ICSE 2025 EXAMINATION

Sample Question Paper - 9

BIOLOGY

Time: 2 Hours **Max. Marks: 80**

General Instructions:

1. Answer to this Paper must be written on the paper provided separately.
2. You will not be 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.
5. Section A is compulsory. Attempt any four questions from Section B.

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 questions, write the correct answer only.)

(i) ..... occurs through semi-permeable membrane.

(a) Osmosis (b) Diffusion
(c) Imbibition (d) Transportation

Answer: (a) Osmosis

(ii) Transpiration :

(a) It is the loss of water in the form of droplets from the aerial parts of the plant.
(b) It is the loss of water in the form of water vapour from the underground parts of the plant.
(c) It is the loss of water in the form of water vapour from the aerial parts of the plant.
(d) It is the loss of water in the form of water vapour from all parts of the plant.

Answer: (c) It is the loss of water in the form of water vapour from the aerial parts of the plant.

(iii) Assertion (A): The cochlea, ear ossicles, and tympanum are essential parts of the human ear that contribute to hearing.

Reason (R): The cochlea converts sound vibrations into nerve impulses, the ear ossicles amplify the vibrations, and the tympanum receives the sound waves from the external environment.

(a) Both Assertion (A) and Reason (R) are true, and Reason (R) is the correct explanation of Assertion (A).

(b) Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of Assertion (A).

(c) Assertion (A) is true, but Reason (R) is false.

(d) Assertion (A) is false, but Reason (R) is true.

Answer: (a) Both Assertion (A) and Reason (R) are true, and Reason (R) is the correct explanation of Assertion (A).

(iv) The primary source of Chlorofluorocarbons is

(a) vehicular emissions
(b) refrigeration equipments
(c) industrial effluents
(d) domestic sewage

Answer: (b) refrigeration equipments

(v) In man, the portal vein carries blood from the intestine to the

(a) liver
(b) kidney
(c) heart
(d) both (a) and (b)

Answer: (a) liver

(vi) Assertion (A): Auxin is responsible for apical dominance.
Reason (R): Auxin can induce fruit formation without fetilisation in fruits like apples.

(a) Both Assertion and Reason are true
(b) Both Assertion and Reason are false
(c) Assertion is true and Reason is false
(d) Assertion is false and Reason is true

Answer: (a) Both Assertion and Reason are true

(vii) Australopithecus is also known as Southern ape, because it had

(a) ape-like characters
(b) man-like characters
(c) Both (a) and (b)
(d) monkey-like characters

Answer: (c) Both (a) and (b)

(viii) Sneha studied the human respiratory system and made the following table:

Part	Function
P	Exchanges gases in the lungs.
Q	Carries air to the lungs.

Identify the correct pair.

(a) P – Alveoli, Q – Trachea
(b) P – Trachea, Q – Bronchi
(c) P – Alveoli, Q – Bronchi
(d) P – Bronchi, Q – Larynx

Answer: (a) P – Alveoli, Q – Trachea

(ix) Cretinism and myxoedema are due to

(a) hyposecretion of thyroxine
(b) hypersecretion of thyroxine
(c) hypersecretion of growth hormone
(d) hyposecretion of growth hormone

Answer: (a) hyposecretion of thyroxine

(x) The twins formed from a single ovum and fertilised by a single sperm are called

(a) fraternal twins
(b) homologous twins
(c) identical twins
(d) none of the above

Answer: (c) identical twins

(xi) Spindle fibers play an important role in mitosis and meiosis. Which biological molecule are spindle fibers composed of?

(a) Polysaccharide
(b) Protein
(c) nucleic acid
(d) Lipid

Answer: (b) Protein

(xii) Assertion (A): GA_3 (Gibberellic acid) is used to speed up the malting process in the brewing industry.

Reason (R): GA_3 promotes the breakdown of stored starches into sugars, which is essential during the malting process.$_3$

(a) Both Assertion (A) and Reason (R) are true, and Reason (R) is the correct explanation of Assertion (A).

(b) Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of Assertion (A).

