Q.1) NASA's spacecraft OSIRIS – Rex has recently arrived at its destination. Which of the following statements is/are correct regarding it?

1. The mission will land at near earth orbit asteroid, Bennu and will bring a rock sample on earth.
2. The aim of the mission is to discover formation of water and organic molecules on mars.
3. This will be the world's first space asteroid sampling.

Select the code from following:

a) 1 only
b) 2 and 3
c) 1 and 3
d) All of the above

Q.1) Solution (a)

The Origins Spectral Interpretation Resource Identification Security - Regolith Explorer spacecraft will travel to a near-Earth asteroid, called Bennu (formerly 1999 RQ36), and bring at least a 2.1-ounce sample back to Earth for study. The mission will help scientists investigate how planets formed and how life began, as well as improve our understanding of asteroids that could impact Earth.

For your Information:

NASA's Goddard Space Flight Center in Greenbelt, Maryland, provides overall mission management, systems engineering and safety and mission assurance for OSIRIS-REx. Dante Lauretta is the mission's principal investigator at the University of Arizona. Lockheed Martin Space Systems in Denver is building the spacecraft. OSIRIS-REx is the third mission in NASA's New Frontiers Program. NASA's Marshall Space Flight Center in Huntsville, Alabama, manages New Frontiers for the agency's Science Mission Directorate in Washington.

NOTE: This is not the first asteroid sampling mission. It was done in 2010 by Japan space agency JAXA.

Q.2) ISRO's launch vehicle PSLV – C43 has successfully launched satellite HysIS. Which of the following statements are correct regarding HysIS?

a) It is an observation satellite to study the earth's surface in the visible, near infrared and shortwave infrared regions.

b) It is a communication satellite that will be helpful in providing DTH connection across India.
c) It is a surveillance satellite launched for Indian army to keep a check at Indo – Pak and Indo – China border.
d) It is a meteorological satellite launched for IMD for exact weather predictions in India.

Q.2) Solution (a)

Hyper Spectral Imaging Satellite (HysIS)

HysIS, the primary satellite of PSLV-C43 mission, weighing about 380 kg, is an earth observation satellite configured around ISRO's Mini Satellite-2 (IMS-2) bus. The primary goal of HysIS is to study the earth's surface in the visible, near infrared and shortwave infrared regions of the electromagnetic spectrum.

For your Information:

The co-passengers of HysIS include 1 micro and 29 nano satellites from eight different countries including one each from Australia, Canada, Columbia, Finland, Malaysia, Netherlands, Spain and 23 from US.

Q.3) Recently NASA retired its Kepler space telescope as it ran out of fuel. Which of the following statements is/are correct regarding the mission?

1. It was NASA's first planet-hunting mission.
2. It used transit photometry detection method for searching for exoplanet.

Select the code from following:

a) 1 only
b) 2 only
c) Both 1 and 2
d) Neither 1 nor 2

Q.3) Solution (c)

NASA's Kepler Space Telescope was an observatory in space dedicated to finding planets outside our solar system with a particular focus on finding planets that might resemble Earth. During its over nine years life, Kepler had observed 530,506 stars and detected 2,662 planets.

It used transit photometry detection method for searching for exoplanet, which looked for periodic, repetitive dips in visible light of stars caused by planets passing or transiting in front in front of its host star.

Q.4) Consider the following statements regarding the Gaganyaan Mission:

1. ISRO is setting up a third launch pad at Kalam Island for this mission.
2. It will be India's first manned space mission.
3. India is planning to send three humans in space in low earth orbit through this mission.

Which of the above statements are correct?

a) 1 and 2
b) 2 and 3
c) 1 and 3
d) All of the above

Q.4) Solution (b)

Gaganyaan Mission

Gaganyaan ("Orbital Vehicle") is an Indian crewed orbital spacecraft intended to be the basis of the Indian Human Spaceflight Programme. The spacecraft is being designed to carry three people, and a planned upgraded version will be equipped with rendezvous and docking capability. In its maiden crewed mission, Indian Space Research Organisation's largely autonomous 3.7-tonne capsule will orbit the Earth at 400 km (250 mi) altitude for up to seven days with a three-person crew on board. The crewed vehicle is planned to be launched on ISRO's GSLV Mk III in December 2021.

Q.5) ISRO has launched two observation satellites NovaSAR and S1 – 4 from Satish Dhawan center. Which of the following statements are correct regarding NovaSAR?

1. It has been launched in Sun synchronous Pole to pole project.
2. It is French satellite commercially launched by ISRO.
3. NovaSAR is a S-Band Synthetic Aperture Radar satellite intended for forest mapping, land use and ice cover monitoring, flood and disaster monitoring.

Select the code from following:

a) 1 and 2
b) 2 and 3
c) 1 and 3
d) All of the above

Q.5) Solution (c)

Indian rocket Polar Satellite Launch Vehicle (PSLV) will put into orbit on Sunday two foreign satellites - NovaSAR and S1-4 - together weighing 889 kg.

The two satellites belong to Surrey Satellite Technologies Ltd (SSTL), UK, under commercial arrangement with Antrix Corp Ltd - the commercial arm of ISRO.

The two earth observation satellites have been launched into a 583 km Sun Synchronous Orbit. NovaSAR is a S-Band Synthetic Aperture Radar satellite intended for forest mapping, land use and ice cover monitoring, flood and disaster monitoring. S1-4 is a high resolution Optical Earth Observation Satellite, used for surveying resources, environment monitoring, urban management and for disaster monitoring.

Q.6) Japanese researchers are going to conduct world's first experiment to test small prototype of space elevator. Which of the following statements regarding space elevator are correct?

1. It is a proposed planet to space transportation system.
2. An Earth-based space elevator would consist of a cable with one end attached to the surface near the equator and the other end in space beyond geostationary orbit.
3. Gravity and centrifugal force keeps the cable under tension, and stationary over a single position on Earth.

