

CAREERS 360

TEST **Series**

NEET UG 2025

Biology Mock Test

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About

The **Biology NEET Mock Test 2025** has been meticulously designed to help NEET aspirants test their knowledge and problem-solving abilities across a range of important topics in biology. The questions are carefully selected to reflect the type and level of difficulty that students will face in the actual NEET exam. The mock test offers a balanced mix of questions from both Botany and Zoology, ensuring a holistic preparation strategy. Detailed solutions are provided for every question to help students analyze their mistakes and improve their conceptual understanding.

Key aims of the mock test:

- **Strengthening Core Concepts:** Covering a variety of topics from the NEET biology syllabus to ensure complete preparation.
- **Improving Problem-Solving Speed and Accuracy:** Practice under timed conditions to enhance exam readiness.
- **Identifying Weak Areas:** Focus on areas that require more revision based on test performance.
- **Boosting Confidence:** Regular practice will help students feel more confident during the actual exam

Here is a structured list of topics or sections covered in the [NEET Biology Mock Test](#).

Diversity in the Living World

- Classification of Living Organisms
- Five Kingdom Classification
- Nomenclature and Taxonomy

Structural Organization in Animals and Plants

- Morphology of Flowering Plants
- Anatomy of Flowering Plants
- Structural Organization in Animals

Cell Structure and Function

- Cell Theory and Structure
- Prokaryotic and Eukaryotic Cells
- Cell Cycle and Cell Division

Plant Physiology

- Photosynthesis in Higher Plants
- Respiration in Plants
- Plant Growth and Development

Human Physiology

- Digestion and Absorption
- Breathing and Exchange of Gases
- Body Fluids and Circulation
- Excretory Products and Their Elimination
- Neural Control and Coordination
- Chemical Coordination and Integration

Reproduction

- Reproduction in Organisms
- Sexual Reproduction in Flowering Plants
- Human Reproduction
- Reproductive Health

Genetics and Evolution

- Principles of Inheritance and Variation
- Molecular Basis of Inheritance
- Evolutionary Biology

Biology and Human Welfare

- Human Health and Diseases
- Strategies for Enhancement in Food Production
- Microbes in Human Welfare

Biotechnology

- Principles and Processes
- Applications in Biotechnology

Ecology and Environment

- Ecosystem and Environmental Issues
- Biodiversity and Conservation
- Organisms and Populations

Practice Questions

- Multiple-choice questions with four options per question.
- Detailed explanations and solutions for all questions to reinforce learning.

Mock Test

Q. 1 A supinator muscle

Option 1:

contracts to rotate the forearm and thus to make palm face upward or forward

Option 2:

contracts to draw a bone away from the body midline

Option 3:

brings the limb towards midline

Option 4:

is antagonist of adductor muscle

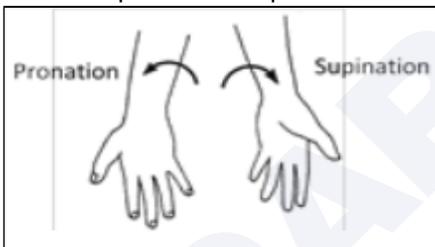
Correct Answer:

contracts to rotate the forearm and thus to make palm face upward or forward

Solution:

Types of Skeletal Muscles -

Pronator and Supinator: The contraction of a pronator rotates the forearm to turn the palm downward or backwards. Supinator is the antagonist of pronator. A supinator contract to rotate the forearm and thus to make palm face upward or forward.



Hence the correct option is a. contracts to rotate the forearm and thus to make palm face upward or forward

Q. 2 Thyroxine is released from Thyroid under the influence of _____ hormone. from Anterior Pituitary which is released due to _____ hormone from hypothalamus.

Option 1:

T₃, T₄

Option 2:

TRH, TSH

Option 3:
TSH, TRH

Option 4:
TRH, TRH

Correct Answer:
TSH, TRH

Solution:

TRH (Thyroid Releasing Hormone) from Hypothalamus acts on Ant. Pitutary to release TSH. This is released to act on Thyroid gland which causes release of Thyroxine.

Q. 3 The battery of artifical pacemaker is built of

Option 1:
Nickel

Option 2:
lithium

Option 3:
photosensitive material

Option 4:
Dry Cadmium

Correct Answer:
lithium

Solution:

The lithium is included in formation of pacemaker. Also it is called Li-Ha battery (Lithium Halide)

Q. 4 Which one of the following growth regulators is known as ' stress hormone'?

Option 1:
Abscissic acid

Option 2:
Ethyelene

Option 3:
GA₃

Option 4:
Indole acetic acid

Correct Answer:

Abscisic acid

Solution:

- Abscisic acid is a mildly acidic dextrorotatory cis sesquiterpene growth hormone which functions as a general growth inhibitor by counteracting other hormones (auxin, gibberellins, and cytokinins) or reactions mediated by them.
- It is also called the stress hormone because the production of hormone is stimulated by drought, water logging and other adverse environmental conditions.

Q. 5 Vital system absent in tapeworm is

Option 1:

Nervous system

Option 2:

Digestive system

Option 3:

Excretory system

Option 4:

Reproductive system

Correct Answer:

Digestive system

Solution:

As we have learned

Digestion in Platyhelminthes -

Digestive system is totally absent, absorbed food directly through body surface.

Q. 6 The sequence of organelles in which photorespiration occurs is

Option 1:

Mitochondria - peroxisome - chloroplast

Option 2:

Chloroplast - peroxisome - mitochondria

Option 3:

Peroxisome - Chloroplast - mitochondria

Option 4:

Peroxisome - mitochondria - chloroplast

Correct Answer:

Chloroplast - peroxisome - mitochondria

Solution:

- Phosphoglycolate is the substrate for the photorespiration process.
- The process requires three cell organelles: chloroplasts, peroxisomes and mitochondria.

The process of respiration requires three cell organelles i.n. chloroplasts, peroxisomes and mitochondria. Hence, the correct answer is option b.

Q. 7 In TCA cycle, how many reduced co-enzymes are produced from acetyl CoA?

Option 1:3NADH,1FADH₂**Option 2:**2NADH,1FADH₂**Option 3:**4NADH,2FADH₂**Option 4:**5NADH,1FADH₂**Correct Answer:**3NADH,1FADH₂**Solution:**

As we learn

Energy production during TCA cycle -

The total of 24 ATP are produced from two acetyl CoA/ 1 glucose

 $6 \text{ NADH} = 6 \times 3 \text{ ATP} = 18 \text{ ATP}$ $2 \text{ FADH}_2 = 2 \times 2 \text{ ATP} = 4 \text{ ATP}$ $2 \text{ GTP} = 2 \times 1 \text{ ATP} = 2 \text{ ATP}$

Two molecules of pyruvate are formed from one molecule of glucose. So, TCA cycle must occur twice for each molecule of glucose respired. Therefore $2 \times 3 = 6 \text{ NADH}$ and $2 \times 1 = 2 \text{ FADH}_2$ are formed from two molecules of acetyl CoA.

Q. 8 Which of the following is **correct** regarding AIDS causative agent HIV?

Option 1:

HIV is enveloped virus containing one molecule of single-stranded RNA and one molecule of reverse transcriptase.

Option 2:

HIV is enveloped virus that contains two identical molecules of single-stranded RNA and two molecules of reverse transcriptase.

Option 3:

HIV is unenveloped retrovirus.

Option 4:

HIV does not escape but attacks the acquired immune response.

Correct Answer:

HIV is enveloped virus that contains two identical molecules of single-stranded RNA and two molecules of reverse transcriptase.

Solution:

As we have already discussed in AIDS -

Cause of AIDS -

AIDS is caused by the Human Immuno Deficiency Virus (HIV), a member of a group of viruses called retrovirus.

- wherein

Retrovirus has an envelope enclosing the RNA genome.

HIV is an enveloped virus that contains two identical molecules of single-stranded RNA and two molecules of reverse transcriptase.

Hence, the correct option is (b).

Q. 9 Assertion: Synergids play an important role in guiding the pollen tube to the egg cell in angiosperms.

Reason: The synergids secrete a chemical attractant that guides the pollen tube toward the egg cell.

Option 1:

Both assertion and reason are true, and the reason is the correct explanation of the assertion.

Option 2:

Both assertion and reason are true, but the reason is not the correct explanation of the assertion.

Option 3:

The assertion is true, but the reason is false.

Option 4:

The assertion is false, but the reason is true.

Correct Answer:

Both assertion and reason are true, and the reason is the correct explanation of the assertion.

Solution:

Synergids play an important role in guiding the pollen tube to the egg cell in angiosperms. They secrete a chemical attractant that guides the pollen tube toward the egg cell and also provides signals that regulate the growth and direction of the pollen tube.

Option 1 is the correct answer

Q. 10 The plant cytokinesis differs from

Option 1:

mid body

Option 2:

microfilament

Option 3:

cell plate

Option 4:

none of the above

Correct Answer:

mid body

Solution:

In plants cytokinesis occurs because of the formation of cell plate but in animals the cytokinesis occurs due to formation of constriction in the middle cell membrane.

