ICSE 2024 EXAMINATION

BIOLOGY

SAMPLE PAPER - 2

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) Brain box refers to
(a) Meninges (b) Neuro motor junction (c) Cerebrum (d) Cranium

(ii) Loss of water as droplets from hydathodes is called :
(a) Transpiration (b) Bleeding (c) Guttation (d) Imbibition

(iii) The technical term for the fertilised egg is :
(a) Placenta (b) Zygote (c) Morula (d) Embryo

(iv) The photoreceptor cells of the retina sensitive to colour are :
(a) Cones (b) Rods (c) Organ of Corti (d) Cornea

(v) Exposure to ozone causes
(a) Tuberculosis (b) Poliomyelitis (c) Malaria (d) Skin cancer

(vi) The cerebral hemispheres in mammals are connected by:
(a) Corpus luteum (b) Hypothalamus (c) Pons varolii (d) Corpus callosum

(vii) Insulin is secreted by :
(a) Beta cells of pancreas (b) Alpha cells of pancreas
(c) Delta cells of pancreas (d) Both (a) & (b)

(viii) Theory of origin of species by Natural selection was proposed by
(a) Hugo de Vries (b) Charles Darvin
(c) Lamarck (d) Malthus

(ix) The development of embryo from a female gamete without fertilisation is called :
(a) Ovulation (b) Cloning (c) Embryogenesis (d) Parthenogenesis

(x) The stimulus for thigmotropism is
(a) Water (b) Gravity (c) Sunlight (d) Touch

(xi) The number of daughter cells formed at the end of meiosis from a diploid parent cell are
(a) 2 Haploid cells (b) 2 Diploid cells (c) 4 Haploid cells (d) 4 Diploid cells.

(xii) Which of the following is not a part of female reproductive system in human beings?
(a) Uterus (b) Ovary (c) Ureter (d) Fallopian tube

(xiii) The growth of the follicules occurs
(a) at the beginning of menstrual cycle (b) in the mid of menstrual cycle
(c) at the end of menstrual cycle (d) after the menstrual phase

(xiv) Phototrophic mode of nutrition requires:

(a) Chlorophyll (b) Sunlight (c) CO_2 and water (d) All the above

(xv) Plasmolysis occurs due to the process of

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

Question 2.

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

(a) The process of uptake of mineral ions against the concentration gradient using energy from cell

(b) The form in which glucose is stored in liver

(c) The vein that carries deoxygenated blood to the liver from intestines, pancreas and gallbladder

(d) The cross between two parents having one pair of contrasting characters

(e) The structure formed by the villi of the embryo and the uterus of the mother

(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) Destarched plant, iodine test, leaf washed in water, leaf boiled in alcohol

(b) Cyton, dendron, axon, axon endings

(c) Seminiferous tubule, penis, urethra, epididymis, vas deferens

(d) Pinna, cochlea, tympanum, ear ossicles, auditory canal

(e) Luteal phase, ovulatory phase, menstrual phase, follicular phase

(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. Associated with statistic body balance
(b) Stroma	2. Chordae tendinae
(c) Afferent nerve	3. Site of light reaction
(d) Prolactin	4. Motor neuron
(e) Saccules	5. SA node
	6. Stimulates production of milk by the mammary gland
	7. Site of dark reaction
	8. Transmits impulses from receptor organ to spinal cord

(iv) There are five sets consisting of five terms given below. In each set there is a word which is an odd one. For each of these sets, write down the category of the group having identified the odd one out.

(a) Blinking, Knitting without looking, Sneezing, Yawning, Crying

(b) Myopia, Cataract, Hypermetropia, Squint, Cretinism.

(c) Cowper's gland, Urethral gland, Lacrimal gland, Seminal vesicles, Prostrate gland

(d) Vasopression, Growth hormone, TSH, ACTH, FSH

(e) Newspaper, DDT, fruit peel, wood, straw

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

(a) Hydathodes (b) Leydig cells (c) Mitral valve (d) Sclera (e) Amnion

SECTION - B

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

Question 3.