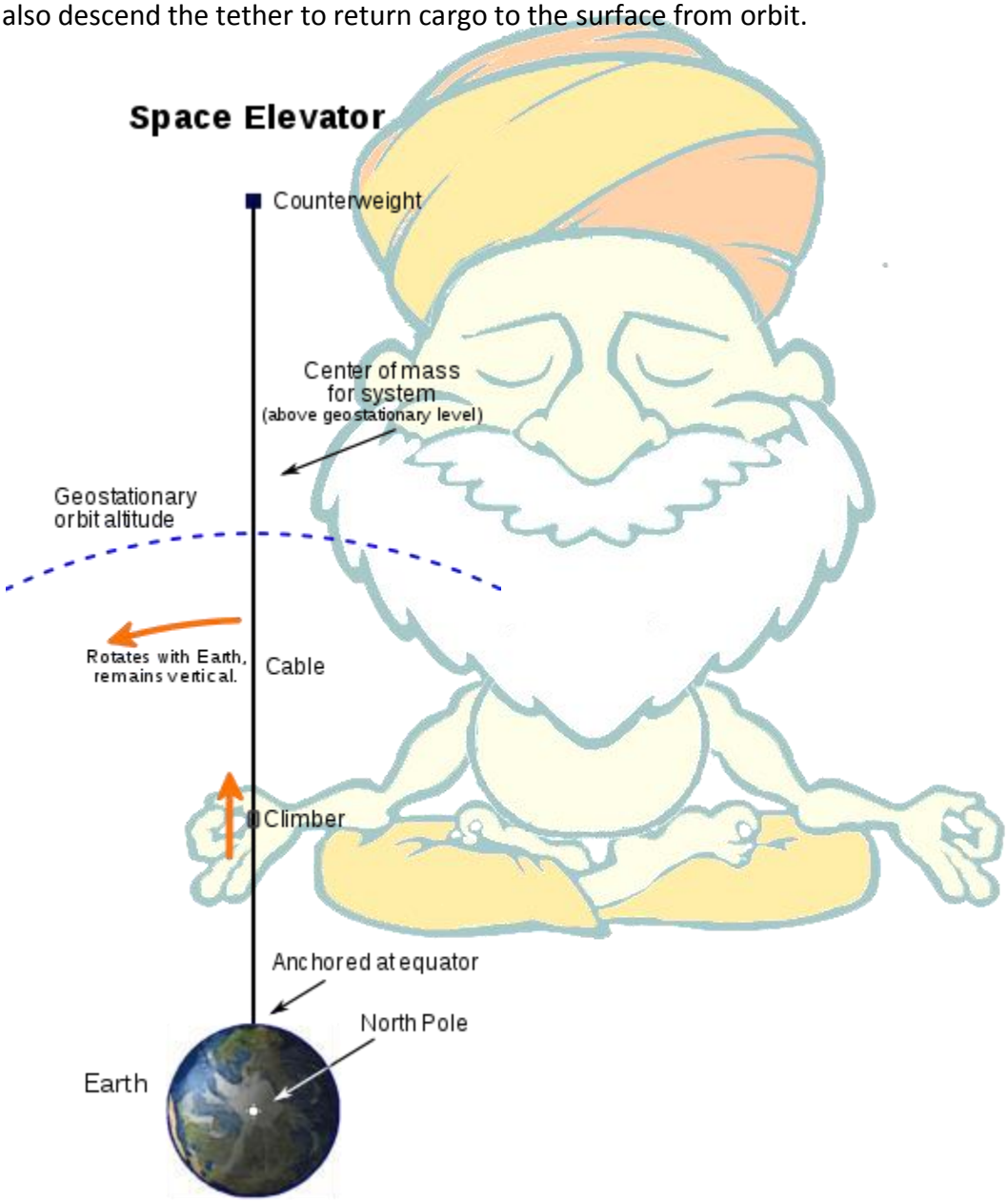
Select the code from following:

a) 1 and 2
b) 2 and 3
c) 1 and 3
d) All of the above

Q.6) Solution (d)

A space elevator is a proposed type of planet-to-space transportation system. The main component would be a cable (also called a tether) anchored to the surface and extending into

space. The design would permit vehicles to travel along the cable from a planetary surface, such as the Earth's, directly into space or orbit, without the use of large rockets. An Earth-based space elevator would consist of a cable with one end attached to the surface near the equator and the other end in space beyond geostationary orbit (35,786 km altitude). The competing forces of gravity, which is stronger at the lower end, and the outward/upward centrifugal force, which is stronger at the upper end, would result in the cable being held up, under tension, and stationary over a single position on Earth. With the tether deployed, climbers could repeatedly climb the tether to space by mechanical means, releasing their cargo to orbit. Climbers could also descend the tether to return cargo to the surface from orbit.



In News:

Japanese researchers from Shizuoka University will conduct world's first experiment to test small prototype of space elevator in space by using two mini satellites. The test equipment will be launched by Japan's space agency on board of H-2B rocket from southern island of Tanegashima.

Q.7) Consider the following statements regarding Gaofen 11:

1. It is part of China High-resolution Earth Observation System (CHEOS).
2. It is a sub-meter resolution optical satellite, used for surveying.
3. It will be used for land surveys, urban planning, road network design, agriculture, and disaster relief.

Which of the above statements are correct?

a) 1 and 2
b) 2 and 3
c) 1 and 3
d) All of the above

Q.7) Solution (d)

Gaofen 11

Gaofen-11, a sub-meter resolution optical satellite, will become part of the China High-resolution Earth Observation System (CHEOS), initiated in 2010 to provide all-weather, all-day coverage by 2020 with optical and synthetic aperture radar satellites, and could also include airborne and near-space systems such as stratospheric balloons.

Gaofen-11 was developed by the China Academy of Space Technology (CAST), a spacecraft and satellite maker under CASC, but few details on its capabilities have been released.

Chinese state media report that the Gaofen-11 satellite will be used for land surveys, urban planning, road network design, agriculture, and disaster relief, while its data will also be used for the country's Belt and Road international trade and infrastructure initiative.

The satellite is the sixth in the Gaofen series launched this year, following a triplet of Gaofen-1 satellites, and the larger Gaofen-5 and -6, all placed in Sun-synchronous orbits. The series,

which means "high resolution" in Chinese, also includes one geosynchronous satellite, Gaofen-4, launched in 2015. Gaofen-7 could also be launched to SSO before the end of the year.

The Gaofen-11 launch was the 63rd launch worldwide in 2018

Q.8) ISRO has successfully conducted ground test of its high thrust version of Vikas Engine. Which of the following statements are correct regarding Vikas Engine?

1. It is a solid propulsion engine carrying solid fuel and oxidizer.
2. It is a workhorse engine of PSLV but hasn't been used in any stage of GSLV.
3. High thrust version of Vikas engine will increase the payload capability of PSLV, GSLV and GSLV Mk III.

Select the code from following:

a) 1 and 2
b) 3 only
c) 1 and 3
d) All of the above

Q.8) Solution (b)

Vikas Engine

The Vikas (a portmanteau from initials of VIKram Ambalal Sarabhai) is a family of liquid fuelled rocket engines conceptualized and designed by the Liquid Propulsion Systems Centre in the 1970s.The design was based on the licensed version of the Viking engine with the chemical pressurisation system. The early production Vikas engines used some imported French components which were later replaced by domestically produced equivalents. It is used in the Polar Satellite Launch Vehicle (PSLV) and the Geosynchronous Satellite Launch Vehicle (GSLV) series of expendable launch vehicles for space launch use.

The recently tested high thrust version of Vikas engine will improve payload capability of PSLV, GSLV and GSLV Mk-III launch vehicles.

Q.9) RemoveDEBRIS is a satellite research project intending to demonstrate various space debris removal technologies. Rather than engaging in active debris removal (ADR) of real space debris, the RemoveDEBRIS mission plan is to test the efficacy of several ADR

technologies on mock targets in low Earth orbit through some experiments. Which of the following experiment is not a part of mission?

a) Net Experiment
b) Vision based Navigation
c) Harpoon and Deployable target
d) Laser HIT and disintegration Experiment

Q.9) Solution (d)

RemoveDEBRIS

RemoveDEBRIS is a satellite research project intending to demonstrate various space debris removal technologies. The satellite's platform was manufactured by Surrey Satellite Technology Ltd (SSTL) and is a variant of the SSTL X50 series. Partners on the project include Airbus, ArianeGroup, Swiss Center for Electronics and Microtechnology, Inria, Innovative Solutions In Space, Surrey Space Centre, and Stellenbosch University.

