Q.1) Ethylenediaminetetraacetic acid (EDTA) injection are used for

a) Removing Uranium from blood stream in case of exposure or nuclear war
b) Increasing the capacity of blood to clot in case of injury or trauma
c) Increasing the ability of body to absorb more nutrients from food
d) killing pathogens forming in the human gut.

Q.1) Solution (a)

Ethylenediaminetetraacetic acid (EDTA) injection that traps uranium in the guts and blood of victims during a nuclear accident or warfare. When EDTA is injected into the veins, it "grabs" heavy metals and minerals and removes them from the body.

Ca-EDTA Respiratory Fluid, which is the inhalation formula for chelation, or grabbing, of heavy metals and radioactive elements deposited in lungs through inhalation at nuclear accident sites.

Q.2) The outbreak of Zika virus led to a condition of Microcephaly in babies. Which of the following statements correctly explains the condition microcephaly?

a) It is a condition where the head (circumference) is smaller than normal.
b) It is a condition where heart growth is abnormal and leads to smaller valves.
c) It is a condition of contraction of blood vessels and restriction of blood flow.
d) It is a condition of discolouration of skin where skin looks pale and blue veins are visible

Q.2) Solution (a)

Microcephaly is a condition where the head (circumference) is smaller than normal.

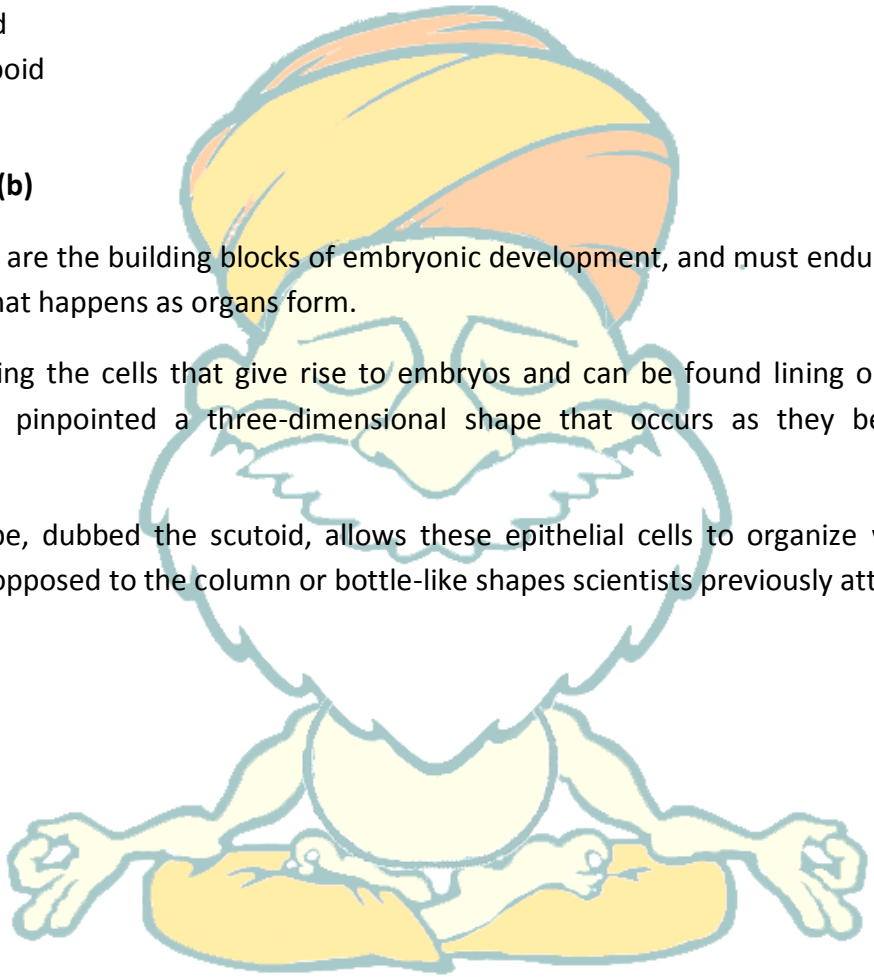
Microcephaly may be caused by genetic abnormalities or by drugs, alcohol, certain viruses, and toxins that are exposed to the fetus during pregnancy and damage the developing brain tissue. Unfortunately, a 2015-2016 outbreak of Zika virus in Brazil has been associated with a large number of infants born with microcephaly. Epidemiological and some viral isolations suggest that pregnant women who get Zika virus have a high chance of fetal infection that may lead to microcephaly, although a definitive link between Zika virus infection and microcephaly is not yet proven.

Signs and symptoms of microcephaly may include a smaller than normal head circumference that usually remains smaller than normal as the child grows, dwarfism or short stature, delayed motor and speech functions, mental retardation, seizures, facial distortions, hyperactivity,

balance and coordination problems, and other brain-related or neurological problems; although some with the disorder may develop normal intelligence.

Q.3) Epithelial cells are the building blocks of embryonic development, and must endure the twisting and packing that happens as organs form. They are packaged in the shape called