Q. 11 The function of Sertoli cells is/are

Option 1:

To provide nutrition to the germ cells

Option 2:

Secret inhibin hormone

Option 3:

Phagocytosis of cytoplasm of spermatids

Option 4:

All of these

Correct Answer:

All of these

Solution:

As we have learned

Testes show three types of cells

1. Spermatogonia that form cells
2. Leydig cells secrete testosterone
3. Sertoli cells are nurse cells that nourish developing sperms

Other functions of Sertoli cells are

- Release Androgen binding protein
- Secrete inhibin hormone
- Bring about phagocytosis of cytoplasm of spermatids to convert them into sperms

Q. 12 The volume of air involved in breathing movements can be estimated by using a

Option 1:

Air Pressure

Option 2:

Spirometer

Option 3:

Airometer

Option 4:

Spiro Pressure

Correct Answer:

Spirometer

Solution:

Mechanism of Breathing: Expiration -

- Expiration takes place when the intrapulmonary pressure is higher than the atmospheric pressure.
- Relaxation of the diaphragm and the intercostal muscles returns the diaphragm and sternum to their normal positions and reduce the thoracic volume and thereby the pulmonary volume.
- This leads to an increase in intrapulmonary pressure to slightly above the atmospheric pressure causing the expulsion of air from the lungs, i.e., expiration
- We have the ability to increase the strength of inspiration and expiration with the help of additional muscles in the abdomen.
- On average, a healthy human breathes 12-16 times/minute.
- The volume of air involved in breathing movements can be estimated by using a spirometer which helps in the clinical assessment of pulmonary functions.

Thus, the volume of air involved in breathing movements can be estimated by using a spirometer. Hence, the correct option is spirometer

Q. 13 Major pigments found in Phaeophyceae i.e brown algae are

Option 1:

Chlorophyll a, b

Option 2:

Chlorophyll a,b,c

Option 3:

Chlorophyll a,c and fucoxanthin

Option 4:

Chlorophyll a,d and phycoerythrin

Correct Answer:

Chlorophyll a,c and fucoxanthin

Solution:

Phaeophyceae -

- The members of Phaeophyceae are commonly called as Brown algae. Ex: *Ectocarpus*, *Dictyota*, *Laminaria*, *Sargassum*, *Fucus*
- These are mostly found in Marine habitats.

- They are large sized and also known as Kelps (*Laminaria*, *Macrocystis*).
- Some forms are filamentous as in *Ectocarpus*.
- Members of this group are olive green to brown in colour
- Major pigments present are chlorophyll a, c, carotenoids and xanthophylls (fucoxanthin).
- The food is stored in the form of complex carbohydrates such as mannitol and laminarin.
- The cell wall has cellulose covered by gelatinous substance Algin. Algins are component of phycocolloids.
- The plant body consists of the holdfast, a short stipe and elaborate photosynthetic frond.

Major pigments found in Phaeophyceae i.e brown algae are chlorophyll a,c and fucoxanthin.

Q. 14 The term used for transfer of pollen grains from anther of one plant to the stigma of a different plant which, brings genetically different types of pollen grains to stigma, is:

Option 1:

Xenogamy

Option 2:

Geitonogamy

Option 3:

Chasmogamy

Option 4:

Correct Answer:

Xenogamy

Solution:

Transfer of pollen grains from the anther to the stigma of same flower is known as **autogamy** or self pollination.

Geitonogamy is transfer of pollens from anther of one flower to stigma of another flower of the same plant

Xenogamy is the transfer of pollen grains from the anther to the stigma of a different plant.

Q. 15 Nucellar polyembryony is reported in species of

Option 1:

Citrus

Option 2:

Gossypium

Option 3:

Triticum

Option 4:

Brassica

Correct Answer:

Citrus

Solution:

As we learnt in

Polyembryony -

The occurrence of more than one embryo in a seed is referred to as polyembryony. In Citrus and mango varieties, some of the nucellar cells surrounding the embryo sac start dividing and develop into the embryos. In such species, each ovule contain many embryos (nucellar polyembryony)

Q. 16 Assertion: Evolution is not a random process.

Reason: Evolution occurs through the accumulation of genetic mutations that provide an advantage in a particular environment.

Option 1:

Assertion and reason are both true, and reason is an accurate account of assertion.

Option 2:

Both assertion and reason are accurate, but reason does not adequately explain assertion.

Option 3:

The assertion is correct, but the reasoning is incorrect.

Option 4:

Both the assertion and reason are incorrect.

Correct Answer:

The assertion is correct, but the reasoning is incorrect.

Solution:

The assertion is true, while the reason is partially true. Evolution is not a random process because it occurs through natural selection, which involves the non-random survival and reproduction of individuals with advantageous traits. However, genetic mutations can occur randomly, and their accumulation over time can lead to the evolution of new traits and species. Natural selection then acts upon these

mutations, selecting for those that provide an advantage in a particular environment. Therefore, while genetic mutations are not directed towards a specific outcome, their selection is not random, making the assertion true, and the reason partially true.

Option 3 is the correct answer.

Q. 17 Sickle cell anemia is ___ disease.

Option 1:

Autosomal recessive

Option 2:

Autosomal dominant

Option 3:

Pathogenic

Option 4:

None of these

Correct Answer:

Autosomal recessive

Solution:

As we have already studied in Sickle-cell Anaemia -

- It is an autosome-linked recessive trait that can be transmitted from parents to the offsprings when both the partners are the carrier for the gene (heterozygous).

Hence, the correct option is (a).

Q. 18 Common cold differs from pneumonia in, that:

Option 1:

Pneumonia is a communicable disease whereas the common cold is a nutritional deficiency disease.

Option 2:

Pneumonia can be prevented by a live attenuated bacterial vaccine whereas the common cold has no effective vaccine.

Option 3:

Pneumonia is caused by a virus while the common cold is caused by the bacterium *Haemophilus influenzae*.

Option 4:

Pneumonia pathogen infects alveoli whereas the common cold affects nose and respiratory passage but not the lungs.

Correct Answer:

Pneumonia pathogen infects alveoli whereas the common cold affects nose and respiratory passage but not the lungs.

Solution:

As we learnt in

common cold -

Many viruses also cause diseases in human beings

- wherein

Rhino viruses represent one such group of viruses which cause one of the most infectious human ailments - the common cold.

pneumonia -

Bacteria like *Streptococcus pneumoniae* and *Haemophilus influenzae* are responsible for the disease pneumonia

- wherein

It infects the alveoli (air filled sacs) of the lungs.

pneumonia infects the alveoli (air filled sacs) of the lungs.

Q. 19 What is the mechanism by which neurotransmitters are removed from the synaptic cleft?

Option 1:

Reuptake by the presynaptic neuron

Option 2:

Diffusion into the extracellular fluid

Option 3:

Uptake by glial cells

Option 4:

Breakdown by enzymes in the synaptic cleft

Correct Answer:

Reuptake by the presynaptic neuron

Solution:

After neurotransmitters have been released into the synaptic cleft, they are removed from the cleft by a process called reuptake. The presynaptic neuron has transporter proteins on its membrane that bind to and transport the neurotransmitter back into the neuron. Once inside the neuron, the neurotransmitter can be repackaged into vesicles and used again in another transmission event.

Option 1 is the correct answer.

Q. 20 The lining of the stomach, intestine and bile duct is made of

Option 1:

Cuboidal cells

Option 2:

Squamous cells

Option 3:

Columnar cells

Option 4:

All of these

Correct Answer:

Columnar cells

Solution:**Simple Columnar Epithelium****Structure**

- The columnar epithelium consists of elongated cells which are placed side by side like columns with slightly broader outer free surfaces.
- The nuclei of these cells are elongated and lie near the bases of the cells.
- Some cells of this epithelium contain mucus and look like goblets. These are called goblet cells.
- The epithelium containing goblet cells i.e. mucus-secreting cells along with the underlying connective tissue is called mucosa. These are found in the stomach and intestine.
- Location
- Simple columnar epithelium lines the stomach, intestine, gallbladder and bile ducts.
- The columnar epithelium also forms gastric glands, intestinal glands etc.

Simple columnar epithelium lines the stomach, intestine, gallbladder and bile ducts.

Q. 21 The number of bones present in the skeleton that runs along the middle longitudinal axis of the body is

Option 1:

87

Option 2:

90

Option 3:

80

Option 4:

78

Correct Answer:

80

Solution:

Axial skeleton -

Axial skeleton comprises 80 bones distributed along the main axis of the body.

- wherein

The skull, vertebral column, sternum and ribs constitute axial skeleton.

Correct option is 3

Q. 22 In platyhelminthes, excretion is carried out by

Option 1:

Nephridia

Option 2:

Kidney

Option 3:

Malpighian tubules

Option 4:

Flame cells

Correct Answer:

Flame cells

Solution:

Flame cells in platyhelminthes are involved in excretion.

