ICSE 2024 EXAMINATION

BIOLOGY

SAMPLE PAPER - 10

Maximum Marks: 80
Time allowed: Two hours
Answers to this Paper must be written on the paper provided separately.
You will not be allowed to write during first 15 minutes.
This time is to be spent in reading the question paper.
The time given at the head of this Paper is the time allowed for writing the answers.

Section A** is compulsory. Attempt **any four** questions from **Section B.
The intended marks for questions or parts of questions are given in brackets [ ].

SECTION - A

(*Attempt **all** questions* from this section.)

Question 1.

Select the correct answers to the questions from the given options. (Do not copy the question. Write the correct answer only) : **[15]**

(i) Auxins are produced by :
(a) old leaves (b) fruits (c) buds (d) woody stem

(ii) A single highly coiled tube where sperms are stored, get concentrated and mature is known as:
(a) Epididymis (b) Vas efferentia
(c) Vas deferens (d) Seminiferous tubule

(iii) The vestigial structure that appear at an age of about 17-20 years is
(a) Appendix (b) Pinna (c) Caecum (d) Wisdom teeth

(iv) Polluted water can cause
(a) Cholera (b) Mumps (c) Tuberculosis (d) Measles

(v) Which one of the following is mainly associated with the maintenance of the posture?
(a) Cerebrum (b) Cerebellum (c) Thalamus (d) Pons

(vi) An example of non-biodegradable waste is :
(a) Table scraps (b) Sewage (c) Livestock waste (d) Disposed syringes

(vii) When cells that cease division, it enters to
(a) G1 phase (b) G0 phase (c) G2 phase (d) S phase

(viii) Pulse wave is mainly caused by the :
(a) Systole of atria (b) Diastole of atria
(c) Systole of the left ventricle (d) Systole of the right ventricle

(ix) The recessive gene is one that expresses itself in :
(a) Heterozygous condition (b) Homozygous condition
(c) F_1 generation (d) Y-linked inheritance

(x) Attached earlobes in humans is :
(a) Dominant trait (b) Recessive trait (c) Homozygous trait (d) Heterozygous trait

(xi) The ventral root ganglion of the spinal cord contains cell bodies of the :
(a) Motor neuron (b) Sensory neuron
(c) Intermediate neuron (d) Association neuron

(xii) A plant is kept in a dark cupboard for about 48 hours before conducting any experiment on photosynthesis to:
(a) Remove starch from the leaf.

(b) Ensure that starch is not translocated from the leaves
(c) Remove all living components from the leaf of the plant
(d) Ensure synthesis of starch in leaf

(xiii) The part of the human ear, while is shaped like a snail's shell is
(a) Eustachian (b) Cochlea (c) Semicircular canals (d) Stapes

(xiv) A reflex arc in human is best described as movement of stimuli from :
(a) Receptor cell, sensory neuron, relaying neuron, effector muscles
(b) Receptor cell, efferent nerve, relaying neuron, muscles of the body
(c) Receptor cell, spinal cord, motor reuron, relaying neuron
(d) Receptor cell, synapse, motor neuron, relaying neuron

(xv) NADP is expanded as : **[5]**
(a) Nicotinamide adenosine diphosphate peptide (b) Nicotinamide adenine dinucleotide phosphate
(c) Nicotinamide adenine dinucleotide peptidase (d) Nicotinamide adenosine dinucleus phosphate

Question 2.

(i) Name the following: **[5]**
(a) The phenomenon in which water is absorbed by solids, resulting in increased volume
(b) The phase of cardiac cycle in which the auricles contract
(c) The organ where urea is produced
(d) The hormone that helps to increase the reabsorption of water from the kidney tubules
(e) Category to which IAA, IBA, NAA and 2, 4–D belongs

(ii) Arrange and rewrite the terms in each group in the correct order so as to be in a logical sequence beginning with the term that is underlined. **[5]**
(a) *Homo erectus*, *Homo habilis*, cro magnon, Australopithecus, Ramapithecus
(b) Graafian follicle, uterus, oviducal funnel, fallopian tube, ovum
(c) Soil water, root hair, xylem, cortex, endodermis
(d) Association neuron, effector, motor neuron, receptor, sensory neuron
(e) Lens, pupil, conjunctiva, yellow spot, cornea

