Q.1) Which of the following are endocrine glands in human system?

1. Pituitary gland
2. Pineal gland
3. Thyroid gland

Select the correct answer using the codes given below.

a) 1 only
b) 2 only
c) 1, 2 and 3
d) None

Q.1) Solution (c)

Endocrine glands lack ducts and are hence, called ductless glands. Their secretions are called hormones.

Hormone is a chemical produced by endocrine glands and released into the blood and transported to a distantly located target organ.

Hormones are non-nutrient chemicals which act as intercellular messengers and are produced in trace amounts.

The endocrine glands and hormone producing diffused tissues/cells located in different parts of our body constitute the endocrine system. **Pituitary, pineal, thyroid, adrenal, pancreas, parathyroid, thymus and gonads (testis in males and ovary in females) are the organized endocrine bodies in our body.**

In addition to these, some other organs, e.g., **gastrointestinal tract, liver, kidney, heart also produce hormones.**

Do you know?

- The pineal gland is located on the dorsal side of forebrain. Pineal secretes a hormone called melatonin. Melatonin plays a very important role in the regulation of a 24-hour (diurnal) rhythm of our body.

THINK!

- Mechanism of Hormone Action

Q.2) Which of the following best defines biomarker?

a) A biomarker is anything that can be used as an indicator of a particular disease state or some other physiological state of an organism.
b) A living organism used to gauge change in climatic patterns.
c) A chemical substance used to regulate the circadian rhythm.
d) None

Q.2) Solution (a)

In medicine, a biomarker is a measurable indicator of the severity or presence of some disease state. More generally a biomarker is anything that can be used as an indicator of a particular disease state or some other physiological state of an organism.

A biomarker can be a substance that is introduced into an organism as a means to examine organ function or other aspects of health. For example, rubidium chloride is used in isotopic labeling to evaluate perfusion of heart muscle. It can also be a substance whose detection indicates a particular disease state, for example, the presence of an antibody may indicate an infection.

Do you know?

- Hematology, also spelled haematology, is the branch of medicine concerned with the study of the cause, prognosis, treatment, and prevention of diseases related to blood.

THINK!

- Hemostasis

Q.3) Which among the following are the products of anaerobic respiration?

1. Adenosine Tri Phosphate (ATP)
2. Lactic Acid
3. Glucose

Select the correct answer using the code given below.

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

Q.3) Solution (c)

In biology terms, respiration is the process by which cells break down sugar. Within a cell, two types of respiration may occur: "aerobic" and "anaerobic." Aerobic respiration is the more productive of the two and requires the presence of oxygen. Without oxygen, anaerobic respiration, which is also known as "fermentation," occurs. And the products of anaerobic respiration are

- ATP
- Lactic acid
- Ethyl alcohol

Do you know?

- Anaerobic respiration produces the relatively lesser amount of energy as compared to aerobic respiration as glucose is not completely broken down in the absence of oxygen.

THINK!

- Cellular respiration

Q.4) DOTS is the treatment given to treat which of the following disease?

a) Malaria
b) TB
c) Kala azhar
d) Leprosy

Q.4) Solution (b)

DOTS is currently the WHO-recommended strategy for TB control. DOTS must be used throughout the entire course of therapy for best cure rates. The core intervention involves a health worker who observes the patient when s/he is swallowing each dose of anti-TB medication. DOTS also involve the regular collection of sputum specimens until two consecutive samples test negative for AFB.

Do you know?

- NIKSHAY- A web-based solution for monitoring of TB patients To monitor Revised National Tuberculosis Programme (RNTCP) effectively, a web enabled and case based monitoring application called NIKSHAY has been developed by National Informatics Centre (NIC).

THINK!

- RNTCP

Q.5) Cobas Zika test is used to detect Zika virus. The test confirms the presence of zika virus by detecting which of the organelle

a) DNA
b) RNA
c) Plastids
d) Vacuoles

Q.5) Solution (b)

Cobas Zika test is qualitative nucleic acid test for **detection of Zika virus RNA** in individual plasma specimens obtained from volunteer donors of w hole blood and blood components and from living organ donors. It has shown more than 99% clinical specificity, in earlier evaluation for testing individual samples from blood donations at five external laboratories.

Do you know?