Q. 23 Intercalated discs are the features of____ and they help in____

Option 1:

Cardiac muscles; maintaining structure

Option 2:

Cardiac muscles; transmission of impulse

Option 3:

Cardiac muscles; excretion

Option 4:

Cardiac muscles; respiration

Correct Answer:

Cardiac muscles; transmission of impulse

Solution:

Cardiac Muscles -

Location-

- These muscles are present in the walls of the heart and in the large veins like pulmonary veins and superior vena cava.

Structure-

- These show characters of both striped and unstriped muscles.
- Each muscle fibre is a long and cylindrical structure having a definite sarcolemma.
- Fibres contain a single nucleus in the centre.
- Fibres possess certain lateral branches that form a contractile network.
- These lateral branches are called oblique bridges.
- Cardiac muscles have intercalated discs.
- Intercalated discs function as boosters of contractions wave and permit the wave of muscle contraction to be transmitted from one cardiac fibre to another.

Intercalated discs are the features of cardiac muscles. They have gap junctions that promote diffusion of ions between cells and allow waves of depolarization to spread over the entire heart by passing from cell to cell.

Q. 24 Assertion (A) : Impulses are faster in myelinated nerves than unmyelinated ones.

Reason (R) : The impulse must travel the length of the myelinated neuron.

Option 1:

Both A and R are true and R is the correct explanation of A.

Option 2:

Both A and R are true but R is NOT the correct explanation of A.

Option 3:

A is true but R is false.

Option 4:

A is false but R is true.

Correct Answer:

A is true but R is false.

Solution:

Myelin accelerates action potential conduction by functioning as an electrical insulator. Unmyelinated axon conduction velocities, for example, range from around 0.5 to 10 m/s, but myelinated axons can conduct at speeds of up to 150 m/s. Hence assertion is true.

The nerve impulse jumps from one Ranvier node to the next in myelinated fibres. As a result, it is speedier. However, the impulse must travel the entire length of the non-myelinated fibre. As a result, it moves slowly. Hence reason is false. Therefore option C is correct.

As reason is false, option A and B are incorrect.

As assertion is true, option D is incorrect.

Hence, Option c is the correct answer.

Q. 25 In cases of placenta abnormality, a complication during pregnancy, the placenta abnormally attaches to the myometrium or muscular lining of the uterus. Among the following statements, which accurately describes the normal formation of the placenta during pregnancies?

Option 1:

The umbilical cord invades the embryo's outermost layer, assisting in its formation.

Option 2:

The umbilical cord attaches the placenta to the embryo, but it does not contribute to its formation.

Option 3:

The blastocyst interdigitates with the Fallopian tube lining during placenta formation.

Option 4:

The trophoblast extends villi into the endometrial wall as part of placenta formation.

Correct Answer:

The trophoblast extends villi into the endometrial wall as part of placenta formation.

Solution:

During normal placenta formation, the trophoblast, an outer layer of cells in the developing embryo, extends finger-like projections called villi into the endometrial wall of the uterus. These villi establish a connection with the maternal blood vessels in the uterus, allowing for the exchange of nutrients, oxygen and waste products between the mother and the developing fetus. This process is essential for the proper development and functioning of the placenta during pregnancy. Hence, the correct answer is option 4.

Q. 26 Three alleles governing the same character known as:

Option 1:

Multiple allele

Option 2:

Polytropism

Option 3:

Avatsim

Option 4:

Pleiotropism

Correct Answer:

Multiple allele

Solution:

Multiple Alleles -

ABO blood grouping is an example of multiple Alleles.

- wherein

ie, three alleles governing the same character

Q. 27 Which of the following enzymes is responsible for removing RNA primers and filling in the gaps with DNA nucleotides during DNA replication?

Option 1:

DNA polymerase I

Option 2:

DNA polymerase III

Option 3:

DNA helicase

Option 4:

DNA ligase

Correct Answer:

DNA polymerase III

Solution:

DNA polymerase III is responsible for synthesizing new DNA strands during DNA replication. It has a 5' to 3' exonuclease activity that allows it to remove RNA primers and fill in the gaps with DNA nucleotides. DNA polymerase I is also involved in this process but primarily in removing the RNA primers. DNA helicase is responsible for unwinding the double-stranded DNA, and DNA ligase is responsible for joining the Okazaki fragments on the lagging strand.

Option 2 is the correct answer.

Q. 28 In angiosperms, functional megaspore develops into

Option 1:

embryo sac

Option 2:

Ovule

Option 3:

endosperm

Option 4:
pollen sac

Correct Answer:
embryo sac

Solution:

As we learnt in

Reproduction in Angiosperms -

Male gametophyte (pollen grain) or microspores reach megasporophyte and through pollen tube reach ovule where one male gamete fuses with egg of embryo sac and another with secondary nucleus.

- wherein

Fusion of one male gamete with secondary nucleus results in formation of endosperms which provide nourishment to developing embryo.

In angiosperms, functional megaspores (female reproductive part) develops into embryo sac

Q. 29 Identify the incorrect statement related to Pollination:

Option 1:
Pollination by wind is more common amongst abiotic pollination

Option 2:
Flowers produce foul odours to attract flies and beetles to get pollinated

Option 3:
Moths and butterflies are the most dominant pollinating agents among insects

Option 4:
Pollination by water is quite rare in flowering plants

Correct Answer:
Moths and butterflies are the most dominant pollinating agents among insects

Solution:

Among the animals, insects, particularly are the dominant biotic pollinating agents.

Hence, the correct answer is (c)

Q. 30 All Gymnosperms are:

Option 1:

Heterosporous

Option 2:

Arborescent/Woody

Option 3:

Seed plants

Option 4:

All of the above

Correct Answer:

All of the above

Solution:

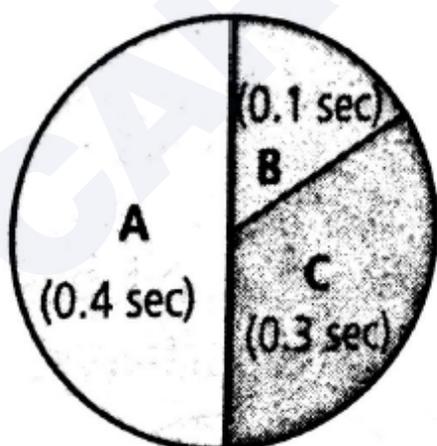
The absence of an enclosing structure is believed to be primitive, thus the first seed plants were gymnosperms.

Gymnosperms are **heterosporous** i.e., produce two types of spores- microspores (pollen grains) and megaspores.

Arborescent means having the shape or characteristics of a tree. The gymnosperms are also arborescent.

Hence the correct option is D.

Q. 31 In the given figure the durations of the events of the cardiac cycle are given. Identify these events and select the correct option

**Option 1:**

A. Auricular systole

B. Joint diastole

C. Ventricular systole

Option 2:

- A. Ventricular systole
- B. Joint diastole
- C. Auricular systole

Option 3:

- A. Ventricular systole
- B. Auricular systole
- C. Joint diastole

Option 4:

- A. Joint diastole
- B. Auricular systole
- C. Ventricular systole

Correct Answer:

- A. Joint diastole
- B. Auricular systole
- C. Ventricular systole

Solution:**Cardiac cycle**

- Cardiac cycle refers to the one cycle of contraction and relaxation of the cardiac muscles or one heartbeat.
- A heart beat consists of contraction and relaxation of atria and ventricles.
- The phase of contraction is referred to as systole while the phase of relaxation is called diastole.
- The term joint diastole is used when both atria and ventricles are undergoing relaxation or diastole together
- During joint diastole, the blood is carried from superior and inferior vena cava into the atria and from atria to the ventricles through auriculoventricular valves
- Blood flow is then restricted from ventricle to aorta and pulmonary trunk

- wherein

The heart beats 72 times per minute, i.e., that many cardiac cycles are performed per minute. From this it could be deduced that the duration of a cardiac cycle is 0.8 seconds.

-

Q. 32 The one aspect which is not a salient feature of genetic code, is its being:

Option 1:

degenerate

Option 2:

ambiguous

Option 3:

universal

Option 4:
specific

Correct Answer:
ambiguous

Solution:

As we learnt in

Silent features of Genetic code -

One codon codes for only one amino acid hence it is unambiguous and specific.

-

Q. 33 During polarized state, Na-K pump transports _____ ions outwards and _____ ions inwards.

Option 1:
3Na, 2K

Option 2:
3K, 2Na

Option 3:
2Na, 3K

Option 4:
2K, 3Na

Correct Answer:
3Na, 2K

Solution:

3Na is transported out and 2K is transported in at the cost of ATP.

Q. 34 Which one of the following is a correct statement?

Option 1:
Pteridophyte, gametophyte has a protonema and leafy stage

Option 2:
In angiosperm, female gametophyte is free-living

Option 3:

Antheridiophores and archegoniophores are present in angiosperms.

