ICSE Board
Class X Biology
Sample Paper – 4 Solution

Time: 2 hrs **Total Marks: 80**

SECTION I

Answer 1

(a)

(i) Abscisic acid
(ii) Chiasmata
(iii) Homozygous condition
(iv) Blood group - AB
(v) Medulla oblongata

(b)

(i) Vestigial organs
(ii) Systolic pressure
(iii) Anaphase
(iv) Myocardial infarction
(v) Fraternal twins

(c)

(i) Thyroid. It is located in the front of the neck just below the larynx.
(ii) Fovea or yellow spot. It is located on the retina almost at the centre on the horizontal axis of the eyeball.
(iii) Urethral sphincters. Present at the distal opening of the urethra.
(iv) Cones. These are located on the retinal surface.
(v) Neurotransmitter. It is located at the terminal end of the axons.

(d)

Set	Odd Term	Category
i. Pinna, Tympanum, Ear Ossicles, Lacrimal gland	Lacrimal gland	Parts of the ear
ii. Cerebrum, Ossicles, Cerebellum, Medulla Oblongata	Ossicles	Parts of the brain
iii. Sneezing, Blinking, Typing, Coughing	Typing	Natural reflexes
iv. Plasmolysis, Diffusion, Imbibition, Osmosis	Plasmolysis	Methods of absorption and conduction of water and minerals by plants
v. Fallopian tube, Uterus, Vas deferens, Vagina	Vas deferens	Parts of the female reproductive system

(e)

(i) Cro-Magnon man
(ii) Water
(iii) Gibberellic acid
(iv) Left ventricle
(v) Vas deferens/sperm duct

(f)

(i) Cerebellum
(ii) Eustachian tube
(iii) Hydathodes
(iv) Cowper's gland
(v) Leptotene

(g)

(i) The structures seen in A are a red blood cell (RBC), a white blood cell (WBC) and a blood platelet in a capillary.
(ii) In Figure A, the WBC is squeezing out of the blood capillary. The technical term for this activity of the WBC is diapedesis.
(iii) In Figure B, the WBC is engulfing the microorganisms with the help of its pseudopodia. In Figure C, the engulfed microorganisms are being destroyed by the enzymes secreted by the WBC.

(h)

(i) Malpighian tubule

(ii) 1. Afferent arteriole; 2. Glomerulus; 3. Glomerular filtrate; 4. Bowman's capsule; 5. Efferent arteriole

(iii) Part 5 is the efferent arteriole. It takes deoxygenated blood away from the glomerulus.

(iv) The arrows indicate the direction of the flow of blood under great hydrostatic pressure.

(v) When both the kidneys fail to function, the patient's blood is led from the radial artery through a machine where the urea and excess salts are removed and the purified blood is returned to a vein in the same arm. This process is called dialysis.

Section II

Answer 2

(a)

(i) 1. Acrosome; 2. Nucleus; 3. Mitochondria; 4. Tail

(ii) 23 chromosomes are present in the nucleus of the sperms.

(iii) Part 1 – Acrosome. It secretes an enzyme hyaluronidase, which helps the sperm to penetrate the egg.
Part 3 – Mitochondria. It provides energy for the mobility of the sperm.
Part 4 – Tail. By its lashing movements, the sperm can move forward.

(iv) The sperms are produced in the seminiferous tubules of the testes by the germinal epithelium.

(b)

(i) 1 - Myopia (Short-sightedness)
2 - Hypermetropia (Long-sightedness)

(ii) Myopia is corrected by using a concave lens. Hypermetropia is corrected by using a convex lens.

(iii) Myopia is because of the lengthening of the eye ball from the front to the back or because the lens is too curved. Hypermetropia is due to the shortening of the eye ball from the front to the back or because of the flattening of the lens.

Answer 3

(a)

(i) The process of formation of ATP from ADP by using an electron and adding one phosphate group during the light reaction is called photophosphorylation.

(ii) Tubectomy in females and vasectomy in males.

(iii) The growth movement of pants in response to the stimulus of touch is called thigmotropism.

(iv) A synapse is the point of contact between the terminal branches of the axon of one neuron and the dendrites of another neuron separated by a fine gap.

(v) Ciliary muscles help in the alteration of the shape of the lens for viewing objects at different distances.

(b)

(i) The elimination of metabolic nitrogenous wastes from the body is defined as excretion.

(ii) The unit of the kidneys is a nephron.

(iii) Malpighian corpuscles lie in the cortical regions of the kidney. Therefore, the cortex of the kidney shows a dotted appearance.

(iv) Functions of the kidneys:

1. The removal of metabolic nitrogenous waste products in the form of urine.
2. Osmoregulation, i.e. maintaining the water and ion concentration in the body.

Answer 4

(a)

(i) 1. Pulmonary vein; 2. Aorta; 3. Hepatic portal vein; 4. Renal artery; 5. Renal vein; 6. Hepatic vein; 7. Inferior vena cava; 8. Pulmonary artery

(ii) The left atrium receives blood from '1' and the left ventricle pumps blood into the blood vessel '8'.

(iii)

Blood Vessel 7 (Inferior vena cava)	Blood Vessel 2 (Aorta)
1. The lumen is wider with thin muscular walls.	1. The lumen is narrow with thick muscular walls.
2. Valves are present.	2. Valves are absent.