a) Tetrahedroid
b) Scutoid
c) Rhomboid
d) Zigzoid

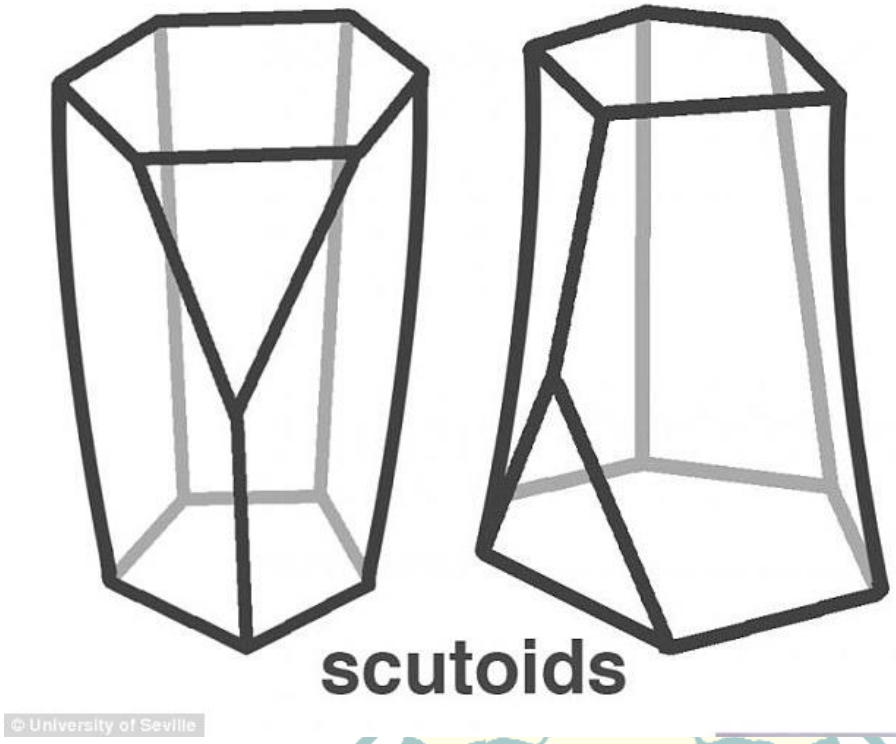


Q.3) Solution (b)

Epithelial cells are the building blocks of embryonic development, and must endure the twisting and packing that happens as organs form.

A team studying the cells that give rise to embryos and can be found lining our organs and blood vessels pinpointed a three-dimensional shape that occurs as they bend and pack together.

The new shape, dubbed the scutoid, allows these epithelial cells to organize with the most efficiency, as opposed to the column or bottle-like shapes scientists previously attributed to this process.



Q.4) Which of the following can be the sources through which communicable diseases can be spread?

1. Food
2. Exchange of Bodily fluids
3. Rodents
4. Air

Select the code from following:

a) 1, 2 and 3
b) 2, 3 and 4
c) 1, 3 and 4
d) All of the above

Q.4) Solution (d)

A communicable disease is one that is spread from one person to another through a variety of ways that include: contact with blood and bodily fluids; breathing in an airborne virus; or by being bitten by an insect.

Reporting of cases of communicable disease is important in the planning and evaluation of disease prevention and control programs, in the assurance of appropriate medical therapy, and in the detection of common-source outbreaks. California law mandates healthcare providers and laboratories to report over 80 diseases or conditions to their local health department. Some examples of the reportable communicable diseases include Hepatitis A, B & C, influenza, measles, and salmonella and other food borne illnesses.

Q.5) Consider the following statements regarding Bio – sensors:

1. It is a device which uses a living organism or biological molecules, especially enzymes or antibodies, to detect the presence of chemicals.
2. Biosensors are used for glucose monitoring in diabetic patients.

Which of the above statements are correct?

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

Q.5) Solution (c)

A biosensor is an analytical device, used for the detection of a chemical substance present in living systems. Most commonly used bloodglucose-biosensor is used for glucose monitoring

Biosensors are used in fields of

- Biotechnology,
- Agriculture,
- Food Technology
- Biomedicine.

Q.6) Which of the following statements correctly explains latent TB?

a) It is a residual bacterial remain in body which cannot become active.
b) It is a condition when TB bacteria is not present in a body but body environment is conducive for bacterial growth.
c) It is a condition when bacteria remain in body in active stage
d) It is a condition when bacteria is present in inactive stage but can later become active.

Q.6) Solution (d)

The bacterial species Mycobacterium Tuberculosis is the causative agent of TB.

- Latent TB – The bacteria remain in the body in an inactive state. They cause no symptoms and are not contagious, but they can become active
- Active TB – the bacteria do cause symptoms and can be transmitted to others.

Q.7) Which of the following components of blood are primarily responsible for clotting of blood in case of an injury?

a) Red Blood Cells
b) White Blood cells
c) Blood platelets
d) Blood plasma

Q.7) Solution (c)

Coagulation, also known as clotting, is the process by which blood changes from a liquid to a gel, forming a blood clot. It potentially results in hemostasis, the cessation of blood loss from a damaged vessel, followed by repair. The mechanism of coagulation involves activation, adhesion and aggregation of platelets, as well as deposition and maturation of fibrin.

Coagulation begins almost instantly after an injury to the blood vessel has damaged the endothelium lining the blood vessel. Exposure of blood to the subendothelial space initiates two processes: changes in platelets, and the exposure of subendothelial tissue factor to plasma Factor VII, which ultimately leads to cross-linked fibrin formation. Platelets immediately form a plug at the site of injury; this is called primary hemostasis. Secondary hemostasis occurs simultaneously: additional coagulation (clotting) factors beyond Factor VII (listed below) respond in a cascade to form fibrin strands, which strengthen the platelet plug.

Q.8) Which of the following tissues are responsible for transportation in plants?

1. Meristamatic Tissue
2. Xylem Tissue
3. Phloem tissue
4. Epithilium tissue

Select the code from following:

a) 1, 2 and 3
b) 2, 3 and 4
c) 2 and 3
d) All of the above

Q.8) Solution (c)

The plants have low energy needs, as they use relatively slow transport systems. Plant transport systems move energy from leaves and raw materials from roots to all their parts.

- The xylem (tissue) moves water and minerals obtained from the soil to all other parts of the plants.
- The phloem (tissue) transports products of photosynthesis from the leaves (where they are synthesized) to other parts of the plant.

Q.9) Which of the following is the correct difference between Respiration and Breathing?

a) Respiration process takes place only in animals while it does not take place in plants
b) Breathing is a physical process of inhale and exhale while respiration is a chemical process of oxidation of glucose.
c) Respiration and breathing are synonymous and there is no difference.
d) Breathing is performed only by humans while respiration is performed by all animals.

Q.9) Solution (b)

Breathing is the physical process where you inhale and exhale air in and out of your lungs. Inhaling brings in air containing Oxygen, which is absorbed and exchanged for Carbon Dioxide. The Carbon Dioxide, now in the air inside your lungs, is expelled when you exhale. The Oxygen is carried in your blood to the cells around your body where respiration takes place. Respiration

is a chemical reaction where Oxygen is used to breakdown Glucose in order to generate energy which is then used by the cell to function.