(c) Assertion (A) is true, but Reason (R) is false.

(d) Assertion (A) is false, but Reason (R) is true.

Answer: (b) Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of Assertion (A).

(xiii) The first scientist who proposed his theory for the evolution was.

(a) Darwin
(b) Mendel
(c) Wallace
(d) Lamarck

Answer: (d) Lamarck

(xiv) Which phase comes between G_1 and G_2 phase?

(a) G_o phase
(b) M – phase
(c) S- phase
(d) Interphase

Answer: (c) S- phase

(xv) Suresh was learning about the heart's function in class. His teacher explained that when both atria contract together, blood is pumped into the ventricles. Suresh was then asked what this phase of the heart cycle is called.

(a) arterial diastole
(b) ventricular systole
(c) ventricular diastole
(d) arterial systole

Answer: (d) arterial systole

QUESTION 2.

(i) Name the following

(a) The process by which kidneys regulate the water content of the body.
(b) Shrinkage of protoplasm when a cell is kept in a hypertonic solution.
(c) The plant on which Mendel had worked.

(d) The hormone which prepares the body for defence.
(e) The structures present in hind brain.

Answer:

(a) Osmoregulation
(b) Plasmolysis
(c) Garden pea (Pisum sativum)
(d) Emergency hormone/Adrenaline
(e) Medulla oblongata and Cerebellum

(ii) Fill in the blanks with suitable words.

Blood in human beings flows (a) ..... in the heart before it completes (b) ..... round. It is comprised of one short pathway, i.e. (c) ..... circulation and another long pathway, i.e. (d) ..... circulation. Due to this reason, the blood flow in humans is known as (e) ..... circulation.

Answer:

(a) twice
(b) one complete
(c) pulmonary
(d) systemic
(e) double

(iii) 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.

(a) Reproductive age, Menarche puberty Menstruals, Menopause
(b) Glucose, CO_2 and H_2O, Light and Chlorophyll, Oxygen
(c) Axon, Nissl's granules, Cyton, Dendrites
(d) Adrenal gland, Epinephrine, Pituitary gland, Adrenocorticotropic.
(e) Genes, Chromosome, Allele, Chromatin

Answer:

(a) Puberty, Menarche, Menstruals, Reproductive age, Menopause

(b) Light and Chlorophyll, Glucose, CO_2 and H_2O, Oxygen

(c) Cyton, Nissl's granules, Dendrites, Axon

(d) Pituitary gland, Adrenocorticotropic, Adrenal gland, Epinephrine

(e) Chromosome, Genes, Allele, Chromatin

(iv) Read the explanations given below and name the structure:

Example: The muscular structure that separates the chest cavity from the abdomen.
Answer: Diaphragm.

(a) The organ that pumps blood throughout the body.
(b) The tubes that carry oxygen to the lungs.
(c) The organ where photosynthesis occurs.
(d) The reproductive organs in plants that produce pollen.
(e) The tiny structures in the lungs where gas exchange takes place.

Answer:

(a) Heart
(b) Trachea/Bronchi
(c) Leaf
(d) Anther
(e) Alveoli

(v) Match the items given in Column I with the most appropriate ones in Column II and rewrite the correct matching pairs.

	Column I		**Column II**
A.	Inner portion of cerebrum	1.	Socket of the skull
B.	Lens	2.	Myelinated sheath
C.	Orbits	3.	Entry of reflected light
D.	Vas delerens	4.	White matter
E.	Nodes of Ranvier	5.	Tympanum
		6.	Synapse
		7.	Carries sperms
		8.	Grey matter

Answer:

	Column I		**Column II**
A.	Inner portion of cerebrum	4.	White matter
B.	Lens	3.	Entry of reflected light
C.	Orbits	1.	Socket of the skull
D.	Vas delerens	7.	Carries sperms
E.	Nodes of Ranvier	2.	Myelinated sheath

SECTION – B

(Attempt any four questions.)

QUESTION 3.

(i) What is a gene ?

Answer: A Gene is a unit of heredity composed of DNA.

