ICSE 2024 EXAMINATION

BIOLOGY

SAMPLE PAPER - 5

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) Nearby objects cannot be clearly seen in :
(a) myopia (b) hypermetropia (c) astigmatism (d) glaucoma

(ii) The BS emission norms enforced for the entire country on Ist April 2017 were
(a) BS V (b) BS IV (c) BS III (d) BS I

(iii) IUDs are devices fitted inside the
(a) vagina (b) uterus
(c) ovary (d) oviduct

(iv) The space between the cell wall and plasma membrane in a plasmolysed cell is filled with
(a) hypotonic solution (b) isotonic solution (c) water (d) hypertonic solution

(v) The rate of transpiration increases with :
(a) increase in humidity of air (b) increase in wind velocity
(c) reduced light intensity (d) decreased wind velocity

(vi) Implantation is :
(a) attachment of the blastocyst to the uterine wall (b) release of ovum from the follicle
(c) development of an embryo without fertilisation (d) formation of ova from germ cells

(vii) The first stable intermediate product of photosynthesis is :
(a) glucose (b) starch (c) phosphoglyceric acid (d) ribulose diphosphate

(viii) Pituitary gland regulates urine formation through :
(a) oxytocin (b) TSH (c) ACTH (d) ADH

(ix) During urine formation some absorption of water and sodium ions occur in
(a) Bowman's Capsule (b) Loop of Henle (c) Glomerulus (d) Distal convoluted tubules

(x) All the listed features were found in *Australopithecus*, except :
(a) Long canines (b) Hairy body
(c) Prominent eyebrow ridge (d) Prominent pointed chin

(xi) Each chromosome consists of two symmetrical structures called.
(a) Centromere (b) Nucleosomes (c) Chromatids (d) DNA helix

(xii) A plant with green pods and smooth seeds with genotype Ggss will give rise to the following gametes :
(a) Gg and Ss (b) Gs and gs (c) Gs and ss (d) Gg and gs

(xiii) Swelling of wooden doors and windows occurs due to the process of.

(a) Diffusion (b) Osmosis (c) Suction pressure (d) Imbibition

(xiv) A blood donor found to have antigen B in blood. The donor can donate blood to individuals having blood group.

(a) A, AB, B (b) AB, B (c) O, A, B (d) AB, O, B

(xv) The end products of photosynthesis are

(a) Sugar and CO_2 (b) Sugar, Oxygen and water

(c) Sugar, Oxygen and Carbon dioxide (d) CO_2 and water

Question 2.

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

(a) A process of removing waste products from blood, when kidneys get damaged

(b) The cells which possess the property of amoeboid movement

(c) The exudation of sap from the injured parts of the plants

(d) The full complement of DNA (including all genes and intergenic regions) of an organism

(e) The term used for mature follicle in females

(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) Fibrin, Platelets, Thromboplastin, Fibrinogen, Thrombin

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

(c) Cro-Magnon, *Homo erectus, Homo habilis,* Neanderthals, *Homo sapiens*

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

(e) Caterpillar, Snake, Owl, Frog, Green leaves

(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) Cretinism	1. Hypersecretion of Adrenal cortex
(b) Diabetes insipidus	2. Hyposecretion of Thyroxine
(c) Exophthalmic Goitre	3. Hyposecretion of Growth hormone
(d) Adrenal virilism	4. Hyposecretion of Vasopressin
(e) Dwarfism	5. Hyposecretion of Adrenal cortex
	6. Hypersecretion of Growth hormone
	7. Hypersecretion of Thyroxine

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

(a) Sewage, Newspaper, Styrofoam, Hay

(b) Thymine, Cytosine, Adenine, Pepsin

(c) Malleus, Iris, Stapes, Incus

(d) Cortisone, Somatotropin, Adrenocorticotropic hormone, Vasopressin

(e) Auxin, Cytokinin, Ethylene, Prolactin, Gibberellins

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

(a) Centromere

(b) Islets of Langerhans

(c) Thyroid gland

(d) Ciliary body

(e) Proximal convoluted tubule

SECTION - B

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

Question 3.