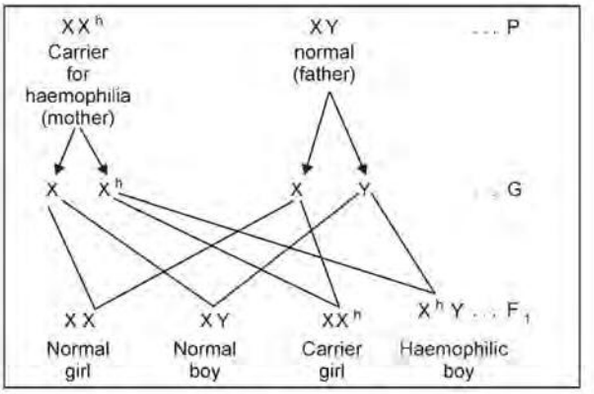
(i) Define Reflex action. **[1]**

(ii) How are RBCs different from WBCs in shape? **[2]**

(iii) How is the static balance of the body maintained? **[2]**

(iv) A closed can of dried seeds bursts open if some water enters it by accident. Give reason. **[2]**

(v) Following is the representation of a cross showing inheritance of haemophilia in human. Study the cross and answer the following : **[3]**



(a) What is the ratio of carrier and haemophilic offspring?

(b) What is the ratio of normal boy and haemophilic boy?

(c) What is the phenotypic ratio of normal and haemophilic offspring?

Question 4.

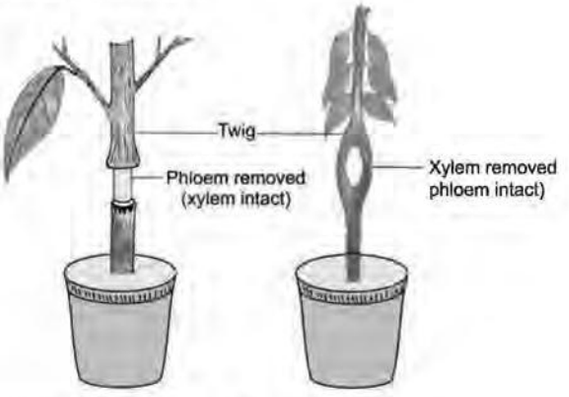
(i) Expand NADP. **[1]**

(ii) Name two types of transpiration other than stomatal transpiration in green plants. **[2]**

(iii) Why do men suffer from haemophilia and colour blindness ? Under what conditions do women suffer from these disorders ? **[2]**

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

(v) The following diagram shows an experimental set up to demonstrate a physiological process going on in plants. Observe and answer the following questions : **[3]**



(a) What is this experiment popularly known as?

(b) Which physiological process has been shown to occur in the above set up?

(c) Name the tissue responsible for the upward movement of water and mineral salts.

Question 5.

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

(ii) Differentiate between ACTH and FSH. **[2]**

(iii) Give the functions of stomata. **[2]**

(iv) What is the role of chlorophyll in photosynthesis? Explain. **[2]**

(v) Draw a well labelled diagram showing vertical section of excretory system of human being. **[3]**

Question 6.

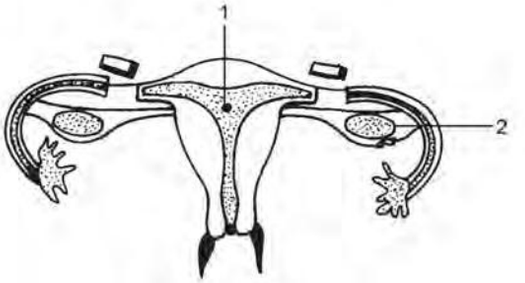
(i) Define Blind spot. **[1]**

(ii) Why is pituitary gland called the "master gland"? **[2]**

(iii) Differentiate between dendrite and axon. **[2]**

(iv) Meiosis I is called reduction division. Give reason. **[2]**

(v) Look at the given diagram of female reproductive system and answer the given questions. **[3]**



(a) Name the parts (1) and (2).

(b) Name the structure that is being cut and tied.

(c) Name the process shown in picture.

Question 7.