(ii) The figure shows two types of chromosomes. Identify them and give reason for your choice.

A

B

Answer:

(a) Type A: The V-shaped structure with a centromere in the middle indicates an **anaphase chromosome**. During anaphase, sister chromatids separate, and the centromere splits, resulting in the V-shaped appearance.

(b) Type B: The I-shaped structure represents a **telophase chromosome**. In telophase, the chromatids have fully separated and uncoiled, forming distinct chromosomes with a single centromere, giving them the rod-like appearance.

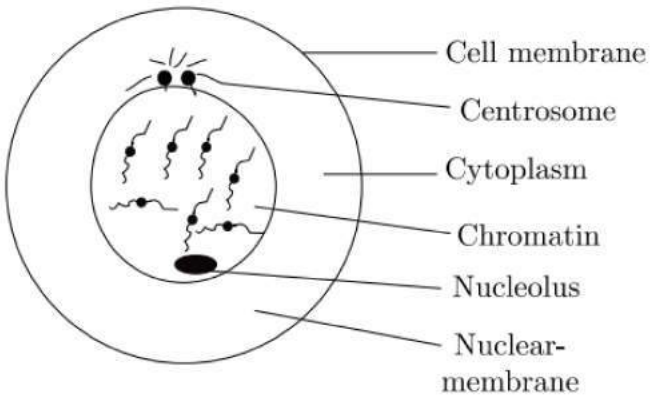
(iii) The term 'stem cells' are often heard these days. Explain briefly of what it means.

Answer: Stem cells are unique cells with the potential to develop into many different cell types in the body. They can self-renew, creating copies of themselves, and differentiate into specialized cells like muscle, nerve, or blood cells. Stem cells hold promise for regenerative medicine, offering hope for treating various diseases and injuries.

(iv) The given figure shows a cell. Study the figure and then answer the questions that follow :

(a) Identify the stage of cell cycle depicted by the cell.

(b) Write any two characteristics of this phase.



Answer:

(a) Inter-phase
(b) (i) **A phase of a project:** This could be the planning, execution, or completion phase.

(ii) **A phase of a chemical reaction:** This could be the initiation, propagation, or termination phase.

(iii) **A phase of the moon:** This could be the new moon, full moon, or any of the other phases.

(v) Define the following :
(a) Genome
(b) Alleles
(c) Punnett square

Answer:

(a) **Genome**: A genome is the complete set of genetic material in an organism, encompassing all of its DNA (or RNA in some viruses). It includes both the genes, which are segments of DNA that encode instructions for building proteins and other molecules, and non-coding sequences that may have regulatory functions or other roles. In humans, the genome consists of 23 pairs of chromosomes located in the cell nucleus, containing approximately 3 billion DNA base pairs and around 20,000 to 25,000 genes.

(b) **Alleles**: Alleles are different versions of a gene that arise by mutation and are found at the same place on a chromosome. For each gene, an individual typically inherits two alleles—one from each parent. These alleles can be dominant or recessive, influencing traits such as eye color or blood type. The combination of

alleles determines an organism's genotype and contributes to its phenotype, or observable characteristics.

(c) **Punnett Square**: A Punnett square is a diagram used in genetics to predict the outcome of a particular genetic cross or breeding experiment. It allows for the visualization of how alleles from two parents can combine in their offspring. The square consists of a grid where one parent's alleles are listed along the top and the other parent's alleles along the side. By filling in the squares, one can determine the possible genotypes of the offspring and their associated probabilities

QUESTION 4.

(i) What is colostrums ?

Answer: Colostrum:

1. Colostrum is the primary milk that is secreted by the mammary glands after childbirth.

2. Colostrum is called bee stings or the first milk produced by the mother.

3. The necessary elements, fat, and protein are present in colostrum.

4. Since it contains high antibodies, it is protective for the newborn.

5. The colostrum contains immune cells and many antibodies, cytokines, and other factors which help the newborn to adapt well to the existing surroundings.

(ii) Give logic for why insulin is injected into the body of a highly diabetic patient and not given orally ?