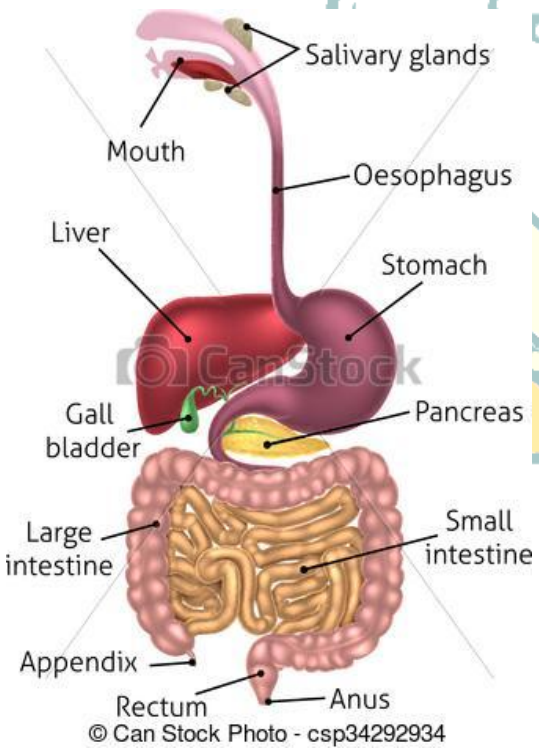
Q.10) Arrange the organs of digestive tract in correct order from first to last.

1. Oesophagus
2. stomach
3. large intestine
4. Rectum
5. Small intestine

Select the code from following:

a) 1,2,4,3,5
b) 1,2,5,3,4
c) 4,1,2,3,5
d) 1,2,3,4,5

Q.10) Solution (b)



Q.11) Consider the following statements regarding Polio vaccine:

1. Two different kinds of vaccine are available: an inactivated (killed) polio vaccine (IPV) and a live attenuated oral polio vaccine (OPV).
2. Inactivated Polio Vaccine is produced from wild-type poliovirus strains of each serotype that have been inactivated (killed) with formalin.

Which of the above statements are correct?

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

Q.11) Solution (c)

Two different kinds of vaccine are available: an inactivated (killed) polio vaccine (IPV) and a live attenuated oral polio vaccine (OPV). OPV consists of a mixture of the three live attenuated poliovirus serotypes.

Inactivated Polio Vaccine is produced from wild-type poliovirus strains of each serotype that have been inactivated (killed) with formalin. It is an injection able vaccine and can be administered alone or in combination with other vaccines (e.g., diphtheria, tetanus, pertussis, hepatitis B, and haemophilus influenza).

In some rare cases, OPV can lead to vaccine-associated paralytic polio (VAPP) or vaccine derived poliovirus (VDPV). VAPP is associated with a single dose of OPV administered in a child or can occur in a close unvaccinated or non-immune contact of the vaccine recipient who is excreting the mutated virus. A VDPV is a very rare strain of poliovirus, genetically changed from the original strain contained in OPV. VDPV can cause paralysis in humans and develop the capacity for sustained circulation.

Q.12) The Government has proposed a ban on the use of antibiotic Colistin. Which of the following statements regarding Colistin is/are correct?

1. It is a directly injectable antibiotic which can fight against many infections.

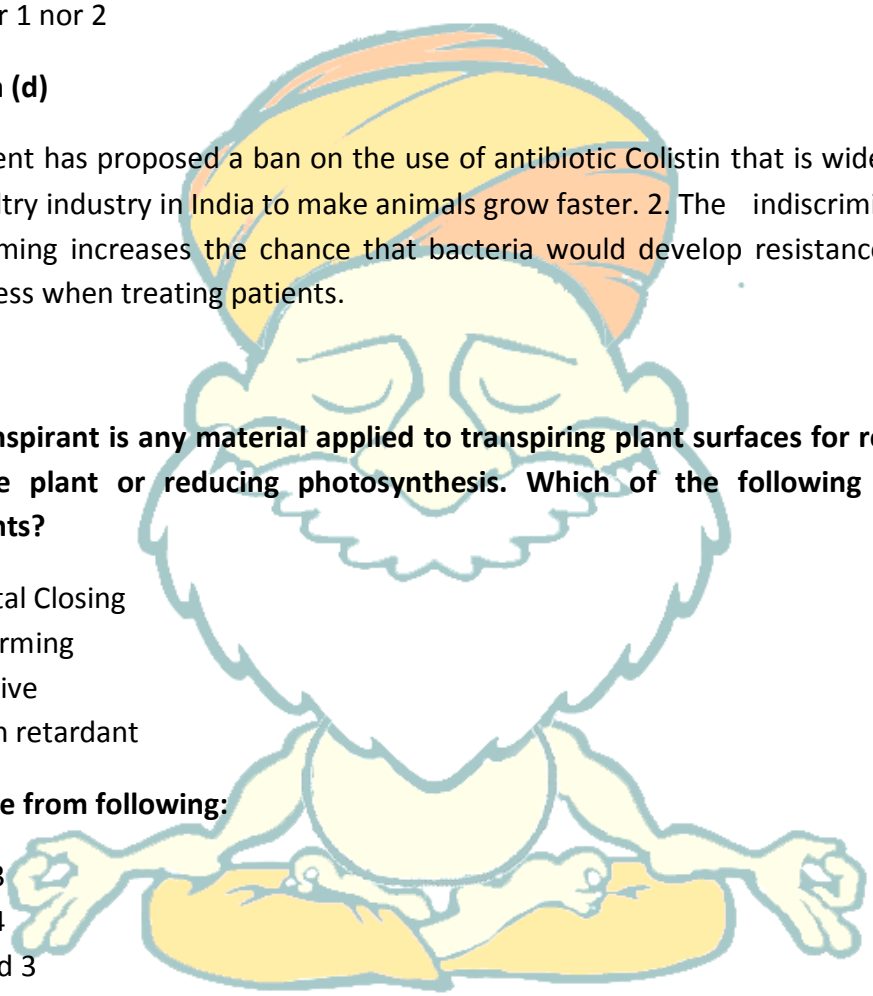
2. It is largely used to cure common cold and high doses of colistin have increased antibiotic resistance.

