

**ICSE Board
Class X Biology
Sample Paper – 1 Solution**

Time: 2 hrs

Total Marks: 80

SECTION I

Answer 1

(a)

- (i) The prostate gland secretes an alkaline secretion into the semen which neutralises the acid in the female's vagina.
- (ii) The placenta protects and provides nourishment, oxygen etc. to the foetus. It also acts as an endocrine gland and produces oestrogen and progesterone.
- (iii) A pacemaker is a sino-atrial (SA) node; a node of cardiac muscles which initiates the heart beat and transmits it further.
- (iv) The corpus callosum connects the two hemispheres of the brain and transfers information from one hemisphere to the other hemisphere.
- (v) Fovea centralis serves as the region of brightest vision and also of colour vision.

(b)

- (i) Haemoglobin
- (ii) Ureter
- (iii) Grana of chloroplast
- (iv) Phloem
- (v) Graafian follicle

(c)

- (i) False. The laws of heredity were proposed by Mendel.
- (i) False. Ethylene is the only hormone which is a gas at ordinary temperature.
- (ii) False. Cells which have lost their water content are said to be plasmolysed.
- (iii) True.
- (iv) True.

(d)

- (i) (4) Decreased transpiration
- (ii) (2) Transpiration
- (iii) (4) Active transport
- (iv) (3) Pelvic girdle
- (v) (4) Production of identical individuals

(e)

- (i) Diapedesis
- (ii) Active absorption
- (iii) Metaphase
- (iv) Alleles
- (v) Speciation

(f)

- (i) Destarched plant → placed in sunlight → a leaf boiled in alcohol → washed in water → iodine added
- (ii) Interphase → Prophase → Metaphase → Anaphase → Telophase
- (iii) Seminiferous tubules → epididymis → vas deferens → urethra → penis
- (iv) Pinna → an auditory canal → tympanum → ear ossicles → cochlea
- (v) Soil water → root hair → cortex → endodermis → xylem

(g) Hydathodes; Guttation; Hydrostatic; Less.

In some plants, droplets of water appear along the margin. This water comes out through special pores called **hydathodes**, and the process of escape of water is known as **guttation**. This process is due to increased **hydrostatic** pressure and **less** transpiration.

(h)

- (i) Vasopressin
- (ii) Insulin
- (iii) Oxytocin
- (iv) Adrenaline
- (v) Follicle-stimulating hormone (FSH)

Section II

Answer 2

(a)

- (i) The aim of the experiment is to show that light is necessary for photosynthesis.
- (ii) After the experiment, part A and part B show blue-black colour. This is because parts A and B are exposed to sunlight and thus starch is produced in these parts. Thus, these parts show positive starch test.
- (iii) Part C shows brown colour because it is covered with black paper before the experiment. This part of the leaf does not undergo photosynthesis, and due to the absence of starch, it gives negative starch test.
- (iv) Iodine is used for this experiment.

(b)

- (i) The process of formation of ATP from ADP by using electrons and by adding one phosphate group during the light reaction is called photophosphorylation.
- (ii) Tubectomy in females and vasectomy in males are the methods to control population in humans.
- (iii) Characteristics of *Australopithecus*:
 1. Cranial capacity ranging from 450-600 cm³.
 2. Vertebral column with a distinct lumbar curve with broad pelvis.
- (iv) A synapse is a point of contact between the terminal branches of the axon of one neuron and the dendrites of another neuron.
- (v) Ciliary muscles present in the choroid change or regulate the shape of the lens.

Answer 3

(a)

- (i) Adrenal gland.
- (ii) It is situated on the top of both the kidneys like a cap.
- (iii) Adrenaline and glucocorticoids are the two hormones produced by the adrenal gland.
- (iv) Adrenaline increases metabolism in an emergency by increasing heart blood pressure etc.
Glucocorticoids regulate carbohydrate, fat and protein metabolism.
- (v) 1. Adrenal cortex 2. Adrenal medulla

(b)

- (i) Growth movement occurring in response to a unidirectional external stimulus in a plant part is called a tropic movement.
Example: Growth of roots in the downward direction in response to gravity is a geotropic movement.
- (ii) Ear ossicles: The three bony structures present in the middle ear, i.e. malleus, incus and stapes are called ear ossicles. Function: Ear ossicles receive the vibrations from the eardrum. Malleus and incus magnify the vibrations of the third ossicle, i.e. stapes. Stapes transmits the vibrations further to the oval window.
- (iii) The peripheral nervous system includes nerves which carry impulses to and from the central nervous system, i.e. cranial nerves and spinal nerves.
- (iv) The process of WBCs squeezing out through the walls of the blood capillaries is called diapedesis.