Answer: Insulin is a protein hormone that is digested by enzymes in the stomach and small intestine if taken orally. This would make it ineffective in controlling blood sugar levels.

Therefore, it is injected directly into the bloodstream, bypassing the digestive system, to ensure it reaches the cells and regulates blood glucose levels.

(iii) During a street fight between two individuals, mention the effects on the following organs by the autonomous nervous system, in the table given below : (one has been done for you as an example)

Organ	Sympathetic system	Parasympathetic system
e.g., Lungs	Dilates bronchi and bronchioles	Constricts bronchi and bronchioles
1. Heart		

2. Pupil of the eye		

Answer:

Organ	Sympathetic system	Parasympathetic system
e.g., Lungs	Dilates bronchi and bronchioles	Constricts bronchi and bronchioles
1. Heart	Increases heartbeat	Decreased heartbeat
2. Pupil of the eye	Dilates	Constricts

(iv) What is the significance of amniotic fluid ?

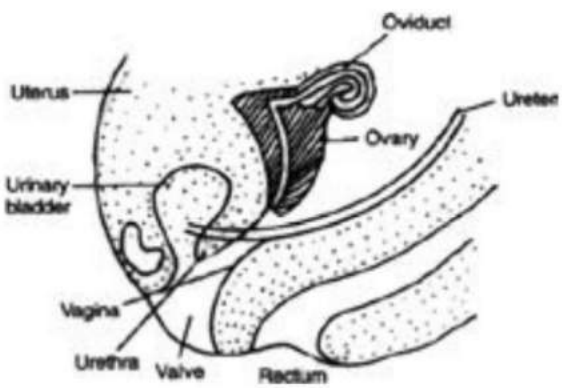
Answer: Amniotic fluid:

1. Amniotic fluid is a protective liquid filled in a sac which is known as the amniotic cavity.

2. Amniotic membrane is made up of single layer of epithelial cells.

3. Amniotic fluid is a clear, slightly yellowish liquid and it surrounds the unborn baby during pregnancy.

(v) Suresh is studying the female reproductive system in his biology class and comes across a diagram representing its organs. Help Suresh apply his knowledge to answer the following questions:



(a) Name the fully developed part of ovary containing the ovum.
(b) Name the organ of the female body in which the fetus develops.
(c) Name the part homologous to penis of male.

Answer:

(a) **Graafian follicle:** This is the fully developed part of the ovary that contains the ovum.

(b) **Uterus:** This is the organ where the fetus develops during pregnancy.

(c) **Clitoris:** The clitoris is the part homologous to the penis in males. It's a small, sensitive organ located above the opening of the vagina.

QUESTION 5.

(i) What is photolysis ?

Answer: Photolysis:

1. Photolysis refers to the breakdown of any particular substance in presence of light.
2. During this process, the substance decomposes forming products in the presence of light (Sunlight).
3. It is also called photodissociation.
4. In this process, inorganic compounds are dissociated or decomposed.
5. The main example of photolysis is the photolysis of water during photosynthesis in plants.
6. In the photolysis of water, water molecules are broken down into hydrogen ions and oxygen.
7. Photolysis of water is the most essential chemical reaction as it releases oxygen for entire biotic components.
8. Photolysis also plays an important role in various nutrient cycles.

(ii) (a) Give two examples of turgor movements in plant.

(b) Give two examples of semi-permeable membrane, other than cell membrane.

Answer: (A) Examples of turgor movements in plants:

1. The rapid drooping of the leaves of the sensitive plant (Mimosa pudica) is an outstanding example of turgor movement.
2. If one of the leaves is touched, even lightly, the leaflets fold up, and within 2 to 3 seconds, the entire leaf droops. If the leaf is touched somewhat strongly, the

wave of folding and drooping spreads from the stimulated leaf to all neighbouring leaves.

