

**ICSE Board
Class IX Biology
Paper – 4 Solution**

SECTION-I

Answer 1

(a)

- (i) Tendon
- (ii) Glandular epithelium
- (iii) Inflorescence
- (iv) Permanent tissue
- (v) Cyton

(b)

- (i) False. (In mammals, neck consists of seven vertebrae.)
- (ii) False. (Fats are essential components of food.)
- (iii) True
- (iv) False. (Genes are present on chromosomes.)
- (v) False. (Some bacteria are useful, while some are harmful to man.)

The explanation provided in the brackets is for your learning .You may not be required to write an explanation in your answer to this question

(c)

- (i) Damaged mobile. (The rest are types of industrial waste from construction units, while a damaged mobile is an electronic waste)
- (ii) Femur (The rest are associated with the chest cavity)
- (iii) Vitamin B₁ (The rest are fat-soluble vitamins, while Vitamin B₁ is water-soluble)
- (iv) Small pox (The rest are non-infectious diseases, while small pox is a infectious disease)
- (v) Pepsin (The rest are enzymes secreted in the small intestines, pepsin is secreted in the stomach)

The explanation provided in the brackets is for your learning .You may not be required to write an explanation in your answer to this question

(d)

- (i) Bilateral symmetry, triploblastic and true body cavity are the characteristic features of members of Phylum **Annelida**.
- (ii) Chlorenchyma is a modified **parenchyma** tissue.
- (iii) The **ovary** of the carpel bears ovules.
- (iv) Ribosomes help in **protein synthesis**.
- (v) **Goitre** is a metabolic disorder.

(e)

Column A	Column B
(i) Ptyalin	Starch
(ii) Trypsin	Proteins
(iii) Lipase	Fats
(iv) Lactase	Lactose
(v) Invertase	Sucrose

(f)

- 1) Synovial joint
- 2) 1: Synovial membrane; 2: Synovial fluid; 3: Fibrous capsule; 4: Ligaments.
- 3) Ball and socket joint: In a ball and socket joint, the ball-shaped end of one bone moves within the cup-shaped cavity of another bone. Movements in all directions are possible in this type of joint. E.g. Hip joint and Shoulder joint.

(g)

- (i) 7-14 days
- (ii) Protista
- (iii) Symbiotic
- (iv) Flame cells
- (v) Non-digestible cellulose

(h)

- (i) Anatomy is defined as the branch of biology that deals with the study of gross structure of an organism as seen in dissection.
- (ii) A cell is defined as the basic structural and functional unit of life.
- (iii) Vegetative propagation is a type of reproduction in plants, which is carried out by humans using non-reproductive parts of the plant.
- (iv) The period between the entry of germs into the body and the appearance of first symptoms of a disease is called the incubation period.
- (v) Ecosystem is a self-contained area composed of all living organisms, which interact with each other and the physical environment prevailing in that area.

SECTION-II

Answer 2

(a)

(i) Disadvantages of self-pollination:

- i. Continued self pollination, generation after generation, may lead to the weakening of the variety or the species.
- ii. The weaker or defective characters of the variety or breed cannot be eliminated.
- iii. It does not yield new varieties.

(ii) In angiosperms, the process of fertilisation occurs twice. Firstly, one male nucleus (sperm nucleus) fuses with the polar nuclei to form the endosperm. Secondly, the other male nucleus fuses with the egg nucleus to form an embryo. This is why, it is called double fertilisation.

(b)

(i) Vaccine is any germ or germ substance, introduced into the body for developing resistance to a particular disease. On injecting a vaccine into the body, the person gets the disease in a mild form and his body gets stimulated to produce antitoxins. These antitoxins provide immunity against any future attack of the particular disease-causing germ.

(ii) Two serum compounds produced by genetically modified bacteria:

- (a) Blood clotting factor VIII for the treatment of Haemophilia A.
- (b) Factor IX for the treatment of Haemophilia B.