Rather than engaging in active debris removal (ADR) of real space debris, the RemoveDEBRIS mission plan is to test the efficacy of several ADR technologies on mock targets in low Earth orbit. In order to complete its planned experiments the platform is equipped with a net, a harpoon, a laser ranging instrument, a dragsail, and two CubeSats (miniature research satellites).

The experiments are as follows:

- **Net experiment -** One of the CubeSats, called DebrisSat 1, will deploy a balloon meant to simulate a piece of space debris. From a short distance away, the RemoveDEBRIS satellite will attempt to capture the debris in a net and then manoeuvre this package to fall into Earth's atmosphere and burn up.
- **Vision-based navigation** - The other CubeSat, called DebrisSat 2, will be released and the RemoveDEBRIS satellite will undergo a series of manoeuvres in order to obtain data and images using both lidar and optical cameras.
- **Harpoon and deployable target** - A harpoon connected by a tether will be fired at a plate attached to an arm extending from the RemoveDEBRIS platform itself.
- **Dragsail** - After the conclusion of the other experiments the satellite will deploy a large sail, which will act in a similar fashion to an air brake. The dragsail will bring RemoveDEBRIS from the relatively low orbital altitude of the space station into the planet's atmosphere to safely disintegrate.

Q.10) NASA has launched InSight Mission as robotic lander on Mars. The aim of the mission is to

a) Study the atmosphere of Mars
b) Study the topography of Mars
c) Study the interior of Mars
d) Study the evidence of life and water on mars

Q.10) Solution (c)

The Interior Exploration using Seismic Investigations, Geodesy and Heat Transport (InSight) mission is a robotic lander designed to study the deep interior of the planet Mars.

InSight's objectives are to place a seismometer, called SEIS, on the surface of Mars to measure seismic activity and provide accurate 3D models of the planet's interior; and measure internal heat flow using a heat probe called HP^3 to study Mars' early geological evolution. This could bring a new understanding of how the Solar System's terrestrial planets – Mercury, Venus, Earth, Mars – and Earth's Moon form and evolve.

Q.11) Chandrayaan 2 is totally indigenous project of ISRO. Which of the following statements are correct regarding Chandrayaan 2?

1. It is a lunar mission consisting of an Orbiter, Lander and Rover.
2. The mission will carry a six-wheeled Rover which will move around the landing site in semi-autonomous mode as decided by the ground commands.
3. If successful, it will be ISRO's first mission to land rover on any celestial body.

Select the code from following:

a) 1 only
b) 2 and 3
c) 1 and 3
d) All of the above

Q.11) Solution (d)

Chandrayaan 2

Chandrayaan-2, India's second mission to the Moon is a totally indigenous mission comprising of an Orbiter, Lander and Rover. After reaching the 100 km lunar orbit, the Lander housing the Rover will separate from the Orbiter. After a controlled descent, the Lander will soft land on the

lunar surface at a specified site and deploy a Rover. If successful, this will be ISRO's first rover mission to any celestial body.

The mission will carry a six-wheeled Rover which will move around the landing site in semi-autonomous mode as decided by the ground commands. The instruments on the rover will observe the lunar surface and send back data, which will be useful for analysis of the lunar soil.

The Chandrayaan-2 weighing around 3290 kg and would orbit around the moon and perform the objectives of remote sensing the moon. The payloads will collect scientific information on lunar topography, mineralogy, elemental abundance, lunar exosphere and signatures of hydroxyl and water-ice. If successful, Chandrayaan-2 will be the second mission to land a rover near the lunar south pole.

GSLV-F10/Chandrayaan-2 Mission is planned during early 2019.

Q.12) Spacecraft cemetery/graveyard is the location used for crash landing of defunct spacecrafts. It is considered to be the most remote part of the earth and lies in Southern Pacific ocean. The name given to this point is

a) Point Dolphin
b) Point Angel
c) Point Nemo
d) Point Poseidon

Q.12) Solution (c)

Point Nemo is officially known as "the oceanic pole of inaccessibility," or, more simply put, the point in the ocean that is farthest away from land.

The area is also known as a "spacecraft cemetery" because hundreds of decommissioned satellites, space stations, and other spacecraft have been deposited there upon re-entering the atmosphere to lessen the risk of hitting inhabited locations or maritime traffic. Point Nemo is relatively lifeless; its location within the South Pacific Gyre blocks nutrients from reaching the area, and being so far from land it gets little nutrient run-off from coastal waters.

In News: Recently, Tiangong 1 – Chinese observatory was sank here after it ran its course.

Q.13) Aditya L1 is India's first dedicated scientific mission to study sun. It will be placed at Lagrange point 1. Which of the following statements are correct regarding Lagrange points?

1. A Lagrange point is a location in space where the combined gravitational forces of two large bodies, such as Earth and the sun or Earth and the moon, equal the centrifugal force felt by a much smaller third body.
2. L1 lies a million miles from Earth in the opposite direction of the sun with the Earth, moon and sun behind it.

Select the code from following:

a) 1 only
b) 2 only
c) Both 1 and 2
d) Neither 1 nor 2

Q.13) Solution (a)

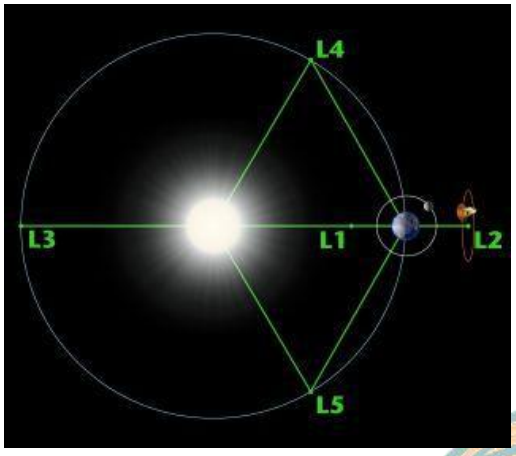
A Lagrange point is a location in space where the combined gravitational forces of two large bodies, such as Earth and the sun or Earth and the moon, equal the centrifugal force felt by a much smaller third body. The interaction of the forces creates a point of equilibrium where a spacecraft may be "parked"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

There are five Lagrange points around major bodies such as a planet or a star. Three of them lie along the line connecting the two large bodies.

- In the Earth-sun system, for example, the first point, L1, lies between Earth and the sun at about 1 million miles from Earth. L1 gets an uninterrupted view of the sun, and is currently occupied by the Solar and Heliospheric Observatory (SOHO) and the Deep Space Climate Observatory.

- L2 also lies a million miles from Earth, but in the opposite direction of the sun. At this point, with the Earth, moon and sun behind it, a spacecraft can get a clear view of deep space.
- The third Lagrange point, L3, lies behind the sun, opposite Earth's orbit.

L1, L2 and L3 are all unstable points with precarious equilibrium. If a spacecraft at L3 drifted toward or away from Earth, it would fall irreversibly toward the sun or Earth.



