

# ICSE 2024 EXAMINATION

## BIOLOGY

### SAMPLE PAPER - 8

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.

[15]

Write the correct answer only) :

- (i) While recording the pulse rate, where exactly does a doctor press on our wrist?  
(a) Nerve (b) Vein (c) Artery (d) Capillary
- (ii) In a human male, a sperm will contain;  
(a) Both X and Y chromosomes (b) Only Y chromosome  
(c) Only X chromosome (d) Either X or Y chromosome
- (iii) A muscular wall is absent in:  
(a) Capillary (b) Venule (c) Arteriole (d) Vein
- (iv) Which of the following statement is NOT true?  
(a) Semicircular ducts are filled with perilymph.  
(b) Utricles and saccule are found in inner ear.  
(c) Cochlea makes almost 3 turns around bony core.  
(d) Basilar membrane separates cochlear duct from scala tympani.
- (v) Which one of the following does not affect the rate of transpiration?  
(a) Light (b) Humidity (c) Wind (d) Age of the plant
- (vi) The number of spinal nerves in a human being are :  
(a) 31 pairs (b) 10 pairs (c) 21 pairs (d) 30 pairs
- (vii) Which of the following character was not chosen by Mendel in his experiment?  
(a) Flower shape (b) Seed colour (c) Plant height (d) Pod Shape
- (viii) Aqueous humour is present between the :  
(a) Lens and Retina (b) Iris and Lens (c) Cornea and Iris (d) Cornea and Lens
- (ix) Which one of the following is a Greenhouse gas?  
(a) Oxygen (b) Methane (c) Sulphur dioxide (d) Nitrogen
- (x) The phase which comes before mitotic phase.  
(a) G1 phase (b) S phase (c) G2 phase (d) M phase
- (xi) Rod shaped chromosome, having centromere at the proximal end is  
(a) Telocentric (b) Acrocentric (c) Metacentric (d) Submetacentric
- (xii) Why does the burning of waste is not advised for solid waste management?  
I. It requires modern instruments and techniques.

- II. It is costly but inefficient practice.  
 III. It generates carcinogens and pollutants.

Choose the correct option.

- (a) I and II (b) Only II (c) II and III (d) Only III

(xiii) Consider the following statements.

Statement I- Lamarck's theory is also known as the inheritance of acquired characters.

Statement II- Evolution is the slow and continuous process.

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

(xiv) ATP is equivalent to :

- (a) ADP + Inorganic phosphate (b) ADP – Inorganic phosphate  
 (c) NADP- ADP (d) NADPH<sub>2</sub>

(xv) The daughter cells are genetically different from parent cell in \_\_\_\_\_.

- (a) meiosis (b) mitosis (c) amitosis (d) cloning

## Question 2.

(i) Name the following:

[5]

- (a) A campaign started by the Government of India to clean roads, streets and infrastructure  
 (b) The blood vessel which supplies blood to the liver  
 (c) The number of chromosomes present in a nerve cell of a human being  
 (d) The layer of eyeball that forms the transparent cornea  
 (e) The wax-like layer on the epidermis of leaves which reduces transpiration

(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) Retina, iris, cornea, lens, sclera  
 (b) Cochlea, Malleus, Pinna, Stapes, Incus  
 (c) Receptor, Spinal cord, Effector, Motor neuron, Sensory neuron  
 (d) Uterus, Parturition, Fertilisation, Gestation, Implantation  
 (e) Distal convoluted tubule, Glomerulus, Afferent arteriole, Proximal convoluted tubule

(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) Pacemaker	1. Static body balance
(b) Saccules	2. Kidney inflammation
(c) Stroma	3. Uric acid accumulation
(d) Nephritis	4. Dark reaction
	5. SA node
	6. Light reaction

(iv) Choose the ODD one out from the following terms given and name the category to which others belong:

- (a) Detergents, Eutrophication, sewage, oil spills (b) Lumen, muscular tissue, connective tissue, pericardium  
 (c) Dendrites, Myelin Sheath, Axon, Duramater (d) Cytokinesis, Cell wall, Cell membrane, Vacuoles  
 (e) Prostate gland, Cowper's gland, Seminal vesicle, Testosterone

[5]

