ICSE 2025 EXAMINATION

Sample Question Paper - 19

BIOLOGY

Time: 2 hours **Total Marks: 80**

General Instructions:

1. *Answers to this paper must be written on the paper provided separately.*
2. *You will be not allowed to write during first 15 minutes.*
3. *This time is to be spent in reading the question paper.*
4. *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

Choose the correct answers to the questions from the given options.
(Do not copy the question, write the correct answer only.) **[15]**

(i) **Assertion (A):** The urine is slightly thicker in winter than in summer.
Reason (R): In summer, kidneys reabsorb more water making the urine concentrated.

1. Both A and R are true
2. Both A and R are false
3. A is true and R is false
4. A is false and R is true

(ii) The innermost foetal membrane which secretes amniotic fluid is the

1. Chorion
2. Amnion
3. Allantoin
4. Fibroin

(iii) **Assertion (A):** Gibberellin is also called the stress hormone.
Reason (R): It increases the tolerance of plants to various kinds of stresses.

1. Both A and R are true
2. Both A and R are false
3. A is true and R is false
4. A is false and R is true

(iv) If there are 46 chromosomes in a cell, how many chromatin fibres will be present inside the nucleus during interphase?

1. 23
2. 46
3. 22
4. 44

(v) The blood cells whose deficiency causes anaemia are the

1. WBCs
2. Platelets
3. RBCs
4. Leucocytes

(vi) Which of the following method/s are useful to prevent pregnancy even when ovulation occurs?

I. Tubectomy
II. Copper-T
III. Oral pills
IV. Condoms

1. Only I
2. Only II and III
3. Only I, II and IV
4. Only II, III and IV

(vii) The process by which a hydrophilic substance absorbs water is

1. Absorption
2. Adsorption
3. Imbibition
4. Evaporation

(viii) **Assertion (A):** Blood group O is called the universal recipient and blood group AB is called the universal donor.

Reason (R): Blood group O has no antigen and blood group AB has no antibodies.

1. Both A and R are true
2. Both A and R are false
3. A is true and R is false
4. A is false and R is true

(ix) While walking on a dark road, Seema happened to step on a coiled piece of rope. She suddenly jumped with fear of a suspected snake.
Which of the following is/are involved in the scenario stated above?

I. Cerebellum
II. Spinal cord
III. Skeletal muscles
IV. Cerebrum

1. Only I
2. Only I and II
3. Only II and III
4. Only IV

(x) The defect of the eye in which the optic axis of the eye becomes too short is

1. Hypermetropia
2. Presbyopia
3. Myopia
4. Cataract

(xi) The fluid present between the layers of the meninges is

1. Pleural fluid
2. Cerebrospinal fluid
3. Amniotic fluid
4. Lymph

(xii) Which of the following is a neurotransmitter?

1. Acetyl choline
2. Thyroxine
3. Calcitonin
4. Insulin

(xiii) **Assertion (A):** Guttation in plants is maximum during mid-day.
Reason (R): Root pressure is maximum during mid-day.

1. Both A and R are true
2. Both A and R are false
3. A is true and R is false
4. A is false and R is true

(xiv) The exudation of plant sap from the injured parts of the plant is called

1. Guttation
2. Bleeding
3. Transpiration
4. Cohesion

(xv) In cattle, having horns is a recessive trait (h) to not having horns (H). When cattle with horns are crossed with cattle that do not have horns, the number of offspring having horns was equal to those not having horns. Which of the following is MOST LIKELY to be true?

1. Both parents are homozygous dominant.
2. One parent is homozygous dominant.
3. Both parents are heterozygous.
4. One parent is heterozygous.

Question 2

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

(a) The full complement of DNA of an organism.
(b) The canal through which the testes descend into the scrotum just before birth in a human male child.
(c) The type of cell division which takes place in the anthers of flowering plants to produce pollen grains.
(d) The metallic cation involved in the opening and closing of stomata.
(e) The occurrence of minor differences in the characteristics of individuals.

(ii) Given below are certain functional activities of specific structures in the body of living organisms. Name the structure responsible for the same. **[5]**

(a) Transfers impulses from the inner ear to the brain.
(b) Helps to change the focal length of the eye lens.
(c) Transports oxygen to the cells of the human body.
(d) Forms the asters during cell division in animal cells.
(e) Loss of water in the form of droplets in plants.