Points L4 and L5, however, are stable. Because of the stability of these points, dust and asteroids tend to accumulate in these regions. Asteroids that surround the L4 and L5 points are called Trojans in honor of the asteroids Agamemnon, Achilles and Hector (all characters in the story of the siege of Troy) that are between Jupiter and the Sun.

Q.14) Stratolaunch is the world's largest composite airplane. Which of the following statements is correct regarding it?

a) It is designed to take astronauts to International Space Station.
b) It is designed to take commercial passengers to exosphere for zero gravity experience.
c) It is designed for sending satellite-carrying rockets into low-Earth orbit
d) It is designed to carry heavy payloads from construction site to the launch site.

Q.14) Solution (c)

Stratolaunch Systems Corporation is an American space transportation venture developing a new air launch to orbit system.

The project is a mobile launch system with three primary components; a carrier aircraft being built by Scaled Composites (called the Stratolaunch), a multi-stage payload "launch vehicle" which would be launched at high altitude into space from under the carrier aircraft, plus a mating and integration system by Dynetics.

Stratolaunch's carrier aircraft would have a wingspan of 117 m (385 ft) or about 6.1 m (20 ft) wider than the length of an Apollo-era Saturn V and about half as long as the Hindenburg class airships. This would make it the largest airplane, by wingspan, ever to fly. It will weigh in at over 540,000 kg (1,200,000 lb) including the fully fueled launch vehicle and will require a runway at least 3,700 m (12,000 ft) long. It can carry over 230,000 kg (500,000 lb) of payload.

On January 9, 2019, the Stratolaunch carrier aircraft completed a 110 knot (219 km/h) taxi test, and released an accompanying photo of the nose landing gear lifted off the ground during the test.

Q.15) NASA successfully tested a supersonic parachute designed to land the agency's next rover on Mars. The supersonic parachute experiment is known as

a) **INSPIRE**
b) **ASPIRE**
c) **EXPIRE**
d) **RESPIRE**

Q.15) Solution (b)

NASA successfully tested a supersonic parachute designed to land the agency's next rover on Mars. The suborbital launch was designed to mimic conditions that the parachute might experience during a Mars landing, then allow engineers to study the parachute and data collected during the flight to make sure the system will function as expected.

Launch was part of NASA's **Advanced Supersonic Parachute Inflation Research Experiment (ASPIRE).** The program is building parachutes that can cling to the Red Planet's tenuous atmosphere well enough to buffer robotic landings — in particular that of NASA's Mars 2020 rover, which is scheduled to launch that year.

Q.16) NASA has named a new bacteria discovered on International Space Station after

a) Dr A P J Abdul Kalam
b) Dr Vikram Sarabai
c) Dr Saha
d) Eugene Parker

Q.16) Solution (a)

Scientists at NASA have named a new organism discovered by them after the much-loved Indian scientist and former President, APJ Abdul Kalam.

Till date, the new organism, a bacteria, has been found only on the International Space Station (ISS) and has not been found on earth.

Researchers at the Jet Propulsion Laboratory (JPL), the foremost lab of NASA for work on inter-planetary travel, discovered the new bacteria on the filters of the International Space Station (ISS) and named it Solibacillus kalamii to honour the late president, who was a renowned aerospace scientist.

Q.17) GUSTO is a balloon based observatory to study the cosmic material entering the earth. The program was launched by

a) NASA
b) ISRO
c) ROSCOSMOS
d) ESA

Q.17) Solution (a)

GUSTO

The Galactic/Extragalactic ULDB Spectroscopic Terahertz Observatory (GUSTO) mission will fly an Ultralong-Duration Balloon (ULDB) carrying a telescope with carbon, oxygen and nitrogen emission line detectors.

GUSTO will provide the first complete study of all phases of the stellar life cycle, from the formation of molecular clouds, through star birth and evolution, to the formation of gas clouds and the re-initiation of the cycle. The observatory will help researchers map out parts of the Milky Way galaxy and a nearby galaxy known as the Large Magellanic Cloud.

Q.18) Which of the following energies are believed to be responsible for expansion and acceleration of Universe?

a) Gravitational energy
b) Weak forces
c) Electromagnetic energy
d) Dark Energy

Q.18) Solution (d)

Dark Energy

In physical cosmology and astronomy, dark energy is an unknown form of energy which is hypothesized to permeate all of space, tending to accelerate the expansion of the universe. Dark energy is the most accepted hypothesis to explain the observations since the 1990s indicating that the universe is expanding at an accelerating rate.

Q.19) Cornell University has successfully tested 'Sprites'. Which of the following statements are correct regarding them?

1. They are world's smallest fully functional space probes, built on a single circuit board achieving low Earth orbit
2. They are equipped with tiny solar panels and two antennas, plus a tiny radio, computer, magnetometer (to orient to Earth's magnetic field) and gyroscope.
3. They were launched by NASA under starshot project.

Select the code from following:

a) 1 and 2
b) 2 and 3
c) 1 and 3
d) All of the above

Q.19) Solution (a)

Sprites, the world's smallest fully functional space probes, built on a single circuit board achieving low Earth orbit. The 3.5cm X 3.5cm chips weigh a mere 4g and contain solar panels, computers, sensors, and radios magnetometer (to orient to Earth's magnetic field) and gyroscope (to move and stabilize the craft). Marking the next step ofrevolution in spacecraft miniaturisation, it was developed by the Breakthrough Starshot project.

The six prototypes of Sprites were launched in June 2017 as part of the Breakthrough Starshot project designed to test technologies that would eventually be used in interstellar missions. They were launched by ISRO by PSLV – C38.

Q.20) ISRO has commissioned the world's third largest hypersonic wind tunnel at Vikram Sabhai Space Center. Which of the following statements regarding this wind tunnel are correct?

1. It is being made with the help of Israel.

2. It will be used to study the effects of air flowing past solid objects like space vehicles.
3. It will help aerodynamic characterisation of advanced space transportation systems in a hypersonic environment.

Select the code from following:

a) 1 and 2
b) 2 and 3
c) 1 and 3
d) All of the above

Q.20) Solution (b)

Hypersonic Wind tunnels

A hypersonic wind tunnel is designed to generate a hypersonic flow field in the working section, thus simulating the typical flow features of this flow regime - including compression shocks and pronounced boundary layer effects, entropy layer and viscous interaction zones and most importantly high total temperatures of the flow. The speed of these tunnels vary from Mach 5 to 15. The power requirement of a wind tunnel increases with the cross section, the flow density and is directly proportional to the third power of the test velocity. Hence installation of a continuous, closed circuit wind tunnel remains a costly affair.

Indigenously developed hypersonic wind tunnel and shock tunnel, the third largest in terms of size and simulation capability in the world, were commissioned at the Vikram Sarabhai Space Centre (VSSC).

These wind tunnels will be used to study the effects of air flowing past a solid object and in ISRO's case, space vehicles. These new facilities will help aerodynamic characterisation of advanced space transportation systems in a hypersonic environment.

Q.21) Recently DRDO has developed 'combat drugs' to reduce casualties in Pulwama type attacks. An important component of it is Glycerated Saline. Which of the following statements regarding it are correct?