(v) Mention the exact function of the following structures :

- (a) Iris (b) Inguinal canal (c) Nephron  
 (d) Thylakoids (e) Proximal convoluted tubule

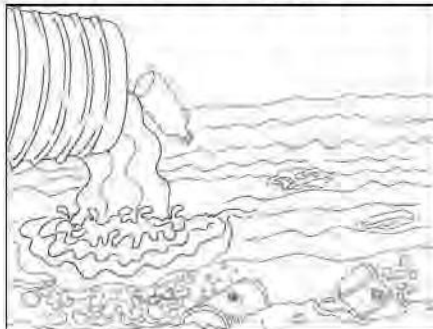
[5]

## SECTION - B

(Attempt any four questions from this Section.)

### Question 3.

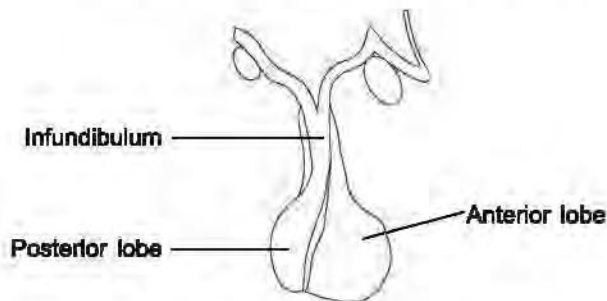
- (i) Define Pollutant. [1]
- (ii) Differentiate between Active Transport and Diffusion. [2]
- (iii) What type of blood do the pulmonary artery and pulmonary vein carry? [2]
- (iv) What is reflex action? Give a brief. [2]
- (v) Study the picture given below and answer the following questions: [3]



- (a) Write two control measures for the above pollution.
- (b) Name one pollutant that causes the above pollution.
- (c) Mention the impact of this pollution on human health.

### Question 4.

- (i) Expand IAA. [1]
- (ii) Name two surgical methods of contraception in humans. [2]
- (iii) The left ventricle of the heart has a thicker wall than the right ventricle. Give reason. [2]
- (iv) Why are the plants growing in fertilised soil often found to wilt if the soil is not adequately watered? [2]
- (v) The diagram given below represents an endocrine gland in the human body. Study the diagram and answer the following questions : [3]



- (a) Identify the endocrine gland. (b) Where is it located?
- (c) Name the hormone which is secreted by the posterior lobe.

### Question 5.

- (i) Define Chlorofluorocarbons (CFCs). [1]
- (ii) What is the significance of photosynthesis for life on earth? [2]
- (iii) State any two features of the plant cell which is not present in animal cells. [2]
- (iv) What is thigmotropism? Give one example. [2]
- (v) Draw a neat, labelled diagram of an experimental setup to show that oxygen is released during photosynthesis. [3]

**Question 6.**

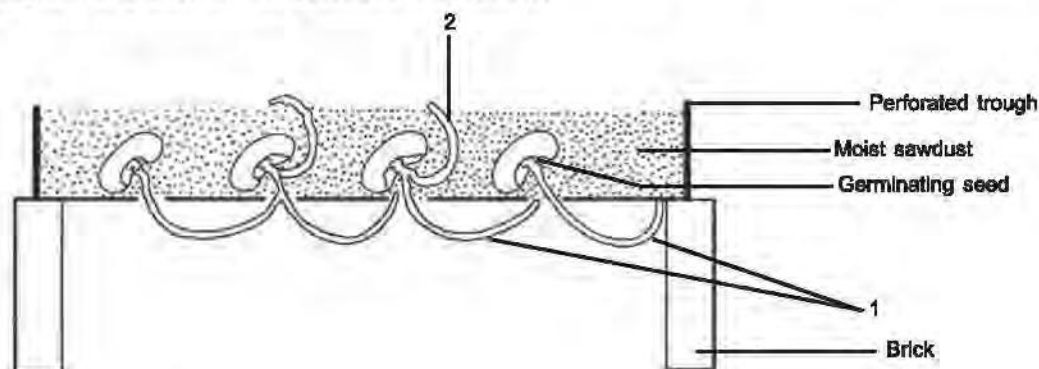
- (i) Define Hormone. [1]
- (ii) Differentiate between Renal cortex and Renal medulla. [2]
- (iii) List two reasons for the population explosion in India. [2]
- (iv) In some xerophytes leaves are modified into spines. Explain. [2]
- (v) Draw a structure of metacentric chromosome and label the following parts : [3]
  - (i) Centromere
  - (b) Chromatid

