ICSE Board
Class X Biology
Board Paper 2013 - Solution

SECTION I

Answer 1

(a)

(i) Cyton
(ii) Cuticle
(iii) DDT
(iv) Phenotype
(v) Glomerulus

(b)

(i) Chloroplast: Inside the plant cells, mainly contained in the mesophyll cells, located between the upper and the lower epidermis of the leaves.
(ii) Incus: Present between the malleus and stapes bones in the middle ear.
(iii) Corpus callosum: It is located between the two cerebral hemispheres.
(iv) Guard cells: They are present on the lower epidermis of a dorsiventral leaf surrounding or on either side of the stoma.
(v) Pulmonary semilunar valve: Located at the opening of the right ventricle into the pulmonary artery.

(c)

Odd terms	Category of the other three items
(i) Acetic acid	Antiseptics
(ii) Bile	Germ-killing secretions
(iii) Acromegaly	Disease related to the thyroid gland
(iv) Typing	Natural (inborn) reflexes
(v) Tympanum	Parts of the inner ear

(d)

Column A	Column B
1) Testis	(f) Gonad
2) Poliomyelitis	(g) Salk's vaccine
3) Transpiration	(b) Water vapour
4) Clotting of blood	(i) Calcium
5) Uriniferous tubule	(a) Kidney

(e)

(i) C. Chromosome
(ii) C. Systole of the left ventricle
(iii) B. Homozygous condition
(iv) B. Pancreas
(v) A. Motor neuron

(f)

(i) Neutrophils: Phagocytosis
(ii) Ureter: Transports urine from the kidneys to the urinary bladder.
(iii) Neurotransmitters: Transmits impulses in a synaptic cleft from a presynaptic neuron to a postsynaptic neuron.
(iv) Iris of the eye: Controls the size of the pupil and regulates the amount of light entering the eye.
(v) Placenta: Provides nourishment and oxygen to the developing foetus.

(g)

(i) The aim of the experiment is to prove that carbon dioxide is necessary for photosynthesis.
(ii) The special condition inside the flask is that the air inside the flask contains no carbon dioxide.
(iii) An alternate chemical which can be used instead of KOH is soda lime.
(iv) The leaf 1 when tested for the presence of starch turned brown, indicating the absence of starch, while leaf 2, which is outside the flask, turned blue–black, indicating the presence of starch.

(h)

(i) Upper epidermis, palisade tissue, spongy cells, sub-stomatal space, stoma
(ii) Receptor, sensory neuron, spinal cord, motor neuron, effector
(iii) Soil water, root hair, cortex, endodermis, xylem
(iv) Prophase, metaphase, anaphase, telophase, cytokinesis
(v) Intestinal artery, intestine, hepatic portal vein, liver, hepatic vein

SECTION II

Answer 2

(a)

(i) 1 – Seminiferous tubules
2 – Lobule
3 – Epididymis
4 – Vas deferens

(ii) 1. Seminiferous tubules: Produce sperms by the process of spermatogenesis.
3. Epididymis: Stores the sperms for some days during which they mature and become motile.

(iii) The production and survival of sperms requires a temperature which is lower than the normal body temperature, so the testes are located in the scrotal sac which is outside the abdomen, which maintains the temperature at 3°C below the normal body temperature.

(iv) The inguinal canal allows the descent of testes along with their ducts, bloods vessels and nerves.

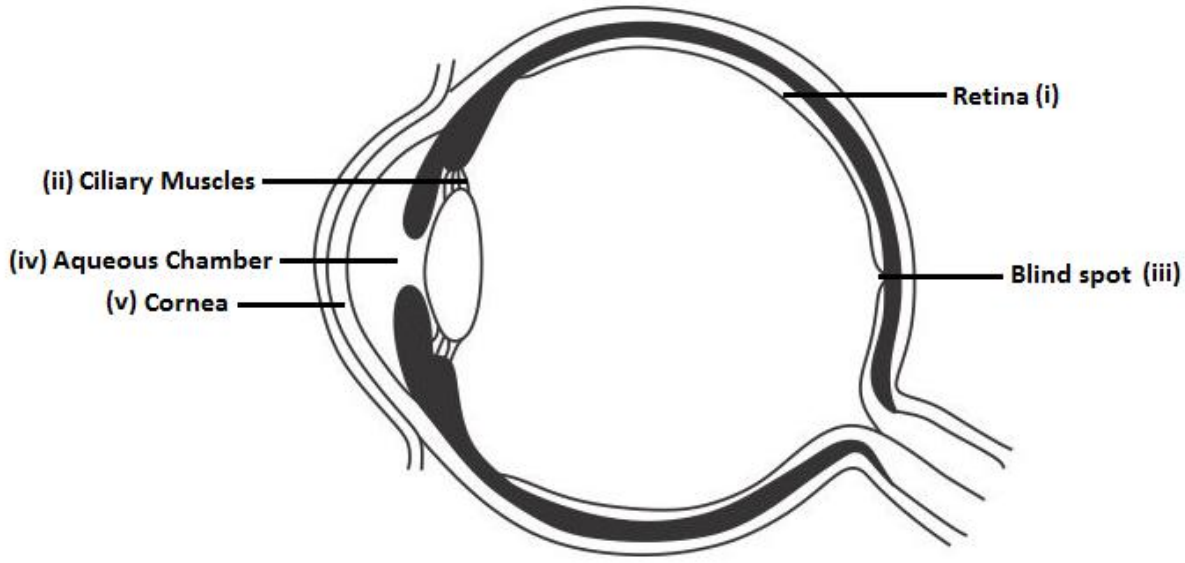
(v) Semen is the mixture of sperms and secretions from the seminal vesicle, prostate gland and Cowper's gland.