1. It is an intravenous fluid that does not freeze till -18 degrees Celsius.
2. Glycerated saline, unlike normal saline, reduces inflammation.
3. It is useful in handling trauma cases in high altitude areas.

Select the code from following:

a) 1 and 2
b) 2 and 3
c) 1 only
d) All of the above

Q.21) Solution (d)

Among the drugs developed is glycerated saline, a battlefield intravenous fluid that does not freeze till -18 degrees Celsius and is useful in handling trauma cases in high altitude areas.

Glycerated saline, unlike normal saline, reduces inflammation. The drug can be life saving, particularly if the traumatic edema, collection of fluid in tissues and cavities of the body, is in the brain or lungs.

Glycerated saline has life saving capacities as it gives more time to the medical personnel to shift the wounded patient to a higher care facility

Q.22) Which of the following statements are correct regarding 'Chitosan Gel'?

a) It is a sealing gel that can be applied directly on a wound to seal it.
b) It is a nitroglycerine gel that can be freezed and used as an explosive.

c) It is an invisible marking gel that can be applied on the uniform which can help in the identification of our soldiers from the enemy at night.
d) It is a temporary adhesive that can be used to seal any leakage in the machinery in the war field.

Q.22) Solution (a)

Chitosan gel is suitable for sealing wounds by twin action: haemostasis by chemical action and filing action. It can be used for wounds on the limbs and also cavities such as abdomen and thorax.

The gel is poured onto the wound and held with physical pressure for few minutes till the bleeding stops. Its antibacterial and wound health properties are of added benefit.

It is topped by Chitosan wound cover. If the wound is deep, filters like silk and cellulose granules may be used after Chitosan gel.

Q.23) It's been 50 years since the establishment of CISF. Which of the following statements regarding CISF are correct?

1. Central Industrial Security Force (CISF) comes under the administrative control of Ministry of Ddfence.
2. It is multi skilled security agency providing security to major critical infrastructure installations like airports, seaports, power plants, sensitive government buildings, heritage monuments etc.
3. It can provide security cover to private sector also with a fee.

Select the code from following:

a) 1 only
b) 2 and 3
c) 1 and 3
d) All of the above

Q.23) Solution (b)

CISF- Central Industrial Security Force

- CISF It was established in 1969.
- It is headed by an IPS officer.

- It comes under the administrative control of MHA.
- It started with an aim to provide integrated security cover to Public Sector Undertakings (PSUs). But over the years, it has become a premier multi skilled security agency providing security to major critical infrastructure installations like airports, seaports, power plants, sensitive government buildings, heritage monuments, Delhi Metro and nuclear as well as space establishments etc.
- Its services are being sought by the private sector as well. After the Mumbai terrorist attack in 2008, its mandate has been widened by the CISF (Amendment) Act, 2008 to provide direct security cover to the private sector for a fee.
- The Act also allows deployment of CISF to protect Indian missions abroad.

Q.24) India has recently signed a deal to lease an attack submarine Chakra III. Which of the following regarding it are NOT correct?

1. The lease has been signed with Israel.
2. It is a nuclear powered attack submarine leased for a period of 10 years.
3. This is the first time India has ever leased a submarine.

Select the code from following:

a) 1 only
b) 2 and 3
c) 1 and 3
d) 3 only

Q.24) Solution (c)

India sealed a USD 3 billion deal with Russia for leasing of a nuclear-powered attack submarine for the Indian Navy for a period of 10 years.

Russia will have to deliver the Akula class submarine, to be known as Chakra III, to the Indian Navy by 2025.

It will be the third Russian submarine to be leased to the Indian Navy. India Navy has taken two more submarines from Russia on lease.

The first Russian nuclear-powered submarine -- christened INS Chakra -- was taken in 1988 under a three year lease. A second INS Chakra was taken on lease in 2012 for a period of 10 years.

The lease of Chakra II will expire in 2022 and India is looking at extending the lease

Q.25) India and Russia has opened a joint facility for the production of AK 203 assault rifles in India. In which of the following places is it located?

a) Mirzapur
b) Ayodhya
c) Amethi
d) Thane

Q.25) Solution (c)

Indo-Russian joint production facility to manufacture AK-203 assault rifles for the Indian Army was inaugurated by Prime Minister Narendra Modi in Amethi in Uttar Pradesh.

Q.26) To ensure proper border management, India has launched BOLD QIT. Which of the following statements regarding this are correct?

1. BOLD QIT stands for Border electronically dominated quick response team interception technique.
2. It has been inaugurated at Indo – Pak border to check cross border movement.
3. It is a part of the Comprehensive Integrated Border Management System (CIBMS)

Select the code from following:

a) 1 and 2
b) 2 and 3
c) 1 and 3
d) All of the above

Q.26) Solution (c)

India-Bangladesh border along Dhubri district in Assam is going to come under the surveillance of BOLD-QIT (Border electronically dominated quick response team interception technique).

It is a part of the Comprehensive Integrated Border Management System (CIBMS), which many countries including Israel have adopted to ensure proper border management.

The implementation of this project will not only help the Border Security Force (BSF) to curb all types of cross border crimes but will also provide respite to the troops from round the clock human surveillance.

The 61-km long border area in Dhubri district in Assam where river Brahmaputra enters into Bangladesh consists of vast char lands and innumerable river channels, thus making the border guarding in the area a daunting task, especially during the rainy season.

To overcome this problem, the Ministry of Home Affairs in 2017 decided to go for a technological solution, besides the physical presence of manpower of BSF. In January last year, the Information and Technology wing of BSF undertook the project BOLD-QIT and completed it in record time with the technical support of various manufacturers and suppliers.

With the BOLD-QIT project, the entire span of river Brahmaputra has been covered with the data network generated by microwave communication along with other paraphernalia, day and night surveillance cameras, and intrusion detection system.

These modern gadgets provide feeds to the BSF control rooms on the border and enable BSF Quick Reaction Teams to thwart any possibility of illegal cross border crossing and crimes.

Q.27) Recently indigenously developed Quick Reaction Surface-to-Air missiles (QRSAM) were test fired from a test range off the Odisha coast. Which of the following statements regarding QRSAM are correct?

1. The missile is an all-weather, all-terrain missile with electronic countermeasures against jamming by aircraft radars.
2. QRSAM has been developed by the Defence Research and Development Organisation (DRDO).
3. QRSAM uses solid-fuel propellant and has a range of 25-30 km

Select the code from following:

a) 1 and 2
b) 2 and 3
c) 1 and 3
d) All of the above

Q.27) Solution (d)

Quick Reaction Surface-to-Air Missile (QRSAM) is a missile developed by the Defence Research and Development Organisation (DRDO) in association with Bharat Electronics Limited and Bharat Dynamics Limited for the Indian Army.

The missile is all-weather, all-terrain missile with electronic counter measures against jamming by aircraft radars.The missile can be mounted on a truck and is stored in a canister. QRSAM uses solid-fuel propellant and has a range of 25-30 km.

Q.28) Netra Airborne Early Warning and Control System Aircraft (AEW&C) was deployed to oversee the Balakot Mission of Indian air force. Which of the following statements are correct regarding Netra?