(iii) Match the items given in Column I with the most appropriate ones in Column II and rewrite the correct matching pairs. **[5]**

Column I	Column II
(a) Potometer	1. Hydrotropism
(b) Hypothalamus	2. Phototropism
(c) Roots	3. Vasectomy
(d) Contraception in males	4. Sudden change in genes
(e) Mutation	5. Pituitary gland
	6. Tubectomy
	7. Transpiration

(iv) Choose the odd one out from the following terms and name the category to which the others belong: **[5]**
(a) Ureter, Uterus, Vagina, oviduct
(b) Chlorophyll, magnesium, photosynthesis, haemoglobin
(c) Zygotene, Pachytene, Diplotene, Karyokinesis
(d) Grey matter, piamater, ventricles, pericardium
(e) Fertilisation, capacitation, fermentation, ovulation

(v) State the exact location of the following structures: **[5]**
(a) Pelvis (b) Organ of Corti (c) Lenticels
(d) Bicuspid valve (e) Loop of Henle

SECTION - B

(Attempt any four questions from this Section.)

Question 3.

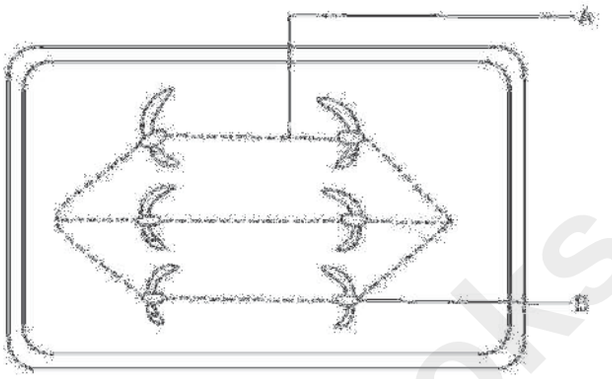
(i) Define Gene. [1]

(ii) Give one difference between Y-linked inheritance and X-linked inheritance. [2]

(iii) Give a brief of selective reabsorption. [2]

(iv) Mention two ways in which transpiration is beneficial to plants. [2]

(v) The diagram given below represents a certain stage of mitosis : [3]



(a) Name the stage of cell division which comes after the stage shown in the diagram.

(b) Name the parts labelled A and B. What is the role of structure 'B'?

(c) What is the unique feature observed in this stage?

Question 4.

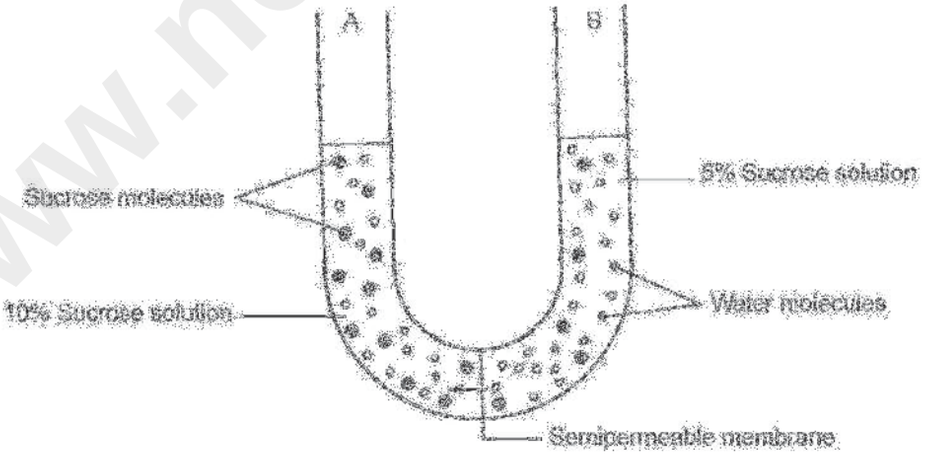
(i) Expand – ACTH. [1]

(ii) What is a variegated leaf and why is this kind of leaf used for the experiment? [2]

(iii) In summer season less quantity of urine is produced than in winter. [2]

(iv) Testis lies outside the abdominal cavity. Give reason. [2]

(v) Given below is the diagram of an experiment. Study the diagram and answer the questions that follow : [3]



(a) What phenomenon is intended to be shown by this experiment?