Option 4:

Origin of seed habit can be traced in pteridophytes

Correct Answer:

Origin of seed habit can be traced in pteridophytes

Solution:

Characteristics of Angiosperms -

- Angiosperms are the most advanced and most dominant of all plants found.
- Angiosperms are seed-bearing plants which form flowers and fruits. It means that the seeds of angiosperms are covered inside the fruit.
- Angiosperms grow in a wide variety of habitats and occur in different forms i.e. herbs, shrubs and trees).
- The smallest angiosperm is Wolffia and the tallest is Eucalyptus (100 meters tall).
- Angiosperms are useful to us in many ways like food, fodder, fuel, clothes, medicines and several others.
- The root system is the tap root system or adventitious root system.
- Xylem has vessels and tracheids as the main conducting elements and phloem has companion cells and sieve tubes.
- Leaves show reticulate or parallel venation.

Origin of seed habit can be traced in pteridophytes due to heterospory in some plants wherein female gametophyte is retained on the sporophyte.

Q. 35 Areolar connective tissue is not found

Option 1:

under the skin as subcutaneous tissue

Option 2:

in the blubber of whales and elephants

Option 3:

in bone marrow

Option 4:

between lobes and lobules of compound glands

Correct Answer:

in the blubber of whales and elephants

Solution:

Areolar Connective Tissues -

- It is the most widely distributed connective tissue.

Structure:

- It is in the form of fine threads that cross each other in every direction and leave small spaces called areolae.
- It is made up of ground substance, the matrix, white, yellow and reticular fibres and cells such as fibroblasts, mast cells, macrophages, lymphocytes, plasma cells, mesenchyme cells, chromatophores, fat cells.

Location:

- It is present under the skin as subcutaneous tissue in between and around muscles, nerves and blood vessels of sub-mucosa of the gastro-intestinal tract and respiratory tract, in bone marrow, between lobes and lobules of compound glands etc.
- This tissue also forms the internal framework of many organs.

In the blubber of whales and elephants, adipose tissue is found.

Q. 36 Which of the following groups of animals is bilaterally 40 symmetrical and triploblastic ?

Option 1:

Aschelminthes (roundworms)

Option 2:

ctenophores

Option 3:

sponges

Option 4:

coelenterates (Cnidarians)

Correct Answer:

Aschelminthes (roundworms)

Solution:

Triploblastic -

Animals in which body cells are arranged in three germ layers- ectoderm , mesoderm and endoderm.

- wherein

Eg Platyhelminthes to chordates.

Q. 37 Riboviruses and Retroviruses both are RNA containing viruses.

They differ from each other in

Option 1:

Riboviruses show RNA → RNA synthesis

Option 2:

Retroviruses show RNA → DNA synthesis by reverse transcription

Option 3:

Both (1) and (2) are correct

Option 4:

All are wrong

Correct Answer:

Retroviruses show RNA → DNA synthesis by reverse transcription

Solution:

RNA viruses are viruses that have a single-stranded or double-stranded RNA as their genetic material, while retroviruses are viruses that have a single-stranded RNA as their genetic material but use DNA intermediates in their life cycle.

Therefore, option 2 is correct.

Q. 38 Sessile leaves do not have a

Option 1:

Lamina

Option 2:

Leaf base

Option 3:

Epipodium

Option 4:

Petiole

Correct Answer:

Petiole

Solution:**Petiole:**

- It is also called the mesopodium.
- It is a smooth or grooved, cylindrical or sub-cylindrical stalk which attaches the leaf to the leaf base.
- It holds the leaf above the level of the stem.
- Leaves with petioles are called petiolate leaves.

- Leaves without petioles are called non-petiolate or sessile leaves.
- Papaya has hollow petiole.

Leaves without petioles are called non-petiolate or sessile leaves.

Q. 39 In human, the sex determination is based on the gametes contributed by _____ because they are _____ and produce _____ types of gametes.

Fill in the blanks using the appropriate option:

Option 1:

females; heterogametic; two

Option 2:

males; homogametic; one

Option 3:

males; heterogametic; one

Option 4:

males; heterogametic; two

Correct Answer:

males; heterogametic; two

Solution:

As learnt in Sex Determination: XX Female & XY Male Type -

- In most insects (e.g., fruit fly) and mammals including humans, the female is homogametic (XX) and male is heterogametic (XY) consisting of two dissimilar chromosomes X and Y.
- The females produce ova all of one type having X chromosome.
- Males produce two types of sperm: -50% with X-chromosome and the remaining 50% with Y-chromosome.
- Thus, the sex chromosomes in females are homomorphic and those of males are heteromorphic.
- In fertilization, an ovum can only carry an X chromosome. It is, therefore, the sex chromosome found in the sperm – either X or Y – that determines whether a zygote will be female or male, respectively.

Hence, the correct answer is option d.

- Q. 40** When F1 female *Drosophila* of the genotype $a^+ a^+ b^+ b^+ c^+ c$ is test crossed, the following progenies were obtained:

Progeny classes	Number of progenies
$a^+ b^+ c^+$	22
$a^+ b^+ c$	28
$a b c^+$	26
$a b c$	24
$a^+ b c^+$	230
$a^+ b c$	220
$a b^+ c^+$	225
$a b^+ c$	225
Total	1000

The progeny has been shown as classes derived from the female gamete.

Statements 1 to 6 as given below are conclusions derived from the above result

1. Genes a and b are linked in cis.
2. Genes a and b are linked in trans.
3. Genes a and b are linked in cis while b and c are linked in trans.
4. The genotypes of the parents are $a^+ a^+ b^+ b^+$ and $aabb$.
5. The genotypes of the parents are $a^+ a^+ bb$ and $aab^+ b^+$.
6. genes a and b are 10 cM apart.

Which of the above statements are correct?

Option 1:
3 alone

Option 2:

1, 5 and 6

Option 3:

2, 5 and 6

Option 4:

1, 4 and 6

Correct Answer:

2, 5 and 6

Solution:

Genes a and b are linked in trans and the genotypes of the parents are $a^+ a^+ bb$ and aab^+b^+ . Genes a and b are 10 cM apart. Therefore, three statements are correct.

Hence, the correct answer is option 3.

Q. 41 Which of the following pteridophytes belong to class pteropsida

Option 1:

Equisetum and Psilotum

Option 2:

Lycopodium and Adiantum

Option 3:

Selaginella and Pteris

Option 4:

Pteris and Adiantum

Correct Answer:

Pteris and Adiantum

Solution:

Pteropsida / Filicopsida (Ferns) -

1-Leaves are fan like.

2-Rhizome stem present.

3-Homosporous or heterosporous.

- wherein

Eg. Dryopteris, pteris, Adiantum.

Pteris , Adiantum , Dryopteris are examples of fern

Q. 42 Shrinking and relaxation of scrotum respectively is due to ____?

Option 1:

Increased Temperature & decreased temperature

Option 2:

Decreased temperature & Increased temperature

Option 3:

Increased Temperature & Increased temperature

Option 4:

Decreased temperature & Decreased temperature

Correct Answer:

Decreased temperature & Increased temperature

Solution:

Scrotum maintains the temperature of testes 2- 3 degree Celsius below the the body temperature.

When the temperature of the testes falls the scrotum shrinks bringing scrotum close to the body to attain the desired temperature.

When the temperature raises the scrotum is relaxed and the testes comes down at a distance from the body.

Hence option B is correct.

- Q. 43** In order to survive in a non-aquatic environment, plants acquired several adaptations with specialised functions.

Given below is a list of features/characteristics (Column A) and their potential role (Column B)

Column A	Column B
P. Waxy cuticle	1. Mechanical support
Q. Thickened or lignified cell walls	2. Protection against excess light
R. Homoiohydric	3. Restrict water loss
S. Pigmentation	4. Vascular system

Which one of the following options represents a correct match between the adaptations and their functions?

Option 1:

P - 4, Q - 2, R - 1, S - 3

Option 2:

P - 3, Q - 1, R - 4, S - 2

Option 3:

P - 2, Q - 3, R - 2, S - 1

Option 4:

P - 1, Q - 4, R - 3, S - 4

Correct Answer:

P - 1, Q - 4, R - 3, S - 4

Solution:

The correct answer is **option 4 - P - 1, Q - 4, R - 3, S - 4.**

1. Waxy cuticle - Mechanical support
2. Thickened or lignified cell walls - Vascular system
3. Homoiohydric - Restrict water loss
4. Pigmentation - Vascular system

Q. 44 Which of the following hormone levels will cause the release of the ovum (ovulation) from the graffian follicle?

Option 1:

The high concentration of estrogen

Option 2:

The high concentration of progesterone

Option 3:

low concentration of LH

Option 4:

low concentration of FSH

Correct Answer:

The high concentration of estrogen

Solution:

- The high concentration of Estrogen will suppress the release of FSH through which the ovary won't be able to grow to become a fully mature Graafian follicle
- High level of estrogen also causes LH surge which is important for ovulation

Q. 45 **Assertion:** Bacterial STDs can be transmitted through sexual contact.

Reason: Bacterial STDs are transmitted through sexual contact with an infected person.