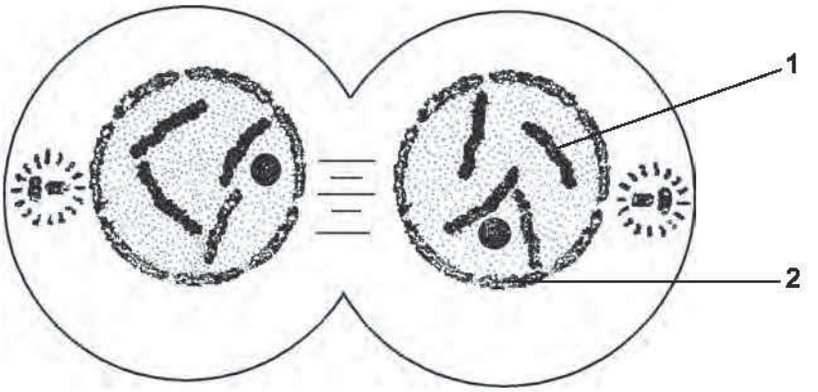
(i) Define Leukaemia. [1]

(ii) Give one difference between blind spot and yellow spot. [2]

(iii) What is chemotropism. Give an example. [2]

(iv) Photosynthetic rate gets lowered even when there is enough CO_2 in the air. Given reason. [2]

(v) Study the diagram given below which represents a stage during the mitotic cell division and answer the questions that follow : [3]



(a) Identify the stage giving suitable reason.

(b) Name the parts numbered 1 and 2.

(c) What is the technical term for the division of nucleus?

Question 4.

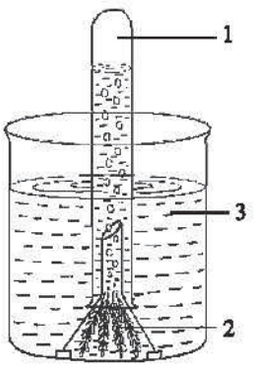
(i) What was the cranial capacity of Cro-Magnon? [1]

(ii) What is the significance of adrenal gland in humans? [2]

(iii) The wall of the ventricles is thicker than the auricles. Give suitable reason. [2]

(iv) Give two impacts of greenhouse effect on our environment. [2]

(v) The following diagram demonstrates a physiological process taking place in green plants. The whole set up was placed in bright sunlight for several hours. Study the diagram and answer the questions that follow : [3]



(a) What aspect of the physiological process is being examined?

(b) Label the parts numbered 1, 2 and 3 in the diagram.

(c) Write a well-balanced-chemical equation for the physiological process shown in the diagram.

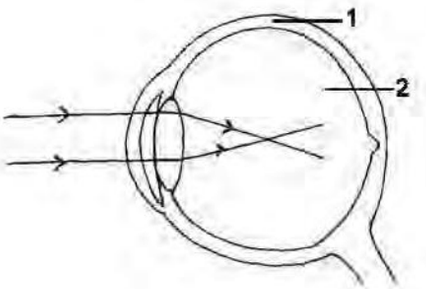
Question 5.

(i) Define synapse. [1]

(ii) Mention any two functions of placenta. [2]

(iii) State Mendel's Law of Dominance. [2]

(iv) What is meant by 'ascent of sap'? List two factors that are responsible for this. [2]



(v) The given diagram depicts a defect of the human eye. Study the same and then answer the questions that follow: [3]

(a) Identify the defect.

(b) Name the parts labelled 1 and 2.

(c) Give two possible reasons for this eye defect.

Question 6.

(i) Deficiency of which hormone causes diabetes insipidus? [1]

(ii) What is mutation? [2]

(iii) Why is Calvin cycle also known as C_3 cycle? [2]

(iv) Give two features of Conjunctiva. [2]

(v) Following diagram shows the picture of an endocrine gland. Study the diagram and answer the following questions. [3]

(a) Identify the structure.

(b) Label the parts marked 1 and 2.