Answer 4

(a)

- (i) 1. Nucleus; 2. Cytoplasm; 3. Cell wall; 4. Cell membrane; 5. Vacuole
- (ii) Part 3, i.e. the cell wall allows the entry of water as it is freely permeable. Part 4, i.e. the cell membrane which is semi-permeable allows water to enter the root hair cells. Part 5, i.e. vacuole. The cell sap of the vacuole contains a higher concentration of solute than the outside water so water enters the cell by osmosis.
- (iii) If fertilisers are sprinkled near the root hair in the soil, then exosmosis will take place and the water will move out of the root hair. Thus, the root hair would become flaccid.
- (iv) Plasmolysis is the shrinkage of the protoplasm when a cell is placed in a hypertonic solution.

(b)

- (i) On a bright sunny day, due to high temperature, the rate of transpiration exceeds the rate of absorption of water by leaves. This causes deficiency of water in plants. Hence, the leaves of certain plants roll up.
- (ii) The salt concentration is greater in the body of marine fish than in tap water. If marine fish are placed under tap water, water enters the fish due to the concentration gradient between the fish and tap water. The fish become more turgid and finally burst, leading to their death.
- (iii) The heart pushes the blood directly into arteries with great force and pressure, then relaxes for a while during joint diastole and then again pushes the blood into the arterial system. Therefore, the blood in arteries flows in spurts.
- (iv) Movement of a plant part away from the direction of sunlight is called negative phototropism. Roots when exposed to sunlight tend to grow away from it in the downward direction. As a result, roots are said to be negatively phototropic.

- (v) When a cell is old or damaged, lysosomes secrete the lytic enzyme lysozyme which digests or destroys the entire cell. Therefore, lysosomes are termed suicidal bags of a cell.

Answer 5

(a)

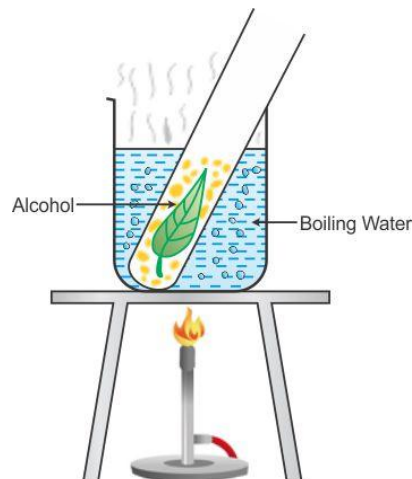
- (i) Telocentric Chromosome:



- (ii)

Phenotype	Genotype
The phenotype is the physical appearance of an individual which is genetically controlled.	The genotype is the genetic constitution of an organism responsible for its physical appearance.

- (iii) Starch Test:



- Take a destarched leaf and keep it in boiling water for a minute to kill the cells.
- Dip the boiled leaf in alcohol/methylated spirit over a water bath to remove chlorophyll. The leaf becomes hard and brittle.
- Place the leaf in hot water to soften it.
- Spread the leaf in a dish and pour iodine solution on it. The presence of starch is indicated by a blue-black colour.

(b)

- (i) Cochlea
- (ii) The three small bones present in the middle ear are malleus (hammer), incus (anvil) and stapes (stirrup). Together these three bones are called ear ossicles.
- (iii) 1. Static balance: Utriculus and sacculus
2. Hearing: Cochlea
3. Dynamic balance: Semicircular canals
- (iv) The nerve which transmits messages from the ear to the brain is the auditory nerve.

Answer 6

(a)

- (i) The father is colour blind.
- (ii) Three daughters and two sons.
- (iii) Child 1 is colour blind.
- (iv) All daughters from 2–5 are carriers, while all the sons are normal.
- (v) X chromosome.

(b)

- (i) Excretion is the separation and elimination of metabolic nitrogenous wastes from the body.
- (ii) The unit of kidney is the nephron.
- (iii) The cortex of the kidney consists of Malpighian tubules which are present in a large number and show dot-like appearance. Therefore, the cortex of the kidney shows a dotted appearance.
- (iv) Functions of the kidney:
 - 1. To excrete nitrogenous metabolic waste and substances in excess from the body.
 - 2. Maintain the water and mineral concentration, i.e. osmoregulation.

Answer 7

(a)

- (i) 1. Prostate gland; 2. Cowper's gland; 3. Urethra; 4. Sperm duct/Vas deferens; 5. Testis
- (ii) The prostate gland pours an alkaline secretion into the semen which neutralises the acid in a female's vagina.
Vas deferens (sperm duct) stores and transports the sperm from the testes to the urethra.
- (iii) Sperms are produced in the testes at a temperature 1–2°C lower than that of the body temperature. To provide the lower temperature, the testes are present outside the body in the scrotal sac.

(b)

- (i) The aim of the experiment is to measure transpiration.
- (ii) The oil has been put on the surface of the water to prevent the evaporation of water from the surface.
- (iii) The level of water in test tube (a) will decrease, while the level of water in test tube (b) will be unchanged.
- (iv) The fall in the water level in test tube (a) is due to transpiration. Because a plant loses water through transpiration, its roots absorb more water from the test tube and thus the water level in test tube (a) falls.
- (v) Test tube (b) has been taken as a control experiment. The control helps to compare the water level in test tube (a) containing the plant.