(b)

(i) Antibodies
(ii) Pollutant
(iii) Menarche
(iv) Umbilical cord
(v) Cerebrospinal fluid
(vi) Lenticels
(vii) Photosynthesis
(viii) Response
(ix) Lysozymes
(x) Isotonic solution

Answer 3

(a)



Vertical section of human eye

(b)

(i)

Photolysis	Photophosphorylation
The splitting up of a water molecule into its two components—hydrogen and oxygen—by photons is called photolysis.	The process in which electrons are used to convert ADP (adenosine diphosphate) into an energy-rich compound ATP (adenosine triphosphate) by adding one phosphate group with the help of light energy is called photophosphorylation.

(ii)

Tricuspid valve	Bicuspid valve
The tricuspid valve prevents the backflow of the blood from the right ventricle to the right atrium.	The bicuspid or mitral valve prevents the backflow of the blood from the left ventricle to the left atrium.

(iii)

Vasectomy	Tubectomy
Vasectomy is the surgery performed in males in which the vas deferens is ligated/cut and tied to block the path of sperms from the testes.	Tubectomy is the surgery performed in females where the fallopian tubes or oviducts are ligated and are tied to close the passage of the egg.

(iv)

Cerebrum	Spinal cord
The outer region of the cerebrum contains cell bodies and is grey in colour, while the inner region contains axons of neurons.	The outer region of the spinal cord contains axons, while the inner region contains cell bodies of neurons and appears grey in colour.

(v)

Bowman's capsule	Malpighian capsule
Bowman's capsule is a cup-shaped body which continues as a body of tubules. A glomerulus is enclosed in its cup-shaped cavity.	Bowman's capsule and glomerulus together are called Malpighian capsule.

Answer 4

(a)

(i) All F_1 progenies will have axial flowers and round seeds.

(ii) F_2 phenotypes will be

- Axial flowers, round seeds
- Axial flowers, wrinkled seeds
- Terminal flowers, round seeds
- Terminal flowers, wrinkled seeds

(iii) Phenotypic ratio of the F_1 progeny:

- Axial flowers, round seeds - 9
- Axial flowers, wrinkled seeds - 3
- Terminal flowers, round seeds - 3
- Terminal flowers, wrinkled seeds - 1

(iv) **Law of Segregation**: When the two members of a pair of factors separate during the formation of gametes, they do not blend but segregate or separate into different gametes.

(b)

Sr. No.	Gland	Secretion	Function/Effect on Body
1.	Thyroid	Thyroxine (1)	Regulates basal metabolism (2)
2.	Posterior lobe of pituitary gland (3)	Vasopressin	Increases reabsorption of water by kidney tubules (4)
3.	Thyroid gland (5)	Insulin (6)	Promotes glucose utilisation by the body cells
4.	Lacrimal gland	Tears (7)	Washes away dust particles and germs (8)
5.	Adrenal medulla	Adrenaline (9)	Increases the heartbeat (10)

Answer 5

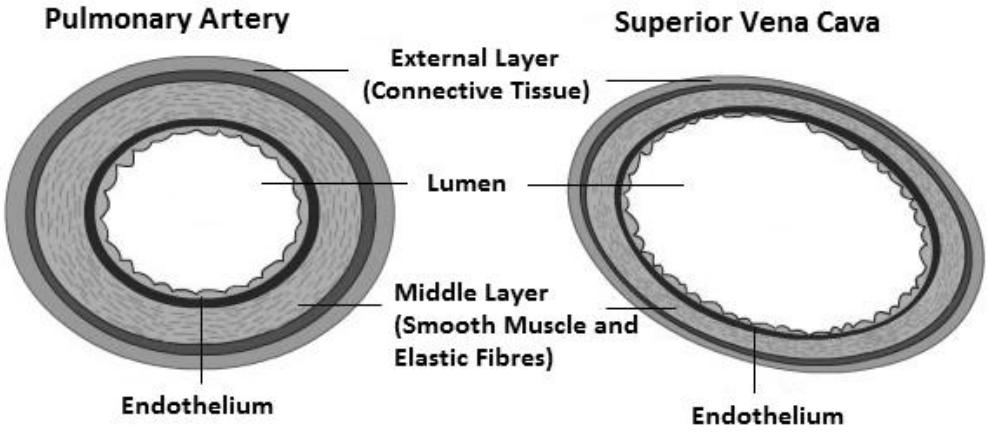
(a)

(i) Atrial systole

(ii) 1 – Pulmonary artery
2 – Superior vena cava
3 – Aorta

(iii) Atria are contracting in this phase. In the diagram, arrows indicating the flow of blood are shown from atria to ventricles. During the atrial systole, the atria contract and the blood moves from the atria to the respective ventricles.