**Question 7.**

- (i) Define Retina. [1]
- (ii) What are the two possible reasons that cause myopia? [2]
- (iii) Explain the term 'Bharat Emission Standards'. [2]
- (iv) What is the difference between sperm duct and fallopian tube? [2]
- (v) Draw a diagram of the nucleus of a cell, having 6 chromosome, as it would appear in the Metaphase stage of Mitosis and label the following parts in the diagram; (1) Aster (2) Spindle (3) Chromatid (4) Centromere. [3]

**Question 8.**

- (i) What is a Dihybrid Cross? [1]
- (ii) Cutting of trees should be discouraged. Explain. [2]
- (iii) Differentiate between Demography and Population density. [2]
- (iv) State two harmful effects of noise pollution on human health. [2]
- (v) Given below is an experimental set up to demonstrate a particular tropic movement in germinating seeds. Study the diagram and answer the questions that follow: [3]



- (a) Label the parts 1 and 2.
- (b) Name the type of movement shown by 1 and 2.
- (c) Part 1 is affected by two stimuli.  
Which one of the two is stronger?

# SOLUTION

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Maximum Marks: 80

Time allowed: Two hours

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The time given at the head of this Paper is the time allowed for writing the answers.

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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 [ ].

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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) While recording the pulse rate, where exactly does a doctor press on our wrist?

- (a) Nerve (b) Vein (c) Artery (d) Capillary

Ans. (c) Artery

(ii) In a human male, a sperm will contain;

- (a) Both X and Y chromosomes (b) Only Y chromosome  
(c) Only X chromosome (d) Either X or Y chromosome

Ans. (d) Either X or Y chromosome

(iii) A muscular wall is absent in:

- (a) Capillary (b) Venule (c) Arteriole (d) Vein

Ans. (a) Capillary

(iv) Which of the following statement is NOT true?

- (a) Semicircular ducts are filled with perilymph  
(b) Utricles and saccule are found in inner ear  
(c) Cochlea makes almost 3 turns around bony core  
(d) Basilar membrane separates cochlear duct from scala tympani

Ans. (a) Semicircular ducts are filled with perilymph

(v) Which one of the following does not affect the rate of transpiration?

- (a) Light (b) Humidity (c) Wind (d) Age of the plant

Ans. (d) Age of the plant

(vi) The number of spinal nerves in a human being are :

- (a) 31 pairs (b) 10 pairs (c) 21 pairs (d) 30 pairs

Ans. (a) 31 pairs

(vii) Which of the following character was not chosen by Mendel in his experiment?

- (a) Flower shape (b) Seed colour (c) Plant height (d) Pod Shape

Ans. (a) Flower shape

(viii) Aqueous humour is present between the :

- (a) Lens and Retina (b) Iris and Lens (c) Cornea and Iris (d) Cornea and Lens

Ans. (d) Cornea and Lens



(ix) Which one of the following is a Greenhouse gas? [5]  
(a) Oxygen (b) Methane (c) Sulphur dioxide (d) Nitrogen

Ans. (b) Methane

(x) The phase which comes before mitotic phase.

- (a) G1 phase (b) S phase (c) G2 phase (d) M phase

Ans. (c) G2 phase

(xi) Rod shaped chromosome, having centromere at the proximal end is

- (a) Telocentric (b) Acrocentric (c) Metacentric (d) Submetacentric

Ans. (a) Telocentric

(xii) Why does the burning of waste is not advised for solid waste management?

I. It requires modern instruments and techniques

II. It is costly but inefficient practice

III. It generates carcinogens and pollutants

Choose the correct option.

- (a) I and II (b) Only II (c) II and III (d) Only III

Ans. (d) Only III

(xiii) Assertion (A): Lamarck's theory is also known as the inheritance of acquired characters.

Reason (R): Evolution is the slow and continuous process.

