ICSE 2024 EXAMINATION

BIOLOGY

SAMPLE PAPER - 1

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) The prime source of chlorofluorocarbons is :
(a) Vehicular emissions (b) Industrial effluents (c) Domestic sewage (d) Refrigeration equipments

(ii) Which of the following is a natural growth inhibitor?
(a) NAA (b) ABA (c) IAA (d) GA

(iii) Marine fish when placed in tap water bursts because of :
(a) Endosmosis (b) Exosmosis (c) Diffusion (d) Plasmolysis

(iv) The differences between the progeny and parents is determined by
(a) Inheritance (b) Heritage (c) Genetics (d) Variation

(v) Identify the correct statement regarding photosynthesis.
(a) Carbon dioxide is obtained from the atmosphere. (b) Water is absorbed from the soil through the shoot system.
(c) Sunlight is trapped by pigments called xanthophyll. (d) Chlorophyll absorbs green light only.

(vi) The phase which comes after mitotic phase is
(a) G1 phase (b) S phase (c) G2 phase (d) M phase

(vii) A bivalent consists of
(a) two chromatids and one centromere (b) two chromatids and two centromeres
(c) four chromatids and two centromeres (d) four chromatids and four centromeres

(viii) The inward movement of water molecules from outside to the cell though a semipermeable membrane is
(a) Endosmosis (b) Exosmosis (c) Plasmolysis (d) Guttation

(ix) Composition of lenticels is :
(a) Dead cells (b) Living cortex cells (c) Living epidermal cells (d) Guard cells

(x) The splitting of water molecules by the light energy is known as :
(a) Hydrolysis of water (b) Photolysis of water (c) Splitting of CO_2 (d) Preparation of glucose

(xi) The light reaction of photosynthesis does not produce
(a) O_2 (b) ATP, $NADPH_2$ (c) High-energy electrons (d) Sugar

(xii) Dendrites perform an essential function in conducting nerve impulses to
(a) Axon (b) Cyton (c) Neuron (d) Cell body

(xiii) The movement of molecules against concentration gradient is called
(a) Diffusion (b) Active transport (c) Osmosis (d) Passive transport

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

(a) Bleeding (b) Guttation (c) Transpiration (d) Evaporation

(xv) The phase when chlorophyll absorbs sunlight is

(a) Photochemical phase (b) Light independent phase

(c) Biochemical phase (d) Calvin cycle

Question 2.

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

(a) The process by which root hairs absorb water from the soil

(b) The organ which produces urea

(c) The kind of lens required to correct Myopia

(d) Lightly stained region of chromosome

(e) The division of nucleus of a cell

(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) Guard cells, Epidermal cells, stoma, Cuticle, Palisade cells

(b) Umbilical cord, Embryo, Ammion, Amniotic fluid, Placenta

(c) Thymus, thyroid gland, Parathyroid, Pituitary, Adrenal gland

(d) CNS, Effector, Response, Receptor, Stimulus

(e) Skull, Pia mater, Skin, Dura mater, Arachnoid

(iii) Match the items given in **Column A** with the most appropriate ones in **Column B** and rewrite the correct matching pairs. **[5]**

Column I		**Column II**
(a) Sacculus	—	1. Dynamic body balance
(b) Guttation	—	2. Hyperglycemia
(c) DNA and histones	—	3. Hypoglycemia
(d) Euro norms	—	4. Hydathodes
(e) Diabetes mellitus	—	5. Static body balance
	—	6. Vehicular standards
	—	7. Nucleosome

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

(a) Aqueous humour, Vitreous humour, Iris, Cochlea

(b) Cerebrum, Cerebellum, Thyroid, Pons

(c) ACTH, TSH, ADH, FSH

(d) Phosphate, Centromere, Sugar, Nitrogeneous base

(e) Bile, Urea, Uric acid, Ammonia

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

(a) Hepatic artery (b) Chordae tendinae (c) Heterochromatin (d) Ciliary body

(e) Proximal convoluted tubule.

SECTION - B

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

Question 3.