(iii) State whether the following statements are true or false. If false, rewrite the correct form of the statement by changing the first word only: **[5]**

(a) Plasmolysis is a condition in which the cell content is shrunken, and the cell is no more tight.
(b) Variation is the sudden change in one or more genes or in the number and structure of chromosomes in the progeny, which normally may not have existed in the parents or grandparents.
(c) Leukaemia is a cancer of the tissue forming white blood corpuscles whose number increases manifold at the cost of red blood corpuscles.
(d) Mortality is the number of deaths per 1000 of population per year.
(e) Puberty is the onset of menstruation in a female at the age of about 13 years.

(iv) 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) Liver	1. Basic unit of the brain
(b) Cytokinin	2. Haploid cell
(c) Neuron	3. Diffusion of respiratory gases
(d) Ova	4. Formation of urea
(e) Stoma	5. Found in plants
	6. Found in the kidney

(v) Give one point of difference between the following pairs on the basis of what is given in brackets. **[5]**

(a) Cobalt chloride paper and goat's bladder (process where it is used)

(b) Hydrotropism and chemotropism (stimulus used)

(c) Exocrine and endocrine gland (secretion transported by)

(d) Transpiration and guttation (define the terms)

(e) Synapsis and synapse (explain the terms)

SECTION B

(Attempt any four questions from this section.)

Question 3

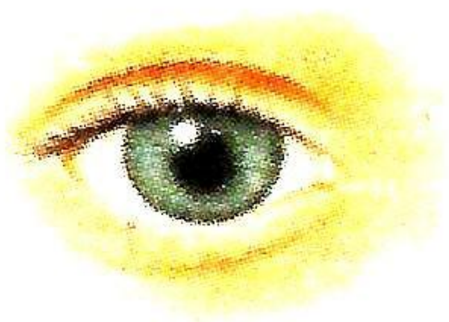
(i) Define – Centrifugal cytokinesis. **[1]**

(ii) Name and state the law which explains the dihybrid phenotypic ratio. **[2]**

(iii) What is the significance of the testes being located in the scrotal sac outside the abdomen? **[2]**

(iv) Draw a diagram of a single Malpighian corpuscle and label the following parts: Glomerulus, Bowman's capsule, Afferent arteriole, and Efferent arteriole. **[2]**

(v) The figures (A) and (B) given below are showing some kind of adjustment. Study the figures and answer the questions that follow: **[3]**

A   B

(a) Identify the kinds of adjustments done in the figures (A) and (B).

(b) Distinguish between the adjustments of figures (A) and (B) based on:

(i) Size of the pupil

(ii) Pigment which gets generated

(iii) Cells of the retina

Question 4

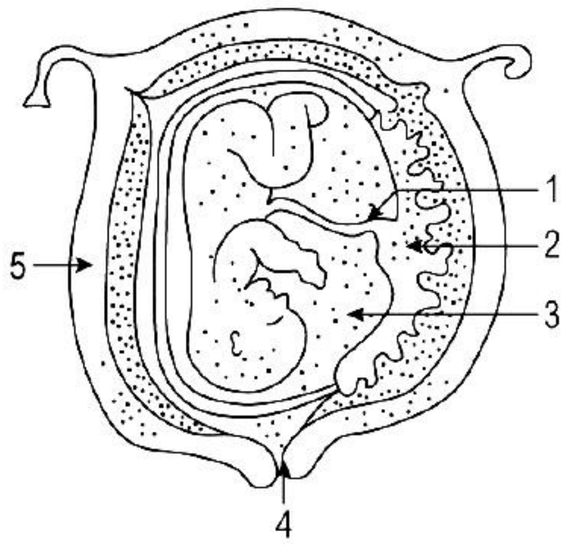
(i) Why do xerophytes have a thick cuticle? **[1]**

(ii) Give reason: *Nerium* loses less amount of water during transpiration. **[2]**

(iii) Mention two structural differences between an artery and a vein. **[2]**

(iv) Give the functions of ear wax. **[2]**

(v) The diagram given below is that of a developing human foetus in the womb. Study the same and answer the questions that follow: **[3]**



(a) Name parts 1–5 indicated by the guidelines.

(b) Mention *two* functions of the part labelled '2' other than its endocrine function.

(c) Name *any one* hormone produced by the part labelled '2'.