- Zika virus is vector borne disease transmitted primarily by Aedes aegypti mosquitoes, the same mosquito that transmits dengue. It can also spread through blood transfusion and sexual contact.

THINK!

- ELISA test

Q.6) Which of the following statements is/are correct regarding `Yellow fever'?

1. It is spread to humans by infected mosquitoes.
2. The infection is so named because of the yellow skin colour (jaundice) observed in people with serious illness.

Select the correct answer using the code given below.

a) 1 only
b) 2 only
c) Both 1 and 2
d) None

Q.6) Solution (c)

Yellow fever is a tropical disease that is spread to humans by infected mosquitoes and is caused by the yellow fever virus. The disease is found in urban and rural areas of tropical zone countries in Africa and South America. **Yellow fever has not been reported in Asia.**

Yellow fever is a viral disease of short duration and varying severity that is transmitted primarily by mosquitoes. **The infection is so named because of the yellow skin colour (jaundice) observed in people with serious illness.** Symptoms of infection can be mild but often increase in severity with the sudden onset of fever, muscle pain, nausea, vomiting, headache and prostration. The disease may progress to visible haemorrhage, jaundice, kidney and liver failure. The death rate in unvaccinated people may be as high as 50 per cent.

Do you know?

- Jungle yellow fever is mainly a disease of monkeys. It is spread from infected mosquitoes to monkeys in the tropical rain forest. People get jungle yellow fever when they put themselves in the middle of this natural cycle and are bitten by mosquitoes that have been infected by monkeys. Jungle yellow fever is rare and occurs mainly in persons who work in tropical rain forests.

THINK!

- MERS

Q.7) DASTAK Campaign is launched to eradicate

a) Japanese Encephalitis
b) Malaria
c) TB
d) Dengue fever

Q.7) Solution (a)

The government of Uttar Pradesh has recently launched a huge door to door campaign DASTAK, to prevent Acute Encephalitis Syndrome (AES) and Japanese Encephalitis (JE) to make sure that the disease is eradicated from the state at the earliest. The campaign was launched in association with UNICEF. Awareness about the disease will be created by initiating sanitation drive, ensuring vaccination and early treatment to the disease, through mass media communication etc.

Do you know?

- Japanese Encephalitis virus (JEV) is a flavivirus spread by mosquitoes and is related to same genus as yellow fever, dengue and West Nile Viruses. JEV is the primary cause for viral Encephalitis in a large number of countries in the Asian continent. In 1871, the first case of Japanese Encephalitis was recorded in Japan.

THINK!

- Ebola

(Source https://timesofindia.indiatimes.com/city/lucknow/uttar-pradesh-to-launch-house-to-house-campaign-against-encephalitis/articleshow/62771097.cms)

Q.8) Which of the following illness are correctly matched?

1. Minamata disease – Mercury contamination
2. Itai-itai disease – Cadmium contamination
3. Emphysema – Coal mine pollution
4. Pneumoconiosis – Air pollution

Select the code from following:

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

Q.8) Solution (a)

- Blue baby Syndrome- Nitrate contamination
- Minamata disease- Mercury contamination
- Itai-itai disease- Cadmium contamination
- Emphysema- Air pollution
- Pneumoconiosis- Coal mine pollution

Q.9) Xylem and Phloem are the vascular tissues of the plants. Which of the following statements regarding Xylem and Phloem are correct?

1. Xylem is continuous network of channels that connects roots to leaves and transport water and nutrients
2. The food prepared by plants is transported back to all the parts of plants via vascular tissue called phloem.

Select the code from following:

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

Q.9) Solution (c)

Transport of water and minerals

- Plants absorb water and minerals through roots
- The root hairs in roots help in absorbing minerals and nutrients dissolved in water from roots to leaves plants have pipe like vessels (which transport water and nutrients from soil)
- These vessels are made of special cells called as vascular tissue (tissue – group of cells for special function)
- Vascular tissue for transport of water and nutrients is called as xylem. Xylem is continuous network of channels that connects roots to leaves and transport water and nutrient.
- The food prepared by plants is transported back to all the parts of plants via vascular tissue called phloem.

