ICSE 2024 EXAMINATION

BIOLOGY

SAMPLE PAPER - 3

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) A plant cell may burst when:
(a) Turgor pressure equalises wall pressure.
(b) Turgor pressure exceeds wall pressure.
(c) Wall pressure exceeds turgor pressure.
(d) None of above

(ii) The individual flattened stacks of membranous structures inside the chloroplasts are known as:
(a) Vesicle (b) Stroma (c) Thylakoids (d) Cristae

(iii) The nephrons discharge their urine in the:
(a) Urinary bladder (b) Urethra (c) Renal pelvis (d) Renal pyramid

(iv) Gigantism and Acromegaly are caused due to:
(a) Hyposecretion of Thyroxine (b) Hyposecretion of Growth hormone
(c) Hypersecretion of Thyroxine (d) Hypersecretion of Growth hormone

(v) The mineral ion needed for the formation of blood clot is:
(a) Potassium (b) Sodium (c) Calcium (d) Iron

(vi) The rate of transpiration will be fastest when the day is :
(a) Hot, humid and windy (b) Cool, humid and windy
(c) Hot, humid and non-windy (d) Hot, dry and windy

(vii) Consider the following statements:
I. Plant hormones are primarily responsible for providing structural support to plants.
II. Plant hormones are involved in regulating various physiological processes in plants, including growth, development, and responses to environmental stimuli.

Choose the correct option.
(a) Statement I is correct and statement II is incorrect.
(b) Statement II is correct and statement I is incorrect.
(c) Both statements I and II are correct.
(d) Both statements I and II are incorrect.

(viii) A cell has five pairs of chromosomes. After mitotic division, the number of chromosomes in the daughter cells will be :
(a) Five (b) Ten (c) Twenty (d) Forty

(ix) Learning is related to :

(a) Cerebrum (b) Cerebellum (c) Medulla Oblongata (d) Hypothalamus

(x) The special protein, forming disc shaped structure in centromere is.

(A) Chromomere (B) Chromonema (c) Kinetochore (D) Lysin

(xi) The random spontaneous change in genetic make up is called.

(a) Variation (b) Heredity (c) Mutation (d) Deletion

(xii) The raw materials for photosynthesis are

(a) Carbon dioxide, water, mesophyll and sunlight (b) Carbon dioxide and water

(c) Oxygen, water, chlorophyll and sunlight (d) Soil and water

(xiii) Which of the following statements accurately describes the structure of chromosomes?

(a) Chromosomes are composed of DNA and proteins, organised into a double helix structure.

(b) Chromosomes are composed of proteinaceous molecules, which are units of heredity that determine specific traits.

(c) Chromosomes are composed of a single stranded DNA molecule, tightly coiled and condensed.

(d) Chromosomes are composed of a lipid bilayer, which provides stability and protection to the genetic material.

(xiv) The production of ATP from ADP, by adding one phosphate group in Hill reaction is

(a) Oxidative phosphorylation (b) Photophosphorylation

(c) Both oxidative and photophosphorylation (d) Photolysis

(xv) The part of eye that can be donated after death is

(a) Sclera (b) Iris (c) Cornea (d) Retina

Question 2.

(i) Name the following:

(a) The layer of the eyeball that provides nourishment to the eye **[5]**

(b) One gaseous compound which depletes the ozone layer

(c) The structure which connects the placenta and the foetus

(d) A pair of corresponding chromosomes of the same shape and size and derived one from each parent

(e) The compound formed when haemoglobin combines with carbon dioxide in blood

(ii) Given below are the sets of terms. In each case, arrange and rewrite each set so as to be in logical sequence beginning with the term that is underlined. **[5]**

(a) Cell body, Axon, <u>Dendrite</u>, Axon ending.

(b) <u>Graafian follicle</u>, uterus, oviducal funnel, fallopian tube, ovum

(c) <u>Cerebrum</u>, Pons, Midbrain, Medulla oblongata.

(d) Association neuron, effector, motor neuron, <u>receptor</u>, sensory neuron.