(b) Which limb of U-tube A or B contains more concentrated sucrose solution?

(c) Why is the membrane separating the two solutions labelled as semipermeable membrane?

Question 5.

(i) Define phagocytosis. [1]

(ii) Give dual function of human ear. [2]

(iii) The oviducal funnel is lined with cilia. Give reason. [2]

(iv) How is cerebrum different from spinal cord in case of arrangement of neurons? [2]

(v) Draw a neat and labelled diagram of chloroplast. [3]

Question 6.

(i) Define bleeding in plants. [1]

(ii) Differentiate between acrosome and centrosome. [2]

(iii) Give the function of placenta. [2]

(iv) Relaxin hormone is released at the time of parturition. Explain. [2]

(v) A woman with normal vision marries a man with normal vision. They have a colourblind son. Her husband dies and she marries a colourblind man. Show the type of children that might be expected from this marriage and the proportion of each. [3]

Question 7.

(i) Define Plasmolysis. [1]

(ii) Why is excretion important for human body? [2]

(iii) Wilted lettuce leaves become firm when placed in cold water for a while. Explain. [2]

(iv) Why does one feel blinded for a short while on coming out of a dark room? [2]

(v) Draw a labelled diagram of a reflex arc. [3]

Question 8.

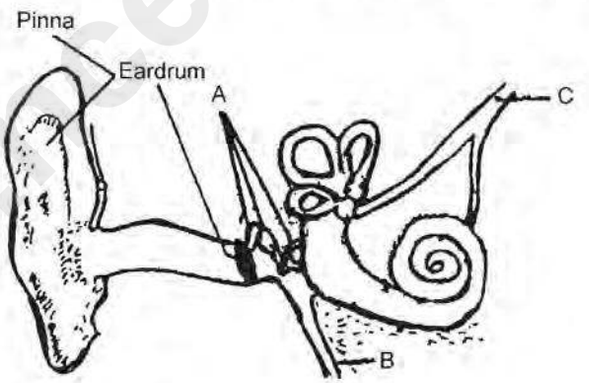
(i) Define Haemoglobin. [1]

(ii) Differentiate between exosmosis and endosmosis. [2]

(iii) The birthrate in India is very high. Explain. [2]

(iv) Why is ammonia the most poisonous waste byproduct of metabolism? [2]

(v) Given below is the diagram of the human ear. Study the same and answer the questions that follow: [3]



(a) Give the biological term for the part labelled 'A'.

(b) State the function of B.

(c) Name the part labelled 'C'.

SOLUTION

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SECTION - A

(*Attempt **all** questions* from this section.)

Question 1.

Select the correct answers to the questions from the given options. **[15]**

(Do not copy the question. Write the correct answer only) :

(i) Auxins are produced by :

(a) old leaves (b) fruits (c) buds (d) woody stem

Ans. (c) buds

(ii) A single highly coiled tube where sperms are stored, get concentrated and mature is known as:

(a) Epididymis (b) Vas efferentia
(c) Vas deferens (d) Seminiferous tubule

Ans. (a) Epididymis

(iii) The vestigial structure that appear at an age of about 17-20 years is

(a) Appendix (b) Pinna (c) Caecum (d) Wisdom teeth

Ans. (d) Wisdom teeth

(iv) Polluted water can cause

(a) Cholera (b) Mumps (c) Tuberculosis (d) Measles

Ans. (a) Cholera

(v) Which one of the following is mainly associated with the maintenance of the posture?

(a) Cerebrum (b) Cerebellum (c) Thalamus (d) Pons

Ans. (b) Cerebellum

(vi) An example of non-biodegradable waste is :

(a) Table scraps (b) Sewage (c) Livestock waste (d) Disposed syringes

Ans. (d) Disposed syringes

(vii) When cells that cease division, it enters to

(a) G1 phase (b) G0 phase (c) G2 phase (d) S phase

Ans. (b) G0 phase

(viii) Human sperm are produced in the testes. They possess a head region in which the nuclear material and acrosome are present. Suppose a sperm lacked an acrosome, what would be the consequence?

