wait for the formal bid round from the Government. The company then submits an application to the government, which puts that block up for bid. The new policy will open up 2.8 million square kilometres of sedimentary basins for exploration and eventual production.

Thus, Option D is correct.

94. C

The two day international conference on Sustainable Biofuels is jointly being organized by Department of Biotechnology, Govt. of India and Biofuture platform. The event is bringing experts and delegates from 19 countries together in Sustainable Biofuels sector to take stock of current knowledge, share information and best practices, and build consensus on the actions most needed to move forward.

The Biofuture Platform aims to be an action-oriented, country-led, multi-stakeholder mechanism for policy dialogue and collaboration among leading countries, organizations, academia and the private sector conscious of the need to accelerate development and scale up deployment of modern sustainable low carbon alternatives to fossil based solutions in transport, chemicals, plastics and other sectors.

The sustainable biofuels have ability to reduce the GHG emission load and this consideration led to establishment of Sustainable Biofuel Innovation Challenge (SBIC) under Mission Innovation (MI).

Thus, Option C is correct.

95. A

Maharashtra became first state in country to unveil Public Cloud Policy that virtually mandates state government departments to shift their data storage onto cloud. The policy will result in additional private sector investments worth US \$2 billion for cloud industry as government is one of biggest creators and consumers of data. It will aim to generate 5 lakh jobs in next five years. The policy is likely to be formally set in motion through detailed government resolution. In coming days, five to six top cloud service providers like Amazon or Microsoft will be empanelled for data storage onto cloud. Under the policy framework, state government will make

Central Delhi: 60/17, Above Subway, Old Rajinder Nagar, Delhi - 60

North Delhi: B-18, Satija House, Main Road, Dr. Mukherjee Nagar, Delhi - 09

Ph: 011 - 45090051, 9818333201, 9871216382

INSIGHT GEN.STUDIES & CSAT

mandatory its various departments for storing data within country and to use public cloud in cases wherever Right to Information Act (RTI) is applicable. Later, it will also allow for enhanced security features for private and sensitive data to be stored on the cloud.

Thus, Option A is correct.

96. B

The Kaleshwaram project is an off-shoot of the original Pranahitha-Chevella Lift Irrigation Scheme taken up by the Congress government in 2007 when Andhra Pradesh was not divided. After the formation of Telangana in 2014, the TRS government redesigned the project on the ground that the original plan had too many environmental obstacles and had very low water storage provision — only about 16.5 tmc ft.

In a major relief to the Telangana government, the Supreme Court has refused to intervene in an order granted by the Hyderabad High Court suspending the order of the National Green Tribunal at Delhi staying the construction of the Kaleswaram Lift Irrigation Project. The NGT bench at Chennai had on October 5, 2017 directed the Telangana government to stay the construction of the project.

Thus, Option B is correct.

97. C

Hepatitis - an inflammatory disease of the liver is caused due to viral infection. In 2015, it led to nearly 1.34 million deaths worldwide (almost equivalent to that caused by tuberculosis);

In India, viral hepatitis (A to E) remains a major public health challenge with intermediate to high endemicity for Hepatitis B; an estimated 40 million individuals are infected and the population prevalence being nearly 3-4%. However, there is a wide geographic variation in its prevalence – being the highest among natives of Andaman and Arunachal Pradesh.

Viral hepatitis - a public health problem, can be caused by any of the known five hepatotropic viruses, namely - hepatitis A, B, C, D and E which are highly divergent in their structure, epidemiology, mode of transmission, incubation period, signs/symptoms, diagnosis, prevention and treatment options.

The Sustainable Development Goal 3 – target 3 (SDG 3.3) calls for a specific action to combat viral hepatitis and water-borne/other communicable diseases.

The Union Ministry of Health and Family Welfare is going to roll out National Programme for Control of Viral Hepatitis, a new scheme free treatment of Hepatitis C from the 2018-19 financial year. Under the new scheme, the focus will be on anti-viral treatment of Hepatitis C which will be provided free at all government health set-ups.

Thus, Option C is correct.

98. C

The Shanghai Cooperation Organisation (SCO) is a Eurasian political, economic, and security organisation, the creation of which was announced on 15 June 2001 in Shanghai, China by the leaders of China, Kazakhstan, Kyrgyzstan, Russia, Tajikistan, and Uzbekistan; the Shanghai Cooperation Organisation Charter was signed in

Central Delhi: 60/17, Above Subway, Old Rajinder Nagar, Delhi - 60

North Delhi: B-18, Satija House, Main Road, Dr. Mukherjee Nagar, Delhi - 09

Ph: 011 - 45090051, 9818333201, 9871216382

INSIGHT GEN.STUDIES & CSAT

June 2002 and entered into force on 19 September 2003. These countries, except for Uzbekistan, had been members of the Shanghai Five group, founded on 26 April 1996 in Shanghai. India and Pakistan joined SCO as full members on 9 June 2017 at a summit in Astana, Kazakhstan.

The 18th Shanghai Cooperation Organization (SCO-2018) will be hosted by China in the city of Qingdao in June, 2018. China had taken over the rotating chair of SCO after the 17th SCO summit 2017, which was held in Astana, Kazakhstan in June 2017. The SCO consists of China, Russia, Kazakhstan, Kyrgyzstan, Tajikistan, Uzbekistan, India and Pakistan. The SCO focuses on security-related issues of the region especially on counter terrorism cooperation.

Thus, Option C is correct.

99. B

Haryana government has developed this scheme in order to address 10 major issues which are as follows:-

1. Financing Facilitation
2. Making Agriculture Profitable and Suitable
3. Improvement of Health Services
4. Implementation of Swachh Bharat Abhiyan
5. Market Areas Decongestion
6. Youth Engagement
7. Air Pollution Monitoring and Control
8. Availability of Identity related services
9. Effective Policing
10. Ensuring Road Order and Conduct

Thus, Option B is correct.

100. A

India's supercomputing prowess moved up several notches after it unveiled Pratyush, an array of computers that can deliver a peak power of 6.8 petaflops. One petaflop is a million billion floating point operations per second and is a reflection of the computing capacity of a system.

Thus, Option A is correct.