Option 1:

Assertion and reason are both true, and reason is an accurate account of assertion.

Option 2:

Both assertion and reason are accurate, but reason does not adequately explain assertion.

Option 3:

The assertion is correct, but the reasoning is incorrect.

Option 4:

Both the assertion and reason are incorrect.

Correct Answer:

Assertion and reason are both true, and reason is an accurate account of assertion.

Solution:

Bacterial STDs are transmitted through sexual contact with an infected person. This can include vaginal, anal, and oral sex. The risk of transmission can be reduced by practicing safe sex, such as using condoms and getting tested regularly for STDs.

Option 1 is the correct answer.

Q. 46 The largest known petrified tree with a trunk of 89.9m, in USA is

Option 1:

Sequoiadendron giganteum

Option 2:

Cycas revoluta

Option 3:

Pinus roxburghii

Option 4:

Selaginella biformis

Correct Answer:

Sequoiadendron giganteum

Solution:

Largest Gymnosperm -

Sequoia dendron

Sequoiadendron giganteum is the largest known tree

Q. 47 In bacteria respiration takes place through

Option 1:

cell wall

Option 2:

Nucleoid

Option 3:

Mesosome

Option 4:

Mitochondria

Correct Answer:

Mesosome

Solution:

Mesosome -

Infolding of plasma membrane, consisting of vesicles, tubules and lamellae.

- wherein

Takes part in respiration and replication in bacteria.

Mesosomes are organ of respiration in bacteria

Q. 48 Which one is the example of Mutualism?

Option 1:

The cattle egret and grazing cattle

Option 2:

sea anemone and the clown fish.

Option 3:

Lichens and fungus

Option 4:

All of the above.

Correct Answer:

Lichens and fungus

Solution:

(a) The classic illustration of commensalism is a cow egret and grazing cattle in close proximity, a scene you are most likely to see if you live in agricultural rural settings. The egrets always feed close to the cattle grazing areas because the cattle's movement stirs up and flushes out insects from the foliage that would otherwise be challenging for the egrets to locate and capture.

(b) The relationship between a clown fish that lives nearby and a sea anemone with stinging tentacles is an illustration of commensalism. The stinging tentacles of the fish's predators deter them, protecting the fish from harm. The clown fish doesn't seem to provide any advantages for the anemone.

(c) Both interacting species profit from this connection. An intimate mutualistic association between a fungus and photosynthesising algae or cyanobacteria is shown by lichens

Option 3 is the correct answer.

Q. 49 The unique mammalian characteristics are:

Option 1:

Hairs, tympanic membrane and mammary glands

Option 2:

Hairs, pinna and mammary glands

Option 3:

Hairs, pinna and indirect development

Option 4:

Pinna, monocondylic skull and mammary glands

Correct Answer:

Hairs, pinna and mammary glands

Solution:

The correct answer is Option 2) Hairs, pinna, and mammary glands.

Hairs: Mammals are characterized by the presence of hairs or fur on their bodies. Hairs serve various functions such as insulation, protection, and sensory perception.

Pinna: The pinna refers to the external, visible part of the mammalian ear. It is a characteristic feature of mammals and helps in collecting sound waves and directing them into the ear canal.

Mammary glands: Mammary glands are unique to mammals and are responsible for producing milk to nourish the young. They are specialized glands that undergo development and enlargement during pregnancy and lactation.

For incorrect options,

Tympanic membrane: This is incorrect as the tympanic membrane, also known as the eardrum, is not unique to mammals. It is found in various animals, including reptiles, birds, and amphibians.

Indirect development: This is also incorrect as most mammals exhibit direct development, where the young are born in a relatively advanced state and undergo minimal or no metamorphosis.

Monocondylic skull: This is incorrect as the monocondylic skull, which refers to having a single occipital condyle, is not unique to mammals. It is found in various groups of vertebrates, including reptiles and amphibians.

Therefore, the correct answer is Option 2) Hairs, pinna, and mammary glands.

Q. 50 The relationship of species richness and area is a straight line as per the equation. However, on logarithmic scale it can be defined as

Option 1:

$$\log S = \log C + \log Z$$

Option 2:

$$\log S = \log Z + \log A$$

Option 3:

$$\log S = \log c + Z \log A$$

Option 4:

$$\log S = \log A + C \log A$$

Correct Answer:

$$\log S = \log c + Z \log A$$

Solution:

As learnt in Patterns of Biodiversity - Species-Area relationships -

On a logarithmic scale, the relationship is a straight line described by the equation:

$$\log S = \log C + Z \log A$$

where,

- S = Species richness A = Area
- Z = slope of the line (regression coefficient)
- C = Y-intercept (unit of measurement of area)

Hence, the correct option is (c).

- Q. 51** The anatomy of springwood shows some peculiar features. Identify the correct set of statements about springwood.
- (a) It is also called as the earlywood
 - (b) In spring season cambium produces xylem elements with narrow vessels
 - (c) It is lighter in colour
 - (d) The springwood along with autumnwood shows alternate concentric rings forming annual rings
 - (e) It has lower density
- Choose the correct answer from the options given below:

Option 1:

(a), (c), (d) and (e) Only

Option 2:

(a), (b) and (d) Only

Option 3:

(c), (d) and (e) Only

Option 4:

(a), (b), (d) and (e) Only

Correct Answer:

(a), (c), (d) and (e) Only

Solution:

In the spring season, Cambium produces xylem elements with wider lumen instead of narrow ones, as the rate of transpiration in plants is very high at - that time. So to fulfill the requirement of water, the xylem with a wider lumen transports more water.

Hence, the correct option is (1).

- Q. 52** Sponges show

Option 1:

Cellular level of organisation

Option 2:

Tissue level of organisation

Option 3:

Organ level of organisation

Option 4:

Organ system level of organisation

Correct Answer:

Cellular level of organisation

Solution:**The cellular level of organization:**

- The body is made up of loose cells that perform specific functions.
- Animals that belong to Phylum Porifera have cellular organization.
- It is the most primitive type of organization and is suited for sedentary life-forms, e.g., Sponges.

Q. 53 Assertion: Androecium is the name for the anther collection.

Reason: The stigma of the flower receives pollen grains from the anther for germination.

Option 1:

Both Assertion & Reason are true and the reason is the correct explanation of the assertion.

Option 2:

Both Assertion & Reason are true but the reason is not the correct explanation of the assertion.

Option 3:

The assertion is true but Reason is false.

Option 4:

Both Assertion and Reason are false.

Correct Answer:

Both Assertion & Reason are true but the reason is not the correct explanation of the assertion.

Solution:

Both Assertion & Reason are true but the reason is not the correct explanation of the assertion. The male reproductive organs of the flower are stamens.

- The androecium is the scientific name for the stamens.
- An anther-like structure and a filament-like stalk are both parts of the stamen.
- Pollen grains from the anther are transported to the flower's stigma for germination.
- The androecium is the name of the anther collection.
- The female portion of the plant is the pistil.
- Ovarian, style, and stigma are all present.
- The gynoecium is the term for the pistil's collection.

Hence, the correct answer is option 2.

Q. 54 Consider the following four statements and select the correct option stating which ones are true (T) and which ones are false (F) ?

(i) Proteins contribute 6-8% of the blood plasma.

(ii) Plasma contains very high amount of minerals.

(iii) Plasma without the clotting factors is called serum.

(iv) Glucose, amino acids, lipids, etc., are also present in the plasma as they are always in transit in the body

Option 1:

(i)	(ii)	(iii)	(iv)
F	F	T	T

Option 2:

(i)	(ii)	(iii)	(iv)
T	F	T	T

Option 3:

(i)	(ii)	(iii)	(iv)
T	T	F	F

Option 4:

(i)	(ii)	(iii)	(iv)
F	F	F	T

Correct Answer:

(i)	(ii)	(iii)	(iv)
T	F	T	T

Solution:

As we learn

Components of blood -

Plasma

- wherein

Plasma is a straw coloured, viscous fluid constituting nearly 55 per cent of the blood. 90-92 per cent of plasma is water and proteins contribute 6-8 per cent of it

Correct option is 2

Q. 55 The increase in blood flow to heart stimulates the secretion of

Option 1:

Renin

Option 2:

Oxytocin

Option 3:

Antidiuretic hormone

Option 4:

Atrial natriuretic factor

Correct Answer:

Atrial natriuretic factor

Solution:

Regulation of Kidney Function -

- The functioning of the kidneys is efficiently monitored and regulated by hormonal feedback mechanisms involving the hypothalamus, JGA and to a certain extent, the heart.

Control by ANF:

- An increase in blood flow to the atria of the heart can cause the release of Atrial Natriuretic Factor (ANF).
- ANF can cause vasodilation (dilation of blood vessels) and thereby decrease the blood pressure.
- ANF mechanism, therefore, acts as a check on the renin-angiotensin mechanism.