Question 5

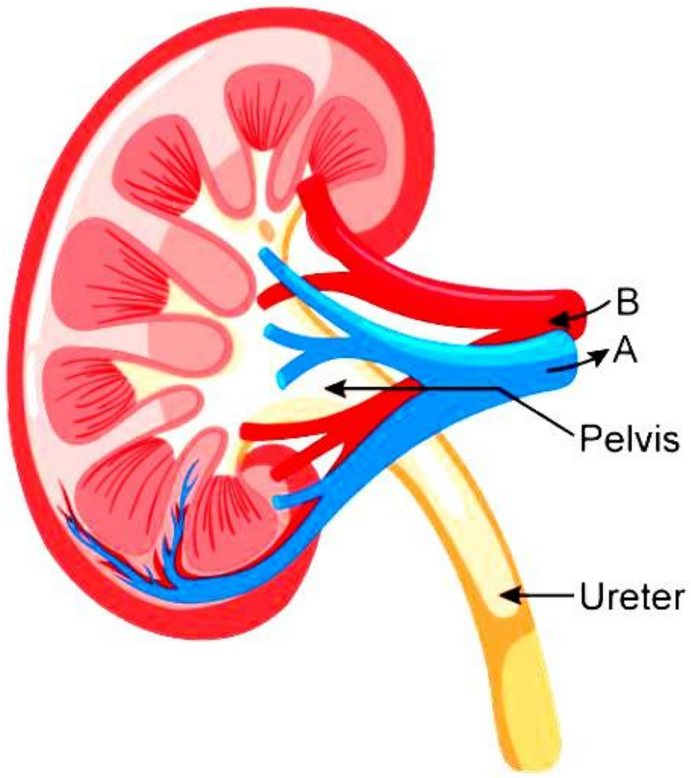
(i) Why are most green leaves thin and broad? **[1]**

(ii) Mention four main postulates of Darwin's theory. **[2]**

(iii) Mention any two points for the importance of turgidity for the plants. **[2]**

(iv) State two functions of ethylene. **[2]**

(v) Given below is a simple diagram of the human kidney cut open longitudinally. Answer the following questions. **[3]**



(a) Why does the cortex of the kidney show a dotted appearance?

(b) Mention any two functions of the kidney.

(c) Write two differences in the composition of the blood flowing through blood vessels A and B.

Question 6

(i) Give reason: When the temperature is high, the rate of transpiration is also high. **[1]**

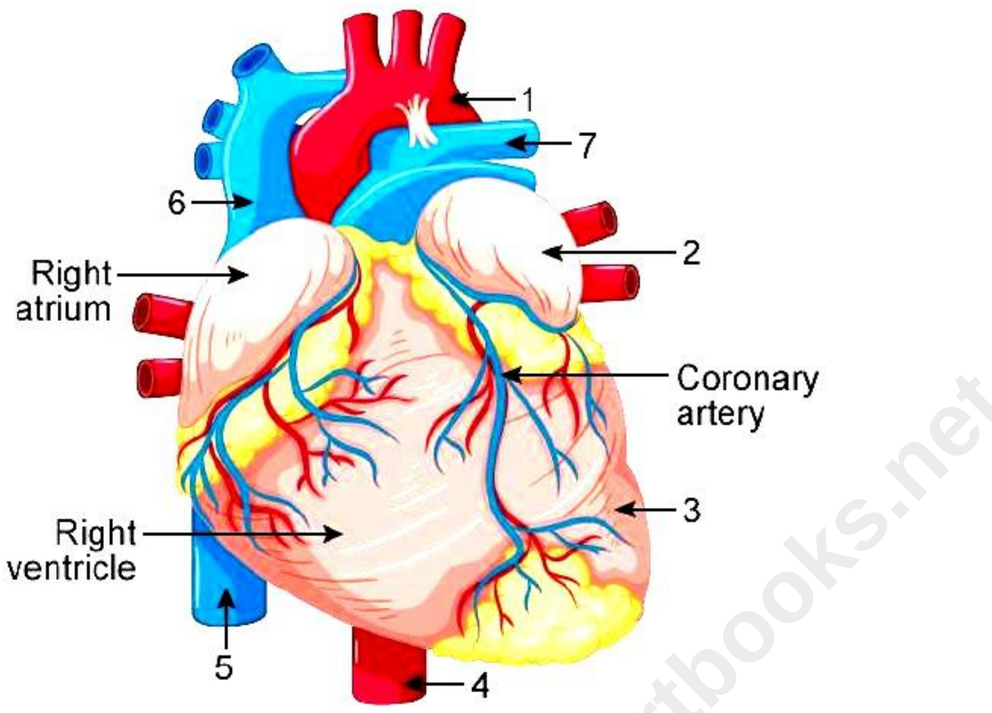
(ii) Name the stimulus which causes the following movements in plants. **[2]**