1. It has been developed jointly by India and Israel.
2. It is light-weight autonomous UAV for surveillance and reconnaissance operations.
3. It uses quadcopters to provide lift and control giving a vertical take - off and landing capability.

Select the code from following:

a) 1 and 2
b) 2 and 3
c) 1 and 3
d) All of the above

Q.28) Solution (b)

The DRDO Netra is an Indian, light-weight, autonomous UAV for surveillance and reconnaissance operations. It has been jointly developed by the Defence Research and Development Organisation's Research and Development Establishment (R&DE), and IdeaForge, a Mumbai-based private firm.

The Netra is a lightweight UAV, constructed of carbon fiber composites, that uses quadcopters to provide lift and control giving a VTOL capability. It has no moving parts other than the rotors, motors and transmissions, and hence it requires very low maintenance. The use of carbon-fibre has resulted in a light weight of 1.5 kg (3 lb), which makes the Netra very portable. A backpack case allows operators to carry the system to field locations to serve as the base station. It also contains the power supply, military-grade controller, hand-held operator console and the communication systems.

Q.29) Which of the following aircrafts will be manufactured in India by Lockheed Martin under 'Make in India' program?

a) F – 16
b) F – 21
c) RF 31
d) F – 35 raptor

Q.29) Solution (b)

US defence giant Lockheed Martin unveiled the F-21 multi-role fighter jet at Asia's biggest air show Aero India-2019, which will be manufactured locally under Prime Minister Narendra Modi's flagship programme 'Make in India'.

The company, which had earlier offered its F-16 fighter, has claimed that the F-21 fighter jet is specifically configured for the Indian Air Force and will strengthen India's path to an advanced airpower future.

The US defence firm will build the plane in collaboration with Tata Advanced Systems.

Q.30) The Indian Air Force (IAF) has received the Final Operational Clearance (FOC) standard certification for Light Combat Aircraft (LCA) Tejas. Which of the following statements regarding Tejas are correct?

1. It is light supersonic aircraft powered by a single engine.
2. LCA Tejas is first advanced fly-by-wire Light Combat Aircraft (LCA) designed, developed and manufactured indigenously.
3. Because of its long range it has deep strike capability.

Select the code from following:

a) 1 and 2
b) 2 and 3
c) 1 and 3
d) All of the above

Q.30) Solution (a)

LCA Tejas is lightweight single-seat multi-role jet fighter powered by a single engine. It has tailless and compound delta wing design made entirely of composite structures. It is pegged as the world's smallest and lightest supersonic fighter aircraft in its class.

LCA Tejas is first advanced fly-by-wire Light Combat Aircraft (LCA) designed, developed and manufactured indigenously by state-owned Hindustan Aeronautical Limited (HAL) and Aeronautical Development Agency (ADA) as part of LCA programme.

LCA Tejas is equipped with the quadruplex digital fly-by-wire flight control system to ease handling by the pilot. It also has a digital computer-based attack system and autopilot mode. It is also equipped with the satellite-aided Inertial Navigation System.

It has a limited reach of little over 400-km and will be mainly used for close air-to-ground operations (unlike Russian-origin Sukhoi-30MKIs or Rafale which have deep strike capability into enemy territory due to their long range).

It can fire air-to-air missiles, carry bombs and precision guided ammunition. DRDO has successfully tested fired Tejas with different kinds of weaponry and missiles including R-73 air-to-air missile, bomb dropping (including laser-guided bombs). DRDO also plans test firing of indigenous Astra missile from Tejas.

Q.31) The Ordnance Factory Board (OFB) has received clearance from the Indian Army and the Ministry of Defence for production of 114 'Dhanush' long range artillery guns. Which of the following statements regarding 'Dhanush' are correct?

1. This is the first ever indigenous 155 mm x 45 calibre long-range artillery gun.
2. It has self-propulsion unit which allows the gun to negotiate and deploy itself in mountainous terrains with ease.
3. The design is based on the Bofors Haubits FH77 which India acquired in the 1980s.

Select the code from following:

a) 1 only
b) 2 only
c) 1 and 3
d) All of the above

Q.31) Solution (d)

The Dhanush is a 155 mm towed howitzer used by the Indian Army. The design is based on the Bofors Haubits FH77 which India acquired in the 1980s. The gun completed development trials in 2018 and was approved for series production in 2019. Indian Army has ordered 114 guns and the total order size could increase to 414 guns.

Described as a product of joint efforts of the OFB and the Indian Army, this is the first ever indigenous 155 mm x 45 calibre long-range artillery gun.

The gun is equipped with inertial navigation-based sighting system, auto-laying facility, on-board ballistic computation and an advanced day and night direct firing system. The self-propulsion unit allows the gun to negotiate and deploy itself in mountainous terrains with ease.

'Dhanush' has also been electronically upgraded to enhance firing accuracies, laying speeds of the existing gun and to provide compatibility with various kinds of ammunition as well.

Q.32) Which of the following statements are correct regarding 'iDEX' scheme?

1. Under the scheme research in the fields of Aerospace & Defence by MSMEs, start-ups, research institutions, educational institutions will be funded.
2. The iDEX will be funded and managed by a Defence Innovation Organisation (DIO).
3. Initially, a corpus of ₹100 crore has been created by two PSUs--HAL and BEL, each contributing ₹50 crore.

Select the code from following:

a) 1 and 2
b) 2 and 3
c) 1 and 3
d) All of the above

Q.32) Solution (d)

Innovations for Defence Excellence (iDEX) Scheme

The incubator will be funded through the Ministry's Innovation for Defence Exellence (iDEX) scheme. Under the scheme research in the fields of Aerospace & Defence by MSMEs, start-ups, research institutions, educational institutions are to be funded.

The iDEX will be funded and managed by a Defence Innovation Organisation (DIO). Initially, a corpus of ₹100 crore has been created by two PSUs--HAL and BEL, each contributing ₹50 crore. More defence PSUs will join in with financial contributions when required. Similarly, the Ministry of Defence also will extend funds when necessary.

Q.33) Recently Chinook helicopters were formally inducted in the Indian Airforce. Which of the following statements are correct?

1. It is an armoured heavy artillery all weather combat helicopter.
2. It can be used for transporting troops, artillery, equipment and fuel.
3. It can be deployed for humanitarian and disaster relief operations and in missions such as transportation of relief supplies and mass evacuation of refugees.

Select the code from following:

a) 1 and 2
b) 2 and 3
c) 1 and 3
d) All of the above

Q.33) Solution (b)

Chinook Helicopters

Chinook is a multi-role, vertical-lift platform, which is used for transporting troops, artillery, equipment and fuel. Chinook would be deployed for humanitarian and disaster relief operations and in missions such as transportation of relief supplies and mass evacuation of refugees.

The Boeing CH-47 Chinook is an American twin-engined, tandem rotor, heavy-lift helicopter developed by American rotorcraft company Vertol and manufactured by Boeing Vertol (later known as Boeing Rotorcraft Systems). The CH-47 is among the heaviest lifting Western helicopters. Its name, Chinook, is from the Native American Chinook people of modern-day Washington state.