(i) Define osmotic pressure. **[1]**

(ii) What does Montreal Protocol refer to? Give a brief. **[2]**

(iii) How is poverty related to population? **[2]**

(iv) Give two points of differences between G1 and G2 phase. **[2]**

(v) Draw a neat diagram of a stomatal aperture and label on it – Guard cell, stomatal pore, Nucleus. **[3]**

Question 8.

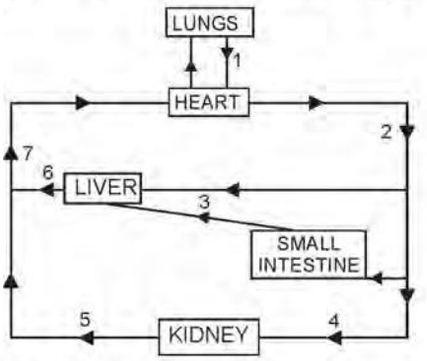
(i) Define Double circulation. **[1]**

(ii) Differentiate between rod cells and cone cells of retina. **[2]**

(iii) Leaflets of "Touch-me-not" plant-droops down on touching. Give reason. **[2]**

(iv) Give two effective measures to control air pollution. **[2]**

(v) The diagram given below represents circulation in the human body. Answer the questions that follow: **[3]**



(a) Name the blood vessels labelled 1 and 6.

(b) Name the blood vessel that supplies nutrient-rich blood to the liver.

(c) Mention one structural difference between blood vessels numbered 4 and 5.

SOLUTION

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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) Brain box refers to

(a) Meninges (b) Neuro motor junction (c) Cerebrum (d) Cranium

Ans. (d) Cranium

(ii) Loss of water as droplets from hydathodes is called :

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

Ans. (c) Guttation

(iii) The technical term for the fertilised egg is :

(a) Placenta (b) Zygote (c) Morula (d) Embryo

Ans. (b) Zygote

(iv) The photoreceptor cells of the retina sensitive to colour are :

(a) Cones (b) Rods (c) Organ of Corti (d) Cornea

Ans. (a) Cones

(v) Exposure to ozone causes

(a) Tuberculosis (b) Poliomyelitis (c) Malaria (d) Skin cancer

Ans. (d) Skin cancer

(vi) The cerebral hemispheres in mammals are connected by:

(a) Corpus luteum (b) Hypothalamus (c) Pons varolii (d) Corpus callosum

Ans. (d) Corpus callosum

(vii) Insulin is secreted by :

(a) Beta cells of pancreas (b) Alpha cells of pancreas
(c) Delta cells of pancreas (d) Both (a) & (b)

Ans. (a) Beta cells of pancreas

(viii) Theory of origin of species by Natural selection was proposed by

(a) Hugo de Vries (b) Charles Darwin
(c) Lamarck (d) Malthus

Ans. (b) Charles Darwin

(ix) Hormones play a major role in the sustenance of pregnancy. Which specific hormonal disruptions during pregnancy can contribute to the occurrence of miscarriages?

(a) Degeneration of corpus luteum at earlier stage (b) Increased level of estrogen
(c) Increased secretion of progesterone (d) Increased thickness of uterus lining

Ans. (a) Degeneration of corpus luteum at earlier stage

(x) The stimulus for thigmotropism is

(a) Water (b) Gravity (c) Sunlight (d) Touch

Ans. (d) Touch

(xi) The number of daughter cells formed at the end of meiosis from a diploid parent cell are

(a) 2 Haploid cells (b) 2 Diploid cells (c) 4 Haploid cells (d) 4 Diploid cells.

Ans. (c) 4 Haploid cells

(xii) Which of the following is not a part of female reproductive system in human beings?

(a) Uterus (b) Ovary (c) Ureter (d) Fallopian tube

Ans. (c) Ureter

(xiii) Assertion (A): Decreased level of progesterone ruptures the uterine lining during menstrual cycle.
Reason (R) : Ovum is released from the ovary during secretory phase of menstrual cycle.