Select the code from following:

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

Q.12) Solution (d)

The Government has proposed a ban on the use of antibiotic Colistin that is widely used in the meat and poultry industry in India to make animals grow faster. 2. The indiscriminate use of Colistin in farming increases the chance that bacteria would develop resistance to the drug, making it useless when treating patients.



Q.13) Antitranspirant is any material applied to transpiring plant surfaces for reducing water loss from the plant or reducing photosynthesis. Which of the following are types of Antitranspirants?

1. Stomatal Closing
2. Film forming
3. Reflective
4. Growth retardant

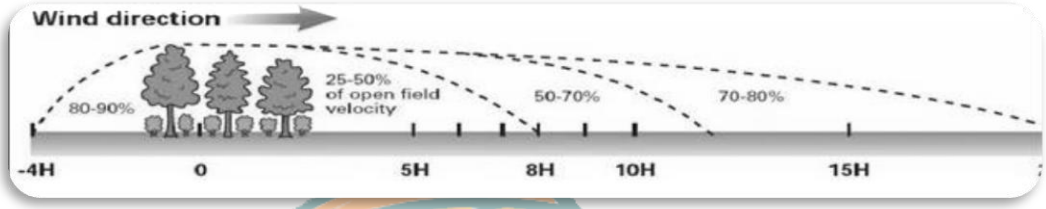
Select the code from following:

a) 1 and 3
b) 2 and 4
c) 1, 2 and 3
d) All of the above

Q.13) Solution (d)

Antitranspirants are compounds applied to the leaves of plants to reduce transpiration. They are used from Christmas trees, on cut flowers, on newly transplanted shrubs, and in other applications to preserve and protect plants from drying out too quickly.
These are of four types:

- Stomatal Closing
- Film forming
- Reflective
- Growth retardant



Q.14) Consider the following statements regarding Lead Poisoning:

1. Lead in the body is distributed to the brain, liver, kidney and bones.
2. It is stored in the teeth and bones, where it accumulates over time.
3. Lead in body is released into blood during pregnancy and becomes a source of exposure to the developing fetus.

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.14) Solution (d)

Lead Poisoning:

- Lead is a cumulative toxicant that affects multiple body systems and is particularly harmful to young children.
- Lead in the body is distributed to the brain, liver, kidney and bones. It is stored in the teeth and bones, where it accumulates over time. Human exposure is usually assessed through the measurement of lead in blood.
- Lead in bone is released into blood during pregnancy and becomes a source of exposure to the developing fetus.
- There is no known level of lead exposure that is considered safe.

- Lead exposure is preventable.

Q.15) Consider the following statements regarding 'Glaucoma':

1. It is a condition of damage of optic nerve due to build up of pressure inside eye.
2. Glaucoma can cause irreversible blindness.
3. The condition of Glaucoma can be inherited.

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.15) Solution (d)

Glaucoma is a condition that causes damage to your eye's optic nerve and gets worse over time. It's often linked to a buildup of pressure inside your eye. Glaucoma tends to be inherited and may not show up until later in life.

The increased pressure, called intraocular pressure, can damage the optic nerve, which transmits images to your brain. If the damage continues, glaucoma can lead to permanent vision loss. Without treatment, glaucoma can cause total permanent blindness within a few years.

Q.16) Recently the term 'p – null' Phenotype was in the news. It is

a) A rare genetic disorder in wheat
b) A new type of epithelial cell in humans
c) A rare Blood group
d) A rare genetic mutation that can occur in Space (Zero Gravity)

Q.16) Solution (c)

A team of doctors led by Dr Shamee Shastry from the blood bank of Kasturba Medical College, Manipal identified a rare blood group called 'pp' or 'P null' phenotype. ABO and Rh D are the commonly typed blood group systems.

There are more than 200 minor blood group antigens that are found very rarely, other than the common ones- A, B and Rh. If 1 out of 1000 people has this kind of antigen, the blood group is considered rare. The person with rare blood group will lack the high-frequency antigen or multiple common antigens.

Q.17) Which of the following statements regarding Cochlear implants is/are correct?

1. A cochlear implant is an electronic medical device that replaces the function of the damaged inner ear.
2. It amplifies the sound and makes it more audible and clear for the receiver.

Select the code from following:

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

Q.17) Solution (a)

A cochlear implant is an electronic medical device that replaces the function of the damaged inner ear. Unlike hearing aids, which make sounds louder, cochlear implants bypass the damaged hair cells of the inner ear (cochlea) to provide sound signals to the brain.

The cochlear implant technology can help people who:

- have moderate to profound hearing loss in both ears
- receive little or no benefit from hearing aids
- score 50% or less on sentence recognition tests done by hearing professionals in the ear to be implanted
- score 60% or less on sentence recognition tests done by hearing professionals in the non-implanted ear or in both ears with hearing aids.

Many people have cochlear devices in both ears (bilateral). Listening with two ears can improve your ability to identify the direction of sound and separate the sounds you want to hear from those you don't.

Q.18) Which of the following diseases is also known as the Hansen's Disease?

a) Tuberculosis
b) Leprosy
c) Kala Azar
d) Sleeping Sickness

Q.18) Solution (b)

Leprosy:

- Leprosy is one of the oldest diseases in recorded history.
- It is a chronic, progressive bacterial infection caused by the bacterium Mycobacterium leprae.
- It primarily affects the nerves of the extremities, the skin, the lining of the nose, the upper respiratory tract and the eyes.
- Known to occur at all agesranging from early infancy to very old age.
- Common in many countries, especially those with a tropical or subtropical climate.
- It is also known as Hansen's disease

Q.19) Which of the following statements are correct regarding Ruminant animals?

1. Instead of one they have four chambers in stomach.
2. Food is partially chewed and sent into rumen which sends it back to mouth to be rechewed.
3. Rumen contains micro organisms which can break down grass and coarse vegetation which can't be digested by animals with no rumen.

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 (d)

Ruminants include cattle, sheep, goats, buffalo, deer, elk, giraffes and camels. These animals all have a digestive system that is uniquely different from our own.