Q.34) To enhance the security of the planes flying President and Prime Minister, India will be buying two missile defence systems - Large Aircraft Infrared Countermeasures (LAIRCAM) and Self-Protection Suites (SPS). Which of the following countries is selling these systems to India?

a) USA
b) France
c) Russia
d) Israel

Q.34) Solution (a)

The US has agreed to sell two state-of-the-art missile defence systems to Air India One for an estimated cost of $190 million, a move that will enhance the security of planes flying the prime minister and the president.

The Trump administrations approved purchase of the two systems known as Large Aircraft Infrared Countermeasures (LAIRCAM) and Self-Protection Suites (SPS) for an estimated cost of $190 million.

The purpose of the LAIRCM programme is to protect large aircraft from man-portable missiles. Once installed, the LAIRCAM system increases crew-warning time, decreases false alarm rates and automatically counters advanced intermediate range missile systems

The missile warning subsystem will use multiple sensors to provide full spatial coverage.

The counter-measures subsystem will use lasers mounted in pointer-tracker turret assemblies. It also automatically counters advanced intermediate range missile systems with no action required by the crew.

The pilot will simply be informed that a threat missile was detected and jammed.

Observing that it will improve India's capability to deter regional threats, the Congressional.

Q.35) India will be purchasing Milan 2T guided missiles from France. They are

a) Anti – Tank missiles
b) Surface to air missiles
c) Anti submarine missiles
d) Anti ballistic missile system

Q.35) Solution (a)

An anti-tank missile, anti-tank guided missile (ATGM), anti-armour guided missile or anti-tank guided weapon (ATGW) is a missile that is created to destroy vehicles that are heavily armoured.

India has approved and order of 5,000 Milan 2T anti-tank guided missiles from France. While the Indian Army needs 70,000 different types of anti-tank guided missiles (ATGM) and 850 different launchers, the approval is for the purchase of 5,000 Milan 2T anti-tank guided missiles.

What is MILAN Anti-Tank Missile System:

– MILAN is a portable medium-range, anti-tank weapon manufactured by Euromissile, based in Fontenay-aux-Roses in France.

– The munitions consist of the missile in a waterproof launch tube.

– MILAN 2 has a single shaped charge warhead for use against very thick and composite armour.

– MILAN 2T and MILAN 3 missiles are armed with a tandem charge for use against reactive armour.

Q.36) Indian Coast Guard (ICG) conducted exercise Clean Sea – 2018. Which of the following statements is/are correct regarding the exercise?

1. The exercise was conducted simultaneously at Mumbai, Chennai and Kolkata ports.
2. The aim of the exercise was to check preparedness of ICG against major oil spills and oil pollution.

Select the code from following:

a) 1 only
b) 2 only
c) Both 1 and 2
d) Neither 1 nor 2

Q.36) Solution (b)

The Indian Coast Guard has conducted the Regional Level Marine Oil Pollution Response Exercise titled 'Clean Sea - 2018' at sea off Port Blair.

Coast Guard ships Viswasth, Vijith, Rajveer, Rajshri, 4 interceptor boats, and its air assets Dornier and Chetak helicopters participated in the exercise.

Q.37) Indian Navy has inducted its first 'Deep Submergence Rescue Vehicle' (DSRV). Which of the following statements regarding DSRV are correct?

1. The vehicle is currently deployed on mother ship INS Sabarmati, which will be placed in Mumbai.
2. The vehicle can rescue as many as 14 people in one dive.
3. DSRVs can also be deployed for various other missions including to lay cables on the sea bed.

Select the code from following:

a) 1 and 2
b) 2 and 3
c) 1 and 3
d) All of the above

Q.37) Solution (d)

The Indian Navy inducted its first 'Deep Submergence Rescue Vehicle' into service. With the DSRV's induction, the Indian Navy has joined the select league of world navies that have an integral submarine rescue capability.

The inducted submarine -- a third generation product of Scotland-based JFD, a part of James Fisher and Sons Plc -- has the latest technology and capability.

The vehicle is currently deployed on mother ship INS Sabarmati, provided by the Shipping Corporation of India, which will be placed in Mumbai.

JFD has won the contract of 193 million pounds for the supply and 25 years of maintenance of the two DSRVs.

More than 80 naval personnel have undergone training on DSRV operations and its exercises will continue in future as well.

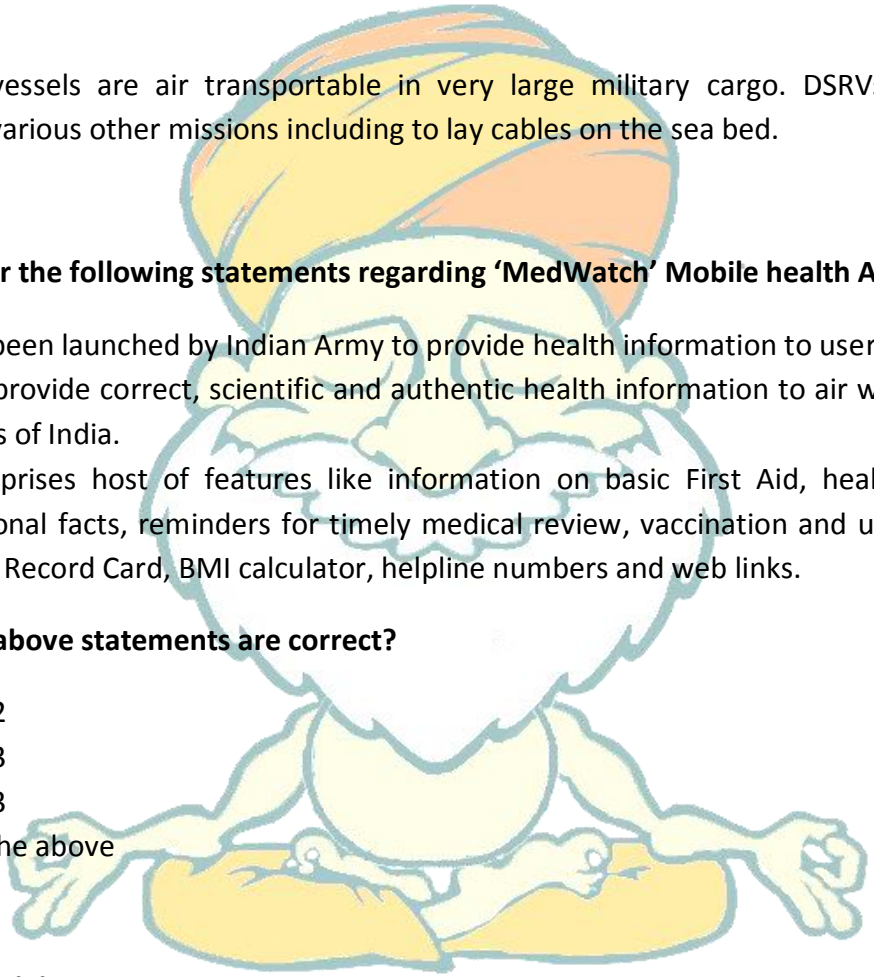
The vehicle can rescue as many as 14 people in one dive.

During the trials, the DSRV carried out underwater mating with a bottomed submarine, at a depth of over 300 feet. On successful mating, the DSRV opened its hatches and the submarine hatches and carried out transfer of personnel from the submarine to the DSRV.