(a) Thigmotropism (b) Geotropism

(iii) Why are fresh beetroot cells preferred over fresh potato cells as material for demonstrating plasmolysis? **[2]**

(iv) 'A tiger cannot survive if there are no green plants.' Explain. **[2]**

(v) Given alongside is a diagram of the external features of the heart. Observe the diagram carefully and answer the questions based on it. **[3]**



(a) Name the parts 1 to 7.

(b) What will happen if the coronary artery gets an internal clot?

(c) Mention one structural difference between 5 and 4.

Question 7

(i) Explain: Pedigree chart. **[1]**

(ii) With reference to photosynthesis, answer the following questions: **[2]**

(a) In what form is glucose stored in plants?

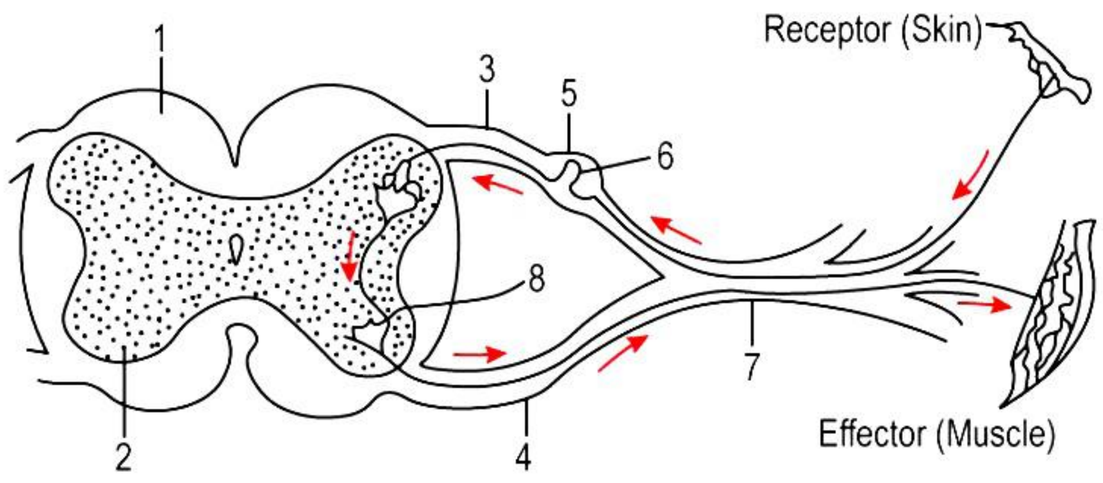
(b) What is the function of palisade parenchyma in a leaf?

(iii) Define the following terms: **[2]**

(a) Evolution (b) Bipedalism

(iv) What is the significance of imbibition in plants? **[2]**

(v) The diagram given below represents the spinal cord of mammal seen in a transverse section together with the nerves. Study the same and then answer the questions that follow. **[3]**



(a) Label the parts 1–8 indicated by guidelines.
(b) What is the pathway indicated above termed as?
(c) What type of nerve is shown in the diagram?