(c) Name the hormone/hormones released by this gland.

Question 7.

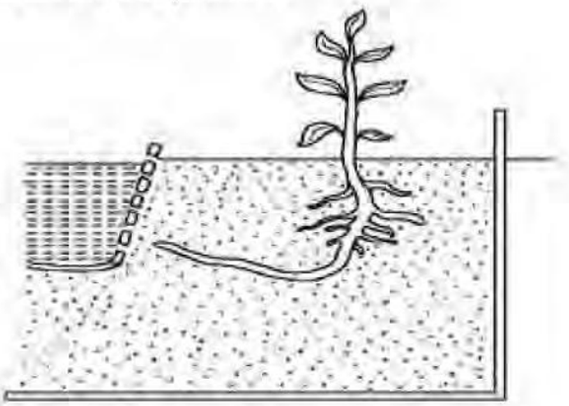
(i) Explain – Acid rain.

(ii) Name the two surgical techniques (one each for human male and female) which can be used to prevent pregnancy.

(iii) Suggest two ways of reducing global warming.

(iv) Differentiate between Malpighian capsule and Bowman's capsule.

(v) Look at the given picture and answer the questions:



(a) Name the tropic movement shown by the of root seedling and stem of the plant.

(b) Name the stimulus responsible for the movement of root.

(c) Which part of this seedling is showing the negative response to the stimulus (water)?

Question 8.

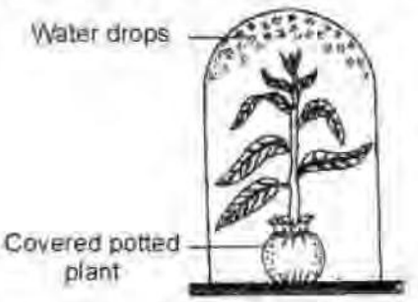
(i) Define – Ultrafiltration.

(ii) Give two harmful effects of noise pollution.

(iii) What are the family welfare centres? Explain.

(iv) Give two points of differences between testosterone and progesterone.

(v) Given below is an experimental set up to study a particular process :



(a) Name the process being studied.

(b) Why is the pot covered with a plastic sheet?

(c) Mention one way in which this process is beneficial to the plants.

SOLUTION

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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) Nearby objects cannot be clearly seen in :
(a) myopia (b) hypermetropia (c) astigmatism (d) glaucoma
Ans. (b) hypermetropia

(ii) The BS emission norms enforced for the entire country on Ist April 2017 were
(a) BS V (b) BS IV (c) BS III (d) BS I
Ans. (b) BS IV

(iii) IUDs are devices fitted inside the
(a) vagina (b) uterus (c) ovary (d) oviduct
Ans. (b) uterus

(iv) The space between the cell wall and plasma membrane in a plasmolysed cell is filled with
(a) hypotonic solution (b) isotonic solution (c) water (d) hypertonic solution
Ans. (d) hypertonic solution

(v) The rate of transpiration increases with :
(a) increase in humidity of air (b) increase in wind velocity
(c) reduced light intensity (d) decreased wind velocity
Ans. (b) increase in wind velocity

(vi) Implantation is :
(a) attachment of the blastocyst to the uterine wall (b) release of ovum from the follicle
(c) development of an embryo without fertilisation (d) formation of ova from germ cells
Ans. (a) attachment of the blastocyst to the uterine wall

(vii) The first stable intermediate product of photosynthesis is :
(a) glucose (b) starch (c) phosphoglyceric acid (d) ribulose diphosphate
Ans. (b) Phosphoglyceric acid

(viii) The posterior pituitary is the back portion of the pituitary gland that stores and releases hormones produced by the hypothalamus. If this part of brain gets damaged due to injury or a disease, which physiological function would be affected in human body?
(a) Maturation of reproductive organs (b) Retention of water in body
(c) Synthesis of TSH (d) Maintenance of normal body temperature
Ans. (b) Retention of water in body

(ix) Assertion (A): Nephrons are the functional unit of kidneys.
Reason (R): Each kidney consists of a single nephron to carry out the function of filtration.