(e) Lens, pupil, <u>conjunctiva</u>, 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) Cranial nerves	1. Granulocyte
(b) Basophil	2. Agranulocyte
(c) Acetylcholine	3. 12 pairs
(d) Spinal nerves	4. Prolactin
(e) Monocyte	5. Neurotransmitter
	6. 18 pairs
	7. 31 pairs
	8. Conditioned reflex

(iv) Identify the ODD term in each set and name the CATEGORY to which the remaining three belong: [5]

(i) Addison's disease, Cushing's Syndrome, Acromegaly, Leukaemia

(ii) Insulin, Adrenaline, Pepsin, Thyroxine

(iii) Axon, Dendron, Photon, Cyton

(iv) Chicken pox, Colour blindness, Haemophilia, Albinism

(v) Polythene bag, Crop residue, Animal waste, Decaying vegetable

(v) Mention the exact location of the following: [5]

(i) Association neurons

(ii) Incus

(iii) Organ of Corti

(iv) Cowper's gland

(v) Corpus callosum

SECTION - B

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

Question 3.

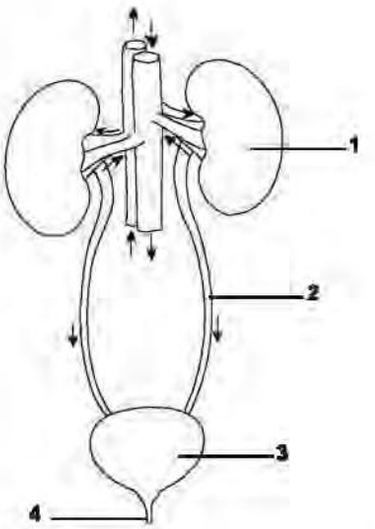
(i) Define – Plasmolysis. [1]

(ii) Give one difference between Mitral valve and Aortic semilunar valve. [2]

(iii) Mention any two objectives of 'Swachh Bharat Abhiyan'. [2]

(iv) Loss of nucleus and mitochondria make erythrocytes more efficient in their function. [2]

(v) The diagram given below represents an organ system in the human body. Study the same and answer the questions that follow: [3]



(a) Mention the significance of part marked as 1.

(b) Label the parts marked 2 and 4. Mention the function of part 4.

(c) What is the fluid that accumulates in part 3?

Question 4.

(i) Expand ABA. [1]

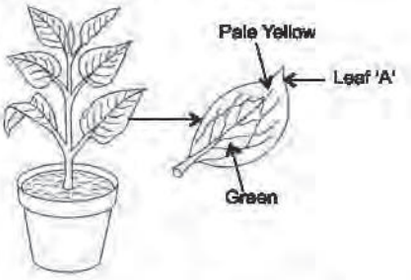
(ii) What are the age restrictions for marriage by law for boys and girls in India? [2]

(iii) We feel blinded for a short while entering a dark room when coming from bright light. Give reason. [2]

(iv) Education is very important for population control. Explain. [2]

(v) A potted plant with variegated leaves was taken in order to prove a factor necessary for photosynthesis. The potted plant was kept in the dark for 24 hours and then placed in bright sunlight for a few hours.

Observe the diagram and answer the questions. [3]



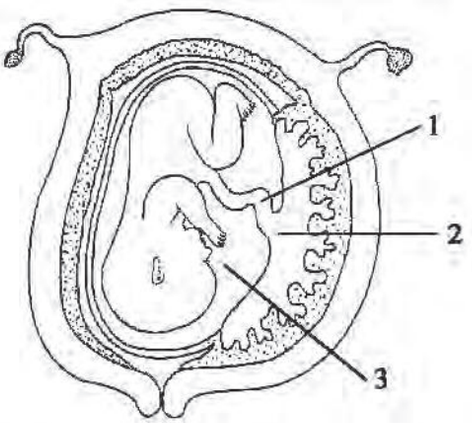
(a) Name any two plants that could be used in this experiment.
(b) Why was the plant kept in the dark before beginning the experiment?
(c) What will be the result of the starch test performed on leaf 'A' shown in the diagram?