(a) The sperm will not mature. (b) Sperm will not be able to fertilise the egg.
(c) The resulting semen will be acidic (d) Sperm will possess double the amount of nuclear material

Ans. (b) Sperm will not be able to fertilise the egg.

(ix) The recessive gene is one that expresses itself in :

(a) Heterozygous condition (b) Homozygous condition

(c) F_1 generation (d) Y-linked inheritance

Ans. (b) Homozygous condition

(x) Attached earlobes in humans is :

(a) Dominant trait (b) Recessive trait (c) Homozygous trait (d) Heterozygous trait

Ans. (b) Recessive trait

(xi) Assertion (A): Spinal nerves are known as mixed nerves.

Reason (R): Spinal nerves carry motor fibres only.

(a) Both (A) and (R) are true (b) Both (A) and (R) are false

(c) (A) is true and (R) is false (d) (A) is false and (R) is true

Ans. (c) (A) is true and (R) is false

(xii) A plant is kept in a dark cupboard for about 48 hours before conducting any experiment on photosynthesis to:

(a) Remove starch from the leaf.

(b) Ensure that starch is not translocated from the leaves

(c) Remove all living components from the leaf of the plant

(d) Ensure synthesis of starch in leaf

Ans. (a) Remove starch from the leaf.

(xiii) Blood vessels in the human body transport oxygen, nutrients, and waste products, ensuring proper circulation and maintaining overall health. They consist of arteries, veins, and capillaries thus, forming an extensive network throughout the body. Which among the following features are correct for blood vessels?

1- Arteries carry blood towards the heart. 2- Blood flows with low pressure in veins.

3- Valves are not present in capillaries. 4- The walls of veins are thin as compared to arteries.

(a) 1 and 3 (b) 1, 3 and 4 (c) 2, 3 and 4 (d) 2 and 3

Ans. (c) 2, 3 and 4

(xiv) A reflex arc in human is best described as movement of stimuli from :

(a) Receptor cell, sensory neuron, relaying neuron, effector muscles

(b) Receptor cell, efferent nerve, relaying neuron, muscles of the body

(c) Receptor cell, spinal cord, motor reuron, relaying neuron

(d) Receptor cell, synapse, motor neuron, relaying neuron

Ans. (a) Receptor cell, sensory neuron, relaying neuron, effector muscles

(xv) NADP is expanded as : **[5]**

(a) Nicotinamide adenosine diphosphate peptide

(b) Nicotinamide adenine dinucleotide phosphate

(c) Nicotinamide adenine dinucleotide peptidase

(d) Nicotinamide adenosine dinucleus phosphate

Ans. (b) Nicotinamide adenine dinucleotide phosphate

Question 2.

(i) Name the following: **[5]**

(a) The phenomenon in which water is absorbed by solids, resulting in increased volume

(b) The phase of cardiac cycle in which the auricles contract

(c) The organ where urea is produced

(d) The hormone that helps to increase the reabsorption of water from the kidney tubules

(e) Category to which IAA, IBA, NAA and 2, 4–D belongs

Ans. (a) Imbibition
(b) Systole
(c) Liver
(d) Vasopressin (ADH)
(e) Auxins

(ii) Arrange and rewrite the terms in each group in the correct order so as to be in a logical sequence beginning with the term that is underlined. **[5]**

(a) *Homo erectus*, *Homo habilis*, cro magnon, Australopithecus, Ramapithecus
(b) Graafian follicle, uterus, oviducal funnel, fallopian tube, ovum
(c) Soil water, root hair, xylem, cortex, endodermis
(d) Association neuron, effector, motor neuron, receptor, sensory neuron
(e) Lens, pupil, conjunctiva, yellow spot, cornea

Ans. (a) Ramapithecus, Austrolopithecus *Homo habilis*, *Homo erectus* cromagnon
(b) Graafian follicle, ovum, oviducal funnel, fallopian tube, uterus
(c) Soil water, root hair, cortex, endodermis, xylem
(d) Receptor, sensory neuron, association neuron, motor neuron, effector
(e) Conjunctiva, cornea, pupil, lens, yellow spot