Instead of one compartment to the stomach they have four. Of the four compartments the rumen is the largest section and the main digestive centre. The rumen is filled with billions of tiny microorganisms that are able to break down grass and other coarse vegetation that animals with one stomach (including humans, chickens and pigs) cannot digest. Ruminant animals do not completely chew the grass or vegetation they eat. The partially chewed grass goes into the large rumen where it is stored and broken down into balls of "cud". When the animal has eaten its fill it will rest and "chew its cud". The cud is then swallowed once again where it will pass into the next three compartments—the reticulum, the omasum and the true stomach, the abomasum.

Q.20) Where in human body would you find a Bowman's Capsule?

a) Brain
b) Heart
c) Digestive tract
d) Kidney

Q.20) Solution (d)

Bowman's capsule (or the Bowman capsule, capsula glomeruli, or glomerular capsule) is a cup-like sack at the beginning of the tubular component of a nephron in the mammalian kidney that performs the first step in the filtration of blood to form urine. A glomerulus is enclosed in the sac.

Q.21) Which of the following statements is/are correct about Astronomical Satellite?

1. These satellites are used for the observation of distant stars and other objects in space.
2. Astronomical satellites can work in spectrum which sometimes is impossible on earth.

Select the code from following:

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

Q.21) Solution (c)

ASTRONOMICAL SATELLITES

- These satellites are used for the observation of distant stars and other objects in space. India's ASTROSAT is an Astronomical satellite.
- Astronomical satellites are those which are used for observation of distant planets, galaxies, and other outer space objects. Astronomical performance from the Earth's surface is limited by Earth's atmospheric conditions. It makes it even more worse by the filtering and distortion of electromagnetic radiation. This makes it desirable to place astrononomical observation devices into space.
- But space-based astronomy is even more important for frequency ranges which are outside the optic and radio window. For example, X-ray astronomy is nearly impossible when done from the Earth, and has reached its current important stand within astronomy only due to orbiting satellites with X-ray telescopes. Infrared and ultraviolet are also greatly blocked.
- The most famous astronomical satellite is the Hubble Telescope. Although now reaching the end of its life it has enabled scientists to see many things that would otherwise not have been possible. Nevertheless it did suffer some major design setbacks that were only discovered once it was in orbit.

The scientific objectives of ASTROSAT mission are:

- To understand high energy processes in binary star systems containing neutron stars and black holes
- Estimate magnetic fields of neutron stars
- Study star birth regions and high energy processes in star systems lying beyond our galaxy
- Detect new briefly bright X-ray sources in the sky
- Perform a limited deep field survey of the Universe in the Ultraviolet region

Q.22) Which of the following are navigation Satellite systems?

1. Chinese beidou satellite
2. Russian Glonass
3. Japanese Quazi Zenith Satellite System

Select the code from following:

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

Q.22) Solution (d)

The best known and currently the most widely used navigation satellite system is the U.S. Global Positioning System (GPS), which became operational two decades ago.

Russia too offers global coverage with its Global Navigation Satellite System (GLONASS). Europe is establishing its own global system, Galileo. Although the full constellation will be ready only by 2019, it plans to begin some services with a reduced number of satellites by the end of next year.

China's Beidou satellite navigation system, that launched its first navigation satellite in 2000, plans to have a full global coverage by 2020. China has already launched 16 satellites and four experimental ones onto space as part of the Beidou system.

Some of the proven and more popular systems include the Chinese Beidou, Russian Glonass and Japanese Quazi-Zenith Satellite System (QZSS) that is making slow progress.

Q.23) ISRO launched several nano satellites last year. In what weight range does a satellite come under nano – satellite range?

a) 1 – 10 kg
b) 10 – 100 kg
c) 100 – 1500 kg
d) 100 g – 1 kg

Q.23) Solution (a)

The term "nanosatellite" or "nanosat" is applied to an artificial satellite with a wet mass between 1 and 10 kg.

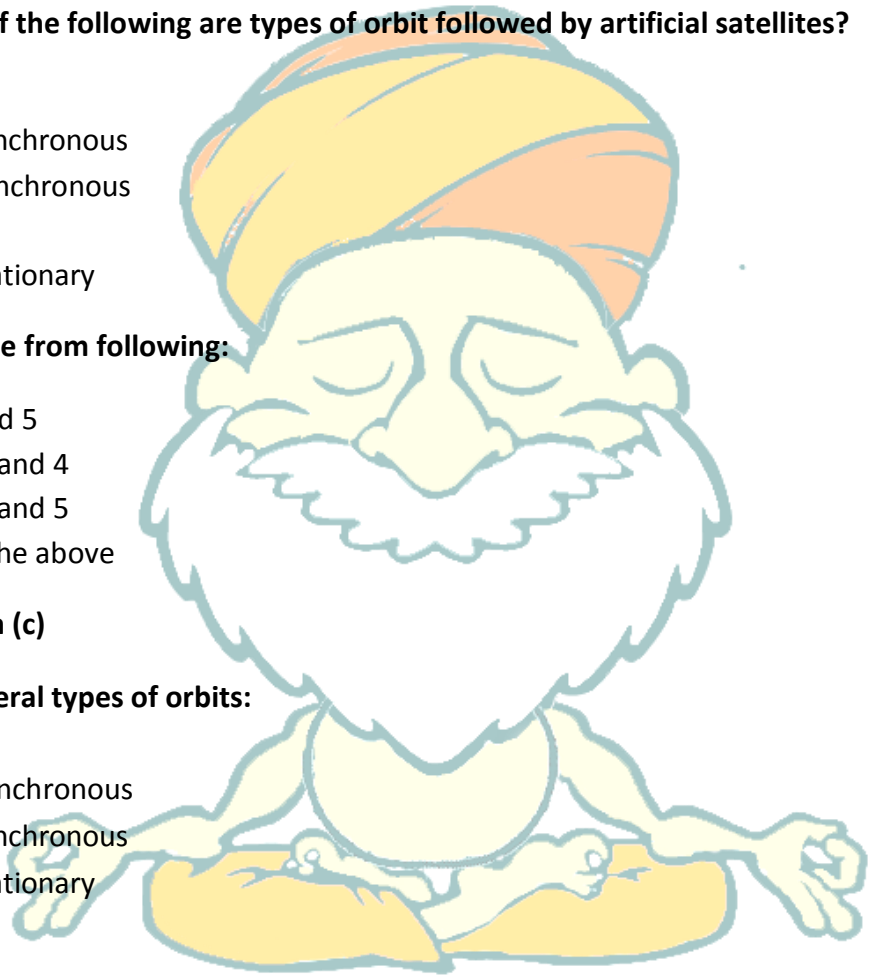
The term "microsatellite" or "microsat" is usually applied to the name of an artificial satellite with a wet mass between 10 and 100 kg. However, this is not an official convention and sometimes those terms can refer to satellites larger than that, or smaller.