Question 5.

(i) Define Gestation. [1]
(ii) Mention the three main steps involved in the formation of the urine. [2]
(iii) Mention two functions of the amniotic fluid. [2]
(iv) Mention any two differences between lymphocytes and monocytes. [2]
(v) Draw different types of granulocytes. [3]

Question 6.

(i) Define Acromegaly. [1]
(ii) What is the function of cerebrospinal fluid? [2]
(iii) Give one difference between Hydrotropism and Thigmotropism. [2]
(iv) Car-sickness and sea-sickness is caused by disturbed balance in inner ear. Explain. [2]
(v) The diagram given below is that of a developing human foetus. Study the diagram and then answer the questions that follow: [3]



(a) Label the parts numbered 1 and 2 in the diagram.
(b) Mention any one function of the part labelled 2 in the diagram.
(c) Give the significance of the part numbered 3 in the diagram.

Question 7.

(i) Explain Swachh Bharat Abhiyan. [1]
(ii) Give one difference between Metaphase and Anaphase. [2]
(iii) Suggest two effective ways of reducing global warming. [2]
(iv) Why is population explosion a cause of grave concern? Give any two reasons. [2]

(v) Draw a well labelled diagram of the membranous labyrinth found in the inner ear. Name. [3]

Question 8.

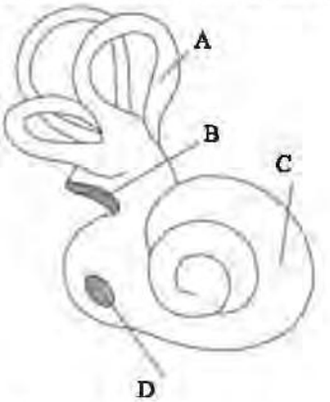
(i) Define Photophosphorylation. [1]

(ii) Mature erythrocytes in humans lack nucleus and mitochondria. Give reason. [2]

(iii) Differentiate between – Demography and Population density [2]

(iv) What is the importance of transpiration for plants? [2]

(v) Refer to the given picture and answer the questions that follow. [3]



(a) Identify A and mention its function.

(b) B and D represent oval and round window respectively. State one characteristic of each B and D.

(c) What would happen if the structure labeled as C gets damaged?

SOLUTION

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Time allowed: Two hours
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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. **[15]**

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

(i) A plant cell may burst when:

(a) Turgor pressure equalises wall pressure. (b) Turgor pressure exceeds wall pressure.
(c) Wall pressure exceeds turgor pressure. (d) None of above

Ans. (b) Turgor pressure exceeds wall pressure.

(ii) The individual flattened stacks of membranous structures inside the chloroplasts are known as:

(a) Vesicle (b) Stroma (c) Thylakoids (d) Cristae

Ans. (c) Thylakoids

(iii) The nephrons discharge their urine in the:

(a) Urinary bladder (b) Urethra (c) Renal pelvis (d) Renal pyramid

Ans. (c) Renal pelvis

(iv) Among the listed options, identify the structures found in the inner ear of humans.

1- Cochlea 2- Tectorial membrane
3- Malleus 4- Tympanic membrane

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

Ans. (b) 1 and 2

(v) Neha was playing outside when she fell and scraped her knee on the pavement. She noticed that her knee started bleeding. Which of the following components in her blood is responsible for forming a scab and stopping the bleeding?

(a) Red blood cells (b) White blood cells (c) Platelets (d) Plasma

Ans. (c) Platelets

(vi) The rate of transpiration will be fastest when the day is :

(a) Hot, humid and windy (b) Cool, humid and windy
(c) Hot, humid and non-windy (d) Hot, dry and windy

Ans. (d) Hot, dry and windy

(vii) Assertion (A): Plant hormones are primarily responsible for providing structural support to plants.
Reason (R): Plant hormones are involved in regulating various physiological processes in plants, including growth, development, and responses to environmental stimuli.