(a) Both (A) and (R) are true
(b) Both (A) and (R) are false
(c) (A) is true and (R) is false
(d) (A) is false and (R) is true

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

(x) All the listed features were found in *Australopithecus*, except :

(a) Long canines
(b) Hairy body
(c) Prominent eyebrow ridge
(d) Prominent pointed chin

Ans. (d) Prominent pointed chin

(xi) A cell cycle encompasses a series of distinct events that take place within a cell. During this cycle, the synthesis of RNA and proteins occurs in
P- Gap 1 phase
Q- Synthetic phase
R- Gap 2 phase

(a) Only P
(b) P and Q
(c) Only Q
(d) P and R

Ans. (d) P and R

(xii) A plant with green pods and smooth seeds with genotype Ggss will give rise to the following gametes :

(a) Gg and Ss
(b) Gs and gs
(c) Gs and ss
(d) Gg and gs

Ans. (b) Gs and gs

(xiii) Swelling of wooden doors and windows occurs due to the process of.

(a) Diffusion
(b) Osmosis
(c) Suction pressure
(d) Imbibition

Ans. (d) Imbibition

(xiv) A blood donor found to have antigen B in his blood. The donor can donate blood to individuals having blood group.

(a) A, AB, B
(b) AB, B
(c) O, A, B
(d) AB, O, B

Ans. (b) AB, B

(xv) The end products of photosynthesis are

(a) Sugar and CO_2
(b) Sugar, Oxygen and water
(c) Sugar, Oxygen and Carbon dioxide
(d) CO_2 and water

Ans. (b) Sugar, Oxygen and water

Question 2.

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

(a) A process of removing waste products from blood, when kidneys get damaged
(b) The cells which possess the property of amoeboid movement
(c) The exudation of sap from the injured parts of the plants
(d) The full complement of DNA (including all genes and intergenic regions) of an organism
(e) The term used for mature follicle in females

Ans. (a) Dialysis
(b) WBCs
(c) Bleeding
(d) Genome
(e) Graafian follicle

(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) Fibrin, <u>Platelets</u>, Thromboplastin, Fibrinogen, Thrombin
(b) Cochlea, Malleus, <u>Pinna</u>, Stapes, Incus

(c) Cro-Magnon, *Homo erectus,* Homo habilis, Neanderthals, *Homo sapiens*

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

(e) Caterpillar, Snake, Owl, Frog, Green leaves

Ans. (a) Platelets, Thromboplastin, Thrombin, Fibrinogen, Fibrin

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

(c) *Homo habilis, Homo erectus*, Neanderthals, Cro-Magnon, *Homo sapiens*

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

(e) Green leaves, Caterpillar, Frog, Snake, Owl

(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) Cretinism	1. Hypersecretion of Adrenal cortex
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(e) Dwarfism	5. Hyposecretion of Adrenal cortex
	6. Hypersecretion of Growth hormone
	7. Hypersecretion of Thyroxine

Ans. (a) Cretinism – 2. Hyposecretion of Thyroxine

(b) Diabetes insipidus – 4. Hyposecretion of Vasopressin

(c) Exophthalmic Goitre – 7. Hypersecretion of Thyroxine

(d) Adrenal virilism – 1. Hypersecretion of Adrenal cortex

(e) Dwarfism – 3. Hyposecretion of Growth hormone

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

(a) Sewage, Newspaper, Styrofoam, Hay

(b) Thymine, Cytosine, Adenine, Pepsin

(c) Malleus, Iris, Stapes, Incus

(d) Cortisone, Somatotropin, Adrenocorticotropic hormone, Vasopressin

(e) Auxin, Cytokinin, Ethylene, Prolactin, Gibberellins

Ans. (a) Odd term : Styrofoam
Category : Biodegradable waste

(b) Odd term : Pepsin
Category : Nitrogenous bases

(c) Odd term : Iris
Category : Bones of middle ear

(d) Odd term : Cortisone
Category : Hormones secreted by Pituitary gland

(e) Odd term : Prolactin
Category : Plant hormones

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

(a) Centromere (b) Islets of Langerhans (c) Thyroid gland

(d) Ciliary body (e) Proximal convoluted tubule

Ans. (a) A centromere is found at the junction of two chomatids in a chromosome.

