

## Sample paper 1

### Question: 1

Which photosynthetic pigment reflects yellow red light?

- A. Chlorophyll A
- B. Chlorophyll B
- C. Carotenoid
- D. Xanthophylls
- E. Phytochrome

**Correct Answer: E. Phytochrome**

### Explanation:

Carotenoids are the photosynthetic plant pigments which reflect yellow red light. They contribute to photosynthesis by transmitting the light energy which is absorbed from chlorophyll. They are also known as orange photosynthetic pigment.

### Question: 2

Which of the following is an example for denitrifying bacteria?

- A. Nitrosomonas sp
- B. Nitrobacter sp
- C. Rhizobium sp
- D. Pseudomonas sp
- E. All of the above

**Correct Answer: D. Pseudomonas sp**

### Explanation:

Denitrification is a process of reduction of nitrate to molecular nitrogen by microbial action. Pseudomonas sp is an example of denitrifying bacteria. Nitrosomonas sp and Nitrobacter sp are examples of nitrifying bacteria. Rhizobium sp is an example for nitrogen fixing bacteria.

### Question: 3

Which of the following glands secrete the FSH hormone?

- A. Islets of Langerhans
- B. Anterior pituitary gland
- C. Posterior pituitary gland
- D. Parathyroid gland
- E. Testis

**Correct Answer: B. Anterior pituitary gland**

### Explanation:

The anterior pituitary gland secretes follicle stimulating hormone (FSH). In male, FSH stimulates spermatogenesis and in females it stimulates the growth of ovarian follicles. Anterior pituitary gland also secretes luteinising hormone, prolactin, thyroid stimulating hormone, adrenocorticotrophic hormone and growth hormone.

### Question: 4

Which among the following processes results in dark coloured amorphous substance during decomposition in soil?

- A. Mineralization
- B. Fragmentation
- C. Leaching
- D. Humification
- E. None of the above

**Correct Answer: D. Humification**

**Explanation:**

Decomposition in soil results in humification and mineralization. Humification refers to the accumulation of dark coloured amorphous substance called humus which serves as a reservoir of nutrients. It resists microbial action and so decomposition takes place very slowly. Further degradation of humus by microbes leads to mineralization.

**Question: 5**

**By which of the following processes, does the exchange of DNA occur due to pairing of two chromosomes?**

- A. Mutation
- B. Crossing over
- C. Mitosis
- D. Transduction
- E. Transformation

**Correct Answer: B. Crossing over**

**Explanation:**

Crossing over which occurs during meiosis, is a process of exchange of genetic material from one chromosome to other when they pair with each other. Mitosis is somatic cell division, which takes place through phases. Mutation occurs by change in the nucleotide sequence. Transduction is the process of transfer of DNA from one bacterium to other by bacteriophages. Transformation refers to the alteration of DNA that results due to transfer of foreign DNA.

**Question: 6**

**Archaeopteryx belongs to the**

- A. Jurassic era
- B. Devonian era
- C. Cretaceous era
- D. Triassic era
- E. None of these

**Correct Answer: A. Jurassic era**

**Explanation:**

Archaeopteryx lived in the Jurassic era. Archaeopteryx shared some similarity with mesozoic dinosaurs. These include sharp teeth, long bony tail, three fingers with claws etc.

**Question: 7**

**Spleen is an organ of which of the following systems?**

- A. Digestive system
- B. Endocrine system

- C. Excretory system
- D. Lymphatic system
- E. Respiratory system

**Correct Answer: D. Lymphatic system**

**Explanation:**

Lymphatic system helps in balancing the body's fluid level and it is closely associated with immune system to act against infection. Its components are thymus, bone marrow, spleen, lymph nodes and lymph. The B-lymphocytes that participate in defense mechanism get accumulated and get matured in spleen, a lymphatic organ.