(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

(xiv) Phototrophic mode of nutrition requires:

(a) Chlorophyll (b) Sunlight (c) CO_2 and water (d) All the above

Ans. (d) All the above

(xv) Gibberellins are acidic plant hormones which produce a wide range of physiological effects in plants. Among the listed options, identify the functions of gibberellins in plants.

1- Bolting 2- Inhibit parthenocarpy and stem elongation
3- Promotes flowering and germination 4- Breaks seed dormancy

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

Ans. (c) 1, 3 and 4

Question 2.

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

(a) The process of uptake of mineral ions against the concentration gradient using energy from cell
(b) The form in which glucose is stored in liver
(c) The vein that carries deoxygenated blood to the liver from intestines, pancreas and gallbladder
(d) The cross between two parents having one pair of contrasting characters
(e) The structure formed by the villi of the embryo and the uterus of the mother

Ans. (a) Active transport (b) Glycogen (c) Hepatic portal vein
(d) Monohybrid cross (e) Placenta

(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) Destarched plant, iodine test, leaf washed in water, leaf boiled in alcohol
(b) Cyton, dendron, axon, axon endings
(c) Seminiferous tubule, penis, urethra, epididymis, vas deferens
(d) Pinna, cochlea, tympanum, ear ossicles, auditory canal
(e) Luteal phase, ovulatory phase, menstrual phase, follicular phase

Ans. (a) Destarched plant, leaf boiled in alcohol, leaf washed in water, iodine test

(b) Dendron, cyton, axon, axon ending

(c) Seminiferous tubule, epididymis, vas deferens, penis, urethra

(d) Pinna, auditory canal, tympanum, ear ossicles, cochlea

(e) Menstrual phase, follicular phase, ovulatory phase, luteal phase

(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. Associated with statistic body balance
(b) Stroma	2. Chordae tendinae
(c) Afferent nerve	3. Site of light reaction
(d) Prolactin	4. Motor neuron
(e) Saccules	5. SA node
	6. Stimulates production of milk by the mammary gland
	7. Site of dark reaction
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Ans. (a) Pacemaker — 5. S A node

(b) Stroma — 7. Site of dark reaction

(c) Afferent nerve — 8. Transmits impulses from receptor organ to spinal cord

(d) Prolactin — 6. Stimulates production of milk by the mammary gland

(e) Saccules — 1. Associated with statistic body balance

(iv) There are five sets consisting of five terms given below. In each set there is a word which is an odd one. For each of these sets, write down the category of the group having identified the odd one out.

(a) Blinking, Knitting without looking, Sneezing, Yawning, Crying

(b) Myopia, Cataract, Hypermetropia, Squint, Cretinism.

(c) Cowper's gland, Urethral gland, Lacrimal gland, Seminal vesicles, Prostrate gland

(d) Vasopression, Growth hormone, TSH, ACTH, FSH

(e) Newspaper, DDT, fruit peel, wood, straw

Ans.

S.No.	Category	Odd one
(a)	Simple reflexes	Knitting without looking
(b)	Eye defects	Cretinism
(c)	Reproductive glands	Lacrimal gland
(d)	Hormones of anterior pituitary	Vasopressin
(e)	Biodegradable waste	DDT

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

(a) Hydathodes (b) Leydig cells (c) Mitral valve (d) Sclera

(e) Amnion

Ans. (a) Hydathodes are found on the leaf margins of some plants.

(b) Leydig cells are located around seminiferous tubules in the testes.

(c) Mitral valve is found between the left atrium and left ventricle of the heart.

(d) Schera is the white front portion of the eye.

(e) Amnion is a layer found within the amniotic cavity in which foetus develops.

SECTION - B

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

Question 3.

