ICSE 2024 EXAMINATION

BIOLOGY

SAMPLE PAPER - 7

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]**

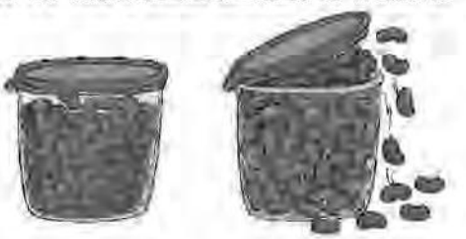
(i) Lymph has :
(a) RBCs and platelets (b) red colour
(c) only WBCs (d) more proteins and calcium than blood

(ii) The largest detoxifying gland present in our body is :
(a) pituitary (b) thyroid (c) liver (d) sweat gland

(iii) Which of the following is responsible for controlling body temperature?
(a) Liver (b) Spinal cord (c) Lungs (d) Hypothalamus

(iv) Dwarfism is due to :
(a) hyposecretion of thyroxine (b) hyposecretion of growth hormone
(c) hypersecretion of thyroxine (d) hyposecretion of growth hormone

(v) In the figure it is showing that the jar is packed with dry kidney beans. If we add a small amount of water to it and put the lid firmly, then after 5-6 hours, the jar burst open with a force. This force is called



(a) Osmotic pressure (b) Turgor pressure
(c) Imbibition pressure (d) Wall pressure

(vi) One of the example of radiation pollutants is :
(a) Sulphur dioxide (b) Ozone
(c) Iodine-131 (d) Fused electric bulbs

(vii) Antiserum contains :
(a) antibodies (b) platelets (c) antigens (d) WBCs

(viii) *Homo sapiens* are characterised by all the listed features, except
(a) Development of chin (b) Bipedal locomotion
(c) Increased size of canines (d) Increased cranial capacity

(ix) The pre human ancestor was :
(a) Ramapithecus (b) Australopithecus (c) cro-magnon (d) Neanderthal man

(x) The 3 carbon compound stable product of photosynthesis is :
(a) glucose (b) ribose
(c) phosphoglyceric acid (d) ribulose diphosphate

(xi) The blood cell which helps in blood clotting is :

(a) RBC (b) WBC (c) Platelet (d) Plasma

(xii) In humans, osmoregulation is associated with :

(a) Urinary bladder (b) Liver (c) Kidney (d) Blood

(xiii) In a dihybrid cross, 9 : 3 : 3 : 1 ratio appears due to

(a) crossing ever (b) independent assortment

(c) segregation (d) linkage

(xiv) Astigmatism can be corrected by :

(a) concave lens (b) convex lens (c) cylindrical lens (d) both a and c

(xv) Pituitary gland regulates urine formation through :

(a) oxytocin (b) TSH (c) ACTH (d) ADH

Question 2.

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

(a) The shortest route that can be taken by an impulse from receptor to an effector

(b) The waxy layer on the epidermis of the leaf

(c) A non-biodegradable pesticide

(d) The physical expression of genes in an individual

(e) Knot-like mass of blood capillaries inside the Bowman's capsule

(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) Tonsils, Spleen, Thymus gland, Mucous membrane

(b) Implantation, Parturition, Ovulation, Gestation, Fertilisation

(c) Oval window, Tympanum, Cochlea, Auditory canal, Ear ossicles

(d) Karyokinesis, S-phase, Cytokinesis, G1-phase, G2-phase

(e) Renal vein, Renal artery, Afferent arteriole, Efferent arteriole, Glomerulus

(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
(1) Vasopressin	(a) Kidney
(2) Photosynthesis	(b) Root pressure
(3) Guttation	(c) Prostate gland
(4) Clotting of blood	(d) Iron
(5) Uriniferous tubule	(e) Diabetes insipidus
	(f) Green plants
	(g) Thyroid gland
	(h) Calcium

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

(a) Acid rain, Dust, Pollens, Fog

(b) Saliva, Bile, Sweat, Pancreatic juice
(c) Cretinism, Myxedema, Simple goitre, Acromegaly
(d) Sneezing, Coughing, Blinking, Typing
(e) Semicircular canals, Cochlea, Tympanum, Utriculus

(v) State the exact location of the following : [5]
(a) Chlorophyll
(b) Incus
(c) Corpus callosum
(d) Guard cells
(e) Pulmonary semilunar valve

SECTION - B

(Attempt any four questions from this Section.)