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

(viii) A cell has five pairs of chromosomes. After mitotic division, the number of chromosomes in the daughter cells will be :

(a) Five (b) Ten (c) Twenty (d) Forty

Ans. (b) Ten

(ix) Learning is related to :

(a) Cerebrum (b) Cerebellum (c) Medulla Oblongata (d) Hypothalamus

Ans. (a) Cerebrum

(x) The special protein, forming disc shaped structure in centromere is.

(A) Chromomere (B) Chromonema (c) Kinetochore (D) Lycin

Ans. (c) Kinetochore

(xi) The random spontaneous change in genetic make up is called.

(a) Variation (b) Heredity (c) Mutation (d) Deletion

Ans. (c) Mutation

(xii) The raw materials for photosynthesis are

(a) Carbon dioxide, water, mesophyll and sunlight (b) Carbon dioxide and water

(c) Oxygen, water, chlorophyll and sunlight (d) Soil and water

Ans. (b) Carbon dioxide and water

(xiii) Which of the following statements accurately describes the structure of chromosomes?

(a) Chromosomes are composed of DNA and proteins, organised into a double helix structure.

(b) Chromosomes are composed of proteinaceous molecules, which are units of heredity that determine specific traits.

(c) Chromosomes are composed of a single stranded DNA molecule, tightly coiled and condensed.

(d) Chromosomes are composed of a lipid bilayer, which provides stability and protection to the genetic material.

Ans. (a) Chromosomes are composed of DNA and proteins, organised into a double helix structure.

(xiv) The production of ATP from ADP, by adding one phosphate group in Hill reaction is

(a) Oxidative phosphorylation (b) Photophosphorylation

(c) Both oxidative and photophosphorylation (d) Photolysis

Ans. (b) Photophosphorylation

(xv) The part of eye that can be donated after death is

(a) Sclera (b) Iris (c) Cornea (d) Retina

Ans. (c) Cornea

Question 2.

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

(a) The layer of the eyeball that provides nourishment to the eye

(b) One gaseous compound which depletes the ozone layer

(c) The structure which connects the placenta and the foetus

(d) A pair of corresponding chromosomes of the same shape and size and derived one from each parent

(e) The compound formed when haemoglobin combines with carbon dioxide in blood

Ans. (a) Choroid

(b) CFCs (Chlorofluorocarbons)

(c) Umbilical cord

(d) Homologous chromosomes

(e) Carbaminohemoglobin

(ii) Given below are the sets of terms. In each case, arrange and rewrite each set so as to be in logical sequence beginning with the term that is underlined. **[5]**

(a) Cell body, Axon, Dendrite, Axon ending.
(b) Graafian follicle, uterus, oviducal funnel, fallopian tube, ovum
(c) Cerebrum, Pons, Midbrain, Medulla oblongata.
(d) Association neuron, effector, motor neuron, receptor, sensory neuron.
(e) Lens, pupil, conjunctiva, yellow spot, cornea.

Ans. (a) Dendrite, Cell body, Axon, Axon ending.
(b) Graafian follicle, ovum, oviducal funnel, fallopian tube, uterus
(c) Cerebrum, midbrain, pons, medulla oblongata
(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) Cranial nerves	1. Granulocyte
(b) Basophil	2. Agranulocyte
(c) Acetylcholine	3. 12 pairs
(d) Spinal nerves	4. Prolactin
(e) Monocyte	5. Neurotransmitter
	6. 18 pairs
	7. 31 pairs
	8. Conditioned reflex

Ans. (a) Cranial nerves — 3. 12 pairs
(b) Basophil — 1. Granulocyte
(c) Acetylcholine — 5. Neurotransmitter
(d) Spinal nerves — 7. 31 pairs
(e) Monocyte — 2. Agranulocyte

(iv) Identify the ODD term in each set and name the CATEGORY to which the remaining three belong: **[5]**

(i) Addison's disease, Cushing's Syndrome, Acromegaly, Leukaemia
(ii) Insulin, Adrenaline, Pepsin, Thyroxine
(iii) Axon, Dendron, Photon, Cyton
(iv) Chicken pox, Colour blindness, Haemophilia, Albinism
(v) Polythene bag, Crop residue, Animal waste, Decaying vegetable