Q.10) Cryogenics finds application in

a) Surgery, Space technology and Magnetic levitation
b) Telemetry, Space technology and Magnetic levitation
c) Space technology, Surgery and Telemetry
d) Surgery, Telemetry and Magnetic levitation

Q.10) Solution (a)

Telemetry

Telemetry is an automated communications process by which measurements and other data are collected at remote or inaccessible points and transmitted to receiving equipment for monitoring.

Applications of cryogenics

- Aerospace-cryogenic engines
- Medical Field

- Manufacturing field
- Electronics Field
- Fuels research

Q.11) Henderson Island is a World Heritage site. he UNESCO website describes Henderson as "a gem" and "one of the world's best remaining examples of a coral atoll," that is "practically untouched by human presence." Where is Henderson Island located?

a) North Pacific
b) South Pacific
c) North Pacific
d) Indian Ocean

Q.11) Solution (b)

Henderson Island lies in the South Pacific, halfway between New Zealand and Chile. No one lives there. It is about as far away from anywhere and anyone on Earth. Yet, on Henderson's white sandy beaches, you can find articles from Russia, the United States, Europe, South America, Japan, and China. All of it is trash, most of it plastic. It bobbed across global seas until it was swept into the South Pacific gyre, a circular ocean current that functions like a conveyor belt, collecting plastic trash and depositing it onto tiny Henderson's shore at a rate of about 3,500 pieces a day.

The accumulation is even more disturbing when considering that Henderson is also a World Heritage site and one of the world's biggest marine reserves. The UNESCO website describes Henderson as "a gem" and "one of the world's best remaining examples of a coral atoll," that is "practically untouched by human presence."

Q.12) Irradiation process significantly increases the shelf life of a food product. Which of the following are the benefits of irradiation process?

1. Effective elimination of harmful bacteria, viruses and insects/pests.
2. Cold & clean process (No temperature raise or residue)
3. Treatment can be done after final packaging
4. Enhances the nutrition level of the food product

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.12) Solution (a)

Bhabha Atomic Research Centre (BARC) - Department of Atomic Energy (DAE) has been engaged in R&D work on the technology of preservation and hygienization of food and agri - products by radiation.

Irradiation is very effective in treating the horticultural produces. Extension of shelf life of horticultural produces is very much depended on the produce, variety and storage conditions.

Unique advantages of radiation processing are:

- Significant increase in shelf life for many products including fruits, vegetables, cereals, pulses,spices, sea foods and meat products.
- Effective elimination of harmful bacteria, viruses and insects/pests.
- Cold & clean process (No temperature raise or residue);
- Treatment done after final packaging (no repacking necessary).

Recently the harmonization of food irradiation rules with the international regulation through adaptation of class wise clearance of irradiated food items by the Food Safety and Standards Authority of India (FSSAI) has taken place [Food Safety and Standards (Food Products Standards and Food Additives) Sixth Amendment Regulations, 2016] for large scale deployment of this technology.

Q.13) Nobel prize for physics in 2017 was given for:

a) Developing cryo-electron microscopy for the high-resolution structure determination of biomolecules in solution
b) Discoveries of molecular mechanisms controlling the circadian rhythm
c) LIGO detector and the observation of gravitational waves
d) Blue LED

Q.13) Solution (c)

- Developing cryo-electron microscopy for the high-resolution structure determination of biomolecules in solution - Chemistry

- Discoveries of molecular mechanisms controlling the circadian rhythm - Medicine
- LIGO detector and the observation of gravitational waves – Physics
- International Campaign to Abolish Nuclear Weapons (ICAN) - "for its work to draw attention to the catastrophic humanitarian consequences of any use of nuclear weapons and for its ground-breaking efforts to achieve a treaty-based prohibition of such weapons" – Peace

Q.14) Inland waterways are usually connected to the seas to provide passage to the ships. What happens to a ship when it enters from a river into the sea?

a) It rises a little
b) It sinks a little
c) The level remains unchanged
d) It can increase or decrease

Q.14) Solution (a)

The density of sea water is higher than the density of river water. Hence it exerts more buoyant force on the ship. This causes a slight increase in the level of the ship.