Q.24) which of the following are types of orbit followed by artificial satellites?

1. Polar
2. Geosynchronous
3. Sun synchronous
4. Spiral
5. Geostationary

Select the code from following:

a) 1, 2 and 5
b) 1, 2, 3 and 4
c) 1, 2, 3 and 5
d) All of the above



Q.24) Solution (c)

There are several types of orbits:

- Polar
- Sun Synchronous
- Geosynchronous
- Geostationary

Q.25) Which of the following are the objectives of MESSENGER mission?

1. To characterize the chemical composition of Mercury's surface.
2. To study Mercury's geologic history.
3. To study the nature of Mercury's exosphere.

Select the code from following:

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

Q.25) Solution (d)

The MESSENGER mission was designed to study the characteristics and environment of Mercury from orbit. Specifically, the scientific objectives of the mission were:

1. To characterize the chemical composition of Mercury's surface.
2. To study the planet's geologic history.
3. To elucidate the nature of the global magnetic field (magnetosphere).
4. To determine the size and state of the core.
5. To determine the volatile inventory at the poles.
6. To study the nature of Mercury's exosphere.

Q.26) Which of the following agencies is/are responsible for allocation of satellite spectrum?

1. For international purposes, spectrum is allocated by the world body called International Telecommunication Union (ITU).
2. For domestic purposes, it is done by Wireless Planning and Coordination (WPC) Wing of the Ministry of Communications

Select the code from following:

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

Q.26) Solution (c)

Agencies allocating Spectrum

For international purposes, spectrum is allocated by the world body called International Telecommunication Union (ITU).

For domestic purposes, it is done by Wireless Planning and Coordination (WPC) Wing of the Ministry of Communications, created in 1952, is the National Radio Regulatory Authority

responsible for Frequency Spectrum Management, including licensing and caters for the needs of all wireless users in the country. It issues licenses to operate wireless stations.

Q.27) The Term 'LTE' (Long Term Evolution) is related to

a) Construction of Cryogenic engine
b) It is a wireless broadband technology designed to support roaming Internet access via cell phones and handheld devices.
c) It is a term given to encryption technology to keep the messages private
d) None of the above

Q.27) Solution (b)

LTE (Long Term Evolution) is a wireless broadband technology designed to support roaming Internet access via cell phones and handheld devices. Because LTE offers significant improvements over older cellular communication standards, some refer to it as a 4G (fourth generation) technology along with WiMAX.

LTE, an acronym for Long Term Evolution, commonly marketed as 4G LTE, is a standard for wireless communication of high-speed data for mobile phones and data terminals.

Long Term Evolution or LTE is **the first step towards true 4G technologies.** To be a truly 4G technology, download speeds of 100 Mb/s and 1Gb/s should be available from moving (i.e. in a car) or pedestrian points respectively. It was however widely decided across the world that companies could market LTE as "4G LTE" due to some having already taken that step and to avoid further consumer confusion with the terms 3.5G or 3.9G that were starting to surface.

LTE offers maximum download speeds of 299.6 Mb/s although there has been controversy over the speeds some operators running LTE networks are providing, sometimes being lower than the supposedly 'inferior' HSPA (plus) technology. Commercially available speeds vary wildly and using the (at the time of writing) recently launched UK LTE network, tests have shown anywhere in between 8-50 Mb/s in available areas. LTE requires brand new network technology and masts / radios. This also means that the devices that support LTE will also need to have a compatible receiver.

Q.28) Mystic project is a secret surveillance project to record 100% of foreign country's telephone calls. Which of the following countries had launched this project?

a) Israel
b) North Korea
c) USA
d) Russia

Q.28) Solution (c)

MYSTIC PROJECT

It is a secret surveillance project of National Surveillance Agency of USA, to record 100% of foreign country's telephone calls. These calls are stored in a database code named NUCLEON and can be retrieved at a later date using a code named RETRO. Former NSA contractor and whistle-blower of USA's surveillance program Edward Snowden have revealed this.

Q.29) Consider the following statements regarding Budapest Convention:

1. It is the first convention on generic drugs and aims at providing access to generic by developing countries.
2. Brazil and India are the only BRICS countries which are part of the convention.

Which of the above statements are correct?

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

Q.29) Solution (d)

The Convention on Cybercrime, also known as the Budapest Convention on Cybercrime or the Budapest Convention, is the first international treaty seeking to address Internet and computer crime by harmonizing national laws, improving investigative techniques, and increasing cooperation among nations.

- It was drawn up by the Council of Europe in Strasbourg, France, with the active participation of the Council of Europe's observer states Canada, Japan, Philippines, South Africa and the United States.
- Since it entered into force, important countries like Brazil and India have declined to adopt the Convention on the grounds that they did not participate in its drafting.

- Russia opposes the Convention, stating that adoption would violate Russian sovereignty, and has usually refused to cooperate in law enforcement investigations relating to cybercrime.
- It is the first multilateral legally binding instrument to regulate cybercrime.
- Since 2018, India has been reconsidering its stand on the Convention after a surge in cybercrime, though concerns about sharing data with foreign agencies remain.

The Convention aims principally at:

- Harmonising the domestic criminal substantive law elements of offences and connected provisions in the area of cyber-crime.
- Providing for domestic criminal procedural law powers necessary for the investigation and prosecution of such offences as well as other offences committed by means of a computer system or evidence in relation to which is in electronic form.
- Setting up a fast and effective regime of international cooperation.