Question 8

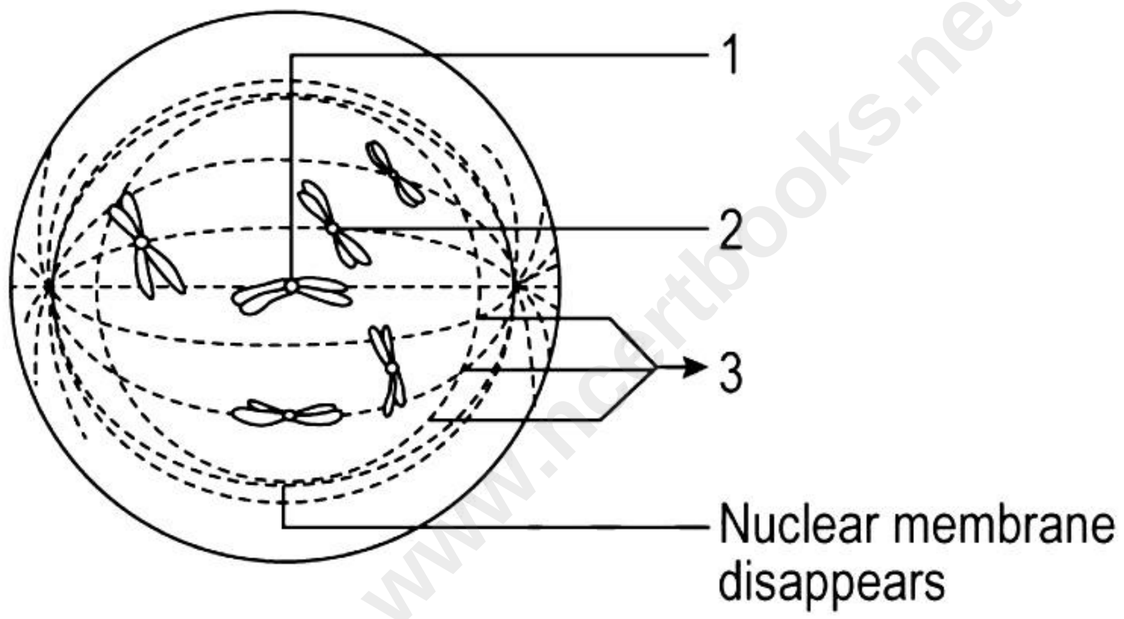
(i) If you sprinkle some common salt on grass growing on a lawn, it is killed at that spot. Give reason. **[1]**

(ii) How do oil spills affect the sea life? **[2]**

(iii) Which hormone is regarded as the emergency hormone? What is its effect on the body? **[2]**

(iv) List three major landmarks in the human history which contributed to the sudden rise in the population of the world. **[2]**

(v) Given below is a diagram representing a stage during mitotic cell division in an animal cell. **[3]**



(a) Identify the above stage. Give a reason to support your answer.
(b) Name the cell organelle that forms the 'aster'.
(c) Name the parts labelled 1, 2 and 3.

Solution

SECTION A

Solution 1

(i) A is false and R is true
(ii) Amnion
(iii) Both A and R are false
(iv) 46
(v) RBCs
(vi) Only I, II and IV
(vii) Imbibition
(viii) A is false and R is true
(ix) Only II and III
(x) Myopia
(xi) Cerebrospinal fluid
(xii) Acetyl choline
(xiii) Both A and R are false
(xiv) Bleeding
(xv) One parent is heterozygous

Solution 2

(i)

(a) Genome
(b) Inguinal canal
(c) Meiosis
(d) Potassium
(e) Variations

(ii)

(a) Auditory nerve
(b) Ciliary muscles
(c) RBCs (Haemoglobin)
(d) Spindle fibres
(e) Hydathodes

(iii)

(a) False. Flaccidity is the condition in which the cell content is shrunken, and the cell is no more tight.

(b) False. Mutation is the sudden change in one or more genes or in the number and structure of chromosomes in the progeny, which normally may not have existed in the parents or grandparents.

(c) True.

(d) True.

(e) False. Menarche is the onset of menstruation in a female at the age of about 13 years.

(iv)

Column I	Column II
(a) Liver	4. Formation of urea
(b) Cytokinin	5. Found in plants
(c) Neuron	1. Basic unit of the brain
(d) Ova	2. Haploid cell
(e) Stoma	3. Diffusion of respiratory gases

(v)

(a) Differences between cobalt chloride paper and goat's bladder (process where it is used)

Cobalt chloride paper	Goat's bladder
Used in the process of transpiration.	Used in the process of osmosis.

(b) Differences between hydrotropism and chemotropism (stimulus used)

Hydrotropism	Chemotropism
Movement of the plant part in the direction of water (stimulus).	Movement of the plant part in the direction of chemicals (stimulus).

(c) Differences between exocrine and endocrine glands (secretion transported by)

Exocrine gland	Endocrine gland
Secretion is transported through ducts.	Secretion is transported through blood.

(d) Differences between transpiration and guttation (define the terms)

Transpiration	Guttation
Loss of water in the form of water vapour from the aerial parts of the plant.	Loss of water in the form of liquid as droplets along the margin of the leaves through hydathodes.

(e) Differences between synapsis and synapse (explain the terms)

Synapsis	Synapse
Pairing of homologous chromosomes.	Fine gap between two successive neurons.