(b) Islets of Langerhans are found in pancreas.

(c) Thyroid gland is situated in front of neck, just before the larynx.

(d) Ciliary body is found at the junction of choroid and iris in human eye.
(e) Proximal convoluted tubule is found between Bowman's capsule and loop of Henle, in the cortex region of kidneys.

SECTION - B

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

Question 3.

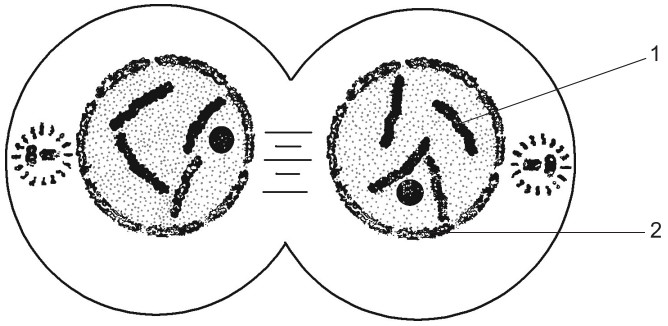
(i) Define Leukaemia. **[1]**

(ii) Give one difference between blind spot and yellow spot. **[2]**

(iii) What is chemotropism. Give an example. **[2]**

(iv) Photosynthetic rate gets lowered even when there is enough CO_2 in the air. Given reason. **[2]**

(v) Study the diagram given below which represents a stage during the mitotic cell division and answer the questions that follow : **[3]**



(a) Identify the stage giving suitable reason.
(b) Name the parts numbered 1 and 2.
(c) What is the technical term for the division of nucleus?

Ans.

(i) Leukaemia is a type of blood cancer that usually begins in the bone marrow and hinders the body's ability to fight infection.

(ii) Blind spot is the point of no vision whereas yellow spot is the point of sharpest vision in human eyes.

(iii) The phenomenon of growth of the plant parts in response to chemicals is called chemotropism. The movement of pollen tube of angiosperms towards sugar in female gametophyte is a suitable example.

(iv) The process like photosynthesis, depends on more than one variable or external factors. The rate of the process depends on the factor which is in shortest supply. Therefore, when there is enough carbon dioxide in the air and the temperature is just below the optimum temperature but the light intensity is very low, in such a situation, the photosynthesis rate will be low.

(v) (a) The given stage is telophase.
- Two sets of daughter chromosomes reach opposite poles.
- Nuclear membrane begin to reappear around the daughter cells.

(b) 1 – Chromatid
2 – Nuclear membrane

(c) The division of nucleus is called karyokinesis.

Question 4.

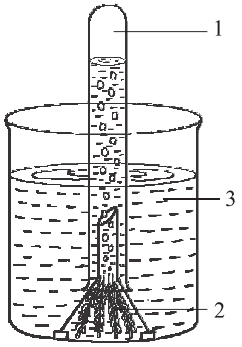
(i) What was the cranial capacity of Cro-Magnon? **[1]**

(ii) What is the significance of adrenal gland in humans? **[2]**

(iii) The wall of the ventricles is thicker than the auricles. Give a suitable reason. **[2]**

(iv) Give two impacts of greenhouse effect on our environment. **[2]**

(v) The following diagram demonstrates a physiological process taking place in green plants. The whole set up was placed in bright sunlight for several hours. Study the diagram and answer the questions that follow : **[3]**



(a) What aspect of the physiological process is being examined?

(b) Label the parts numbered 1, 2 and 3 in the diagram.

(c) Write a well-balanced-chemical equation for the physiological process shown in the diagram.

Ans.

(i) 1500 – 1600 cc

(ii) The adrenal gland produces hormones called emergency hormones which help us to cope with emergency situation and stress. For example, cortisol is produced in stressful situations such as shock, pain, extreme cold or infection. Adrenaline and noradrenaline prepare our body for quick action during an emergency.