(iii) Match the items given in Column I with the most appropriate ones in Column II and rewrite the correct matching pairs. **[5]**

Column I	**Column II**
(a) Potometer	1. Hydrotropism
(b) Hypothalamus	2. Phototropism
(c) Roots	3. Vasectomy
(d) Contraception in males	4. Sudden change in genes
(e) Mutation	5. Pituitary gland
	6. Tubectomy
	7. Transpiration

Ans. (a) Potometer — 7. Transpiration
(b) Hypothalamus — 5. Pituitary gland
(c) Roots — 1. Hydrotropism
(d) Contraception in males — 3. Vasectomy
(e) Mutation — 4. Sudden change in genes

(iv) Choose the odd one out from the following terms and name the category to which the others belong: **[5]**

(a) Ureter, Uterus, Vagina, oviduct
(b) Chlorophyll, magnesium, photosynthesis, haemoglobin
(c) Zygotene, Pachytene, Diplotene, Karyokinesis
(d) Grey matter, piamater, ventricles, pericardium
(e) Fertilisation, capacitation, fermentation, ovulation

Ans. (a) Odd term : Ureter
Category : Parts of female reproductive system
(b) Odd term : Haemoglobin
Category : Terms related to plants
(c) Odd term : Karyokinesis
Category : Phases of prophase in Meiosis-I
(d) Odd term : Pericardium
Category : Parts of brain

(e) Odd term : Fermentation
Category : Processes related to human's reproductive system

(v) State the exact location of the following structures: **[5]**

(a) Pelvis (b) Organ of Corti (c) Lenticels
(d) Bicuspid valve (e) Loop of Henle

Ans. (a) Pelvis is the front end of the water, expanded into the kidney.

(b) Organ of corti is found in the middle canal of spiral shaped cochlea of inner ear.

(c) Lenticels are raised pores in the stems of woody plants. These are special openings that develop in the older stem for gaseous exchange.

(d) Bicuspid valve is situated between the left atrium and the left ventricle of the heart.

(e) Loop of Henle is a hairpin-shaped structure of nephron situated between the proximal and distal tubules of the nephron in kidneys.

SECTION - B

(*Attempt **any four** questions from this Section.*)

Question 3.

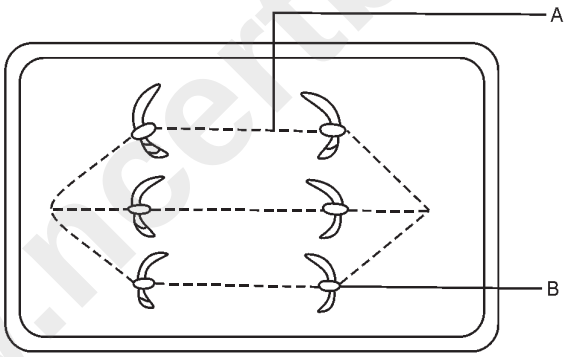
(i) Define Gene. **[1]**

(ii) Give one difference between Y-linked inheritance and X-linked inheritance. **[2]**

(iii) Give a brief of selective reabsorption. **[2]**

(iv) Mention two ways in which transpiration is beneficial to plants. **[2]**

(v) The diagram given below represents a certain stage of mitosis : **[3]**



(a) Name the stage of cell division which comes after the stage shown in the diagram.

(b) Name the parts labelled A and B. What is the role of structure 'B'?

(c) What is the unique feature observed in this stage?

Ans.

(i) Gene is a linear segment of DNA which is responsible for the inheritance of a character from parents to offspring.

(ii)

Y-linked inheritance	X-linked inheritance
There are certain traits like baldness or hyperstrichory that occur in male but not in female because the dominant genes controlling these traits are found on the Y chromosome, which is present only in males.	Certain inherited defects such as colour blindness and haemophilia are far more common in males that in females because these defects are due to recessive genes and both genes occur on the X-chromosome.

(iii) Selective reabsorption : The glomerular filtrate entering the renal tubule is an extremely dilute solution containing glucose and many salts. As the filterate passes down the tubule, a good amount of water is reabsorbed together with these salts. But, this reabsorption occurs only to the extent that the normal concentration of the blood is not disturbed. It is called selective reabsorption.