**Question: 8**

**A region with high level of endemic species that is under threat from humans is called**

- A. Botanical garden
- B. Wild life Sanctuaries
- C. Zoos
- D. Biodiversity hotspot
- E. None of these

**Correct Answer: D. Biodiversity hotspot**

**Explanation:**

Hotspots are the regions with significant reservoir of biodiversity and high level of endemic species that is under threat from humans. Botanical garden is a place where plants are cultivated for education, scientific and ornamental purposes. Wildlife sanctuaries are areas in natural conditions which are reserved for the conservation of animals within which human activity is inhibited. Zoo refers to an institution in which living animals are kept and usually exhibited to the public.

**Question: 9**

**G protein receptors have**

- A. 5 transmembrane  $\beta$  helices
- B. 7 transmembrane  $\alpha$  helices
- C. 5 transmembrane  $\alpha$  helices
- D. 6 transmembrane  $\alpha$  helices
- E. 7 transmembrane  $\beta$  helices

**Correct Answer: B. 7 transmembrane  $\alpha$  helices**

**Explanation:**

G protein receptors have 7 transmembrane  $\alpha$  helices that traverse the plasma membrane and are connected by loops of varying length. The carboxy-terminus is located inside the cell and the amino terminus of the receptor is located outside the cell.

**Question: 10**

**Which of the following metals is responsible for Itai-itai disease?**

- A. Arsenic
- B. Cadmium

- C. Lead
- D. Mercury
- E. Uranium

**Correct Answer: B. Cadmium**

**Explanation:**

Itai-itai is a disease caused by cadmium poisoning. The symptoms of the disease include weak and brittle bones. The disease is initially characterized by spinal and leg bone pain. It also includes complications like kidney failure.

**Question: 11**

**Which of the following produces angiotensinogen?**

- A. Liver
- B. Pancreas
- C. Kidney
- D. Thyroid gland
- E. Pituitary gland

**Correct Answer: A. Liver**

**Explanation:**

Angiotensinogen is a serum globulin produced by liver. Angiotensinogen is the precursor of angiotensin, an oligopeptide involved in regulating blood pressure. Angiotensin increases blood pressure by enhancing vasoconstriction. Angiotensinogen belongs to the serpin family

**Question: 12**

**Deposition of sediments or sediment accumulation is known as**

- A. Profundation
- B. Aggradation
- C. Biocoenosis
- D. Trophic succession
- E. None of these

**Correct Answer: B. Aggradation**

**Explanation:**

Aggradation is the accumulation of sediments resulting in an elevation of land. Aggradation occurs when the deposition of sediments exceeds the amount of material the system can transport. Biocoenosis describes the interacting organisms in a habitat.

**Question: 13**

**What is the inactivated X chromosome in females called?**

- A. Barr body
- B. Heterochromatin
- C. Euchromatin
- D. Nucleosome
- E. None of the above

**Correct Answer: A. Barr body**

**Explanation:**

The inactivated X chromosome in females is called Barr body. Barr body was first discovered by Dr. Murray L. Barr. Inactivation of an X chromosome occurs due to dosage compensation.

**Question: 14**

**Lowest area of water body is called**

- A. Littoral zone
- B. Aphotic zone
- C. Photic zone
- D. Benthic zone
- E. None of the above

**Correct Answer: D. Benthic zone**

**Explanation:**

Lowest area of water body such as ocean or lake is called as benthic zone. Organisms living in this zone are called as Benthos. Littoral zone is the region of lake, sea or ocean. Aphotic zone is the zone of water body which lacks sunlight. Photic zone is the upper part of water body to which enough sunlight penetrates and permits photosynthesis.

**Question: 15**

**The type of petrification in which the organic matter of the dead body is replaced by double carbonates of calcium and magnesium is called**

- A. Silicification
- B. Pyritization
- C. Carbonization
- D. Dolomitization
- E. None of these

**Correct Answer: D. Dolomitization**

**Explanation:**

In the process of fossil formation, the replacement of dead organic matter by the dissolved minerals is called petrification. It is of different types according to the mineral deposited. Silicification is the replacement of original dead matter by silica; Pyritization is the replacement by iron pyrites. When carbon compounds are deposited, it is called carbonization. In dolomitization, magnesium carbonate replaces the calcium carbonate that was already deposited in dead matter.