Answer 3

(a)

- (i) Vegetative propagation involves the use of vegetative parts of only one parent. Therefore, no mixing of different characters takes place in vegetative propagation. So, no new varieties of plants can be produced by this method.
- (ii) During strenuous physical exercise, energy requirements exceed the supply of oxygen. Therefore, the muscles start respiring anaerobically and lactic acid is produced. Accumulation of lactic acid gives the feeling of fatigue. This condition is called 'oxygen debt'.

(b) Salient features of Phylum Protozoa:

- i. They have unicellular level of organisation.
- ii. They are mostly aquatic (freshwater or marine).
- iii. They can be solitary, colonial, free-living, parasitic or symbiotic.
- iv. Their body shape can be irregular, spherical, oval, elongated or flattened.
- v. Their cytoplasm is differentiated into ectoplasm (outer) and endoplasm (inner).
- vi. Their mode of locomotion can be with the help of pseudopodia, flagella or cilia.
- vii. Their mode of nutrition is heterotrophic.
- viii. Asexual reproduction is by binary fission or multiple fission, and sexual reproduction is by conjugation.

Answer 4

(i)

- 1. Cartilage
- 2. 1: Matrix; 2: Chondrioblast/Chondriocyte
- 3. Cartilage supports the external ear, nose, etc. It is an elastic tissue.

- (ii) A bulbil is an aerial modification of the stem. It grows in the axil of a leaf getting detached from the parent plant and develops into a new plant.

(iii)

- 1. *Bryophyllum*
- 2. 1: Shoot; 2: Adventitious root
- 3. The *Bryophyllum* leaf contains notches on its margin, which produces meristematic tissue, and gives rise to small plants and adventitious roots, which develop from the notch region.

- (iv) Yes, the micropyle is important for the seed as it is through the micropyle that seeds get water and oxygen for germination.

Answer 5

(a)

- (i) Stigma: Receives the pollen grains during pollination.
- (ii) Chromosomes: Transmit hereditary characters from the parents to the offspring.
- (iii) Phloem: Conducts manufactured food from the leaves to the other parts of the plant.
- (iv) Sweat gland: Secretes sweat.
- (v) Roughage: Increases the fibre content and thereby, prevents constipation.

(b)

- (i) Bacteria replenish nitrates in the soil by the process of nitrification. Presence of nitrates is important for the soil because, from these nitrates, plants obtain nitrogen for producing proteins.
- (ii) Harmful effects of bacteria:
 - 1. Spoilage of food.
 - 2. Causes many diseases in animals and plants.
 - 3. Reduces soil fertility.
- (iii) Preservation of food means, to make food free from germs, in order to keep it in a good and edible condition, for a long time.

Answer 6

(a)

- (i) The given experiment aims to show that respiration takes place in germinating seeds.
- (ii) Seeds use oxygen for respiration and a vacuum is created in the tube. As a result, the water rises in the tube.
- (iii) KOH absorbs CO₂ released by the germinating seeds.
- (iv) Yes. Another conical flask with the same experimental set-up can be used. But, we have to use boiled seeds, instead of germinating seeds.
- (v) The flask used should be airtight.

(b)

- (i)
 - 1. 1: Stigma; 2: Style; 3: Ovary; 4: Ovule; 5: Thalamus
 - 2. It is a carpel.
 - 3. It belongs to gynoecium.
- (ii) Humerus, radius, ulna, carpals, metacarpals and phalanges are the 6 different types of bones present in the arm.

Answer 7

(a)

(i) Adaptations of villi for absorption:

1. Villi have large surface area.
2. They have an epithelial lining with a network of capillaries and lacteals.

(ii) Role of fats in the body:

1. Fats help in the formation of the cell membrane.
2. The layer of adipose tissue forms a shock absorbing structure around the organs.
3. They help in absorption of fat-soluble vitamins.

(b)

(i) Maize grain

(ii) 1: Endosperm; 2: Radicle; 3: Coleorhiza; 4: Plumule; 5: Coleoptile; 6: Aleurone layer

(iii) The seed coat and pericarp are fused together in the maize seed.

(iv) It is a monocot seed. It contains only one scutellum.