3. Slowly, the leaves recover and again stand erect. In this plant, the stimulus of touch leads to loss of turgor at the base of the leaflets and at the base of the petioles, called pulvinus.
4. Somewhat similar turgor movements are found in insectivorous plants, whose leaves close up to entrap a living prey.
5. The bending movements of certain flowers towards the sun and the sleep movements of the leaves of certain plants at night are also due to turgor movements.

(b) Semipermeable membrane :

1. It is a membrane that only allows the movement of solvent molecules but restricts the movement of solute particles across the membrane.
2. It is involved in a process of **osmosis** (movement of water molecules from higher concentration region to lower concentration region)

(iii) Auxins and Gibberellins induce growth in plants. Which hormone has inhibitory effect on growth ?

Answer: Ethylene has inhibitory effect on elongation of stem and root.

(iv) A well watered potted plant shows wilting of leaves on hot sunny day. Explain the reason.

Answer: On a hot sunny day, the rate of water loss through transpiration exceeds the rate of water absorption by the roots, leading to a decrease in turgor pressure within the plant cells, causing the leaves to wilt.

This occurs even in well-watered plants due to the increased rate of transpiration in high temperatures and low humidity.

(v) Potato cubes 1 cm in size were placed in two containers, one containing water, the other containing concentrated sugar solution. After about 24 hours when the cubes were examined, then those placed in water were found to be firm and had increased in size by a few millimeters. Those placed in concentrated sugar solution were found to be soft and had decreased in size. Use the above information to answer the questions that follow :

(a) Account for the firmness and increase in size of the potato cubes which were placed in water.

(b) Account for the softness and decrease in size of the potato cubes which were placed in the sugar solution.
(c) Name and define the physical process being investigated in this experiment.

Answer: (a) Water is hypotonic to the potato cells, due to which endosmosis occurs and water enters the potato cells. The protoplasm swells up pressing tight against the cell wall. The cells are fully distended i.e. turgid. This causes the firmness and increase in the size of the potato cubes when placed in water.

(b) The potato cell loses its distended appearance the cytoplasm shrinks and the plasma membrane withdraws from the cell wall. The cells become limp or flaccid. This causes the softness and decrease in size of the potato cubes when placed in sugar solution.

(c) The process being investigated is osmosis. Osmosis is the diffusion of water molecules across a semi-permeable membrane from a more dilute solution with a lower solute concentration to a less dilute solution with a higher solute concentration.

QUESTION 6.

(i) What is the function of eyelashes ?

Answer: Eyelashes act as a protective barrier, shielding the eyes from dust, debris, and other foreign particles.

They also help reduce tear evaporation, keeping the eyes moist.

Additionally, they act as sensors, triggering a blink reflex when something approaches the eye.

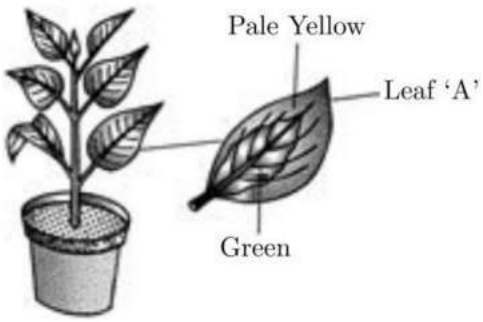
(ii) Name the type of cell division that occurs during :
1. Growth of shoot.
2. Formation of pollen grains.
3. Repair of worn out tissues.

Answer:

(i) Mitosis
(ii) Meiosis
(iii) Mitosis

(iii) 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 diagrams and answer the questions.



(a) What aspect of photosynthesis is being tested in the above diagram?

(b) Represent the process of photosynthesis in the form of a balanced equation.

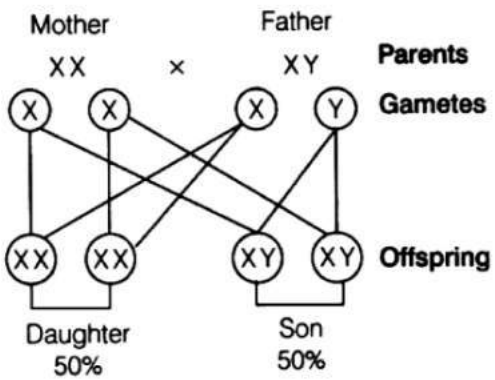
Answer: (a) Chlorophyll is necessary for photosynthesis.