Q.30) Which of the following are correct differences between a bar code and a QR code?

1. QR Code is 2 dimensional code unlike bar code which is one dimensional.
2. A bar code stores more information as compared to a QR code.
3. A slightly tempered QR code can be read while tempered Bar code becomes useless.

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 (c)

QR Code is 2 dimensional codes unlike bar code which is one dimensional.

- It can store more information than Bar codes.
- 30% error can be tolerated by QR code. Tampered QR codes can be easily read. It provides a robust coding technology.
- QR codes can store diverse information like Web URLs, Pictures, Text information, numbers etc.

- There is no need of dedicated device. Smartphone cameras other digital cameras are enough to scan these codes.
- Simple and easily installable software is needed that translates the bar code into information coded into it.
- It has wide applications from town planning to enterprise. It is being used in business marketing.

Q.31) Which of the following statements regarding IPTV are correct?

1. IPTV enables two-way interactivity, in contrast to traditional one way cable or satellite broadcast network.
2. It communicates over Internet protocol in the form of packets rather than signals in normal TV's.

Select the code from following:

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

Q.31) Solution (c)

IPTV

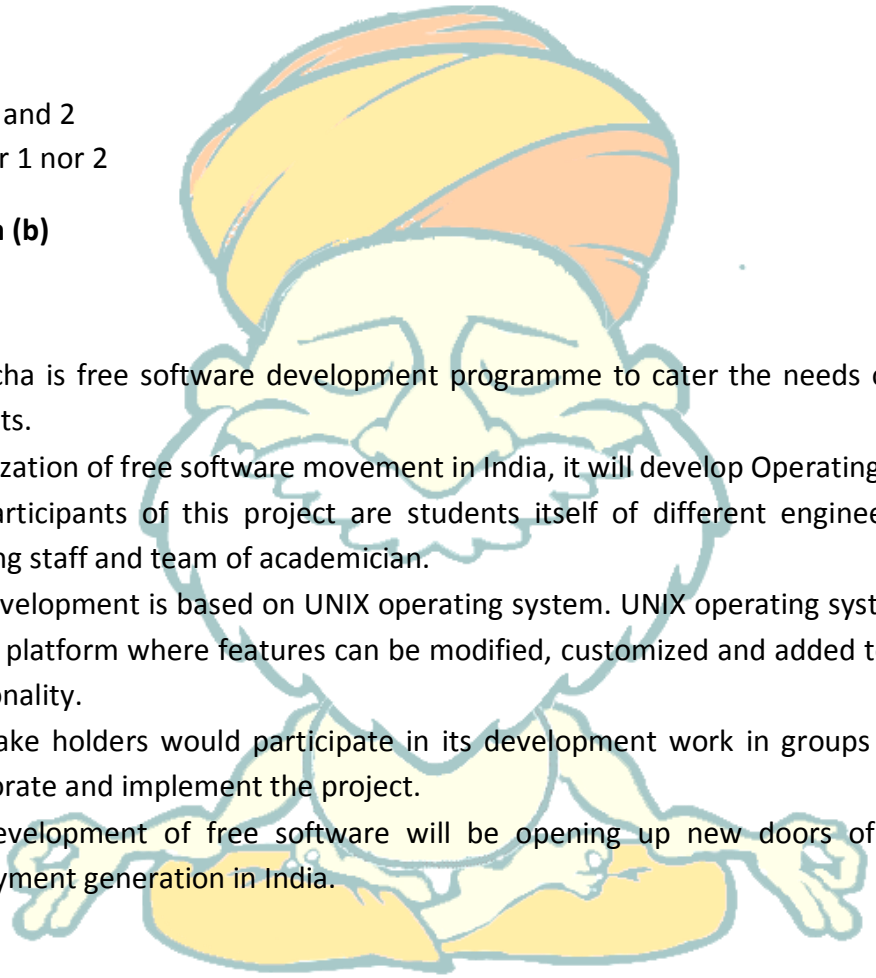
- IPTV is new generation TV that communicates over Internet protocol in the form of packets rather than signals in normal TV's.
- It has 3 components: IPTV where content is encoded and decoded; Delivery Network over which information in the form of packets is transmitted; Setup Box which is communication link between operator's broadband modem and customer's TV. Also packets delivered are reassembled here.
- IPTV enables two-way interactivity, in contrast to traditional one way cable or satellite broadcast network. The two-way IPTV network means viewers have more options to personalize interact and control their viewing experience.
- Because IPTV is based on internet protocol, it is sensitive to packet loss and delays if the IPTV connection is not fast enough.

Q.32) Consider the following statements regarding E – Swecha OS:

1. E-Swecha is free software development programme to design operating system for defense purposes.
2. The participants of this project are students itself of different engineering colleges, teaching staff and team of academician.

Which of the above statements are correct?

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



Q.32) Solution (b)

E-SWECHA OS

- E-Swecha is free software development programme to cater the needs of engineering students.
- In realization of free software movement in India, it will develop Operating System (OS).
- The participants of this project are students itself of different engineering colleges, teaching staff and team of academician.
- The development is based on UNIX operating system. UNIX operating system is an open source platform where features can be modified, customized and added to enhance the functionality.
- The stake holders would participate in its development work in groups and teams to collaborate and implement the project.
- The development of free software will be opening up new doors of learning and employment generation in India.

Q.33) Which of the following statements correctly defines 'Specific Absorption Rate'?

a) It is the amount of time which is required increase the temperature of liquid by $1^{o}C$ through absorption of heat.
b) It is the rate at which solar heat is absorbed by a solid surface.
c) It's a standard for safe exposure to radio frequency.
d) It is a measure of radiation received by the antennas from the satellite.

Q.33) Solution (c)

SPECIFIC ABSORPTION RATE (SAR)

- It's a standard for safe exposure to radio frequency.
- SAR measured as the amount of radio frequency or electromagnetic frequency absorbed per unit mass of tissue or human body. It's measured in units of Watt per kilogram.
- It has gained importance because of high exposure of human beings to Mobile radio frequency.
- It is assumed that exposure of human tissue to high frequency can cause mutation and gene transformation. Hence to meet the health standard FCC has come up with a standard that is tolerable by human body.
- FCC limit for public exposure from cellular telephones is an SAR level of 1.6 watts per kilogram (1.6 W/kg).
- India, Department of Telecommunication has come up with SAR regulation to check electromagnetic radiation to address health concerns and regulate Mobile manufacturing industry.