- (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. (a) Both (A) and (R) are true

(xiv) ATP is equivalent to :

- (a) ADP + Inorganic phosphate (b) ADP – Inorganic phosphate  
(c) NADP- ADP (d) NADPH<sub>2</sub>

Ans. (a) ADP + Inorganic phosphate

(xv) Ria, who was battling cancer, received a chemotherapy treatment involving a drug that possesses the ability to hinder the cancer cells from producing new DNA and proteins. In which stage of the cell cycle will doctors administer this drug to Ria?

- (a) G 1 phase (b) G 2 phase (c) M phase (d) S phase

Ans. (d) S phase

## Question 2.

(i) Name the following:

[5]

- (a) A campaign started by the Government of India to clean roads, streets and infrastructure  
(b) The blood vessel which supplies blood to the liver  
(c) The number of chromosomes present in a nerve cell of a human being  
(d) The layer of eyeball that forms the transparent cornea  
(e) The wax-like layer on the epidermis of leaves which reduces transpiration

Ans. (a) Swachh Bharat Abhiyan

- (b) Hepatic artery  
(c) 46 chromosomes  
(d) Sclera  
(e) Cuticle

(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) Retina, iris, cornea, lens, sclera

- (b) Cochlea, Malleus, Pinna, Stapes, Incus
- (c) Receptor, Spinal cord, Effector, Motor neuron, Sensory neuron
- (d) Uterus, Parturition, Fertilisation, Gestation, Implantation
- (e) Distal convoluted tubule, Glomerulus, Afferent arteriole, Proximal convoluted tubule

**Ans.** (a) Sclera → Cornea → Iris → Lens → Retina

(b) Pinna → Malleus → Incus → Stapes → Cochlea

(c) Receptor → Sensory neuron → Spinal cord → Motor neuron → Effector

(d) Fertilisation → Uterus → Implantation → Gestation → Parturition

(e) Afferent arteriole → Glomerulus → Proximal convoluted tubule → Distal convoluted tubule.

**(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) Pacemaker	1. Static body balance
(b) Saccules	2. Kidney inflammation
(c) Stroma	3. Uric acid accumulation
(d) Nephritis	4. Dark reaction
	5. SA node
	6. Light reaction

**Ans.** (a) Pacemaker — 5. SA node

(b) Saccules — 1. Static body balance

(c) Stroma — 4. Dark reaction

(d) Nephritis — 2. Kidney inflammation

**(iv)** Choose the ODD one out from the following terms given and name the category to which others belong:

- (a) Detergents, Eutrophication, sewage, oil spills
- (b) Lumen, muscular tissue, connective tissue, pericardium
- (c) Dendrites, Myelin Sheath, Axon, Duramater
- (d) Cytokinesis, Cell wall, Cell membrane, Vacuoles
- (e) Prostate gland, Cowper's gland, Seminal vesicle, Testosterone

**[5]**

**Ans.** (a) Odd Term — Eutrophication

Category — Sources of water pollution

(b) Odd Term — Lumen

Category — others do not have tubular opening and are tissues related to heart

(c) Odd Term — Dura mater

Category — Parts of a nerve cell

(d) Odd Term — Cytokinesis

Category — Parts of a plant cell

(e) Odd Term — Testosterone

Category — Accessory glands of human male

**(v)** Mention the exact function of the following structures :

- (a) Iris
- (b) Inguinal canal
- (c) Nephron
- (d) Thylakoids
- (e) Proximal convoluted tubule

**[5]**

**Ans.** (a) **Iris** : It regulates the amount of light entering the eye. It has radial muscles to widen and circular muscles to constrict the pupil.

(b) **Inguinal Canal** : It allows the descent of testes alongwith their ducts, from abdomen into the scrotum.

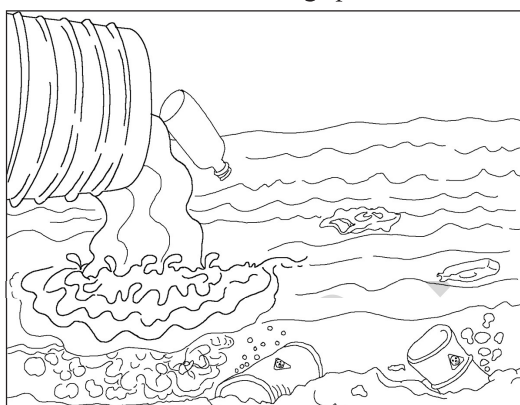
- (c) **Nephron** : It is the excretory unit of kidney which helps in the filtration of many constituents of blood.
- (d) **Thylakoids** : Each thylakoid contains the green pigment chlorophyll in which light reaction of photosynthesis is carried out.
- (e) **Proximal Convolved tubule** : It reabsorb most water, glucose, sodium and chloride ions from the filtrate.