Question 3.

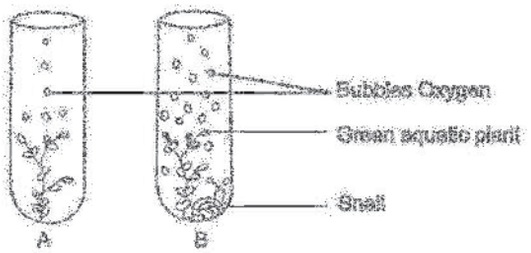
(i) Define transpiration. [1]

(ii) What is the significance of amniotic fluid? [2]

(iii) What is the function of ear ossicles? [2]

(iv) Differentiate between diffusion and osmosis. [2]

(v) *The diagram below shows two test-tubes A and B. Test-tube A contains a green aquatic plant. Test-tube B contains both a green aquatic plant and a snail. Both test-tubes are kept in sunlight. Answer the questions that follow :* [3]



(a) Name the physiological process that releases the bubbles of oxygen.
(b) What is the purpose of keeping a snail in test-tube 'B'?
(c) Give an example of aquatic plant that can be used in the above experiment.

(iv)

Diffusion	Osmosis
Diffusion is the free movement of molecules of a substance from the region of their higher concentration to the region of their lower concentration.	Osmosis is the diffusion of water molecules across a semi-permeable membrane from the region of higher concentration to its lower concentration.

(v) (a) Photosynthesis
(b) The snail kept in test-tube B breathe out CO_2. This CO_2 is utilised by the green plant for photosynthesis.
(c) *Hydrilla*

Question 4.

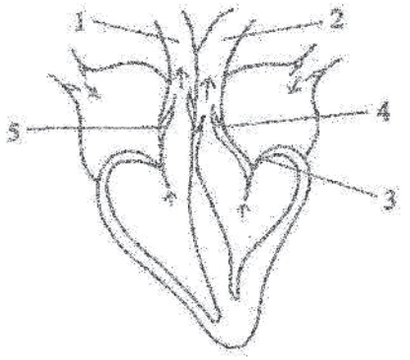
(i) Expand FSH. [1]

(ii) State the difference between Darwinism and Lamarckism. [2]

(iii) Why is it necessary to have fluids in and around many organs in human body? [2]

(iv) What are the excretory products in humans? [2]

(v) The diagram below represents the human heart in one phase of its functions. Study the diagram carefully and answer the questions that follow : [3]



(a) Name the phase.

(b) Which part of the heart is contracting in this phase?

(c) Label 1 and 2. What type of blood flows through '2'?

Question 5.

(i) Explain the term – Natality. [1]

(ii) Differentiate between turgor pressure and wall pressure. [2]

(iii) A person after consuming alcohol walks clumsily. Give reason. [2]

(iv) State the main function of chordae tendinae. [2]

(v) Draw a neat diagram of the human sperm as seen under high magnification and label the following parts. [3]

(1) Acrosome (2) Mitochondria

Write the function of acrosome.

Question 6.

(i) Define tropism. [1]

(ii) Carbon monoxide is highly dangerous when inhaled. Explain. [2]

(iii) Give one example of each – thigmotropism and hydrotropism. [2]

(iv) Give the dihybrid phenotypic ratio and the phenotype of the offspring of F_2 generation when two plants of the F_1 (RrYy) generation are crossed. [2]

(v) The diagram given below is an experiment conducted to study a factor necessary for Photosynthesis. Observe the diagrams and then answer the following questions : [3]

(a) What is the aim of the experiment? What type of leaf is shown in the diagram?

(b) Name the test performed on the leaf and the solution used for test.

(c) Give examples of two plants with such leaves shown in the diagram.

Question 7.