(iii) The ventricles have thicker walls because they have to pump blood to long distances in body with intense pressure. So, to withstand such pressure by the heart, the walls are thicker.

(iv)
- Gradual increase in the temperature of the earth's surface results in melting of glaciers and rising level of oceans.
- Changes in the pattern of rainfall leads to drought.

(v) (a) Oxygen is given out during photosynthesis.

(b) 1 – Oxygen
2 – *Hydrilla* plant twigs
3 – water

(c) $6CO_2 + 12H_2O \xrightarrow[\text{Chlorophyll}]{\text{Light energy}} C_6H_{12}O_6 + 6H_2O + 6O_2\uparrow$

Question 5.

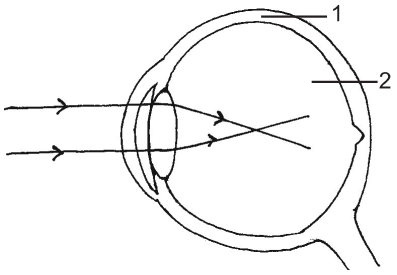
(i) Define synapse. **[1]**

(ii) Mention any two functions of placenta. **[2]**

(iii) State Mendel's Law of Dominance. **[2]**

(iv) What is meant by 'ascent of sap'? List two factors that are responsible for this. **[2]**

(v) The given diagram depicts a defect of the human eye. Study the same and then answer the questions that follow: **[3]**



(a) Identify the defect.

(b) Name the parts labelled 1 and 2.

(c) Give two possible reasons for this eye defect.

Ans.

(i) Synapse is a point of contact between the terminal branches of the axon of a neuron and the dendrites of another neuron separated by a fine gap.

(ii)
- The placenta allows diffusion of oxygen and food nutrients from mother to foetus.
- It allows elimination of CO_2 and urea from foetus to the mother.

(iii) **Law of Dominance :** When a pair of contrasting characters are present together, only one is able to express itself in F_1 generation while the other remains suppressed. The character which is expressed, is called **dominant character** while the suppressed character is called **recessive character.**

(iv) The upward conduction of water from the roots to the shoot apex is called ascent of sap.
The main factors responsible for ascent of sap are –
(a) Root pressure
(b) Transpiration pull

(v) (a) The defect is short-sightedness (myopia).
(b) 1 – Sclera
2 – Vitreous chamber
(c) The two possible reasons for this eye defect are –
A. The lens has become too convex or curved.
B. The elongation of the eyeball from front to back.

Question 6.

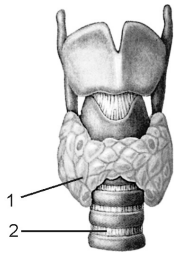
(i) Deficiency of which hormone causes diabetes insipidus? **[1]**

(ii) What is mutation? **[2]**

(iii) Why is Calvin cycle also known as C_3 cycle? **[2]**

(iv) Give two features of Conjunctiva. **[2]**

(v) Following diagram shows the picture of an endocrine gland. Study the diagram and answer the following questions. **[3]**



(a) Identify the structure.
(b) Label the parts marked 1 and 2.
(c) Name the hormone/hormones released by this gland.

Ans.

(i) Deficiency of ADH (Antidiuretic hormone) causes diabetes insipidus.

(ii) Mutation can be defined as the sudden change in certain characters or traits of an organism. Mutation causes changes in DNA structure thus, it results into changes in certain characters or traits of an organism.

(iii) In Calvin cycle, the first stable product is 3-carbon compound, known as 3-phosphoglyceric acid. Hence, it is also called C_3 cycle.

(iv) The conjunctiva is a thin membrane covering the entire front part of the eye. It is continuous with the inner lining of the eyelids. Over the cornea, it is reduced to a single layer of transparent epithelium.

(v) (a) Thyroid gland.
(b) 1 – Thyroid gland
2 – Trachea
(c) It secretes two hormones – thyroxine and calcitonin.