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

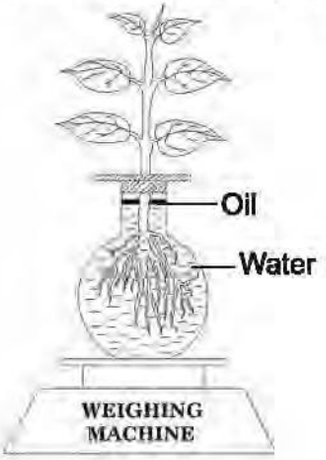
(ii) Differentiate between RBCs and WBCs. **[2]**

(iii) Draw a Punnett square to show the gametes and offspring when both the parents are heterozygous for tallness. Give the phenotypic ratio also. [2]

(iv) Explain how the human eye adapts itself to bright light and dim light. [2]

(v) The diagram below represents a process in plants. [3]

The setup was placed in bright sunlight. Answer the following questions:



(a) Name the physiological process depicted in the diagram.

(b) Why was oil added to the water?

(c) When placed in bright sunlight for four hours, what do you observe with regard to the initial and final weight of the plant?

Question 4.

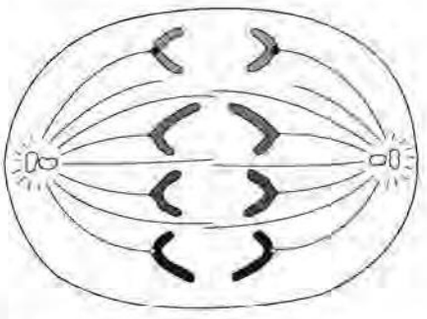
(i) What is Neo-Darwinism? [1]

(ii) Give two features of telophase. [2]

(iii) When an ovum gets fertilised, menstrual cycle stops temporarily in a woman. Give reason. [2]

(iv) Mention any two adaptations found in plants to overcome the process transpiration. [2]

(v) Given below is a diagram representing a stage during the mitotic cell division. Study the diagram and answer the following questions. [3]



(a) Identify the stage by giving a suitable reason.

(b) Is it a plant or an animal cell? Give a reason to support your answer.

(c) How many chromosomes will each daughter cell have after the completion of the above division?

Question 5.

(i) Define Parthenocarpy. [1]

(ii) What is the significance of placenta for the development of a foetus? [2]

(iii) State two functions of scrotum in men. [2]

(iv) RBCs do not have certain organelles but they are very efficient in their function. Explain. [2]

(v) Draw a well-labelled diagram of human kidney. [3]

Question 6.

(i) Define X-linked inheritance. [1]

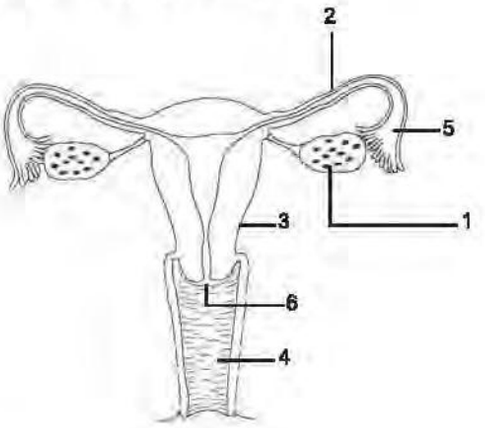
(ii) Differentiate between Testosterone and Oestrogen. [2]

(iii) Name two soil pollutants. [2]

(iv) Why should we not put sharp objects into our ears? [2]

(v) The diagram given below represents a system in the human body. [3]

Study the diagram and answer the following questions:



(a) Identify the system.

(b) Label the parts marked 5 and 6.

(c) Name the two hormones secreted by 1.

Question 7.

(i) Explain Root pressure. [1]

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

(iii) Mention two functions of Eustachian tube. [2]

(iv) Differentiate between Ureter and Urethra. [2]

(v) Draw a well-labelled diagram of a plant showing phototropism. [3]

Question 8.