(i) Define Reflex action. **[1]**

(ii) How are RBCs different from WBCs in shape? **[2]**

(iii) How is the static balance of the body maintained? **[2]**

(iv) A closed can of dried seeds bursts open if some water enters it by accident. Give reason. **[2]**

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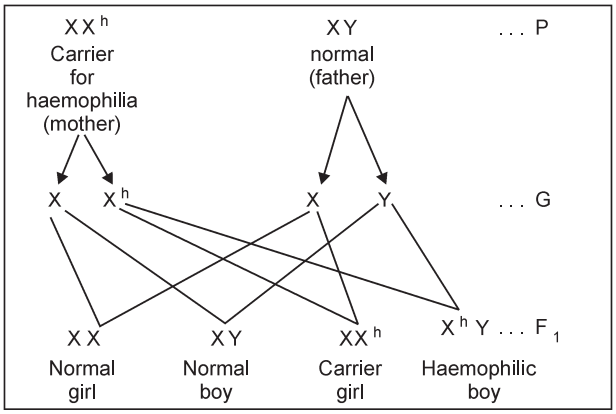


(a) What is the ratio of carrier and haemophilic offspring?

(b) What is the ratio of normal boy and haemophilic boy?

(c) What is the phenotypic ratio of normal and haemophilic offspring?

Ans.

(i) A reflex action is a sudden and involuntary response to stimuli. It helps an organism to quickly adapt to the adverse circumstances.

(ii)

RBC	WBC
RBCs (Red Blood Cells) are minute biconcave disc-like structures, flat in the centre and thick rounded at the periphery.	Most of the WBCs (White Blood cells) are amoeboid in shape.

(iii) The inner ear plays a crucial role in maintaining static balance by detecting the position and movement of the head in relation to gravity. This is achieved through the otolith organs, which sense linear acceleration and gravity, and the semicircular canals, which sense rotational movement.

(iv) A closed can of dried seeds can burst open if water enters accidentally. When the seeds come in contact with water, they absorb it and begin to swell. As a result, the internal pressure within the can increases, and if it exceeds the strength of the can, it can lead to bursting open of the can.

(v) (a) 1 : 1

(b) 1 : 1

(c) 3 : 1

Question 4.

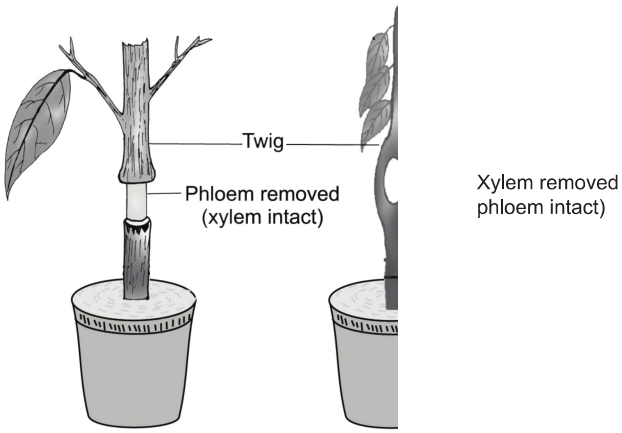
(i) Expand NADP. **[1]**

(ii) Name two types of transpiration other than stomatal transpiration in green plants. **[2]**

(iii) Why do men suffer from haemophilia and colour blindness? Under what conditions do women suffer from these disorders? **[2]**

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

(v) The following diagram shows an experimental set up to demonstrate a physiological process going on in plants. Observe and answer the following questions : **[3]**



(a) What is this experiment popularly known as?

(b) Which physiological process has been shown to occur in the above set up?

(c) Name the tissue responsible for the upward movement of water and mineral salts.

Ans.

(i) NADP – Nicotinamide Adenine Dinucleotide Phosphate

(ii) - Lenticular transpiration
- Cuticular transpiration

(iii) Haemophilia and colour blindness are sex-linked disorders, caused by recessive genes located on X-chromosome. These disorders occur more frequently in men because males are heterozygous for the defect. They have one X-chromosome and one Y-chromosome. Y- chromosome does not carry alleles for these traits, therefore the recessive genes are able to express even in single dose.

(iv) The process like photosynthesis depends on more than one variable external factors and 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, the photosynthesis rate will be determined by light intensity. Hence, the rate of photosynthesis would get lowered.

(v) (a) Ringing or girdling experiment

(b) Ascent of sap

(c) Xylem

Question 5.