(b) $6CO_2 + 12H_2O \xrightarrow[\text{Sunlight}]{\text{Chlorophyll}} C_6H_{12}O_6 + 6H_2O + 6O_2$

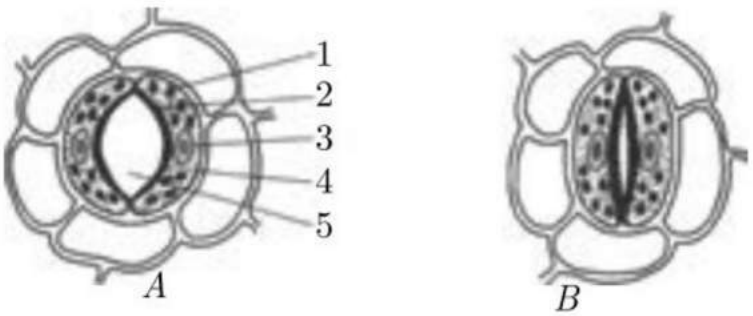
(iv) Explain sex-determination in human beings by giving schematic diagram.

Answer:

Sex determining mechanism in human beings is XX-XY type. The schematic diagram of sex-determination in human beings is as follows



(v) Following are the diagrams of a certain structure in plants in two conditions:



(a) Name the structure shown.

(b) Name the parts numbered 1-5.

(c) What is the most apparent difference between A and B in the structure shown?

Answer: (a) Stomata
(b)

I. Chloroplast
II. Inner wall of guard cell
III. Nucleus
IV. Outer wall of guard cell
V. Stomata

(c) The most apparent difference between A and B in the structure shown is the shape of the central opening. In A, the opening is oval, while in B, it is elongated and narrower.

QUESTION 7.

(i) What is Rh-factor?

Answer: Rh factor:

1. Rh factor is an inherited protein present on the surface of the red blood cells.
2. If Rh factor or antigen is present in red blood cells it is known as positive (+) blood group.
3. If Rh factor or antigen is absent in red blood cells it is known as negative (-) blood group.
4. The antigen was first discovered in the rhesus monkey so it is called rhesus factor.

(ii) When did Cro – Magnon man appear? State the distinguishing features of them.

Answer: They appeared about 3000 mya.
1. They had a large brow ridge.
2. Their skull was rounded.
3. They had thicker teeth.

(iii) How is heart protected from shocks and jerks?

Answer: Protection of human heart:

1. Heart in human beings is protected in different ways.

2. It is enclosed in a double layered, transparent thin membrane called pericardium.

3. The space between the inner and outer layers is called pericardial space.

4. This space is filled with a fluid called pericardial fluid.

5. Pericardium and pericardial fluid protect the heart from physical shocks.

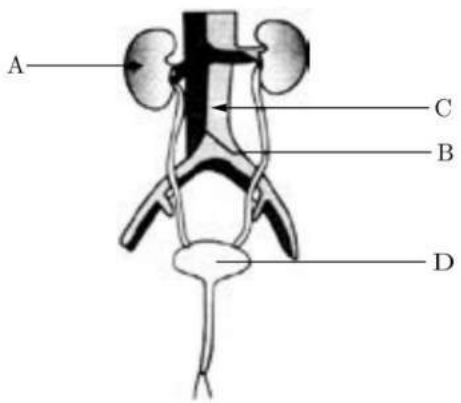
6. It is also protected by ribcage or chest cavity.

(iv) What factors govern the growth of population?

Answer:

a) Birth Rate
b) Death Rate
c) Emigration and Immigration

(v) Raju is reviewing a diagram of the human excretory system in his biology class. Help him apply his understanding to answer the following:



(a) Identify the labels A, B, and C.
(b) Name the basic filtration unit present in the kidney.
(c) Structure which stores urine until it is passed out.