Q.15) Is it possible for the sun to become a black hole?

a) No because it's too large in mass
b) No because it's too small in mass
c) Yes at the end of its life
d) May or may not

Q.15) Solution (b)

Only stars with very large masses can become black holes. Our Sun, for example, is not massive enough to become a black hole. Four billion years from now when the Sun runs out of the available nuclear fuel in its core, our Sun will die a quiet death. Stars of this type end their history as white dwarf stars. More massive stars, such as those with masses of over 20 times our Sun's mass, may explode as supernovae and eventually create a black hole.

Q.16) Which of the following is the closest answer to how climate scientists infer that climate change happened?

a) Tree rings
b) Thermometer-based recordings
c) Rain guage measurements
d) Sea-level rise

Q.16) Solution (a)

The analysis of carbon and oxygen isotopes embedded in tree rings can reveal information about past climate events.

Carbon and oxygen isotope analysis is a good way to measure past climate change as it can provide accurate data on past events.

Although, scientists have long looked at the width of tree rings to estimate temperature levels of past years but strong correlation between the carbon and oxygen data and temperatures has been found for the first time.

Observing tree rings scientists have reconstructed past climatic patterns and environmental change in the region. Beyond providing valuable insight into how the environment reacted to events like fires and climatic shifts in the past, these observations can also help predict how the Arctic environment may respond to the inevitable warming of the future.

Thin rings would indicate low precipitation, wide rings higher precipitation.

Q.17) In astronomy, what is gravitational lensing?

a) Introducing a very large lens or series of lenses to view distant objects
b) Observing massive celestial bodies
c) The bending of light from a celestial body when it passes close to a massive object
d) It is work done by the gravitational field moving a body to its given position in space from infinity

Q.17) Solution (c)

When astronomers refer to lensing, they are talking about an effect called gravitational lensing. Normal lenses such as the ones in a magnifying glass or a pair of spectacles work by

bending light rays that pass through them in a process known as refraction, in order to focus the light somewhere (such as in your eye).

Gravitational lensing works in an analogous way and is an effect of Einstein's theory of general relativity – simply put, mass bends light. The gravitational field of a massive object will extend far into space, and cause light rays passing close to that object (and thus through its gravitational field) to be bent and refocused somewhere else. The more massive the object, the stronger its gravitational field and hence the greater the bending of light rays - just like using denser materials to make optical lenses results in a greater amount of refraction.

Q.18) This is the structure that allows nerve cells to communicate with their neighbours by passing on electrical or chemical signals. Name it.

a) Dendron
b) Axon
c) Synapse
d) Glial

Q.18) Solution (c)

In the nervous system, a synapse is a structure that permits a neuron (or nerve cell) to pass an electrical or chemical signal to another neuron or to the target efferent cell.

The function of the synapse is to transfer electric activity (information) from one cell to another. The transfer can be from nerve to nerve (neuro-neuro), or nerve to muscle (neuro-myo). The region between the pre- and postsynaptic membrane is very narrow, only 30-50 nm.

Q.19) In signal processing what is "white noise"?

a) A signal whose intensity peaks around a single frequency
b) A signal having a sharply defined frequency
c) A signal having an equal distribution of intensity over all frequencies
d) It is effectively silence with a tiny bit of random noise at some frequencies, which is the upper limit of human hearing

Q.19) Solution (b)

In signal processing, white noise is a random signal having equal intensity at different frequencies, giving it a constant power spectral density.

Q.20) Which is the largest cell in the human body?

a) Epithelial cell
b) Glial cell
c) Neuron
d) Ovum or egg cell

Q.20) Solution (d)

The egg cell, or ovum (plural ova), is the female reproductive cell (gamete) in oogamous organisms. The egg cell is typically not capable of active movement, and it is much larger (visible to the naked eye) than the motile sperm cells. When egg and sperm fuse, a diploid cell (the zygote) is formed, which rapidly grows into a new organism.

Do you know?

The ovum is one of the largest cells in the human body, typically visible to the naked eye without the aid of a microscope or other magnification device. The human ovum measures approximately 0.1 mm in diameter.

Q.21) Consider the following statements:

1. Both electromagnetic and gravitational waves travel with the speed of light.
2. Both electromagnetic and gravitational waves can create ripples in space-time.

Which of the statements given above is/are correct?