## SECTION - B

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

### Question 3.

- (i) Define Pollutant. [1]
- (ii) Differentiate between Active Transport and Diffusion. [2]
- (iii) What type of blood do the pulmonary artery and pulmonary vein carry? [2]
- (iv) What is reflex action? Give a brief. [2]
- (v) Study the picture given below and answer the following questions: [3]



- (a) Write two control measures for the above pollution.
- (b) Name one pollutant that causes the above pollution.
- (c) Mention the impact of this pollution on human health.

**Ans.**

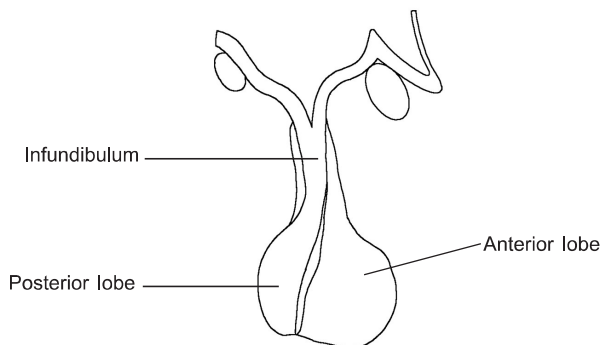
- (i) **Pollutant** : Pollutant is any additional constituent to air, water or land that deteriorates the natural quality of that resource and environment.
- (ii) In **active transport**, the substances or ions pass through the cell membrane from the right ventricle of the its lower concentration to higher concentration using energy from the cell. **Diffusion** allows the movement of particles from higher concentration to lower concentration without using any energy from the cell.
- (iii) 1. **Pulmonary artery** : It carries deoxygenated blood to the lungs from the right ventricle of the heart for oxygenation.  
 2. **Pulmonary veins** : They carry oxygenated blood from lungs to the left atrium of the heart.
- (iv) **Reflex action** : Reflex action is an automatic, quick and involuntary action in the body brought about by a stimulus. Reflexes are of two types — natural reflexes and conditioned reflexes. Blinking, coughing, sneezing, salivation, etc. are natural reflexes while acquired reflexes are conditioned reflexes, e.g. cycling, painting, etc.
- (v) (a) The picture represents water pollution that can be controlled by treating the industrial effluents before discharging them into water bodies and by setting up sewage treatment plants.  
 (b) Sewage and industrial waste  
 (c) It may cause many diseases such as cholera, diarrhoea, etc, in humans.

### Question 4.

- (i) Expand IAA. [1]



- (ii) Name two surgical methods of contraception in humans. [2]
- (iii) The left ventricle of the heart has a thicker wall than the right ventricle. Give reason. [2]
- (iv) Why are the plants growing in fertilised soil often found to wilt if the soil is not adequately watered? [2]
- (v) The diagram given below represents an endocrine gland in the human body. Study the diagram and answer the following questions : [3]



- (a) Identify the endocrine gland.
- (b) Where is it located?
- (c) Name the hormone which is secreted by the posterior lobe.

**Ans.**

- (i) Indole 3-Acetic Acid.
- (ii) Surgical methods of contraception in
1. Human males — Vasectomy
  2. Human females — Tubectomy
- (iii) The left ventricle of the heart has thicker wall because ventricles have to pump blood to long distances. The left ventricle pumps blood upto the farthest points in the body like up to the brain and upto the toes whereas the right ventricle only has to pump blood to the lungs.
- (iv) When fertilisers are added to the soil, the soil water becomes hypertonic as compared to the cell sap. So if adequate water is not added to such soil frequently, the exosmosis will occur in the root cells of the plants and the water will come out from the plant through root cells. As a result the plant will wilt down.
- (v) (a) Pituitary gland
- (b) It is located at the base of the hypothalamus in brain.
- (c) Oxytocin is secreted by the posterior lobe of pituitary gland.