Answer:

(a) A-Right kidney

B-Vena cave carries blood directly to the heart.
C-Aorta supplies blood to kidney for liltration.

(b) Nephron

(c) Urinary bladder

QUESTION 8.

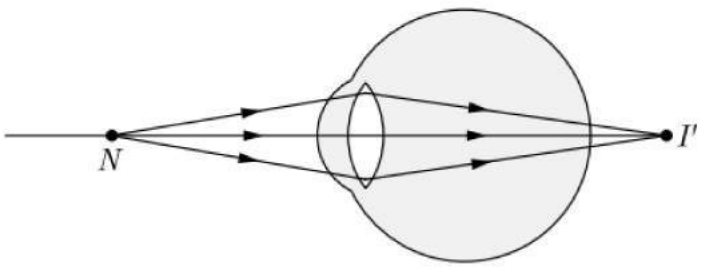
(i) Give biological reasons for On sprinkling common salt on grass growing in a lawn, the grass is killed.

Answer: Common salt, when sprinkled on the grass, causes the plasmolysis of grass cells, ultimately leading to their death. Hence, if we sprinkle some common salt on grass growing on a lawn, it is killed on the spot.

(ii) Which part of the human ear gives 'Dynamic balance' and 'Static balance' to the body ?

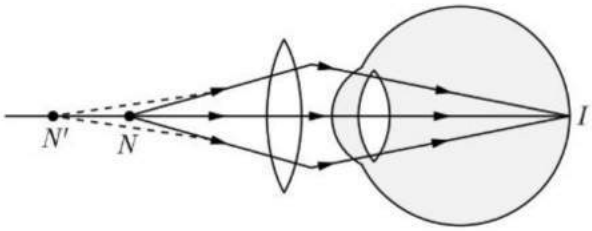
Answer: The semicircular canals in the inner ear are the primary source of dynamic balance. They detect rotational head motions and assist you in maintaining your balance while in motion, such as when walking, running, or turning quickly.

(iii) The diagram given below represents a defect of vision of the human eye :



(a) Draw a neat labelled diagram to show how this defect can be rectified.
(b) What is the nature of this image that falls on the retina of a normal eye ?

Answer: (a)



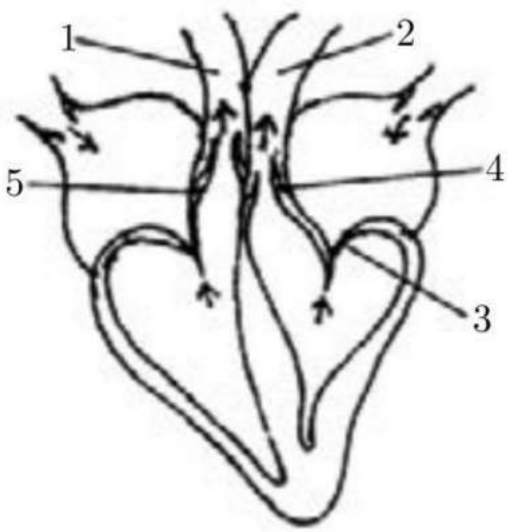
(iv) State any two harmful effects of acid rain.

Answer: Acid rain is a phenomenon when acid comes with rain to the earth. The gases especially sulphur oxides and nitrogen oxides released by vehicles, factories, and from burning processes escaped into the upper atmosphere, where it reacts with water and comes to earth back with rain. This is called acid rain.

The harmful effect of acid rain are as follows:

- It destroys the ancient buildings.
- It makes the soil unfertile by increasing the acidity of the soil.
- It also destroys metal objects.

(v) The diagram below represents the human heart in one phase of its functions.



(a) Name the phase.

(b) Which part of the heart is contracting in this phase ? Give a reason to support your answer.

(c) Name the parts labelled 1 to 4.

Answer:

(a) Ventricular systole
(b) Ventricles are contracting as cuspid valves are closed and semi-lunar valves are opened.
(c) 1 Pulmonary artery
2. Aorta
3. Bicuspid valve
4. Left atrium