Ans. (i) Odd term : Leukaemia
Category : Different types of hormonal disorders
(ii) Odd term : Pepsin
Category : Different types of hormones
(iii) Odd term : Photon
Category : Parts of a Nerve cell
(iv) Odd term : Chicken pox
Category : Genetic disorders
(v) Odd term : Polythene bag
Category : Biodegradable waste

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

(i) Association neurons

(ii) Incus

(iii) Organ of Corti

(iv) Cowper's gland

(v) Corpus callosum

Ans. (i) Association neurons are located in brain and spinal cord.

(ii) Incus is found in the middle ear of humans.

(iii) Organ of Corti is a spiral organ in the inner ear.

(iv) Cowper's gland is found at the base of urethera.

(v) Corpus callosum is found in the between cerebral hemispheres of humans.

SECTION - B

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

Question 3.

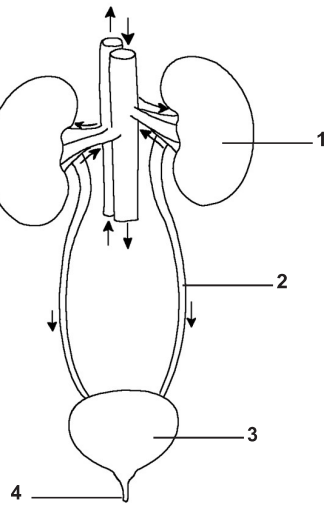
(i) Define – Plasmolysis. **[1]**

(ii) Give one difference between Mitral valve and Aortic semilunar valve. **[2]**

(iii) Mention any two objectives of 'Swachh Bharat Abhiyan'. **[2]**

(iv) Loss of nucleus and mitochondria make erythrocytes more efficient in their function. **[2]**

(v) The diagram given below represents an organ system in the human body. Study the same and answer the questions that follow: **[3]**



(a) Mention the significance of part marked as 1.

(b) Label the parts marked 2 and 4. Mention the function of part 4.

(c) What is the fluid that accumulates in part 3?

Ans.

(i) Plasmolysis : It is the contraction of the cytoplasm from the cell wall due to the withdrawal of water when the cell is placed in a hypertonic solution.

(ii) Mitral valve is located at the opening between the left auricle and the left ventricle.
Aortic semilunar valve is located at the point of origin of aorta from the left ventricle.

(iii) Objective of Swachh Bharat Abhiyan

- To eradicate open defecation through the construction of toilets.
- To spread awareness among people about cleanliness and community hygiene.

(iv) The erythrocytes or RBCs of mammals lack nucleus, mitochondria and endoplasmic reticulum. Absence of nucleus makes the RBCs biconcave to increase their surface area volume for absorbing more oxygen. Absence of mitochondria means RBCs do not use the absorbed oxygen for themselves, so they let the lungs to absorb all the oxygen.

(v) (a) 1 represents kidney that serves as the primary excretory organ in human body. It helps in eliminating nitrogenous waste from blood in the form of urine.

(b) 2 — Ureter
4 — Urethra
Urethra let the urine pass out of the body.

(c) Urine is accumulated in urinary bladder (3).

Question 4.

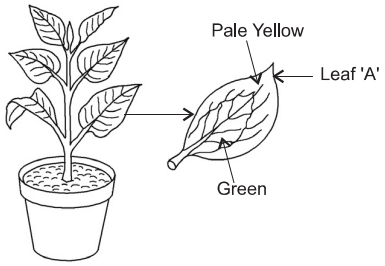
(i) Expand ABA. **[1]**

(ii) What are the age restrictions for marriage by law for boys and girls in India? **[2]**

(iii) We feel blinded for a short while entering a dark room when coming from bright light. Give reason. **[2]**

(iv) Education is very important for population control. Explain. **[2]**

(v) A potted plant with variegated leaves was taken in order to prove a factor necessary for photosynthesis. The potted plant was kept in the dark for 24 hours and then placed in bright sunlight for a few hours. Observe the diagram and answer the questions. **[3]**



(a) Name any two plants that could be used in this experiment.