An increase in blood flow to the atria of the heart can cause the release of Atrial Natriuretic Factor (*ANF*). Hence the correct option is Atrial natriuretic factor

Q. 56 A group of related Families of the organism is known as ____.

Option 1:

Class

Option 2:

Order

Option 3:

Genus

Option 4:

Species

Correct Answer:

Order

Solution:

A group of related Families of the organism is known as Order.

Q. 57 Bicuspid present in per arch in adults are

Option 1:

2

Option 2:

1

Option 3:

4

Option 4:

8

Correct Answer:

4

Solution:

Bicuspid are premolars. Each Quadrant has two bicuspid. Thus each arch has 4 total bicuspid.

Q. 58 Cranial capacity was largest among

Option 1:

Peking man

Option 2:

Ape man

Option 3:

African man

Option 4:

Neanderthal man

Correct Answer:

Neanderthal man

Solution:

As we have already discussed in Origin & Evolution of Man -

The cranial capacity was largest among 'neanderthal man' which was about 1450 c.c. (almost equal to the modern man). Hence, the correct option is (d).

Q. 59 Which of the following groups of animals is bilaterally symmetrical and triploblastic?

Option 1:

Aschelminthes (roundworms)

Option 2:

Ctenophores

Option 3:

Sponges

Option 4:

Cnidarians

Correct Answer:

Aschelminthes (roundworms)

Solution:

Bilateral symmetrical: Such animals can be divided into two equal halves along any one plane, that is, either transversely or longitudinally. For example, Aschelminthes, annelids, arthropods, and vertebrates

Triploblastic animals: Such animals develop three germ layers as innermost endoderm, middle mesoderm and outer ectoderm, for example, aschelminthes.

Hence,

Aschelminthes are bilaterally symmetrical, triploblastic and pseudocoelomate.

Q. 60 The common bottle cork is a product of:

Option 1:

Dermatogen

Option 2:

Phellogen

Option 3:

Periderm

Option 4:

Plerome

Correct Answer:

Phellogen

Solution:

- Periderm develops through the activity of cork cambium or phellogen.
- Cork cambium or phellogen is the secondary meristem that develops generally from the collenchymatous cells of hypodermis, sometimes from the cells of the epidermis (apple), pericycle (Cimatis), phloem (vitis).
- Phellogen gives rise to cork or phellem on the outer side and secondary cortex of phelloderm on the inner side.
- Phellem or cork is the dead tissue with suberised cell walls. It is impermeable to water and is used commercially.
- Quercus suber is commercial cork.
- Secondary cortex or phelloderm is living tissue. It stores food and replaces the damaged primary cortex.
- Phellem, phellogen and phelloderm are called periderm.
- Periderm and fragments of epidermis form the protective tissues in an old dicot stem.

phellogen given rise to phellem which is used as commercial cork.

Q. 61 Following are certain statements regarding respiratory metabolism in plants:

P. Respiratory quotient during the partial breakdown of carbohydrate (alcoholic fermentation) will be infinity.

Q. Respiratory quotient indirectly provides information about (i) the nature of substrate used for respiration and (ii) the relative rate of competing respiratory processes.

R. Breakdown of organic acids in mature fruit will exhibit a respiratory quotient value of more than one since organic acids are relatively oxygen-rich compared to other common substrates.

S. Anabolic metabolism can influence respiratory quotient by removing reduction equivalents for respiration leading to a decrease in oxygen uptake.

Which one of the following combinations of the above statement is correct?

Option 1:

Only P

Option 2:

Only Q and R

Option 3:

Only S

Option 4:

P, Q, R and S

Correct Answer:

Only Q and R

Solution:

Statement P is incorrect because the respiratory quotient (RQ) during the partial breakdown of carbohydrates (alcoholic fermentation) is not infinity but less than 1 due to the production of ethanol, which does not contribute to carbon dioxide production.

Statement Q is correct as the respiratory quotient provides information about the nature of the substrate used for respiration and the relative rate of competing respiratory processes.

Statement R is correct as the breakdown of organic acids in mature fruit leads to a respiratory quotient value greater than 1 due to the release of carbon dioxide and water.

Statement S is not included in the given combination and cannot be determined from the provided information.

Therefore, the correct combination is in option 2 which is Only Q and R. Hence, the correct answer is option 2.

Q. 62 ' Bundle of His' is a part of which one of the following organs in humans?

Option 1:

Brain

Option 2:

Heart

Option 3:

Kidney

Option 4:

Pancreas

Correct Answer:

Heart

Solution:

As we learnt in

bundle of His -

Purkinje fibres along with right and left bundles are known as

- wherein

bundle of His

Q. 63 In the equation

$$\boxed{\begin{array}{l} \text{GPP} - \text{R} = \\ \text{NPP} \end{array}}$$

GPP is Gross Primary Productivity

NPP is Net Primary Productivity

R here is _____.

Option 1:

Photosynthetically active radiation

Option 2:

Respiratory quotient

Respiratory loss

Reproductive allocation

Respiratory loss

Solution:

The correct option is Option 3) Respiratory loss.

In the given equation, GPP (Gross Primary Productivity) represents the total amount of energy fixed by plants through photosynthesis. R represents the respiratory loss, which is the energy consumed by the plant through respiration. Respiration is the process by which organisms, including plants, convert stored energy (such as glucose) into usable energy (ATP) for cellular activities.

NPP (Net Primary Productivity) represents the net amount of energy available for plant growth and biomass production after accounting for the energy lost through respiration. Therefore, in the equation $GPP - R = NPP$, R represents the respiratory loss, indicating the energy consumed by plants during respiration.

Q. 64 Genetic variation arising by crossing over of chromosome termed as:

Option 1:

Gene aberration

Option 2:

Gene flow

Option 3:

Gene recombination

Option 4:

Gene mutation

Correct Answer:

Gene recombination

Solution:

Genetic recombination -

Genetic variation arising by crossing over of chromosomes, independent assortment of chromosomes during meiosis and random coming together of maternal and paternal chromosomes at fertilisation

Correct option is 3

Q. 65 Which of the statement given below is not true about formation of Annual Rings in tree?

Option 1:

Annual rings is a combination of spring wood and autumn wood produced in a year.

Option 2:

Differential activity of cambium causes light and dark bands of tissue - early and late wood respectively

Option 3:

Activity of cambium depends upon variation in climate

Option 4:

Annual rings are not prominent in trees of temperate region.

Correct Answer:

Annual rings are not prominent in trees of temperate region.

Solution:

Annual rings are most prominent in trees of temperate region.

Annual rings refer to an annual formation of wood in plants, consisting of two concentric layers, one of spring wood and others of autumn wood. These layers are formed due to differential activity of cambium caused by variation in climate. These rings are most prominent in trees of temperate regions as these have distinct growing periods and periods when there is no to little growth.

Q. 66 The spongocoel of sponges is connected to the outer environment through an opening called

Option 1:

Ostium

Option 2:

Osculum

Option 3:

Choanoderm

Option 4:

Pinacoderm

Correct Answer:

Osculum

Solution:**Morphological Features of Porifera**

- The name 'Porifera' signifies the body made up of pores.
- Most of the sponges are asymmetric cylindrical in shape with a large central cavity called the spongocoel.
- There are numerous pores in the body wall called the ostia (sing. ostium) through which water moves in the spongocoel.
- Water leaves the spongocoel through a large pore called osculum.

Water leaves the spongocoel through a large pore called osculum.

Q. 67 What happens in the control experiment of the barley endosperm bioassay?

Option 1:

Endosperms are sterilized.

Option 2:

Reducing sugars are formed.

Option 3:

Endosperms are kept in plain water.

Option 4:

The gibberellin concentration is measured.

Correct Answer:

Endosperms are kept in plain water.

Solution:

In the control experiment of the barley endosperm bioassay, the endosperms are kept in plain water. In this experiment, reducing sugars are not formed, as opposed to the test solution where gibberellin is present.

Option 3 is the correct answer.

Q. 68 The behaviour of chromosomes was parallel to the behaviour of gene observed by

Option 1:

George Gamow

Option 2:

Walter and Theodor

Option 3:

Nirenberg

Option 4:

Morgan

Correct Answer:

Walter and Theodor

Solution:

As we have learned

Walter and Theodor -

They observed that the behaviour of chromosomes was parallel to the behaviour of genes a.

- wherein

They used chromosomal movement to explain Mendel's law.