(iv) Transpiration is beneficial to plants in the following ways —

- **Cooling effect :** It reduces temperature of the plant's surroundings.
- **Transport :** It helps in the transportation of water and minerals through xylem in plants.

(v) (a) Telophase

(b) A-Spindle fibres B-Centromere

Centromere serves as the cohesion site between sister chromatids and plays the role in equal chromosome segregation.

(c) The two sister chromatids of each chromosome separate and are drawn apart towards the opposite poles.

Question 4.

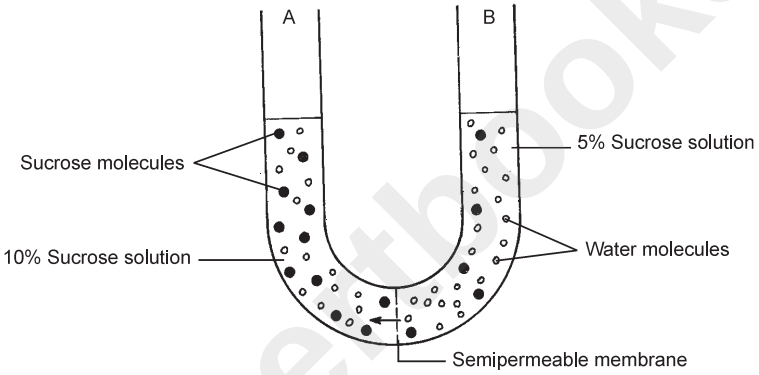
(i) Expand – ACTH. **[1]**

(ii) What is a variegated leaf and why is this kind of leaf used for the experiment? **[2]**

(iii) In summer season less quantity of urine is produced than in winter. **[2]**

(iv) Testis lies outside the abdominal cavity. Give reason. **[2]**

(v) Given below is the diagram of an experiment. Study the diagram and answer the questions that follow : **[3]**



(a) What phenomenon is intended to be shown by this experiment?

(b) Which limb of U-tube A or B contains more concentrated sucrose solution?

(c) Why is the membrane separating the two solutions labelled as semipermeable membrane?

Ans.

(i) Adrenocorticotropic hormone

(ii) A variegated leaf possess yellow or creamy white regions alongwith green patches. This is used to test the presence of chlorophyll by the starch test in the green portions of the leaf.

(iii) In summer season, we drink more water than in winter. Yet, we pass urine fewer times in summer than in winter. In summer, we lose a good amount of water through perspiration to keep our body temperature normal, and the kidneys have to reabsorb more water from urine.

(iv) Testes lie outside the abdominal cavity since the production of spermatozoa is feasible at a temperature of 2°C lower than the body temperature.

(v) (a) Osmosis

(b) 'A' tube contains more concentrated solution due to the presence of large quantity of sucrose molecules.

(c) The membrane is called semipermeable since it allows only the solvent molecules to pass through it and not the solutes molecules.

Question 5.

(i) Define phagocytosis. **[1]**

(ii) Give dual function of human ear. **[2]**

(iii) The oviducal funnel is lined with cilia. Give reason. **[2]**

(iv) How is cerebrum different from spinal cord in case of arrangement of neurons? **[2]**

(v) Draw a neat and labelled diagram of chloroplast. **[3]**

Ans.

(i) Phagocytosis : The process of engulfing and ingesting foreign particles, like bacteria is known as phagocytosis.

(ii) Human ear performs two functions.