(i) Define Fibrinogen. [1]

(ii) State two beneficial effects of transpiration to plants. [2]

(iii) What is the difference between mitosis in animal cell and plant cell? [2]

(iv) Name two genetic disorders commonly seen in men. [2]

(v) Draw a flow chart depicting the pathway of blood coagulation in humans. [3]

SOLUTION

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Section A** is compulsory. Attempt **any four** questions from **Section B.
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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) The prime source of chlorofluorocarbons is :

(a) Vehicular emissions (b) Industrial effluents
(c) Domestic sewage (d) Refrigeration equipments

Ans. (d) Refrigeration equipments

(ii) Which of the following is a natural growth inhibitor?

(a) NAA (b) ABA (c) IAA (d) GA

Ans. (b) ABA

(iii) Meena went on a vacation to the sea coast and caught a fish. She kept the fish in a bowl filled with sea water. Upon returning home, she changed the water in bowl and replaced it with tap water. To her surprise and disappointment, the fish died. The possible reason could be :

(a) Endosmosis (b) Exosmosis (c) Diffusion (d) Plasmolysis

Ans. (a) Endosmosis

(iv) The differences between the progeny and parents is determined by

(a) Inheritance (b) Heritage (c) Genetics (d) Variation

Ans. (d) Variation

(v) Identify the correct statement regarding photosynthesis?

(a) Carbon dioxide is obtained from the atmosphere
(b) Water is absorbed from the soil through the stem system
(c) Sunlight is trapped by pigments called xanthophyll
(d) Chlorophyll absorbs green light only

Ans. (a) Carbon dioxide is obtained from the atmosphere

(vi) The phase which comes after mitotic phase is

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

Ans. (a) G1 phase

(vii) A bivalent consists of

(a) two chromatids and one centromere (b) two chromatids and two centromeres
(c) four chromatids and two centromeres (d) four chromatids and four centromeres

Ans. (c) four chromatids and two centromeres

(viii) The inward movement of water molecules from outside to the cell though a semipermeable membrane is

(a) Endosmosis (b) Exosmosis (c) Plasmolysis (d) Guttation

Ans. (a) Endosmosis

(ix) Composition of lenticels is :

(a) Dead cells (b) Living cortex cells

(c) Living epidermal cells (d) Guard cells

Ans. (a) Dead cells

(x) Assertion (A): Photophosphorylation involves the synthesis of ATP.

Reason (R): ATP acts as the assimilatory power in plants.

(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

(xi) Water pollution leads to environmental degradation and it endanger both aquatic life and human well-being. It poses a grave threat to the health and sustainability of our water resources.

Among the listed options, possible reasons for water pollution are:

1- Sewage 2- Brick kilns 3- Oil spill 4- Deforestation

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

Ans. (c) 1 and 3

(xii) Dendrites performs an essential function in conducting nerve impulses to

(a) Axon (b) Cyton (c) Neuron (d) Cell body

Ans. (b) Cyton

(xiii) The movement of molecules against concentration gradient is called

(a) Diffusion (b) Active transport (c) Osmosis (d) Passive transport

Ans. (b) Active transport

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

(a) Bleeding (b) Guttation (c) Transpiration (d) Evaporation

Ans. (a) Bleeding

(xv) The phase when chlorophyll absorbs sunlight is

(a) Photochemical phase (b) Light independent phase

(c) Biochemical phase (d) Calvin cycle

Ans. (a) Photochemical phase

Question 2.

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

(a) The process by which root hairs absorb water from the soil

(b) The organ which produces urea

(c) The kind of lens required to correct Myopia

(d) Lightly stained region of chromosome.

(e) The division of nucleus of a cell

Ans. (a) Osmosis (b) Liver (c) Concave lens

(d) Euchromatin (e) Karyokinesis

(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) Guard cells, Epidermal cells, stoma, Cuticle, Palisade cells

(b) Umbilical cord, Embryo, Ammion, Amniotic fluid, Placenta

(c) Thymus, thyroid gland, Parathyroid, Pituitary, Adrenal gland

(d) CNS, Effector, Response, Receptor, Stimulus

(e) Skull, Pia mater, Skin, Dura mater, Arachnoid

Ans. (a) Cuticle, Epidermal cells, Palisade cells, Guard cells, Stoma

(b) Placenta, Umbilical cord, Amnion, Amniotic fluid, Embryo

(c) Pituitary, thyroid, parathyroid, thymus, adrenal gland

(d) Stimulus, Receptor, CNS, Effector, Response

(e) Skin, Skull, Duramater, Arachnoid, Pia mater

(iii) Match the items given in **Column A** with the most appropriate ones in **Column B** and rewrite the correct matching pairs. **[5]**