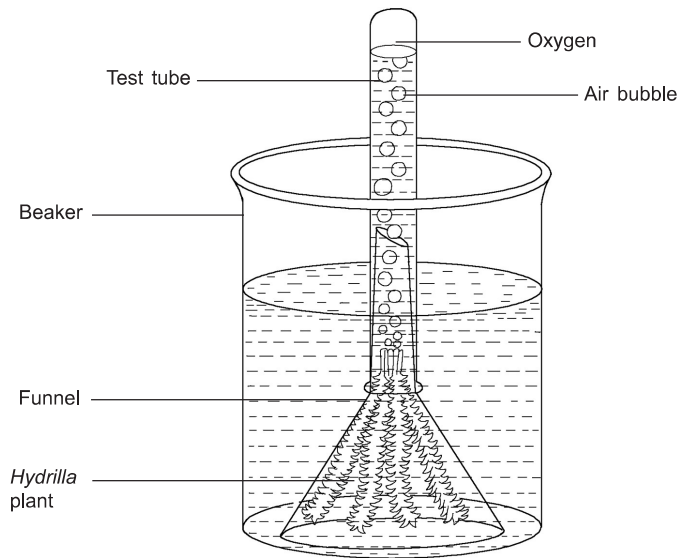
**Question 5.**

- (i) Define Chlorofluorocarbons (CFCs). [1]
- (ii) What is the significance of photosynthesis for life on earth? [2]
- (iii) State any two features of the plant cell which is not present in animal cells. [2]
- (iv) What is thigmotropism? Give one example. [2]
- (v) Draw a neat, labelled diagram of an experimental setup to show that oxygen is released during photosynthesis. [3]

**Ans.**

- (i) CFCs are the gases which gets readily liquify when compressed. Therefore, these are used in refrigeration, fire extinguishers, etc. CFCs are potent source of ozone layer depletion.
- (ii) **Significance of Photosynthesis for life on Earth :**
- Photosynthesis is ultimately the source of energy and food for all living beings, directly for plants and indirectly for animals.

- It is the only biological process which releases oxygen into the atmosphere. This oxygen supports all life forms on the earth.
- (iii) Features present in plant cell, but not present in animal cells, are :
- Cell wall is present.
  - Large vacuole and chloroplasts are present.
- (iv) Thigmotropism is the directional movement of plant or its part in response to touch or, contact. For example – drooping of touch-me-not plant leaves when we touch them.
- (v)



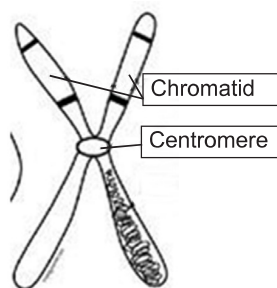
#### Question 6.

- (i) Define Hormone. [1]
- (ii) Differentiate between Renal cortex and Renal medulla. [2]
- (iii) List two reasons for the population explosion in India. [2]
- (iv) In some xerophytes leaves are modified into spines. Explain. [2]
- (v) Draw a structure of metacentric chromosome and label the following parts : [3]
- Centromere
  - Chromatid

#### Ans.

- (i) **Hormone** : Hormone is a secretion from some glandular part of the body which is poured into blood directly to act on the target organ of an individual.
- (ii) **Renal cortex** consists of cup shaped body of nephrons called Bowman's capsule and proximal and distal convoluted tubule. The **renal medulla** part of a kidney consists of loop of Henle and collecting tubules of nephrons.
- (iii) Two reasons for the population explosion in India :
- Illiteracy in rural population which forms a major constituent of our total population.
  - Religious and social customs due to which people do not accept family planning norms.
- (iv) In some xerophytes like cacti; the leaves are modified into spines to reduce the exposed surface, in order to reduce transpiration and thus, prevents loss of water.

