ICSE SEMESTER-I EXAMINATION

BIOLOGY

Solved Paper - 2021-22

Class-10th

(Science paper-3)

Max. marks : 40 *You will not be allowed to write during the first 10 minutes. This time is to be spent in reading the question paper.* *Time allowed : One Hour*

ALL QUESTIONS ARE COMPULSORY.

The marks intended for questions are given in brackets [ ].

Select the correct option for each of the following questions.

Question 1.

Name the following by choosing the correct option:

(i) The process of conversion of ADP to ATP during photosynthesis: **[1]**

(a) Polymerisation
(b) Photophosphorylation
(c) Photorespiration
(d) Photolysis

(ii) Permanently open structures seen on the barks of old woody stems: **[1]**

(a) Stomata **(b)** Hydathodes
(c) Lenticels **(d)** Epidermal pores

(iii) The pressure developed in the roots due to continuous inward movement of water by cell to cell osmosis: **[1]**

(a) Root pressure **(b)** Wall pressure
(c) Turgor pressure **(d)** Air pressure

(iv) The type of gene, which in the presence of a contrasting allele is not expressed: **[1]**

(a) Homozygous **(b)** Heterozygous
(c) Dominant **(d)** Recessive

(v) After Mitosis, a female human cell will have: **[1]**

(a) 44 +XX chromosomes
(b) 22 + X chromosomes
(c) 22 + Y chromosomes
(d) 44 + XY chromosomes

Question 2.

Complete the following statements by choosing the appropriate option for each blank:

(i) At the end of _____, Cytokinesis is completed. **[1]**

(a) Metaphase **(b)** Prophase
(c) Interphase **(d)** Telophase

(ii) The genotype of a person who cannot roll his tongue is _____. **[1]**

(a) Rr **(b)** RR
(c) rr **(d)** RRr

(iii) When a cell is placed in a _____ solution, it becomes plasmolysed. **[1]**

(a) Distilled water **(b)** Hypertonic
(c) Isotonic **(d)** Hypotonic

(iv) The nitrogenous base Adenine always pairs with_____. **[1]**

(a) Thymine **(b)** Guanine
(c) Cytosine **(d)** Thiamine

(v) The basic units of heredity are _____. **[1]**

(a) Chromosomes **(b)** Chromatids
(c) Genes **(d)** Centrosome

Question 3.

Choose the correct answer from each of the four options given below:

(i) NADP is expanded as: **[1]**

(a) Nicotinamide Adenosine Dinucleotide Phosphate.
(b) Nicotinamide Adenine Dinucleotide Phosphate.
(c) Nicotinamide Adenine Dinucleolus Phosphate.
(d) Nicotinamide Adenosine Dinucleolus Phosphate.

(ii) Transpiration is useful to the plant because it: **[1]**

(a) Creates a suction force for absorption of water from the soil.
(b) Helps in photophosphorylation.
(c) Synthesises glucose.
(d) Splits water molecules.

(iii) A homozygous pea plant having purple flowers is crossed with a homozygous pea plant bearing white flowers. The phenotypic ratio of the offspring obtained in F_2 generation is: **[1]**

(a) 2 : 1 **(b)** 1 : 1
(c) 1 : 2 : 1 **(d)** 3 : 1

(iv) A shoot from a balsam plant is kept in a beaker containing eosin solution (pink). The pink colour will be distinctly seen in the: **[1]**

(a) Xylem **(b)** Phloem
(c) Epidermis **(d)** Cortex

(v) Replication of DNA in the cell cycle occurs during the: **[1]**

(a) G_1- phase **(b)** Anaphase
(c) S- phase **(d)** G_2-phase

Question 4.

Explain the following terms:

(i) Karyokinesis: **[1]**

(a) It is the division of nucleus during cell division.
(b) It is the division of cytoplasm during cell division.
(c) It is the division of centrosome.
(d) It is the division of nucleolus.

(ii) Law of Dominance: **[1]**

(a) Out of a pair of contrasting alleles present together, only the recessive allele is able to express itself while the dominant remains suppressed.
(b) Out of a pair of contrasting alleles present together, only the dominant allele is able to express itself while the recessive remains suppressed.
(c) Out of a pair of contrasting alleles present together, both the dominant and recessive cannot express themselves.

(d) Out of a pair of contrasting alleles present together, both the dominant and recessive can express themselves.

(iii) Mutation: **[1]**
- **(a)** It is a sudden change in one or more genes in an organism's cells which is heritable.
- **(b)** It is a change in the number of centrosomes in an organism's cells which is heritable.
- **(c)** It is a change in the structure of cell membrane in an organism's cell which is heritable.
- **(d)** It is a change in the shape of cells which is heritable.