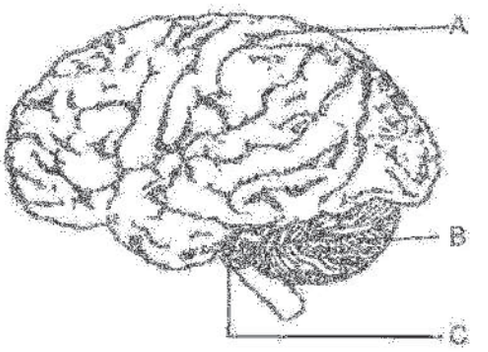
(i) What is semen? [1]

(ii) List two advantages of a small family. [2]

(iii) Differentiate between sex chromosomes and autosomes. [2]

(iv) Mention two points of difference between Mitosis and Meiosis. [2]

(v) The diagram shows a section of the human brain. [3]



Answer the questions that follow :

(a) Name the parts labelled A and B.

(b) Give the main function of part C.

(c) Name the basic unit of the brain.

Question 8.

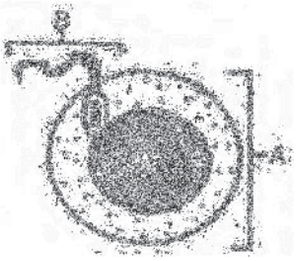
(i) Define Mutation. [1]

(ii) Give a brief of stress hormone of plants. [2]

(iii) Twins may or may not be identical. Give reason. [2]

(iv) Differentiate between myopia and hypermetropia. [2]

(v) The diagram given below represents two reproductive cells A and B. Study the same and then answer the questions that follow : [3]



(a) Identify the reproductive cells A and B.

(b) Where in the female reproductive system do these cells unite?

(c) What is the genetic composition of A and B?

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) :

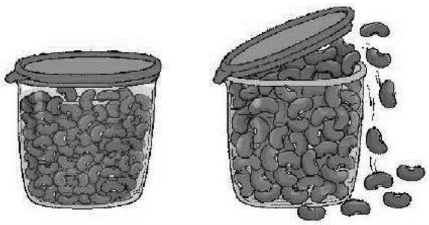
(i) Lymph has :
(a) RBCs and platelets (b) red colour
(c) only WBCs (d) more proteins and calcium than blood
Ans. (c) Only WBCs

(ii) The sperm cell of a buffalo contains 30 sperms. How many chromosomes will be found in the skin cell of the buffalo?
(a) 30 (b) 15 (c) 60 (d) 90
Ans. (c) 60

(iii) Which of the following is responsible for controlling body temperature?
(a) Liver (b) Spinal cord (c) Lungs (d) Hypothalamus
Ans. (d) Hypothalamus

(iv) Assertion (A): Thyroxine hormone controls tissue metabolism and growth.
Reason (R): Secretion of thyroxine hormone is regulated by pituitary gland.
(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

(v) In the figure it is showing that the jar is packed with dry kidney beans. If we add a small amount of water to it and put the lid firmly, then after 5-6 hours, the jar burst open with a force. This force is called



(a) Osmotic pressure (b) Turgor pressure
(c) Imbibition pressure (d) Wall pressure
Ans. (c) Imbibition pressure

(vi) One of the example of radiation pollutants is :
(a) Sulphur dioxide (b) Ozone (c) Iodine-131 (d) Fused electric bulbs
Ans. (c) Iodine-131

(vii) Antiserum contains :
(a) antibodies (b) platelets (c) antigens (d) WBCs
Ans. (a) antibodies

(viii) *Homo sapiens* are characterised by all the listed features, except
(a) Development of chin (b) Bipedal locomotion

(c) Increased size of canines (d) Increased cranial capacity

Ans. (c) Increased size of canines.

(ix) The pre human ancestor was :

(a) Ramapithecus (b) Australopithecus (c) cro-magnon (d) Neanderthal man

Ans. (b) Australopithecus

(x) The 3 carbon compound stable product of photosynthesis is :

(a) glucose (b) ribose

(c) phosphoglyceric acid (d) ribulose diphosphate

Ans. (c) phosphoglyceric acid

(xi) The blood cell which helps in blood clotting is :

(a) RBC (b) WBC (c) Platelet (d) Plasma

Ans. (c) Platelet

(xii) The human heart contains a network of blood vessels that supply oxygen and nutrients to its own muscle tissue, ensuring its proper functioning. These vessels are exclusively designed to carry either oxygenated or deoxygenated blood. Among the listed blood vessels, identify those which carry oxygenated blood only.