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

(ii) Differentiate between ACTH and FSH. **[2]**

(iii) Give the functions of stomata. **[2]**

(iv) What is the role of chlorophyll in photosynthesis? Explain. **[2]**

(v) Draw a well labelled diagram showing vertical section of excretory system of human being. **[3]**

Ans.

(i) The process of formation of energy-rich compound ATP (Adenosine triphosphate) from ADP (Adenosine diphosphate) and inorganic phosphate by utilising light energy is called photophosphorylation.

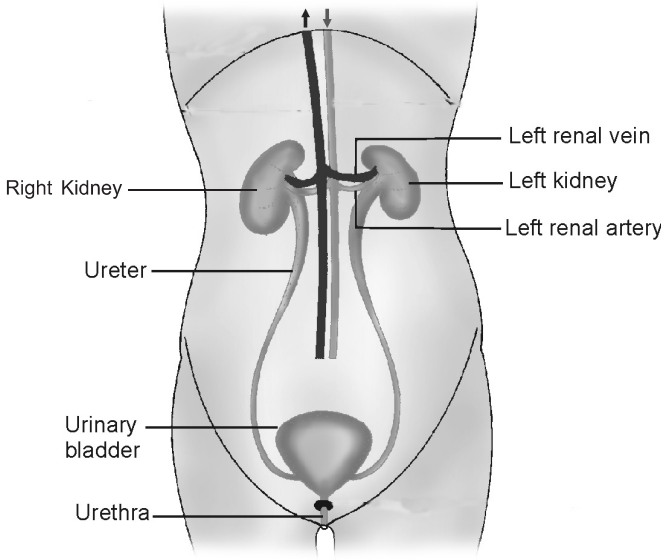
(ii) **ACTH —** It is secreted from adrenal gland and it stimulates adrenal cortex to secrete glucocorticoid and mineralocorticoid hormones.

FSH — It is secreted from anterior pituitary. It stimulates egg formation in females and sperm formation in males.

(iii) Stomata help in transpiration and exchange of gases. They help intake of CO_2 and release of O_2 during photosynthesis by opening and closing of guard cells.

(iv) The chlorophyll molecule traps the solar energy and converts it into chemical energy which is stored in the form of ATP molecules and reducing substance $NADPH_2$ (reduced form of Nicotinamide Adenine Dinucleotide Phosphate).

(v) Excretory System of Human



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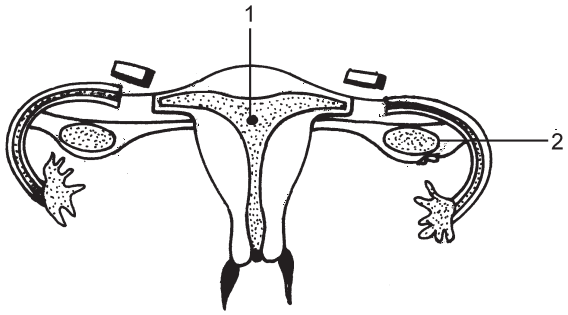
(i) Define Blind spot. **[1]**

(ii) Why is pituitary gland called the "master gland"? **[2]**

(iii) Differentiate between dendrite and axon. **[2]**

(iv) Meiosis I is called reduction division. Give reason. **[2]**

(v) Look at the given diagram of female reproductive system and answer the given questions. **[3]**



(a) Name the parts (1) and (2).

(b) Name the structure that is being cut and tied.

(c) Name the process shown in picture.

Ans.

(i) The point on retina that is devoid of receptor cells is called blind spot. Optic nerve fibres arise from blind spot and no image is formed at it.

(ii) The pituitary gland is referred to as the 'master gland' because the activities and secretions of other endocrine glands are under the influence of secretions of the pituitary gland. Nearly 50,000 nerve fibres enter this fragment of tissue, and an enormously rich blood supply carries its hormones to rest of the body.

(iii) **Dendrite :** These are short, much branched processes that conduct nerve impulse toward the cell body.

Axon : It is a single, long process of uniform thickness. It conducts impulse away from the cell body.

(iv) In the first meiotic division, the reduction in chromosome number takes place. Here, number of chromosomes reduced to half. Thus, it is called reduction division.