Q. 69 Which of the following are the features of neural tissues?

Option 1:
Irritability

Option 2:
Conductivity

Option 3:
Response

Option 4:
All of these

Correct Answer:
All of these

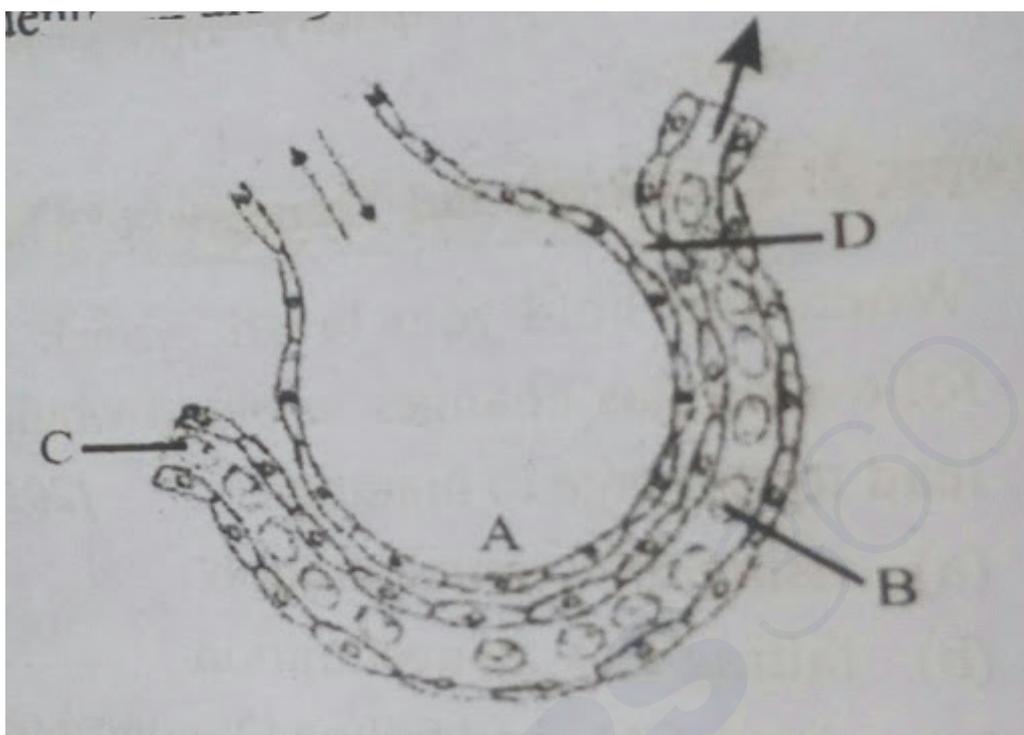
Solution:

Neural or Nervous Tissue -

- Nervous tissue originates from the ectoderm.
- Nervous tissue show excitability i.e. ability to initiate a nerve impulse in response to a stimulus and conductivity i.e. the ability to transmit a nerve impulse.
- There are four components of nervous tissue:
 1. neurons
 2. neuroglia
 3. ependymal cells
 4. neurosecretory cells.

Nervous tissue show excitability i.e. ability to initiate a nerve impulse in response to a stimulus and conductivity i.e. the ability to transmit a nerve impulse.

- Q. 70** The figure given below shows a small part of human lung where exchange of gases takes place. In which one of the options given below, the one part **A**, **B**, **C** and **D** is identified along with its function.



Option 1:

C : arterial capillary - passes oxygen to tissues

Option 2:

A: alveolar cavity - main site of exchange of respiratory gases

Option 3:

D : capillary wall - exchange of O_2 and CO_2 takes place here

Option 4:

B : red blood cell - transport of CO_2 mainly

Correct Answer:

A: alveolar cavity - main site of exchange of respiratory gases

Solution:

The given diagram is a section of an alveolus with a pulmonary capillary.

A is the alveolar cavity which is the main site for exchange of gases. B are the red blood cells in capillaries. C is the membrane of capillary and D is the basement membrane between the alveolar membrane and capillary. Thus, the correct answer is option b.

Q. 71 Mitosis is called the equational division because

Option 1:

The number of chromosomes is reduced in parent cell

Option 2:

The number of chromosomes is reduced in daughter cell

Option 3:

The number of chromosomes in the parent cell and daughter cells is equal

Option 4:

The number of chromosomes is reduced in both the parent cell and daughter cell

Correct Answer:

The number of chromosomes in the parent cell and daughter cells is equal

Solution:

Mitosis -

Mitosis

- Mitosis is also called the equational division (because the daughter cells have an equal number of chromosomes as that of parents) and somatic cell division (because it occurs in somatic cells).
- Mitosis was first observed by Strasburger in 1875.
- The term mitosis was given by Fleming in 1882.
- The following two theories have been proposed to substantiate the occurrence of the mitosis:

a) Kern plasm theory: It was proposed by Hertwig.

1. According to this theory mitosis occurs due to disturbance in Karyoplasmic Index.
2. Karyoplasmic Index of small cell is high as they have less cytoplasm. Nucleus efficiently controls the activity of cytoplasm in small cells.
3. In a large cell nucleus fail to control the activity of cytoplasm.
4. To attain the control of nucleus on metabolism a large cell divides into two cells.

b) Surface-volume Ratio:

1. When a cell grows in size its volume increases more than its surface.
2. So a stage will reach when the surface area becomes insufficient to draw the material.
3. At such a critical stage, division of cell started.

Mitosis is a type of cell division. It is also called the equational division (because the daughter cells have an equal number of chromosomes as that of parents).

Q. 72 Function of companion cells is

Option 1:

Loading of sucrose into sieve elements by passive transport

Option 2:

Loading of sucrose into sieve elements

Option 3:

Providing energy to sieve elements for active transport

Option 4:

Providing water to phloem

Correct Answer:

Loading of sucrose into sieve elements

Solution:

The main function of the companion cells is to load the sugar (sucrose) and amino acid molecules into sieve elements. They use transmembrane proteins to take these molecules with the help of an active transport system.

Q. 73 Which one of the following organisms is **not** an example of eukaryotic cells?

Option 1:

Amoeba proteus

Option 2:

Paramecium caudatum

Option 3:

Escherichia coli

Option 4:

Euglena viridis

Correct Answer:

Escherichia coli

Solution:

Amoeba proteus, *Paramecium caudatum*, *Euglena viridis* are unicellular eukaryotic organisms and belongs to the kingdom Protista. *Escherichia coli* is a prokaryotic organism and belongs to the kingdom of Monera. It does not have nucleus or other membrane-bound cell organelles like chloroplast and mitochondria.

Q. 74 Pollen tablets are available in the market for:

Option 1:

In vitro fertilization

Option 2:

Breeding programmes

Option 3:

Supplementing food

Option 4:

Ex situ conservation

Correct Answer:

Supplementing food

Solution:

As we learnt in

Pollen grains as supplements -

Pollen grains are rich in nutrients and hence are used for food supplements. Pollen consumption has been claimed to increase the performance of athletes and race horses.

- wherein

Example:



Pollen grains are used as food supplements.

Q. 75 One cannot calculate the age of a tree by its annual rings if that tree is located in which of the following forests?

Option 1:

Tropical deciduous

Option 2:

Tropical evergreen

Option 3:

Temperate deciduous

Option 4:

Temperate evergreen

Correct Answer:

Tropical evergreen

Solution:

In temperate woody plants and in a few tropical trees, the activity of vascular cambium is seasonal and is seen only in the secondary xylem. The cambium is less active in autumn and more active in spring. Thus, in each year two zones of secondary xylem are formed and both can be easily demarcated. These two zones form an annual or growth ring. By counting the number of annular rings, it is possible to know the age of a plant. The tropical evergreen trees do not have these annular rings due to lack of major seasonal changes.

So, the correct answer is 'tropical evergreen'. Hence, the correct answer is option 2.

Q. 76 Tsellated Epithelium is a type of

Option 1:

Columnar epithelium

Option 2:

Squamous epithelium

Option 3:

Pseudostratified epithelium

Option 4:

Transitional epithelium

Correct Answer:

Squamous epithelium

Solution:

Tsellated is a type of Squamous epithelium in which the cell borders are modified to increase the surface area

Q. 77 Which of the following has haplontic life cycle ?

Option 1:

Polytrichum

Option 2:

Ustilago

Option 3:

Wheat

Option 4:

Funaria

Correct Answer:

Ustilago

Solution:

Life cycle of Funaria and Polytrichum is haplo-diplontic while life cycle of wheat is diplontic.

Ustilago shows haplontic life cycle in which the dominant phase is haploid (gametophyte) while the diploid phase (sporophyte) is represented by zygote.

Q. 78 Which of the following is not the function of placenta ?

Option 1:

Facilitates removal of carbon dioxide and waste material from embryo

Option 2:

Secretes oxytocin during parturition.

Option 3:

Facilitates supply of oxygen and nutrients to embryo.

Option 4:

Secretes estrogen

Correct Answer:

Secretes oxytocin during parturition.

Solution:

Placentation -

- The placenta facilitates the supply of oxygen and nutrients to the embryo and also removal of carbon dioxide and excretory/waste materials produced by the embryo.
- The placenta is connected to the embryo through an umbilical cord which helps in the transport of substances to and from the embryo.
- Placenta also acts as an endocrine tissue and produces several hormones like human chorionic gonadotropin (hCG), human placental lactogen (hPL), estrogens, progestogens, etc.