1- Pulmonary artery 2- Hepatic artery 3- Pulmonary vein 4- Vena cava

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

Ans. (c) 2 and 3

(xiii) In a dihybrid cross, 9 : 3 : 3 : 1 ratio appears due to

(a) crossing ever (b) independent assortment

(c) segregation (d) linkage

Ans. (b) independent assortment

(xiv) Astigmatism can be corrected by :

(a) concave lens (b) convex lens (c) cylindrical lens (d) both a and c

Ans. (c) cylindrical lens

(xv) Pituitary gland regulates urine formation through :

(a) oxytocin (b) TSH (c) ACTH (d) ADH

Ans. (d) ADH

Question 2.

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

(a) The shortest route that can be taken by an impulse from receptor to an effector

(b) The waxy layer on the epidermis of the leaf

(c) A non-biodegradable pesticide

(d) The physical expression of genes in an individual

(e) Knot-like mass of blood capillaries inside the Bowman's capsule

Ans. (a) Reflex arc (b) Cuticle (c) DDT (d) Phenotype (e) Glomerulus

(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) Tonsils, Spleen, Thymus gland, <u>Mucous membrane</u>

(b) Implantation, Parturition, <u>Ovulation</u>, Gestation, Fertilisation

(c) Oval window, Tympanum, Cochlea, <u>Auditory canal</u>, Ear ossicles

(d) Karyokinesis, S-phase, Cytokinesis, <u>G1-phase</u>, G2-phase

(e) Renal vein, <u>Renal artery</u>, Afferent arteriole, Efferent arteriole, Glomerulus

Ans. (a) Mucous membrane, Tonsils, Thymus gland, Spleen

(b) Ovulation, Fertilisation, Implantation, Gestation, Parturition

(c) Auditory canal, Tympanum, Ear ossicles, Oval window, Cochlea
(d) G1-phase, S-phase, G2-phase, Karyokinesis, Cytokinesis
(e) Renal artery, Afferent arteriole, Glomerulus, Efferent arteriole, Renal vein

(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
(1) Vasopressin	(a) Kidney
(2) Photosynthesis	(b) Root pressure
(3) Guttation	(c) Prostate gland
(4) Clotting of blood	(d) Iron
(5) Uriniferous tubule	(e) Diabetes insipidus
	(f) Green plants
	(g) Thyroid gland
	(h) Calcium

Ans.
(1) Vasopressin — (e) Diabetes insipidus
(2) Photosynthesis — (f) Green plants
(3) Guttation — (b) Root pressure
(4) Clotting of blood — (h) Calcium
(5) Uriniferous tubule — (a) Kidney

(iv) Choose the odd one out from the following terms and name the category to which the others belong: **[5]**
(a) Acid rain, Dust, Pollens, Fog
(b) Saliva, Bile, Sweat, Pancreatic juice
(c) Cretinism, Myxedema, Simple goitre, Acromegaly
(d) Sneezing, Coughing, Blinking, Typing
(e) Semicircular canals, Cochlea, Tympanum, Utriculus

Ans.
(a) **Odd term** — Acid rain
Category — Air Pollutants
(b) **Odd term —** Sweat
Category — Digestive juices
(c) **Odd term —** Acromegaly
Category — Thyroid gland malfunction diseases
(d) **Odd term —** Typing
Category — Unconditioned reflex actions
(e) **Odd term —** Tympanum
Category — Parts of inner ear

(v) State the exact location of the following : **[5]**
(a) Chlorophyll
(b) Incus
(c) Corpus callosum
(d) Guard cells
(e) Pulmonary semilunar valve

Ans. (a) In the walls of thylakoids of chloroplast.

(b) In-between the bony ossicles malleus and stapes in middle ear of humans.

(c) Corpus callosum is found in-between the left and right cerebral hemispheres of cerebrum in human brain.