Column I		**Column II**
(a) Sacculus	—	1. Dynamic body balance
(b) Guttation	—	2. Hyperglycemia
(c) DNA and histones	—	3. Hypoglycemia
(d) Euro norms	—	4. Hydathodes
(e) Diabetes mellitus	—	5. Static body balance
	—	6. Vehicular standards
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Ans.

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

(a) Aqueous humour, Vitreous humour, Iris, Cochlea

(b) Cerebrum, Cerebellum, Thyroid, Pons

(c) ACTH, TSH, ADH, FSH

(d) Phosphate, Centromere, Sugar, Nitrogeneous base

(e) Bile, Urea, Uric acid, Ammonia

Ans. (a) Aqueous humour, Vitreous humour and Iris are the parts of human eye.
Odd term : Cochlea

(b) Cerebrum, cerebellum and pons are parts of brain that do not secrete hormones.
Odd term : Thyroid

(c) The hormones ACTH, TSH and FSH are secreted by anterior lobe of pituitary gland.
Odd term : ADH

(d) Phosphate, sugar and nitrogenous base are the parts of genetic material.
Odd term : Centromere

(e) Urea, Uric acid and Ammonia are nitrogenous waste products.
Odd term : Bile

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

(a) Hepatic artery (b) Chordae tendinae (c) Heterochromatin (d) Ciliary body

(e) Proximal convoluted tubule.

Ans. (a) Hepatic artery is located in abdomen, near the lower portion of 12th thoracic vertebra.

(b) Chordae tendinae connect the papillary muscles to the tricuspid valve and the mitral valve in the heart.

(c) Heterochromatin is found in the darkly stained regions of chromosome where chromatin remains in condensed state.
(d) Ciliary body is found encircling the inside of eye behind the iris.
(e) Proximal convoluted tubule is the foremost convoluted region of the tubule, near to the Bowman's capsule.

SECTION - B

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

Question 3.

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

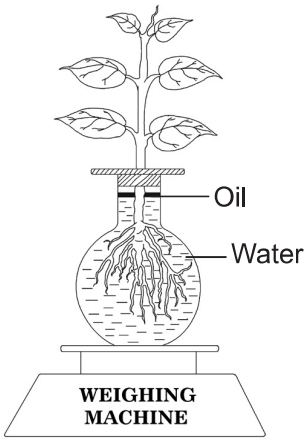
(ii) Differentiate between RBCs and WBCs. **[2]**

(iii) Draw a Punnett square to show the gametes and offspring when both the parents are heterozygous for tallness. Give the phenotypic ratio also. **[2]**

(iv) Explain how the human eye adapts itself to bright light and dim light. **[2]**

(v) The diagram below represents a process in plants. **[3]**

The setup was placed in bright sunlight. Answer the following questions:



(a) Name the physiological process depicted in the diagram.
(b) Why was oil added to the water?
(c) When placed in bright sunlight for four hours, what do you observe with regard to the initial and final weight of the plant?

Ans.

(i) Transpiration is the loss of water in the form of water vapour from the leaves and other aerial parts of the plant.

(ii)

RBCs	WBCs
(1) Mature RBCs do not possess nuclei.	WBCs possess nuclei.
(2) RBCs are biconcave, disc shaped structures.	WBCs are irregular or amoeboid in shape.

(iii)

G→ ↓	T	t
T	TT	Tt
t	Tt	tt

Here, T = tall plant, t = dwarf plant
Phenotypic ratio — 3 : 1

(iv) When a person moves to a brightly lighted area, the visual purple (rhodopsin) of the rods reduce their sensitivity and the pupil constricts to reduce the amount of light entering the eyes.

When a person moves to a dim lighted area, the pigments of rods (rhodopsin) increase in number and dilation of pupil permits more light to enter the eyes.