(b)

(i) The pressure which develops in the cortical cells of the root that helps to push the cell sap upwards is called root pressure.

(ii) The pairing of homologous chromosomes for the exchange of genetic material during meiosis is called synapsis.

(iii) Significance of turgidity:
Turgidity provides rigidity to the soft tissues such as the leaves and young stems.

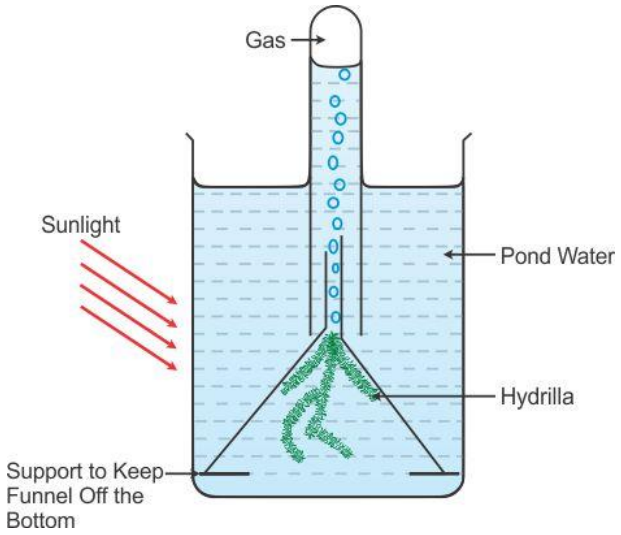
(iv) Effect of adrenaline hormone:
Adrenaline prepares the body for the fight and flight mechanism. It increases the heartbeat, blood pressure and breathing at the time of an emergency.

(v) Homo erectus were so called because they stood erect and the proportion of arms and legs resembled that of modern man.

Answer 5

(a)

(i) Experimental setup to show that oxygen is evolved during photosynthesis



(ii) Biosynthetic phase: It is a light-independent reaction which occurs during photosynthesis. It takes place in the stroma of the chloroplast. During this phase, the hydrogen of NADPH is used to combine it with carbon dioxide by using ATP to produce glucose.

(b)

(i) 1. Cerebrum; 2. Cerebellum; 3. Medulla oblongata

(ii) Receptors are the cells present in sensory organs such as the skin which receive specific stimuli and transmit the impulse to the sensory nerves to complete the reflex arc in order to get a proper response.

(iii) Part 2 is the cerebellum. It is responsible for the balance of the body and coordination of muscular activities. If it is damaged, then the body will not be able to coordinate muscular activities and this will produce movement disorders.

Answer 6

(a)

(i) Prophase

(ii) 1. Centrioles; 2. Spindle fibres; 3. Chromosomes

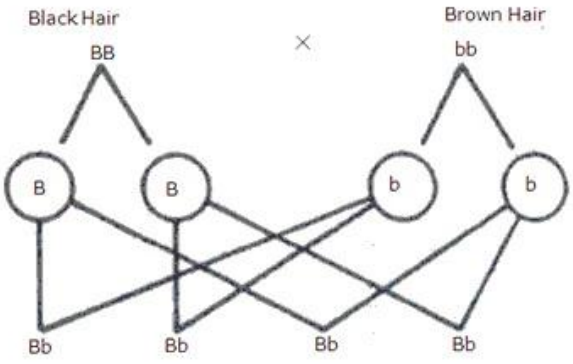
(iii) The changes which occur:

1. The chromosomes become short and thick.
2. Nuclear membrane and nucleolus disappear.
3. Spindle apparatus is formed.

(iv) Metaphase

(b)

(i)



In the F_1 generation, all the offspring will be heterozygous for black hair.

(ii) 1. Law of dominance: Of a pair of contrasting characters present together, only one is able to express itself while the other remains suppressed.

2. Identical twins: Two identical individuals born when a single fertilised egg gets split into two embryos during its development.

(iii) Heredity: It is the transmission of genetically controlled characters from one generation to the next generation.

Answer 7

(a)

(i)

Lymphocytes	Neutrophils
The nucleus is large with a dent-like depression.	The nucleus has 3–4 lobes.

(ii)

Beginning of Ventricular Systole	End of Ventricular Systole
The heart sound produced at the beginning of ventricular systole is 'LUBB'.	The heart sound produced at the end of ventricular systole is 'DUBB'.

(iii)

Prostate Gland	Cowper's Gland
The prostate gland secretes white alkaline fluid into the semen.	Cowper's gland secretes mucous into the semen.

(iv)

Rod Cells	Cone Cells
Pigment rhodopsin is present in rod cells.	Pigment iodopsin is present in cone cells.

(v)

Simple Goitre	Exophthalmic Goitre
Simple goitre is caused by the hyposecretion of thyroxine.	Exophthalmic goitre is caused by the hypersecretion of thyroxine.

(b)

(i) Veins
(ii) Valves
(iii) Blood flowing through the veins is at a low pressure and moving against gravity; hence, it tends to flow downwards, filling the pocket-shaped valves which close. The closing of valves thus prevents the backflow of the blood.
(iv) Valves are present at the opening of the aorta and the pulmonary artery.
(v) The heart is located towards the top of the figure.