(d) In the wall bordering the pore of stomatal aperture.

(e) At the opening of the right ventricle into the pulmonary artery.

SECTION - B

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

Question 3.

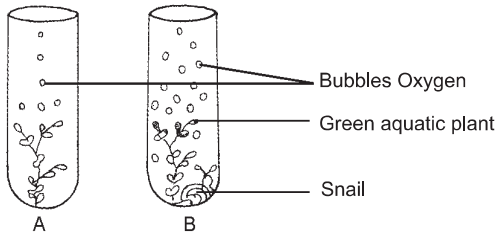
(i) Define transpiration. **[1]**

(ii) What is the significance of amniotic fluid? **[2]**

(iii) What is the function of ear ossicles? **[2]**

(iv) Differentiate between diffusion and osmosis. **[2]**

(v) *The diagram below shows two test-tubes A and B. Test-tube A contains a green aquatic plant. Test-tube B contains both a green aquatic plant and a snail. Both test-tubes are kept in sunlight. Answer the questions that follow:* **[3]**



(a) Name the physiological process that releases the bubbles of oxygen.

(b) What is the purpose of keeping a snail in test-tube 'B'?

(c) Give an example of aquatic plant that can be used in the above experiment.

Ans.

(i) Transpiration is the loss of water from the aerial parts of the plant. All plants continuously absorb water through their roots. More than 90% of this water is lost to the atmosphere as water vapour during transpiration.

(ii) Amniotic fluid protects the embryo from physical damage by shocks or jerks, prevents sticking of the foetus to the amnion, and allows the foetus to carry out some movement.

(iii) Ear ossicles transmit vibrations from the tympanum across the middle ear to oval window, which transfers them to the inner ear.

(iv)

Diffusion	Osmosis
Diffusion is the free movement of molecules of a substance from the region of their higher concentration to the region of their lower concentration.	Osmosis is the diffusion of water molecules across a semi-permeable membrane from the region of higher concentration to its lower concentration.

(v) (a) Photosynthesis

(b) The snail kept in test-tube B breathe out CO_2. This CO_2 is utilised by the green plant for photosynthesis.

(c) *Hydrilla*

Question 4.

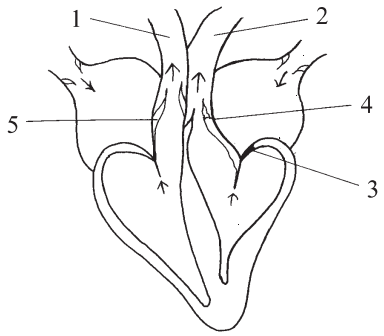
(i) Expand FSH. **[1]**

(ii) State the difference between Darwinism and Lamarckism. **[2]**

(iii) Why is it necessary to have fluids in and around many organs in human body? **[2]**

(iv) What are the excretory products in humans? **[2]**

(v) The diagram below represents the human heart in one phase of its functions. Study the diagram carefully and answer the questions that follow : **[3]**



(a) Name the phase.

(b) Which part of the heart is contracting in this phase?

(c) Label 1 and 2. What type of blood flows through '2'?

Ans.

(i) FSH – Follicle Stimulating Hormone

(ii)

Darwinism	Lamarckism
This theory discredits the Internal Vital Force theory.	Lamarckism strongly builds on the notion of Internal Vital Force in organisms.
Development or disappearance of an organ happens due to continuous variations.	From an evolutionary perspective, organs develop if they are constantly used. If unused, it could disappear.
Darwinism emphasises the struggle for existence.	Lamarckism discredits the struggle for existence.
Only useful variations are transferred the succeeding generation.	All acquired traits are transferred to the next generation.

(iii) Fluid in and around the organs give them protection from friction and infection. It helps in exchange of respiratory gases. The fluid also helps in the regulation of temperature and maintains homeostasis of the body by regulating fluid balance.

(iv) The excretory products in humans include :

(i) Carbon dioxide and water from respiration

(ii) Nitrogenous compounds such as ammonia, urea and uric acid from the breakdown of excess amino acids.

(iii) Bile pigments from the breakdown of haemoglobin of RBCs.