SECTION B

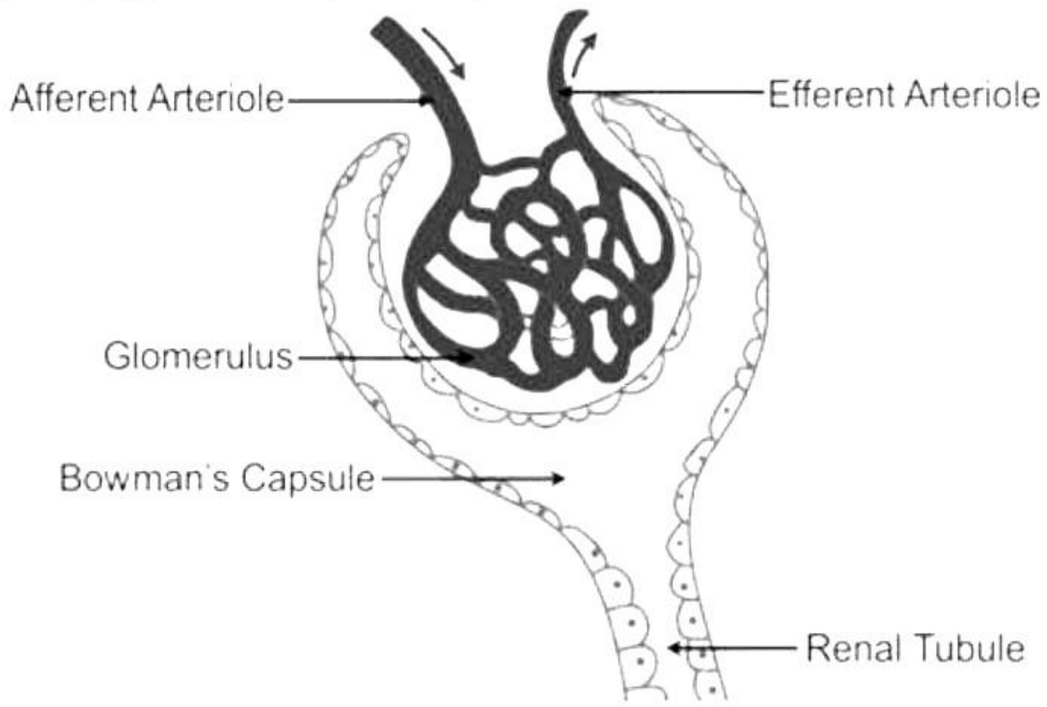
Solution 3

(i) Centrifugal cytokinesis follows the division of the nucleus when the cytoplasm divides by the formation of a cell plate in the centre, which then proceeds outwards.

(ii) The law of independent assortment explains the dihybrid phenotypic ratio.
Law of independent assortment: When there are two pairs of characters, the distribution of the alleles of one character into the gametes is independent of the distribution of the alleles of the other character.

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

(iv) Malpighian corpuscle:



(v)

(a) The adjustment done in figure A is dark adaptation whereas in figure B, it is light adaptation.

(b) Differences between the adjustments in figures (A) and (B):

Based on	Dark adaptation (A)	Light adaptation (B)
(i) Size of the pupil	Dilated	Constricted
(ii) Pigment which gets generated	Rhodopsin	Iodopsin
(iii) Cells of the retina	Cones become inactive and disintegration of iodopsin starts	Rods become inactive and disintegration of rhodopsin starts

Solution 4

(i) Xerophytes have a thick cuticle to check the excessive loss of water through transpiration.

(ii) *Nerium* is a xerophyte with sunken stomata covered with hairs. They help to limit water loss through transpiration. Also, the plant has narrow leaves which reduces the surface area and limits the rate of transpiration.

(iii) Structural differences between an artery and a vein:

Artery	Vein
• Thick muscular walls	• Thin muscular walls
• Narrow lumen without valves	• Wider lumen with valves

(iv) Functions of ear wax:

- The ear wax has insect repellent properties which prevents the entry of insects and dust particles into the auditory canal.
- It lubricates and protects the eardrum.

(v)

(a) 1 - Umbilical cord
2 - Placenta
3 - Amniotic fluid
4 - Mouth of the uterus
5 - Wall of the uterus

(b) Functions of part 2 (placenta):

- Excretes nitrogenous wastes and carbon dioxide.
- Does not allow the passage of germs from the mother to the foetus.