(v)



**Question 7.**

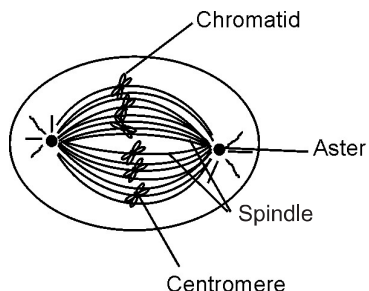
- (i) Define Retina. [1]  
(ii) What are the two possible reasons that cause myopia? [2]  
(iii) Explain the term 'Bharat Emission Standards'. [2]  
(iv) What is the difference between sperm duct and fallopian tube? [2]  
(v) Draw a diagram of the nucleus of a cell, having 6 chromosome, as it would appear in the Metaphase stage of Mitosis and label the following parts in the diagram; (1) Aster (2) Spindle (3) Chromatid (4) Centromere. [3]

**Ans.**

- (i) **Retina** : It is the innermost layer of the eye which is sensitive to light. It contains rod cells sensitive to dim light, and cones which are sensitive to bright light.  
(ii)
  - Elongation of eyeball from front to back.
  - The lens may become too convex or curved.  
(iii) Bharat Emission Standards are Instituted by the Government of India to regulate the output of air pollutants. The standards and the timeline for implementation are set by the Central Pollution Control Board. All new vehicles manufactured after the implementation of the norms have to be compliant with the regulations.

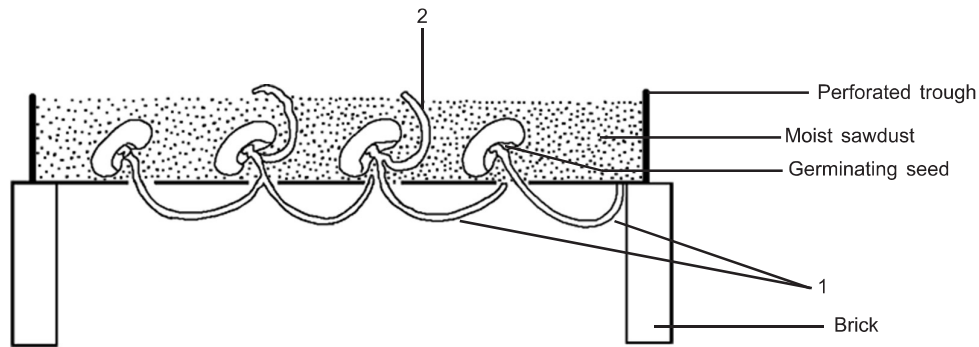
(iv) Sperm duct	Fallopian tube
(1) It is a part of male reproductive system.	(1) It is a part of female reproductive system.
(2) The sperm ducts carry the sperms from testes to the urethra.	(2) The fallopian tubes convey the eggs released from the ovary.

(v) Metaphase stage of Mitosis



**Question 8.**

- (i) What is a Dihybrid Cross? [1]  
(ii) Cutting of trees should be discouraged. Explain. [2]  
(iii) Differentiate between Demography and Population density. [2]  
(iv) State two harmful effects of noise pollution on human health. [2]  
(v) Given below is an experimental set up to demonstrate a particular tropic movement in germinating seeds. Study the diagram and answer the questions that follow: [3]



- (a) Label the parts 1 and 2.
- (b) Name the type of movement shown by 1 and 2.
- (c) Part 1 is affected by two stimuli.  
Which one of the two is stronger?

**Ans.**

- (i) Dihybrid cross is a cross in which two pairs of contrasting characters are taken into consideration.
- (ii) Trees reduce the air pollution, noise pollution and their roots hold the soil thus reduce soil erosion. They also maintain the level of underground water. Also, trees produce oxygen through the process of photosynthesis. So, cutting of trees should be discouraged.
- (iii) **Demography** is the statistical study of human population.  
**Population density** is the number of individuals per square kilometer at given time.
- (iv) Two harmful effects of noise pollution on human health are :
  - It interrupts our concentration on our work and disturbs peace of mind.
  - Prolonged noise can even lead to deafness.
- (v) (a) 1 — Radicle of the seed  
2 — Plumule of the seed
- (b) 1 (radicle) initially shows positive geotropic movement and then it starts growing upwards towards water.  
2 shows negative geotropic movement or, phototropic movement.
- (c) Part 1 is affected by two stimuli. namely gravity and water. Among these two, the effect of water (hydrotropism) is stronger.