(iv) Excess salts and vitamins.

(v) (a) Ventricular systole

(b) Ventricles or ventricular muscles are contracting in this phase.

(c) 1 – pulmonary artery

2 – Aorta

Through aorta (2), oxygenated or pure blood flows from left ventricle to the whole body.

Question 5.

(i) Explain the term – Natality. **[1]**

(ii) Differentiate between turgor pressure and wall pressure. **[2]**

(iii) A person after consuming alcohol walks clumsily. Give reason. **[2]**

(iv) State the main function of chordae tendinae. **[2]**

(v) Draw a neat diagram of the human sperm as seen under high magnification and label the following parts. **[3]**

(1) Acrosome (2) Mitochondria

Write the function of acrosome.

Ans.

(i) Natality (Birth rate) : Natality is the number of births per 1000 individuals in the population per year.

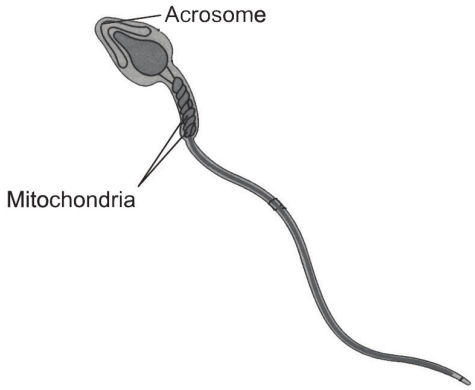
(ii)

Turgor pressure	Wall pressure
Turgor pressure pushes the plasma membrane against the cell wall.	It is the pressure exerted on the contents of a plant cell by the cell wall that is equal but opposite in direction to turgor pressure.

(iii) A person after consuming alcohol walk clumsily because alcohol affects the transmission of impulses across the pons varolii connecting the two lobes of cerebellum. As a result, cerebellum fails to coordinate muscular movement in humans.

(iv) Chordae tendinae connect the papillary muscles to the tricuspid valve and the mitral valve in the heart thereby, prevents turning up of the flaps of the heart valves.

(v) Human sperm



Acrosome helps the sperm to penetrate the egg's coat.

Question 6.

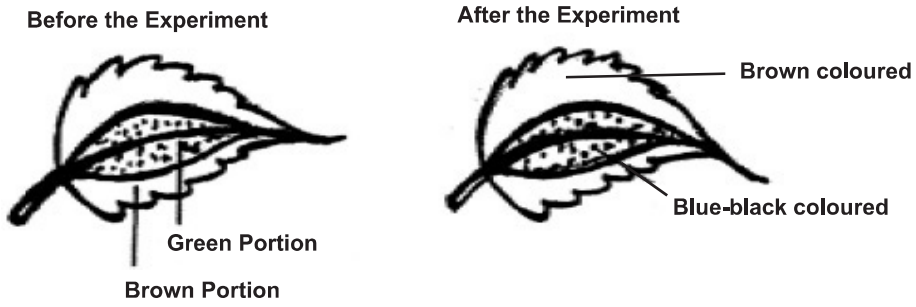
(i) Define tropism. **[1]**

(ii) Carbon monoxide is highly dangerous when inhaled. Explain. **[2]**

(iii) Give one example of each – thigmotropism and hydrotropism. **[2]**

(iv) Give the dihybrid phenotypic ratio and the phenotype of the offspring of F_2 generation when two plants of the F_1 (RrYy) generation are crossed. **[2]**

(v) The diagram given below is an experiment conducted to study a factor necessary for Photosynthesis. Observe the diagrams and then answer the following questions : **[3]**



(a) What is the aim of the experiment? What type of leaf is shown in the diagram?

(b) Name the test performed on the leaf and the solution used for test.

(c) Give examples of two plants with such leaves shown in the diagram.

Ans.

(i) The directional growth of a plant organ in response to an external stimulus such as light, touch or gravity is called tropism or tropic movement.

(ii) Carbon monoxide reduces the oxygen carrying capacity of blood. So when CO is inhaled, it becomes dangerous as it blocks the uptake of oxygen in our body. It may cause death.