(b) Why was the plant kept in the dark before beginning the experiment?

(c) What will be the result of the starch test performed on leaf ‘A’ shown in the diagram?

Ans.

(i) ABA–Abscisic Acid

(ii) In India the age restriction for marriage by law are

For girls = 18 years

For boys = 21 years

(iii) When we enter a dark room while coming from bright light, we feel difficulty in seeing objects for a short while. It is because regeneration of the rhodopsin pigments occurs in dark room (dim light) which were broken down in bright light. So, in the absence of rhodopsin we feel blinded for a short while.

(iv) Education makes the people aware regarding the advantages of small families and disadvantages of large families. They come to know about various methods of family planning in order to limit the family-size.

(v) (a) Coleus and Croton.

(b) The plant was kept in the dark before beginning the experiment to destarch it.

(c) As a result of starch test on leaf 'A', the inner green part turns blue-black while the outer pale yellow part remains unchanged.

Question 5.

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

(ii) Mention the three main steps involved in the formation of the urine. **[2]**

(iii) Mention two functions of the amniotic fluid. **[2]**

(iv) Mention any two differences between lymphocytes and monocytes. **[2]**

(v) Draw different types of granulocytes. **[3]**

Ans.

(i) Gestation : Gestation is the period of the development of an embryo in the uterus of the female. In humans, gestation lasts for about 280 days.

(ii) Three main steps involved in the formation of urine are —

- **Ultrafiltration**, the mechanical filtration in the glomerulus.
- **Selective Reabsorption** of useful substances in the proximal convoluted tubule.
- **Tubular secretion** in the distal convoluted tubule.

(iii) Two functions of amniotic fluid are —

- It protects the embryo from physical damage such as from jerks or mechanical shocks.
- It prevents sticking of the foetus to the amnion.

(iv)

Lymphocytes	Monocytes
• Single large nucleus	• Large kidney-shaped nucleus
• Produce antibodies	• Phagocytose germs

(v)

Basophil **Eosinophil** **Neutrophil**

Question 6.

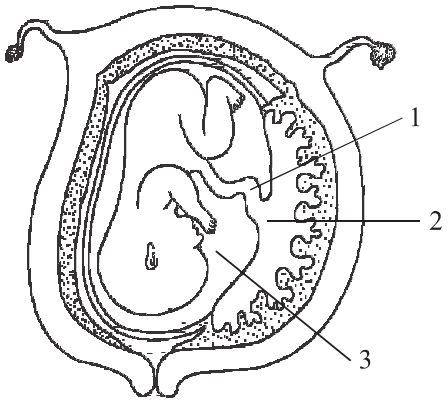
(i) Define Acromegaly. **[1]**

(ii) What is the function of cerebrospinal fluid? **[2]**

(iii) Give one difference between Hydrotropism and Thigmotropism. **[2]**

(iv) Car-sickness and sea-sickness is caused by disturbed balance in inner ear. Explain. **[2]**

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



(a) Label the parts numbered 1 and 2 in the diagram.

(b) Mention any one function of the part labelled 2 in the diagram.

(c) Give the significance of the part numbered 3 in the diagram.

Ans.

(i) Acromegaly is the condition which is caused due to hypersecretion of growth hormone. It results in abnormal long bones of limbs and jaws.

(ii) Cerebrospinal fluid acts like a cushion to protect the brain from shocks. The same fluid also fills the central space of the brain and central canal of spinal cord.

(iii) In hydrotropism, the stimulus is water.

In thigmotropism, the stimulus is touch or contact.

(iv) Sea-sickness and car-sickness are often caused due to the unusual sensation of equilibrium. Constant spinning of head causes the fluid in semicircular canals to spin for a short time, even after we stop. It results in dizziness and light headedness.

(v) (a) 1 — Umbilical cord 2 — Placenta

(b) The placenta (2) allows diffusion of oxygen and food nutrients from mother to foetus.