(v) (a) 'Transpiration'.

(b) Oil was added to the water to prevent the evaporation from the surface of water in the pot.

(c) After placing the plant setup in bright sunlight for 4 hours, there will be a decrease in final weight due to loss of water.

Question 4.

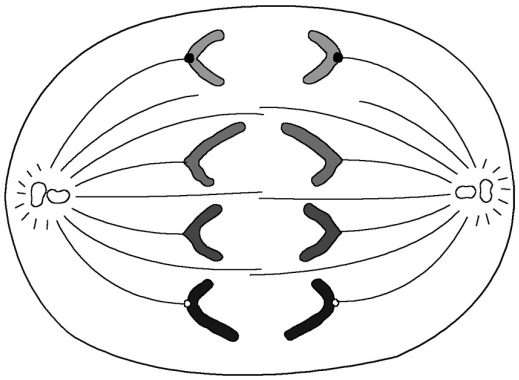
(i) What is Neo-Darwinism? [1]

(ii) Give two features of telophase. **[2]**

(iii) When an ovum gets fertilised, menstrual cycle stops temporarily in a woman. Give reason. **[2]**

(iv) Mention any two adaptations found in plants to overcome the process transpiration. **[2]**

(v) Given below is a diagram representing a stage during the mitotic cell division. Study the diagram and answer the following questions. **[3]**



(a) Identify the stage by giving a suitable reason.

(b) Is it a plant or an animal cell? Give a reason to support your answer.

(c) How many chromosomes will each daughter cell have after the completion of the above division?

Ans.

(i) The modern genetics that modified Darwin's theory of natural selection and revealed the sources of variations constitutes Neo Darwinism.

(ii) **Telophase :** • Two sets of daughter chromosomes reach opposite poles.

• The cleavage furrow starts deepening in the animal cells.

(iii) When an ovum gets fertilised, it gets implanted in the uterus wall and there is no menstrual discharge. It is because the level of the hormone progesterone is increased and it prevents maturation of another follicle.

(iv) Two adaptations found in plants to overcome the process 'transpiration' are —

- a thick cuticle is formed on the leaf surface.
- the leaves become narrower to reduce surface area.

(v) (a) Early Anaphase of mitosis

Reason — Sister chromatids are moving towards the opposite poles.

(b) It is an animal cell. The cell wall is absent and the asters are present on opposite poles.

(c) Each daughter cell will have 4 chromosomes after the completion of division.

Question 5.

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

(ii) What is the significance of placenta for the development of a foetus? **[2]**

(iii) State two functions of scrotum in men. **[2]**

(iv) RBCs do not have certain organelles but they are very efficient in their function. Explain. **[2]**

(v) Draw a well-labelled diagram of human kidney. **[3]**

Ans.

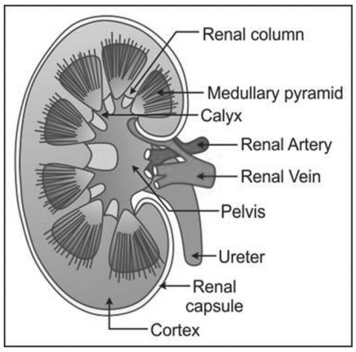
(i) Parthenocarpy is the production of fruits without fertilisation of ovules. It makes the fruits seedless.

(ii) The placenta is a disc like structure attached to the uterine wall. It makes the connection between the mother and that of the foetus. Through placenta, the foetus get required nutrients and oxygen from the mother. Similarly, the nitrogenous wastes and CO_2 are diffused out from foetus to mother's blood through placenta.

(iii)
- Scrotum is a separate sac, suspended outside the body to house the testicles.
- It provides suitable temperature to the testes for producing sperms.

(iv) Since RBCs do not possess mitochondria, they cannot use the oxygen for themselves. Lack of nucleus in RBCs enables them to carry more haemoglobin pigments to transport respiratory gases.

(v) Excretory System of humans



Question 6.