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

Q.21) Solution (a)

Gravitational waves are ripples in the curvature of space-time which propagate as waves, travelling outward from the source. Predicted in 1916 by Albert Einstein on the basis of his

theory of general relativity. Gravitational waves transport energy as gravitational radiation, a form of radiant energy similar to electromagnetic radiation. The speed of gravitational waves in the general theory of relativity is equal to the speed of light in vacuum, c.

Electromagnetic waves are synchronized oscillations of electric and magnetic fields that propagate at the speed of light through a vacuum. Visible light is one type of electromagnetic radiation; other familiar forms are invisible electromagnetic radiations, such as radio waves, infrared light and X rays.

Only gravitational waves can create ripples in space-time, electromagnetic waves create vibrations of electric and magnetic field in space only. Thus, statement 1 is correct and statement 2 is wrong. Hence, (a) is the correct answer.

Q.22) 'Walong' is a tri-junction between

1. India
2. China
3. Myanmar
4. Sikkim

Select the correct code:

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

Q.22) Solution (a)

Walong is situated on the bank of Lohit river.

Source: https://www.livemint.com/Politics/pk7ZEWPLKnYoVCO5o8SWpN/Army-increases-strength-at-IndiaChinaMyanmar-trijunction.html

Q.23) 'Pradhan Mantri Adarsh Gram Yojana' (PMAGY) is under the

a) Ministry of Rural Development
b) Ministry of Social Justice and Empowerment
c) Ministry of Statistics and Programme Implementation
d) Ministry of Drinking Water and Sanitation

Q.23) Solution (b)

The Centrally Sponsored Scheme 'Pradhan Mantri Adarsh Gram Yojana' (PMAGY) is being implemented for integrated development of Scheduled Castes (SC) majority villages having SC Population concentration > 50%. Initially the scheme was launched on Pilot basis in 1000 villages in 5 States viz. Assam, Bihar, Himachal Pradesh, Rajasthan and Tamil Nadu. The Scheme was further revised on 22.01.2015 with expansion to another 1500 SC majority villages distributed in Assam, Uttar Pradesh, West Bengal, Madhya Pradesh, Karnataka, Punjab, Uttarakhand, Odisha, Jharkhand, Chhattisgarh, Andhra Pradesh, Telangana and Haryana.

The scheme is being implemented by the Ministry of Social Justice and Empowerment.

Q.24) Consider the following statement

1. There are only two landlocked countries in South America
2. There are no landlocked countries in South East Asia
3. No Scandinavian Country is landlocked

Select the correct code:

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

Q.24) Solution (c)

Statement 1 is correct – Bolivia and Paraguay are landlocked

Statement 2 is incorrect – Laos is landlocked.

Statement 3 is correct.

Q.25) Consider the following statements about 'Nipah Virus'

1. The natural host of the virus are Culex mosquitoes
2. It was first identified in Coastal Kerala

Select the correct statements

1. 1 Only
2. 2 Only
3. Both 1 and 2
4. Neither 1 nor 2

Q.25) Solution (d)

Nipah virus (NiV) infection is a newly emerging zoonosis that causes severe disease in both animals and humans. The natural host of the virus are fruit bats of the Pteropodidae Family, Pteropus genus.

NiV was first identified during an outbreak of disease that took place in Kampung Sungai Nipah, Malaysia in 1998.

The Nipah virus or NiV infection has symptoms like breathing trouble, inflammation of the brain, fever, headache, drowsiness, disorientation and delirium. A patient can slip into coma within 48 hours.

In 2004, many were infected in Bangladesh after consuming date palm sap contaminated by infected fruit bats.

The virus is transmitted through direct contact with infected bats, pigs, or from other NiV-infected people. Doctors advise that fruits strewn on the ground should not be eaten, for safety.

Q.26) 'Karamay Declaration' is associated with which of the following?

a) INSTC
b) CPEC
c) TAPI
d) SCO

Q.26) Solution (b)

Karamay Declaration is collaboration between Pakistan and China in space technology under China-Pakistan Economic Corridor (CPEC).

It stressed upon a joint launch of space missions which would consist of astronauts from both countries.

CPEC is one of the six economic corridors conceived by china under its "Road and Belt" initiative. CPEC is China and Pakistan's bilateral project connecting Xinjian to Gwadar port through highways, railways, pipelines etc.