Q.34) Consider the following statements regarding 'Ambient Intelligence':

1. Ambient intelligence (AmI) is a setup of electronic devices that observes records, analyse and respond to the human environment.
2. AmI comprises of three main components: ubiquitous computing, ubiquitous communication, and user adaptive interfaces.

Which of the above statements is/are correct?

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

Q.34) Solution (c)

AMBIENT INTELLIGENCE

- Ambient intelligence (AmI) is a setup of electronic devices that observes records, analyse and respond to the human environment.

- They have Ability to model user behaviour, activity prediction and recognition, decision making and controlling.
- The objective of AmI is to broaden the interaction between human beings and digital information technology through the use of ubiquitous computing devices.
- AmI comprises of three main components: ubiquitous computing, ubiquitous communication, and user adaptive interfaces.
- It has wide range of applications like Smart homes which smartly interact with residents;
- Health related Application where patients' activity can be monitored, analyzed and quick and automatic decisions can be taken; Public transportation System where traffic can be managed efficiently.
- It poses security issue and Privacy challenges.

Q.35) E-Eye is a pilot project started by government of India for e-surveillance. Where is E – Eye being used

a) International Border
b) Shopping complex
c) Strategic Public Establishment
d) National Parks

Q.35) Solution (d)

E-EYE

- E-Eye is a pilot project started by government of India for e-surveillance
- E-surveillance is achieved by providing a set of cameras that are installed in an area especially National parks which can monitor and record the movement around it at 360 degree. These cameras are fitted with night vision features. The system can raise alarms as when required.
- In India, The National Tiger Conservation Authority (NTCA) has approved the installation of these cameras in Corbet National Park.

Purpose and Benefits

- Tracking animal movement
- Checking human trespassing

- Control and avoidance of animal poaching.
- Habitat destruction, cutting of trees, grazing can be tracked
- It will help in better planning and coordination of authorities.

Q.36) Which of the following statements is/are correct regarding Flue gases?

1. They are methane rich gases found above the petroleum reserve.
2. They contain large amount of Nitrogen and Sulphur oxides as well as particulate matter like soot.

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)

Flue Gases

Flue Gases is mixture of gases produced by combustion of fuel and other materials in power stations and various industrial plants and released via flu (ducts) in atmosphere. It largely contains oxides of nitrogen derived from combustion of air, sulphur oxides, carbon dioxide, carbon monoxide, water vapour, excess oxygen, particulate matter like soot.

Q.37) Which of the following statements correctly define Petro crops?

a) They are the crops used to extract petroleum from an oil field.
b) They are the crops that are grown directly on the rocks
c) They are hydrocarbon producing plants.
d) They are highly nutritious edible crops which resemble like rocks.

Q.37) Solution (c)

Petro crops (plants) are hydrocarbon producing plants that can be grown on land which are unfit for agriculture and not covered with forests.

- These can become alternative energy sources, which can be inexhaustible and ideal for liquid fuel.
- Jatropa curcas is an important petro plant.
- Latex of Jatropa curcas is used to obtain biocrude, which is then converted into several useful products like gasoline (automobile fuel), gas oil and kerosene.

Q.38) Which of the following is known as 'Animal Starch'?

a) Glycogen
b) Glycerin
c) Cellulose
d) Fructose

Q.38) Solution (a)

Starch and Gylcogen

Starch is the main storage polysaccharide of plants. It is the most important dietary source for human beings. High content of starch is found in cereals, roots, tubers and some vegetables.

Cellulose occurs exclusively in plants and it is the most abundant organic substance in plant kingdom. It is a predominant constituent of cell wall of plant cells. The carbohydrates are stored in animal body as glycogen. It is also known as animal starch.

Glycogen is the body's storage form of starch, though it is technically glucose. To understand this, you must understand that starch is a plant's storage form of glucose. However, as humans, we store the same glucose as glycogen. Our body is equipped to contain excess glucose molecules as glycogen rather than starch.

Q.39) Which of the following statements correctly defines 'Biologics'?

a) Biologics are medicines made from living cells through highly complex manufacturing processes.
b) They are inorganic chemical compounds which mimic organic compounds once they are inside a living being.
c) They are artificial prosthetic organs made from tissue culture.
d) They are computers which can mimic a human brain.

Q.39) Solution (a)

Biologics

- Biologics are medicines made from living cells through highly complex manufacturing processes and must be handled and administered under carefully monitored conditions.
- In contrast to most drugs that are chemically synthesized and their structure is known, most biologics are complex mixtures that are not easily identified or characterized.

Q.40) Consider the following statements regarding Orphan Drugs:

1. It is a medicine that is intended to treat diseases so rare that sponsors are reluctant to develop them under usual marketing conditions.
2. They are usually generic medicine which is sold without a brand name.
3. Karnataka is the first state in India to release an Orphan Drug policy.

Select the code from following:

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

Q.40) Solution (d)

ORPHAN DRUG

A biological product or medicine that is intended to treat diseases so rare that sponsors are reluctant to develop them under usual marketing conditions.

- In 1983, the US government passed the Orphan Drugs Act to stimulate research in the treatment of diseases that have been largely ignored by the pharmaceutical industry. Similar laws have been enacted in Japan, Australia and the European Union.
- All these laws offer incentives such as shorter clinical trials, extended exclusivity, tax breaks and high rates of regulatory success. They have made it commercially attractive for pharmaceutical companies to invest in the research and development (R&D) required to find a cure for these diseases. India does not have a nationwide Orphan Drug policy.

- In 2016 Karnataka became the first state to release a Rare Diseases and Orphan Drugs Policy. It recommended the implementation of preventive and carrier testing as a means of reducing morbidity and mortality. Given that over 80% of rare diseases have a genetic basis, it suggested the use genetic testing to accelerate the identification of the critical genes involved in rare diseases.