(c) Progesterone

Solution 5

(i) Most green leaves are thin and broad for the easy exchange of gases and to receive more sunlight.

(ii) Four main postulates of Darwin's theory:

1. Overproduction
2. Struggle for existence
3. Variation
4. Survival of the fittest

(iii) Importance of turgidity for the plants:

- Provides shape and rigidity to soft tissues.
- Turgor in root cells builds up root pressure.

(iv) Functions of ethylene:

- Induces fruit ripening
- Promotes senescence

(v)

(a) The cortex of the kidney shows a dotted appearance due to the presence of Malpighian corpuscles.

(b) Functions of the kidney:

- Urine formation
- Osmoregulation

(c) Differences in the composition of the blood flowing through blood vessels A (renal vein) and B (renal artery):

Renal vein	Renal artery
• Carries deoxygenated blood	• Carries oxygenated blood
• Contains less water and urea	• Contains more water and urea

Solution 6

(i) At higher temperatures, the warm air in the atmosphere can hold more water. So, the rate of transpiration also increases. Therefore, when the temperature is high, the rate of transpiration is also high.

(ii)

Tropic movement	Stimulus
(a) Thigmotropism	Touch
(b) Geotropism	Gravity

(iii) Beetroot cells contain soluble sugar, whereas potato cells contain insoluble starch. As a result, osmotic processes readily occur in beetroot cells than in potato cells. Therefore, fresh beetroot cells are preferred over fresh potato cells as material for demonstrating plasmolysis.

(iv) If there are no green plants, there will not be any food production and herbivorous animals that depend on plants will not be able to survive. Carnivorous animals like the tiger that depend on herbivorous animals, indirectly depend on plants for their survival. In the absence of plants, they also will not be able to survive and will eventually die.

(v)

(a) 1 - Aorta
2 - Left auricle
3 - Left ventricle
4 - Dorsal aorta
5 - Inferior vena cava
6 - Superior vena cava
7 - Pulmonary artery

(b) If the coronary artery gets an internal clot, it will result in a heart attack.

(c) <u>Difference between 5 (inferior vena cava) and 4 (dorsal aorta):</u>

Inferior vena cava	Dorsal aorta
• Thin and less muscular walls	• Thick muscular walls

Solution 7

(i) A pedigree chart is a diagram that shows the occurrence and appearance or phenotypes of a particular gene or organism and its ancestors from one generation to the next. In the pedigree chart, males are denoted by squares and females by circles.

(ii)

(a) Starch

(b) Palisade parenchyma contains a large number of chloroplasts. As a result, the extent of photosynthesis is more in palisade parenchyma.

(iii)

(a) Evolution: Evolution is a slow and a continuous process whereby complex forms of life have emerged from simpler forms through millions of years.

(b) Bipedalism: Bipedalism is the movement of an animal or a human being with two legs, thereby freeing up the forelimbs from the ground.

(iv) Significance of imbibition in plants:

- It helps in germination of seeds and absorption of water by roots in the initial stages.
- Imbibition pressure helps in the ascent of sap.

(v)

(a) 1 - White matter
2 - Grey matter
3 - Dorsal root
4 - Ventral root
5 - Dorsal root ganglion
6 - Sensory ganglion
7 - Spinal nerve
8 - Synapse

(b) Nervous reflex arc pathway

(c) Spinal nerve

Solution 8

(i) Common salt when sprinkled on the grass causes the plasmolysis of the grass cells leading to their death. Hence, if we sprinkle some common salt on grass growing on a lawn, it is killed at that spot.

(ii) The sea birds and the sea animals sometimes get a thick, greasy coating on their bodies due to oil spills. Sea birds may ingest the oil coated. This may irritate their digestive system and may even damage their liver and kidney ultimately causing the death of sea birds as well as sea animals.

(iii) Adrenaline is regarded as the emergency hormone. It increases the heartbeat and the blood supply to the muscles. It decreases the blood supply to the digestive system, resulting in a dry mouth.

(iv) <u>Major landmarks in the human history which contributed to the sudden rise in population of the world:</u>

1. Tool making revolution
2. Agricultural revolution
3. Scientific industrial revolution

(v)

(a) The given stage is Prophase because the nuclear membrane disappears only during prophase.

(b) Centrosome

(c) 1 - Centromere
2 - Sister chromatids (Duplicated chromosomes)
3 - Spindle fibres