(a) Hearing

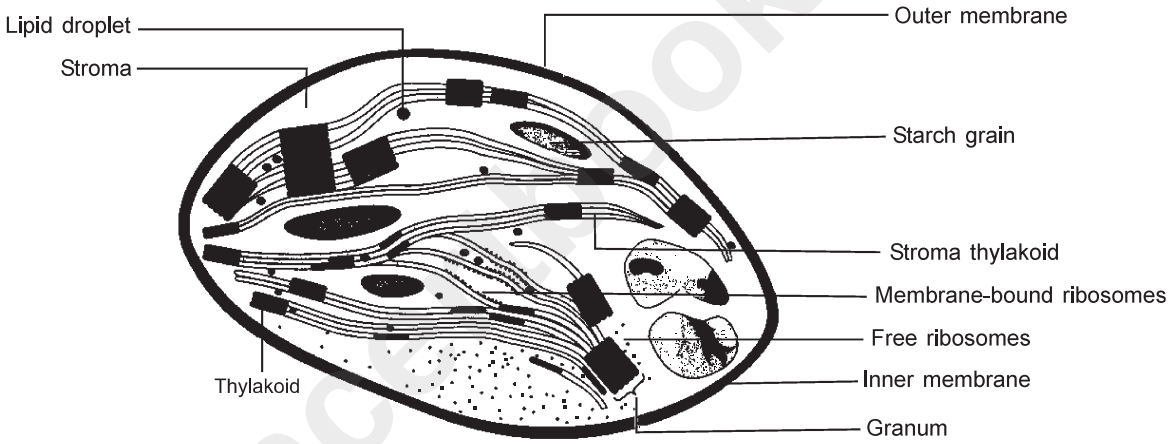
(b) Maintaining the balance of the body.

(iii) The ovum released by the ovary is swept into the uterine tube by the ciliary action of the fimbriae.
The further movement of ovum along the oviduct is carried out by :
(a) ciliary action of the epithelium, (b) fluid currents in the oviduct, (c) peristaltic contraction of muscles of oviduct.

(iv)

Cerebrum	Spinal Cord
The outer region of cerebrum contains cell bodies of the neurons while inner region of cerebrum consists of white matter containing axons of the neurons.	The outer region of spinal cord contains axons of the neurons while inner region of spinal cord consists of grey matter containing cell bodies of the neurons.

(v) Structure of chloroplast



Question 6.

(i) Define bleeding in plants. **[1]**

(ii) Differentiate between acrosome and centrosome. **[2]**

(iii) Give the function of placenta. **[2]**

(iv) Relaxin hormone is released at the time of parturition. Explain. **[2]**

(v) A woman with normal vision marries a man with normal vision. They have a colourblind son. Her husband dies and she marries a colourblind man. Show the type of children that might be expected from this marriage and the proportion of each. **[3]**

Ans.

(i) Bleeding is the exudation of sap from the injured parts of the plants. When an incision is made in the stem of a plant growing in well-watered soil, xylem sap starts oozing out of the incision due to root pressure. This is known as bleeding in plants.

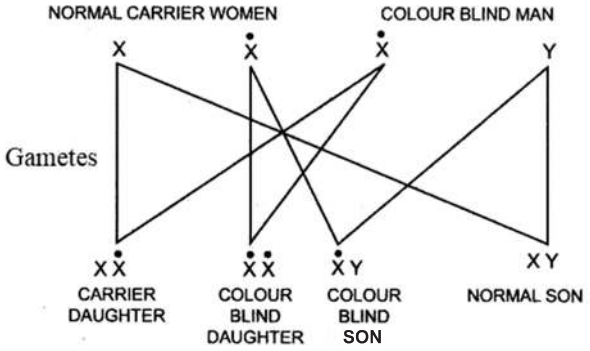
(ii) Acrosome : Acrosome is present at the anterior most end of the head of the sperm. It helps in the penetration of sperm into the egg by secreting sperm lysin (enzyme).

Centrosome : It is a cell organelle which is found only in animal cells. It helps in the initiation of the cell division.

(iii) Placenta : Placenta acts as nutritive, digestive, respiratory, excretory, endocrine and filter organ for the foetus. It also stores glycogen to be converted to glucose at the time of need. It protects the foetus from the relatively high blood pressure of the mother's blood.

(iv) The relaxin hormone helps to initiate the labour pains caused by the contraction of the uterine wall at the time of childbirth or parturition. Relaxin also helps in the softening of pubic symphysis during parturition.

(v) In the first marriage of woman the son was colourblind therefore the woman is a carrier.



Since the man in the second marriage was colourblind.Genotype of that man: XY

Possible combination of this marriage.

Expected result :

Sons	:	50%	Normal	:	25%
			Colourblind	:	25%
Daughters	:	50%	(Carrier) Normal	:	25%
			Colourblind	:	25%

Question 7.