(iii) Thigmotropism – folding of leaves in 'Touch-me-not' plant.

Hydrotropism – movement of roots of a plant towards water.

(iv) Dihybrid phenotypic ratio = 9 : 3 : 3 : 1

Phenotype of F_2 generation :

9 round and yellow

3 round and green

3 wrinkled and yellow

1 wrinkled and green

(v) (a) To demonstrate that chlorophyll is essential for photosynthesis. Variegated leaf that possesses more than one colour.

(b) Starch test. Iodine is used for this test.

(c) *Coleus, Croton*

Question 7.

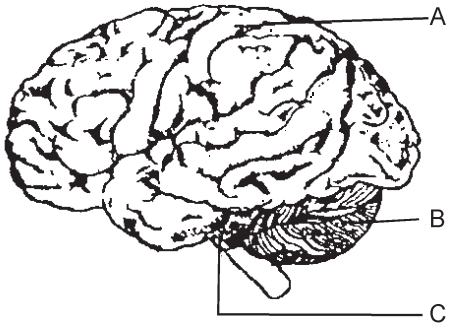
(i) What is semen? **[1]**

(ii) List two advantages of a small family. **[2]**

(iii) Differentiate between sex chromosomes and autosomes. **[2]**

(iv) Mention two points of difference between Mitosis and Meiosis. **[2]**

(v) The diagram shows a section of the human brain. **[3]**



Answer the questions that follow :

(a) Name the parts labelled A and B.

(b) Give the main function of part C.

(c) Name the basic unit of the brain.

Ans.

(i) The semen is a mixture of spermatozoa and the secretions of accessory reproductive glands in males.

(ii) Advantages of small family :

(1) Good health of mother and other family members (2) Quality education for children

(iii)

Sex chromosome	Autosome
1. They determine the sex of an organism.	1. They determine the somatic traits.
2. Different in size and behaviour in males and females.	2. They show similarities in both males and females.
3. The female sex chromosomes are homologous but male sex chromosome are non homologous.	3. Autosomes are homologous.
4. One pair of chromosome is sex chromosome.	4. 22 pairs of chromosome are autosomal chromosomes.

(iv)

Mitosis	Meiosis
1. It occurs in somatic cells.	It occurs in reproductive cells.
2. As a result two daughter cells are formed.	As a result four daughter cells are formed.

(v) (a) A – Cerebrum
B – Cerebellum
(b) C represents Medulla oblongata. It controls the activities of the internal organs such as breathing, heart rate, etc.
(c) Neuron

Question 8.

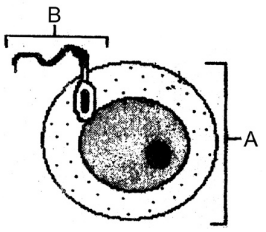
(i) Define Mutation. **[1]**

(ii) Give a brief of stress hormone of plants. **[2]**

(iii) Twins may or may not be identical. Give reason. **[2]**

(iv) Differentiate between myopia and hypermetropia. **[2]**

(v) The diagram given below represents two reproductive cells A and B. Study the same and then answer the questions that follow : **[3]**



(a) Identify the reproductive cells A and B.
(b) Where in the female reproductive system do these cells unite?
(c) What is the genetic composition of A and B?

Ans.

(i) Mutation is a sudden change in the DNA sequence of an organism.

(ii) Abscisic acid (ABA) is known as stress hormone of plants. It is called so because it increases tolerance or resistance of plants to cold or other stresses.

(iii) Twins may or may not be identical because :
— if a single embryo splits into two identical embryos, they develop into identical twins.
— if two ova are released from the ovary and are fertilised by different sperms, they develop into non-identical twins.

(iv) Differences between

Myopia	Hypermetropia
Myopia is caused either because the lens has become too convex or due to elongation or lengthening of the eyeball from front to back.	Hypermetropia is caused by either too flattening of the lens or shortening of the eyeball from front to back.

(v) (a) A is an ovum (female gamete). B is a sperm (male gamete).
(b) These two cells unite in fallopian tube.
(c) The genetic composition of A is 22 + X and that of B is 22 + Y.