During the trials, the DSRV also dived successfully up to 666 metres, which is a record for deepest submergence by a 'manned vessel' in Indian waters.

The DSRV crew carried out remotely operated vehicle operations at a depth of over 750 metres and side scan sonar operations at a depth of over 650 metres, which are all 'firsts' for the Indian Navy.

Some DSRV vessels are air transportable in very large military cargo. DSRVs can also be deployed for various other missions including to lay cables on the sea bed.



Q.38) Consider the following statements regarding 'MedWatch' Mobile health App:

1. It has been launched by Indian Army to provide health information to users.
2. It will provide correct, scientific and authentic health information to air warriors and all citizens of India.
3. It comprises host of features like information on basic First Aid, health topics and nutritional facts, reminders for timely medical review, vaccination and utility tools like Health Record Card, BMI calculator, helpline numbers and web links.

Which of the above statements are correct?

a) 1 and 2
b) 2 and 3
c) 1 and 3
d) All of the above

Q.38) Solution (b)

Indian Air Force (IAF) has launched 'MedWatch' mobile health app to provide health information to users, including first-aid and other health and nutritional topics. It was launched on 8 October on the occasion of IAF's 85th anniversary. It is first of its kind mobile health app built by any of the three armed forces.

The app was conceived by doctors of IAF and developed in-house by Directorate of Information Technology (DIT) with Zero financial outlay.

It will provide correct, scientific and authentic health information to air warriors and all citizens of India.

It comprises host of features like information on basic First Aid, health topics and nutritional facts, reminders for timely medical review, vaccination and utility tools like Health Record Card, BMI calculator, helpline numbers and web links.

Q.39) Indian Airforce has successfully tested the Astra missiles. Which of the following statements regarding Astra Missiles is NOT correct?

a) Astra is air to air beyond visual range air-to-air indigenously developed by Defence Research and Development Organisation (DRDO).
b) It is single stage solid fuelled missile and has payload capacity of 15 kg conventional explosives.
c) It is all-weather missile with active radar terminal guidance, excellent electronic counter-counter measure (ECCM) features, smokeless propulsion.
d) As of now it is compatible only with Sukhoi 30 and MiG 29 aircrafts of IAF.

Q.39) Solution (d)

Astra is an all weather beyond-visual-range air-to-air missile developed by the Defence Research and Development Organisation, India. It is the first air-to-air missile developed by India. It features mid-course inertial guidance with terminal active radar homing. Astra is designed to be capable of engaging targets at varying range and altitudes allowing for engagement of both short-range targets at a distance of 20 km (12 mi) and long-range targets up to a distance of 80 km (50 mi). Astra has been integrated with Indian Air Force's Sukhoi Su-30MKI and will be integrated with Dassault Mirage 2000 and Mikoyan MiG-29 in the future.

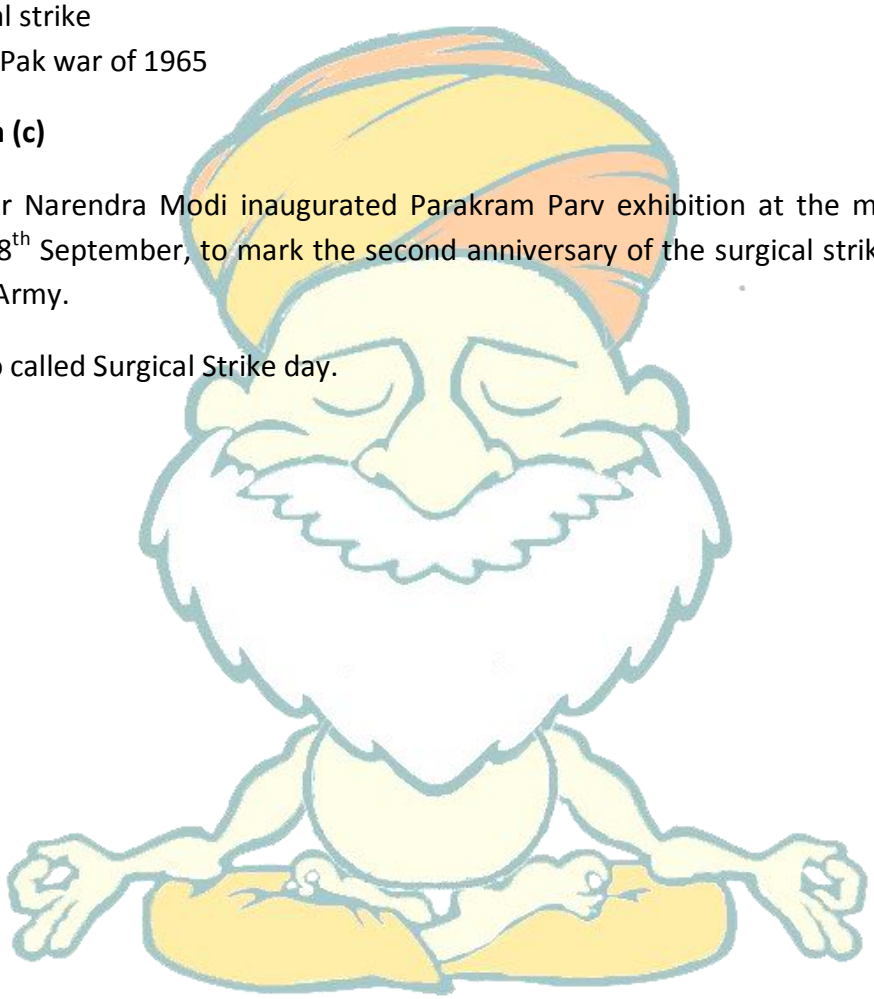
Astra is equipped with electronic counter-countermeasures to allow operation even during enemy attempts to jam the seeker using electronic countermeasures. It carries a 15 kg (33 lb) high explosive pre-fragmented warhead activated by a proximity fuse. Astra uses a smokeless solid fuelled motor that can propel the missile to a speed of Mach 4.5 and allows operation from a maximum altitude of 20 km (66,000 ft). The maximum range of Astra is 110 km (68 mi) in head-on chase mode and 20 km (12 mi) in tail chase mode. The maximum range is achieved when the missile launched from an altitude of 15 km (49,000 ft). When it is fired from an altitude of 8 km (26,000 ft), the range drops to 44 km (27 mi) and when it is launched from sea level, the range drops further to 21 km (13 mi). Astra's low aspect ratio wings allow it to engage manoeuvring targets up to a range of 80 km (50 mi) in head-on chase mode and 20 km (12 mi)

in tail chase mode. It can be launched in both autonomous and buddy mode operation and can lock on to its target before or after it is launched.

Q.40) Parakaram Parv was celebrated by Indian Army to celebrate

a) Kargil war
b) Indo – Pak war of 1971
c) Surgical strike
d) Indo – Pak war of 1965

Q.40) Solution (c)



Prime Minister Narendra Modi inaugurated Parakram Parv exhibition at the military station, Jodhpur, on 28th September, to mark the second anniversary of the surgical strikes carried out by the Indian Army.

The day is also called Surgical Strike day.