

Sample paper 4

Question: 1

Which of the following statements is false with respect to class Monocotyledoneae?

- A. Grass is an example of class Monocotyledoneae.
- B. Embryo has one cotyledon
- C. Monocotyledons have a single cotyledon
- D. Vascular cambium usually absent
- E. Monocotyledons generally have reticulate venation

Correct Answer: E. Monocotyledons generally have reticulate venation

Explanation:

Monocotyledons generally have parallel venation. In parallel venation, the veins are present parallel to each other. Reticulate venation is a characteristic of dicot plant where the veins emerge from different parts of the main vein.

Question: 2

Heart develops from

- A. Lateral plate mesoderm
- B. Intermediate mesoderm
- C. Ectoderm
- D. Endoderm
- E. Paraxial mesoderm

Correct Answer: A. Lateral plate mesoderm

Explanation:

Lateral plate mesoderm is found at the periphery of the embryo. The circulatory system develops from the lateral plate mesoderm. Intermediate mesoderm develops into kidneys and gonads. Cartilage, skeletal muscles etc. develop from paraxial mesoderm.

Question: 3

Which of the following is/are the characteristics of euglenoids?

- A. Autotrophic
- B. Heterotrophic
- C. Presence of pellicle
- D. Presence of flagella
- E. All the above

Correct Answer: E. All the above

Explanation:

Euglenoids are the protists which come under the group flagellates. They live in both fresh water and marine environment. They contain pellicle, a protein rich membrane which helps them in flexibility. They are mixotrophic which means that they are photosynthetic in the presence of sunlight and heterotrophic when they lack sunlight.

Question: 4

Which of the following reactions block polyspermy?

- A. Capacitation
- B. Spermatogenesis
- C. Acrosome reaction
- D. Cortical reaction
- E. Fertilization

Correct Answer: D. Cortical reaction

Explanation:

Cortical reaction can be defined as the reaction of egg cell to fertilization which results in the change of cell membrane. The cortical reaction is exocytosis of eggs' cortical granules. The calcium signal activates the egg to undergo cortical reaction. Cortical reaction prevents other sperms from entering the egg.

Question: 5

Which of the following develops from ectoderm?

- A. Liver
- B. Pancreas
- C. Kidney
- D. Stomach
- E. Brain

Correct Answer: E. Brain

Explanation:

Liver, pancreas and stomach develop from endoderm. Kidney develops from intermediate mesoderm. Brain develops from the neural tube of the ectoderm. Ectoderm generates the outer layer of the embryo. The ectoderm develops into the surface ectoderm, neural crest and neural tube.

Question: 6

To which of the following do ES cells belong?

- A. Pluripotent
- B. Oligopotent
- C. Multipotent
- D. Totipotent
- E. None of the above

Correct Answer: A. Pluripotent

Explanation:

ES cells or embryonic stem cells can develop into any of the cells belonging to the three germ layers. So they are pluripotent stem cells. ES cells will not develop extraembryonic cells. The differentiation of ES cells to different cells depends on specific factors.

Question: 7

Presence of metameric segmentation is the characteristic of phylum

- A. Protista
- B. Porifera
- C. Cnidaria
- D. Annelida
- E. Platyhelminthes

Correct Answer: D. Annelida

Explanation:

Metameric segmentation is the division of body into a number of similar segments. Metameric segmentation is generally exhibited by phylum Annelida and phylum Arthropoda.

Question: 8

A process by which an egg undergoes a series of rapid cell divisions without cell growth or gene expression is called

- A. Apoptosis
- B. Acrosome reaction
- C. Cortical reaction
- D. Cleavage
- E. None of the above

Correct Answer: D. Cleavage

Explanation:

Cleavage is a series of rapid cell divisions without cell growth or gene expression. The organisms are formed by growth and development of these cells. The different cells formed from cleavage are called as blastomere. The compact mass of blastomere is called morula.

Question: 9

Which of the following is mixotrophic?

- A. Yeast
- B. Dinoflagellates
- C. Amoeba
- D. Mushroom
- E. Blue- green algae

Correct Answer: B. Dinoflagellates

Explanation:

A mixotroph is an organism that can utilize different forms of energy. Dinoflagellates are flagellated mixotrophic protists. They combine photosynthesis with ingestion of prey. Yeast, amoeba and mushroom are heterotrophic. Blue- green algae is autotrophic.

Question: 10

Lung is a derivative of _____ germ layer.

- A. Surface ectodermal
- B. Neuroectodermal
- C. Mesodermal
- D. Endodermal
- E. Both A and C

Correct Answer: D. Endodermal

Explanation:

During embryo development, the germ layers ectoderm, endoderm and mesoderm are differentiated from blastula in a process called gastrulation. Later organogenesis takes place from those germ layers. Lung is one of the foregut derivatives of endoderm.

Question: 11

The passage of materials between the nucleus and the cytosol takes place through

- A. Vesicle
- B. Nuclear pore
- C. Nucleosome
- D. Cajal body
- E. Nuclear speckle

Correct Answer: B. Nuclear pore

Explanation:

Nuclear pores are small perforations on the nuclear envelope that allow transportation of substances across the nucleus and cytoplasm. Cajal body and nuclear speckle are small subnuclear organelles. Nucleosome is a chromosomal structure containing histones in DNA. Vesicles present in cytoplasm transport substances from one part of a cell to another part.

Question: 12

The state of a neuron which inhibits the generation of action potential is said to be

- A. Depolarized
- B. Repolarized
- C. Hyperpolarized
- D. Resting potential
- E. A, B and D

Correct Answer: C. Hyperpolarized.

Explanation:

Resting potential is the state of a neuron which is not under any stimulus. The normal resting potential of human nerves is -70 mV. When a neuron receives stimulus, the cell's interior will be depolarized with influx of Na⁺ ions which will result in action potential. Immediately after the generation of action potential the cell is hyperpolarized; that makes the cell more negative and keeps the neuron in a refractory period so that the next action potential cannot generate. Next is the repolarization i.e. neuron will come to its original resting state.

Question: 13

The word 'arthropod' means

- A. Jointed feet
- B. Jointed head
- C. Presence of eight legs
- D. Segmented body
- E. Bilateral symmetry

Correct Answer: A. Jointed feet

Explanation:

The word arthropod in Greek means jointed feet. Presence of jointed feet is the characteristic feature of arthropods.

Question: 14

Which of the following is included in aphotic zone?

- A. Bathypelagic
- B. Abyssopelagic
- C. Mesopelagic
- D. Hadopelagic
- E. All of the above

Correct Answer: E. All of the above

Explanation:

All the above mentioned zones are devoid or have little light and are called aphotic zones. Aphotic zone is the epipelagic zone. Very few organisms live in the hadopelagic (deepest) zone.

Question: 15

Engrailed proteins are

- A. Tethering proteins
- B. Transcription factors
- C. Ubiquitins
- D. Signaling molecules
- E. Carrier proteins

Correct Answer: B. Transcription factors

Explanation:

Engrailed proteins are transcription factors which play a major role in brain development in many species. They determine the midbrain/hindbrain border and aid in neuronal axon guidance.