(c) Amniotic fluid (3) fills the space between the amnion and the embryo, thus protects the embryo from physical damage by jerks or shocks.

Question 7.

(i) Explain Swachh Bharat Abhiyan. **[1]**

(ii) Give one difference between Metaphase and Anaphase. **[2]**

(iii) Suggest two effective ways of reducing global warming. **[2]**

(iv) Why is population explosion a cause of grave concern? Give any two reasons. **[2]**

(v) Draw a well labelled diagram of the membranous labyrinth found in the inner ear. **[3]**

Ans.

(i) Swachh Bharat Abhiyan is a campaign by Government of India that aims to keep the country clean including roads, streets and infrastructure.

(ii) In metaphase, the chromosomes (chromatids) get arranged in one plane at the equator.

In anaphase, the two sister chromatids of each chromosome get separated and are drawn apart towards opposite poles.

(iii) Two effective ways to reduce the global warming are –

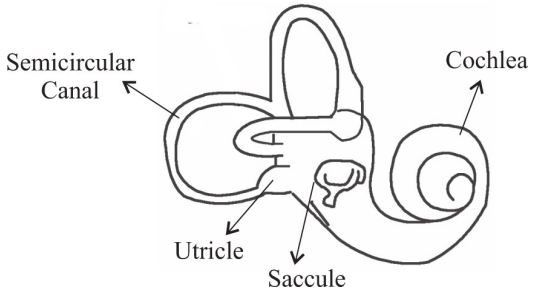
- Use of renewable energy sources
- Less use of heating and cooling gadgets

(iv) (a) It has caused socio-economic problems due to the lack of space and food, inadequate educational and health facilities.

(b) Rising population has also caused an energy crisis, as energy sources are fast dwindling while demand is increasing.

(c) It has also led to an increase in air, water and soil pollution and ecological degradation.

(v) Membranous labyrinth in inner ear



Question 8.

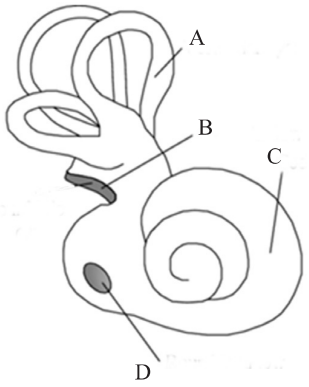
(i) Define Photophosphorylation. **[1]**

(ii) Mature erythrocytes in humans lack nucleus and mitochondria. Give reason. **[2]**

(iii) Differentiate between – Demography and Population density **[2]**

(iv) What is the importance of transpiration for plants? **[2]**

(v) Refer to the given picture and answer the questions that follow. **[3]**



(a) Identify A and mention its function.

(b) B and D represents oval and round window respectively. State one characteristic of each B and D.

(c) What would happen if the structure labeled as C gets damaged?

Ans.

(i) Photophosphorylation : Photophosphorylation is the process of formation of energy-rich compounds i.e., ATP from ADP and inorganic phosphates, utilising light energy.

$$ADP + P_i \xrightarrow{\text{Sunlight}} ATP$$

(ii) Mature erythrocytes in human lack nucleus to get the biconcave shape which increases the surface area and volume for more oxygen absorption. They lack mitochondria so they transport all the oxygen to the tissues without any loss.

(iii) Demography : Demography is the statistical study of the size, structure and distribution of the population especially of human beings.

Population Density : Population density is a measurement of population per unit area or per unit volume. It is a quantity, frequently applied to living beings.

(iv) Transpiration is important for plants in two ways :

- The loss of water creates suction force in the stem to enable the roots to absorb water and minerals.
- Loss of water in vapour form from the leaves creates a cooling effect in the surrounding area of the plant.

(v) (a) A represents vestibular apparatus and it provides the sense of balance and the information about body position.

(b) Oval window is the upper opening and it is enclosed by the stapes footplate. Round window is the lower opening and it is covered by a thin tympanic membrane.

(c) C represent cochlea and its damage could result in permanent hearing loss.