(i) Define Plasmolysis. **[1]**

(ii) Why is excretion important for human body? **[2]**

(iii) Wilted lettuce leaves become firm when placed in cold water for a while. Explain. **[2]**

(iv) Why does one feel blinded for a short while on coming out of a dark room? **[2]**

(v) Draw a labelled diagram of a reflex arc. **[3]**

Ans.

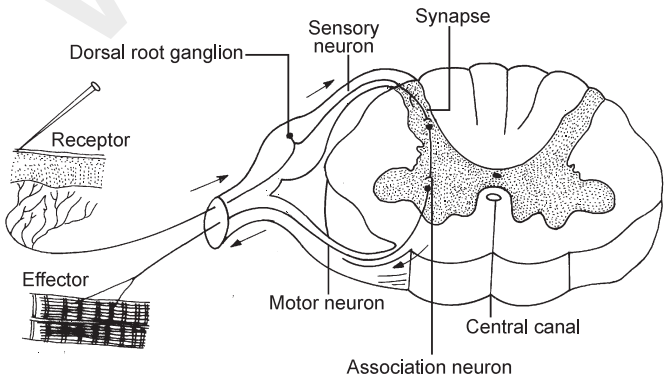
(i) Plasmolysis is the process by which a cell lose water and shrink due to the movement of water out of the cell.

(ii) Removal of toxic waste material from the body is called excretion. If the waste substances are not removed, they may poison the cells or may slow down the metabolism of human body.

(iii) When wilted lettuce leaves are kept in cold water for a while, they absorb water through endosmosis and finally become firm.

(iv) When a person comes out from a dark room, she/he feels blinded for a few seconds due to the regeneration of the rhodopsin and dilation of the pupil, permitting the entry of more light into the eye.

(v)



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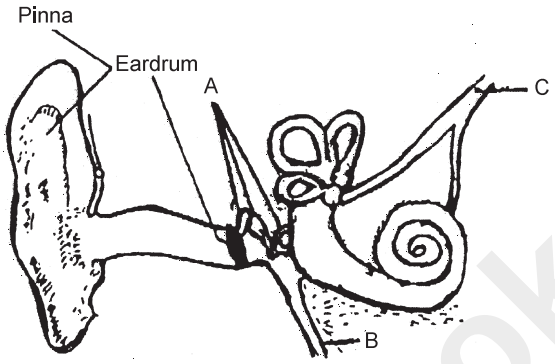
(i) Define Haemoglobin. **[1]**

(ii) Differentiate between exosmosis and endosmosis. **[2]**

(iii) The birthrate in India is very high. Explain. **[2]**

(iv) Why is ammonia the most poisonous waste byproduct of metabolism? **[2]**

(v) Given below is the diagram of the human ear. Study the same and answer the questions that follow: **[3]**



(a) Give the biological term for the part labelled 'A'.

(b) State the function of B.

(c) Name the part labelled 'C'.

Ans.

(i) Haemoglobin is an iron-containing proteinaceous pigment present in the red blood cells which helps in transporting oxygen to the tissue cells from lungs.

(ii) **Exosmosis :** When a cell is placed in a solution having higher concentration of solute than that of the cell sap, water diffuses out of the cell and the cell becomes flaccid. This flow of water is called exosmosis.

Endosmosis : If the cell is placed in a solution of lower concentration of solute, water enters into the cell and it becomes turgid. This is called endosmosis.

(iii) Some of the most essential causes of high birth rate in India are as follows:

- Illiteracy
- Traditional beliefs
- Preference for Male Child
- Inadequate Recreational Facilities
- Effect of Religion
- Inadequate Supply of Family Welfare Services
- High Infant Mortality
- Poverty
- Climatic Factor

(iv) The most poisonous waste byproducts of metabolism is ammonia. Ammonia is highly soluble in water and its higher concentration in the blood is fatal. So, the liver immediately converts ammonia into a relatively harmless substance called urea.

(v) (a) A comprises of three bony ossicles.

(b) B is eustachian tube which equalises air pressure on either side of the eardrum.

(c) C is auditory nerve.