Oxytocin is secreted by pituitary Hence Option 2 is incorrect

Q. 79 Which of the following represents the volume of air that reaches the lungs after accounting for the dead space?

Option 1:

Inspiratory reserve volume

Option 2:

Expiratory reserve volume

Option 3:

Tidal volume

Option 4:

Alveolar ventilation

Correct Answer:

Alveolar ventilation

Solution:

Tidal volume represents the volume of air inspired or expired during normal respiration, but some amount of air is lost in the respiratory tracts. This is known as dead space. The amount of air that reaches the lungs after accounting for the dead space is known as alveolar ventilation.

Option 4 is the correct answer.

Q. 80 Pyruvic acid, the key product of glycolysis can have many metabolic fates. Under aerobic condition it forms

Option 1:

Lactic acid

Option 2:

$\text{CO}_2 + \text{H}_2\text{O}$

Option 3:

Acetyl CoA + CO_2

Option 4:

Ethanol + CO_2

Correct Answer:

Acetyl CoA + CO_2

Solution:

Fate of pyruvate after glycolysis -

Pyruvate enters mitochondria when there is an availability of oxygen, where its oxidation is complete.

It is carried out in two phases.

1. Oxidative decarboxylation
2. Krebs cycle.

During oxidative decarboxylation, pyruvate is converted to acetyl co-A and Carbon dioxide is released.

Hence the correct option is c.

Q. 81 Choose the incorrect statement

Option 1:

Areolar connective tissue is the most widely distributed connective tissue.

Option 2:

Areolar connective tissue contains cells such as fibroblasts, mast cells, macrophages, lymphocytes, plasma cells, mesenchyme cells, chromatophores, fat cells.

Option 3:

Areolar connective tissue acts as a fat reserve

Option 4:

Areolar connective tissue can allow the diffusion of materials and cells to the infected area

Correct Answer:

Areolar connective tissue acts as a fat reserve

Solution:**Functions:**

- The major function of areolar connective tissue is to bind the parts together.
- It also provides strength, elasticity, support.
- It can also allow the diffusion of materials and cells to the infected area.

Areolar connective tissue do not act as fat reserve.

Q. 82 Choanocytes are specialised cells in Poriferans and are present in the _____ layer.

Option 1:

Outer layer, Pinacoderma

Option 2:

Inner layer, Pinacoderma

Option 3:

Outer layer, Choanoderm

Option 4:

Inner layer, Choanoderm

Correct Answer:

Inner layer, Pinacoderma

Solution:

Poriferans have outer layer - Pinacoderm and inner layer Choanoderm. Choanoderm shows presence of Choanocutes which bring about water transport.

Q. 83 Fertilization in aschelminthes is

Option 1:

External

Option 2:

External then internal

Option 3:

Internal

Option 4:

Internal then external

Correct Answer:

Internal

Solution:

Reproduction and Development in Aschelminthes. -

- Aschelminthes are dioecious animals, i.e., the male and female reproductive organs are present in different individuals.
- Sexual dimorphism is also observed, i.e., females are longer than the males.
- Fertilization is internal and development occurs through the larval stage.
- Hence, the development is indirect.

The following types of larvae are seen in different roundworms:

- Filariform larva - hookworm
- Microfilaria larva - *Wuchereria*
- Rhabditiform larva - *Ascaris*

Fertilization is internal and development occurs through the larval stage.

Q. 84 Cardiac output is determined by

Option 1:

Stroke volume

Option 2:

Stroke volume

Option 3:

Both a and b

Option 4:

Blood flow

Correct Answer:

Both a and b

Solution:**As we have learnt:****Cardiac output:**

- The volume of blood ejected from the left or right ventricle into the aorta (pulmonary trunk) per minute is called cardiac output
- Heart of a normal person beats 72 times per minute and pumps out 70 ml of blood per beat
- It is calculated by the formula

$$\begin{aligned}\text{Cardiac output} &= \text{stroke volume} \cdot \text{heart rate} \\ &= 70 \text{ ml} \cdot 72 \text{ per min} \\ &= 5040 \text{ ml per min}\end{aligned}$$

- The stroke volume depends on venous return i.e. the amount of blood delivered to the heart by veins
- Cardiac output is not constant, it varies with physical activity
- During vigorous exercise, cardiac output increases as much as 21L per min

Cardiac output is determined by heart rate as well as stroke volume. Hence, the correct answer is option c.

Q. 85 In an ecosystem the rate of production of organic matter during photosynthesis is termed as:

Option 1:
Secondary productivity

Option 2:
Net productivity

Option 3:
Net primary productivity

Option 4:
Gross primary productivity

Correct Answer:
Gross primary productivity

Solution:

The rate of photosynthesis or chemosynthesis is referred to as gross primary productivity. Net primary production (NPP) is the rate at which all plants in an ecosystem generate net useful chemical energy; it is equivalent to the difference between the rate at which plants yield useful chemical energy (GPP) and the rate at which they utilize some of that energy during respiration. Gross primary production (GPP) is the quantity of chemical energy produced as biomass by primary producers in a specific time frame.

Q. 86 Water shows surface tension due to

Option 1:

Cohesion

Option 2:

Adhesion

Option 3:

Both

Option 4:

None

Correct Answer:

Cohesion

Solution:

Properties of Water

- Water is an important constituent of biochemistry, the study of biological reactions.
- Cells contain approximately 70-90% water.
- Water molecules cling to each other due to hydrogen bonding.
- Water plays a role as an important solvent and determines the pathway taken by the water.
- Those molecules that can attract water are said to be hydrophilic.
- Nonionized and nonpolar molecules that cannot attract water are said to be hydrophobic.
- Water molecules are cohesive and adhesive.
- Due to cohesion, water shows surface tension.
- Water has a high heat capacity.
- Water is not a linear molecule. It has a bent shape. This is because the highly electronegative oxygen pulls the electrons from the hydrogen closer and gains a partial negative charge. This makes hydrogen partially positive.

Water molecules cling to each other due to hydrogen bonding. Due to cohesion, water shows surface tension.

Q. 87 The mechanism that causes a gene to move from one linkage group to another is called

Option 1:

Inversion

Option 2:

Duplication

Option 3:

Translocation

Option 4:

Crossing over

Correct Answer:

Translocation

Solution:

Linkage group refers to number of type of chromosome present in species. Human have 22 autosomal linkage groups, one X and one Y linkage group. Rearrangement of chromosomal segment between two non homologous chromosomes i.e., translocation moves gene of one linkage group to that of other, which occurs due to an induced abnormality and is not part of the regular cell cycle.

Inversion and duplication cause rearrangement of genes on same chromosome. There is a change in the order of genes within the same linkage group.

Crossing over results in exchange of genes between two homologous chromosomes. A process that occurs during Meiosis I resulting in recombination.

Therefore, the correct answer is option C.

Q. 88 The sound producing organ of bird is called as

Option 1:

Larynx

Option 2:

Syrinx

Option 3:

Trachea

Option 4:

glottis

Correct Answer:

Syrinx

Solution:

As we have learned

Voice box of aves -

Lies at the junction of trachea and bronchi called syrinx.

Q. 89 What are the genetic mechanisms that regulate self-incompatibility in plants?

Option 1:

Gametophytic and sporophytic

Option 2:

Heterozygotic and homozygotic

Option 3:

Dominant and recessive

Option 4:

Polygenic and monogenic

Correct Answer:

Gametophytic and sporophytic

Solution:

Self-incompatibility in plants is regulated by two main genetic mechanisms: gametophytic and sporophytic.

Gametophytic self-incompatibility involves the interaction between the pollen and the stigma. The S-allele gene is expressed in the pollen, and the S-receptor gene is expressed in the stigma. If the pollen and stigma express the same S-allele, the pollen will not be able to fertilize the ovules.

In sporophytic self-incompatibility, the interaction occurs between the pollen and the maternal tissues of the plant. The S-allele gene is expressed in the sporophyte, and the S-receptor gene is expressed in the stigma. If the pollen and sporophyte express the same S-allele, the pollen will not be able to fertilize the ovules.

Overall, these mechanisms ensure that plants cannot self-fertilize, promoting genetic diversity within the species. Hence, option 1 is the correct answer.

Q. 90 A childless couple can be assisted to have a child through a technique called GIFT. The full form of this technique is:

Option 1:

Gamete intra fallopian transfer

Option 2:

Gamete internal fertilization and transfer

Option 3:

Germ cell internal fallopian transfer

Option 4:

Gamete inseminated fallopian transfer

Correct Answer:

Gamete intra fallopian transfer

Solution:

As we learnt in

GIFT (gamete intra fallopian transfer) -

This method involves transfer of an ovum collected from a donor into the fallopian tube of another female who cannot produce one, but can provide suitable environment for fertilisation and further development.

-

GIFT is gamete intra fallopian transfer.

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