(i) Define X-linked inheritance. **[1]**

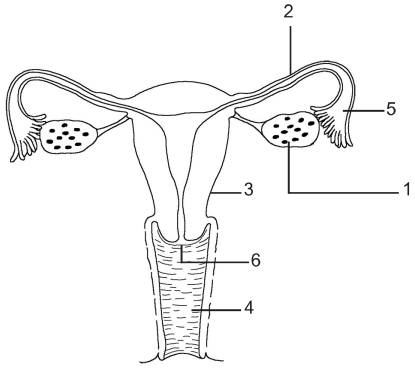
(ii) Differentiate between Testosterone and Oestrogen. **[2]**

(iii) Name two soil pollutants. **[2]**

(iv) Why should we not put sharp objects into our ears? **[2]**

(v) The diagram given below represents a system in the human body. **[3]**

Study the diagram and answer the following questions:



(a) Identify the system.
(b) Label the parts marked 5 and 6.
(c) Name the two hormones secreted by 1.

Ans.

(i) X-linked inheritance means that the gene causing the trait or the disorder is located on the X chromosome. A characteristic of X-linked inheritance is that fathers cannot pass X-linked traits to their sons (no male-to-male transmission).

(ii) **Testosterone** is secreted by testis in human males.

Oestrogen is secreted by ovaries in human females.

(iii) Two soil pollutants are :

- Chemical fertilisers
- Industrial wastes

(iv) There is a delicate, membranous layer of tympanum or ear drum in our middle ear. When we put any sharp object into our auditory canal, it may damage the ear drum and it can impair our hearing.

(v) (a) Reproductive system of human female

(b) 5 — Fimbriae of oviduct
6 — Cervix

(c) Oestrogen and progesterone

Question 7.

(i) Explain Root pressure. **[1]**

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

(iii) Mention two functions of Eustachian tube. **[2]**

(iv) Differentiate between Ureter and Urethra. **[2]**

(v) Draw a well-labelled diagram of a plant showing phototropism. **[3]**

Ans.

(i) **Root pressure :** It is the pressure developed in the roots due to the inflow of water, brought about due to the alternate turgidity and flaccidity of the cells.

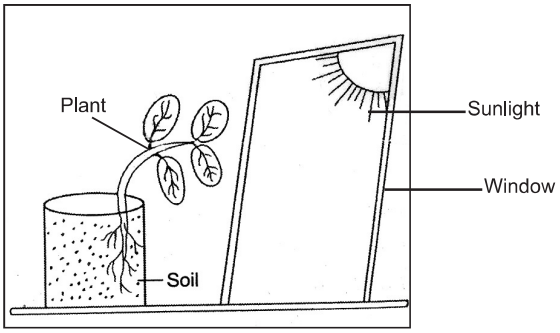
(ii) **Mendel's Law of Dominance :** Out of a pair of contrasting characters present together, only one is able to express itself while the other remains suppressed. The character that expresses itself is called dominant character while the suppressed character is called recessive character.

(iii) Eustachian tube connects the middle ear to the back of the throat i.e. pharynx. It equalises air pressure on each side of the eardrum.

(iv) **Ureter** carries urine from kidney to urinary bladder.

Urethra expels out urine from the urinary bladder.

(v) **Phototropism**



Question 8.

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

(ii) State two beneficial effects of transpiration to plants. **[2]**

(iii) What is the difference between mitosis in animal cell and plant cell? **[2]**

(iv) Name two genetic disorders commonly seen in men. **[2]**

(v) Draw a flow chart depicting the pathway of blood coagulation in humans. **[3]**

Ans.

(i) 'Fibrinogen' is the soluble protein found in plasma which forms insoluble threads during clotting of blood.

(ii) Transpiration is beneficial to plants in the following ways —

- **Cooling effect :** Transpiration reduces temperature of the plant even when it is exposed to bright sunlight.
- **Translocation :** It helps in the translocation of water and minerals through xylem.

(iii)

Mitosis in Animal cell	Mitosis in Plant cell
(1) Asters are formed.	Spindle formation takes place through microtubules.
(2) Cytokinesis occurs through cell furrow formation.	Cytokinesis occurs through cell plate formation.

(iv) Colour blindness and haemophilia

(v)