(v) (a) (1) Uterus (2) Ovary

(b) Oviduct/Fallopian tube

(c) Tubectomy

Question 7.

(i) Define osmotic pressure. **[1]**

(ii) What does Montreal Protocol refer to? Give a brief. **[2]**

(iii) How is poverty related to population? **[2]**

(iv) Give two points of differences between G1 and G2 phase. **[2]**

(v) Draw a neat diagram of a stomatal aperture and label on it – Guard cell, stomatal pore, Nucleus. **[3]**

Ans.

(i) Osmotic pressure is the hydrostatic pressure which balances and prevents the osmotic inflow of water into concentrated solution.

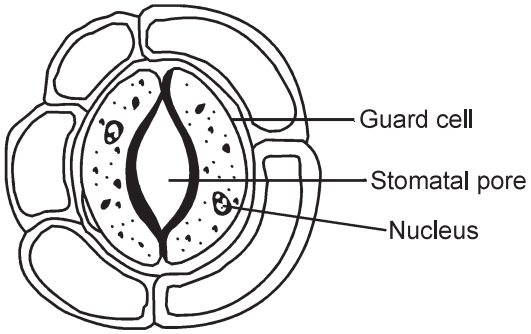
(ii) Montreal Protocol is a landmark international agreement to
(i) freeze CFCs production at the 1986 levels, (ii) phase out the use of ozone depleting substances, (iii) help the developing countries to implement the use of alternatives to CFCs.

(iii) Rapid population growth is likely to reduce the economic growth and well being of the people of that area. It also increases the pressure on ration, land and health facilities. As a result it tends to increased poverty.

(iv)

G1 phase	G2 phase
It is the first sub stage of interphase.	It is the first sub stage of interphase.
It proceeds to S phase.	It proceeds to mitotic phase.

(v)



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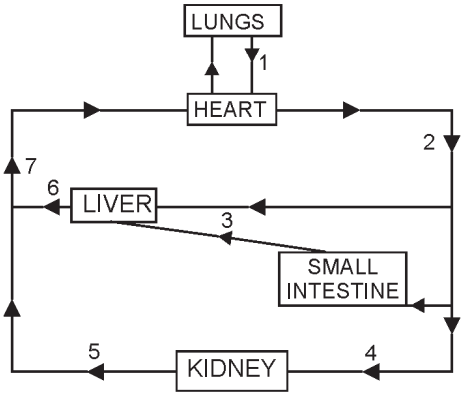
(i) Define Double circulation. **[1]**

(ii) Differentiate between rod cells and cone cells of retina. **[2]**

(iii) Leaflets of "Touch-me-not" plant-droops down on touching. Give reason. **[2]**

(iv) Give two effective measures to control air pollution. **[2]**

(v) The diagram given below represents circulation in the human body. Answer the questions that follow: **[3]**



(a) Name the blood vessels labelled 1 and 6.

(b) Name the blood vessel that supplies nutrient-rich blood to the liver.

(c) Mention one structural difference between blood vessels numbered 4 and 5.

Ans.

(i) Double circulation : The type of circulatory system in mammals, in which the blood passes through the heart twice before completing a full circuit of the body, is called double circulation.

(ii) Rod cells : These are the sensory cells of the retina of our eye which are sensitive to dim light and important for night vision. They have a pigment called rhodopsin.

Cone cells : These are the sensory cells of the retina of our eye which are sensitive to bright light and responsible for colour vision. They have pigment called iodopsin.

(iii) If any leaflet of touch me not plant is touched, stimulus of touch leads to loss of turgor pressure at the base of the leaflets and petioles. Thus, it folds up and within two to three seconds, the entire leaf droops.

(iv) ı Air pollution can be controlled by preventing the burning of wastes and using electrostatic precipitators in industries.

ı Strict laws formulated by the government to regulate the emission.

(v) (a) 1. Pulmonary vein 6. Hepatic vein

(b) Hepatic portal vein

(c) Renal artery (4) has thick, elastic and muscular wall while renal vein (5) has thin, less muscular wall and wide lumen.