Question 7.

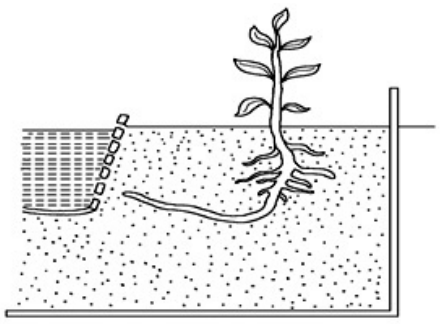
(i) Explain – Acid rain.

(ii) Name the two surgical techniques (one each for human male and female) which can be used to prevent pregnancy.

(iii) Suggest two ways of reducing global warming.

(iv) Differentiate between Malpighian capsule and Bowman's capsule.

(v) Look at the given picture and answer the questions:



(a) Name the tropic movement shown by the of root seedling and stem of the plant.

(b) Name the stimulus responsible for the movement of root.

(c) Which part of this seedling is showing the negative response to the stimulus (water)?

Ans.

(i) Acid rain is a form of precipitation that is characterised by pH lower than 5, due to the presence of pollutants like sulphur dioxide and nitrogen oxide in it.

(ii) **Vasectomy:** It is the surgical technique of sterilisation, used in males.
Tubectomy: It is the surgical technique of sterilisation, used in females to prevent pregnancy.

(iii) There are many categories of actions that can be taken to mitigate global warming. such as :–

- Shifting from carbon–based fossil fuels to alternative energy sources.
- Carbon capture and storage.

(iv) **Malpighian capsule:** Bowman's capsule and glomerulus together constitute as Malpighian capsule. It receives blood for filtration.
Bowman's capsule: It is round, double walled cup like structure of a nephron. It receives the filtrate of the glomerulus.

(v) (a) Hydrotropism is shown by the seedling in the given picture. Phototropism is seen by the stem of the plant.
(b) Water acts as stimulus responsible for the movement of root.
(c) Shoot of a plant shows the negative response to the given stimulus i.e., water.

Question 8.

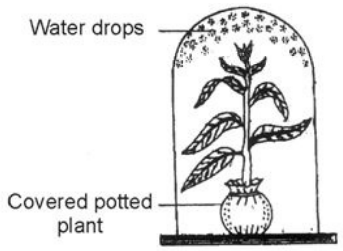
(i) Define – Ultrafiltration.

(ii) Give two harmful effects of noise pollution.

(iii) What are the family welfare centres? Explain.

(iv) Give two points of differences between testosterone and progesterone.

(v) Given below is an experimental set up to study a particular process :



(a) Name the process being studied.

(b) Why is the pot covered with a plastic sheet?

(c) Mention one way in which this process is beneficial to the plants.

Ans.

(i) **Ultrafiltration –** It is the process of filtration of blood that enters in the glomerulus under high pressure. It is also known as mechanical filtration. This process helps to filter small molecules out of the blood.

(ii) Harmful effects of Noise pollution.

- Auditory fatigue- related to whistling and buzzing in the ears.
- Deafness - most serious pathological effect of noise pollution.

(iii) Family welfare centres are the departments responsible for all the plans or programmes run by government related to family planning in India. The Ministry of Health and Family Welfare is an Indian government ministry charged with health policies in India. It provides help, spread awareness among young couples or families and even provide counselling on various situations to overcome the queries or questions for healthy family living.

(iv) **Testosterone:** It is a male sex hormone produced by testes. It helps in sperm production and in the development of secondary sexual characteristics in males.

Progesterone: It is a female sex hormone, produced by corpus luteum of the ovary. It prepares inner lining of the uterus for implantation of zygote and supports a healthy pregnancy.

(v) (a) Transpiration is being studied in the given experimental set up.

(b) The pot is covered with the plastic sheet in order to capture the water vapour, released by the plant in the process of transpiration.

(c) Transpiration helps in the transport of water and minerals through xylem by creating a pressure called as transpirational pull.