(iv) Diagram of an artery and vein:



(b)

(i) The left ventricle pumps blood to all the body parts, and the right ventricle pumps blood to the lungs. Both ventricles pump the blood against the force of gravity which requires a great force. In order to provide strength to apply this force and ensure there is no damage to the walls, the walls of the ventricle are thicker than the auricles.

(ii) The Malpighian capsules lie in the cortex of the kidneys. These Malpighian capsules appear in large numbers and appear like dots when observed. Therefore, the renal cortex has a dotted appearance.

(iii) During the monsoon, doors absorb moisture from the atmosphere due to imbibition and swell up, which results in them getting jammed.

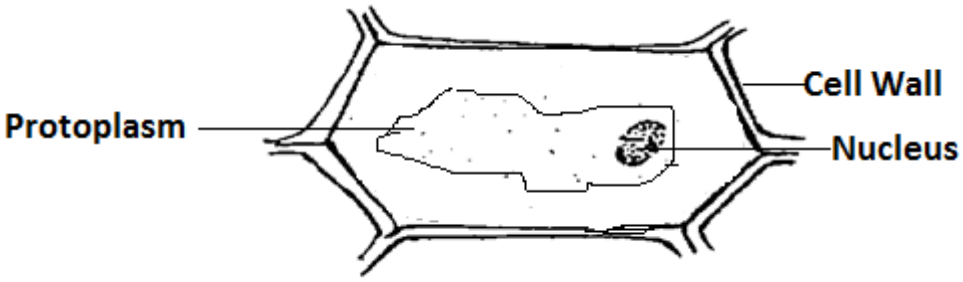
(iv) The Eustachian tube connects the cavity of the middle ear with the throat. Therefore, throat infections can lead to ear infections.

(v) Due to previous learning about directions, the brain actually remembers its reflex. This is called conditioned reflex. Therefore, the hand automatically shows the direction to turn a cycle without thinking.

Answer 6

(a)

(i)



(ii) The cell is plasmolysed.

(iii) The cell has to be placed in water so that water will enter the cell by endosmosis, and the cell will regain its original shape.

(iv) Deplasmolysis of the cell.

(v) Osmosis is the process by which water molecules move from the region of their high concentration to the region of their low concentration through a semi-permeable membrane.

(b)

(i) **Genes**: Genes are the specific sequences of nucleotides on a chromosome which encode a particular protein, which is expressed in the form of some visible character of the body.

(ii) **Cytokinesis in plant cell**: During cytokinesis in a plant cell, the cell plate grows from the centre to the periphery of the cell resulting in division of the cytoplasm which forms two daughter cells.

(iii) **Guttation**: Guttation is the loss of water by plants, from the margins of their leaves, through special pores called hydathodes.

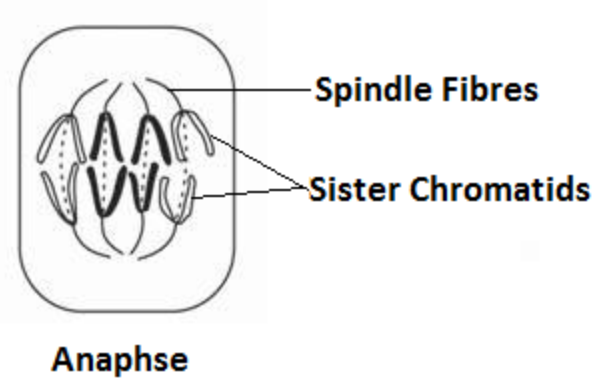
(iv) **Diabetes insipidus:** Deficiency of antidiuretic hormone makes the urine very dilute. Large amount of urine is excreted out of the body leading to dehydration and thirst. This condition is called 'diabetes insipidus'.

(v) **Disinfectants:** Disinfectants are strong chemical substances which are applied on spots and places where germs thrive and multiply.

Answer 7

(a)

(i) Anaphase in plant cell:



Anaphse

(ii) Harmful effects of acid rain:

(1) Causes damage to vegetation by polluting the soil.

(2) Causes decaying or corrosion of historical monuments made of marble.

(iii)(1) NADP – Nicotinamide adenine dinucleotide phosphate

(2) ACT – Adrenocorticotropic hormone

(b)

(i) Two major activities of the Red Cross:

(1) To extend relief and help to the victims of any calamities such as floods, fires, famines, earthquakes etc.

(2) To procure and supply blood for the needy victims of war or other calamities.

(ii) Two reasons for population explosion in the world:

(1) Improved medical facilities and public health measures.

(2) Improved nutrition and increased food production.

(iii)The four nitrogenous bases are Adenine, Guanine, Thymine and Cytosine.