(iv) Photosynthesis: **[1]**
- **(a)** It is the synthesis of glucose from carbon dioxide by non-green plants using light energy.
- **(b)** It is the synthesis of glucose by green plants from carbon dioxide using light energy.
- **(c)** It is the synthesis of glucose from carbon dioxide and water by non-green plants using light energy.
- **(d)** It is the synthesis of glucose from carbon dioxide and water by green plants using light energy.

(v) Transpiration: **[1]**
- **(a)** It is the loss of water in the form of droplets from the aerial parts of the plant.
- **(b)** It is the loss of water in the form of water vapour from the underground parts of the plant.
- **(c)** It is the loss of water in the form of water vapour from the aerial parts of the plant.
- **(d)** It is the loss of water in the form of water vapour from all parts of the plant.

Question 5.

Mention the exact location of the following:

(i) Aster: **[1]**
- **(a)** Around the centrioles in plant cells.
- **(b)** Around the centrioles in animal cells.
- **(c)** Around the chromatids in animal cells.
- **(d)** Around the chromatids in plant cells.

(ii) Guard cells: **[1]**
- **(a)** Around the root hairs.
- **(b)** Around the lenticels.
- **(c)** Around the thylakoids.
- **(d)** Around the stoma.

(iii) Xylem tissue: **[1]**
- **(a)** Conducts water and minerals in leaves.
- **(b)** Does not conduct water and minerals in stems.
- **(c)** Conducts food and nutrients to roots.
- **(d)** Conducts food and nutrients to all parts of the plant.

(iv) Centrioles: **[1]**
- **(a)** Found only in plant cells.
- **(b)** Found inside nucleus.
- **(c)** Found only in animal cells.
- **(d)** Found in animal and plant cells.

(v) Genes: **[1]**
- **(a)** Present on cell wall.
- **(b)** Present on chloroplast.
- **(c)** Present on chromosomes.
- **(d)** Present on centrosomes.

Question 6.

State the functions of the following:

(i) Cell wall: **[1]**
- **(a)** Regulates entry of solutes in plant cells.
- **(b)** Regulates entry of solutes in animal cells.
- **(c)** Gives rigidity and shape to plant cells.
- **(d)** Gives rigidity and shape to animal cells.

(ii) Centromere: **[1]**
- **(a)** It is the point of attachment of two sister chromatids.
- **(b)** It is the point of attachment of two centrioles.
- **(c)** It is the point of attachment of two centrosomes.
- **(d)** It is the point of attachment between two daughter nuclei.

(iii) Cuticle on leaves: **[1]**
- **(a)** Prevents photosynthesis.
- **(b)** Reduces transpiration.
- **(c)** Protects leaves from grazing animals.
- **(d)** Gives colour to leaves.

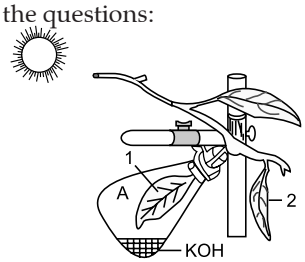
(iv) Hydathodes: **[1]**
- **(a)** Transpiration **(b)** Absorption of water
- **(c)** Photosynthesis **(d)** Guttation

(v) Grana of chloroplast is not the: **[1]**
- **(a)** Site of Light Independent Phase
- **(b)** Site of Light Dependent Phase
- **(c)** Site of Photolysis
- **(d)** Site of Photon absorption

Question 7.

The diagram given below represents an experiment to demonstrate a particular aspect of photosynthesis. The letter 'A' indicates a certain condition inside the flask.

Answer the questions:



(i) What is the aim of the experiment? **[1]**
- **(a)** To show that oxygen is released during Photosynthesis.
- **(b)** To show that Photosynthesis occurs in the presence of KOH.
- **(c)** To show that chlorophyll is necessary for Photosynthesis.
- **(d)** To show that carbon dioxide is necessary for Photosynthesis.

(ii) What is the special condition inside the flask? **[1]**
- **(a)** Air inside the flask is free of oxygen.
- **(b)** Air inside the flask is free of carbon dioxide.
- **(c)** Air inside the flask is free of nitrogen.
- **(d)** KOH purifies the air inside the flask.

(iii) An alternative chemical that can be used instead of KOH is: **[1]**
- **(a)** Sodium hydroxide. **(b)** Sodium chloride.
- **(c)** Potassium chloride.
- **(d)** Potassium permanganate.

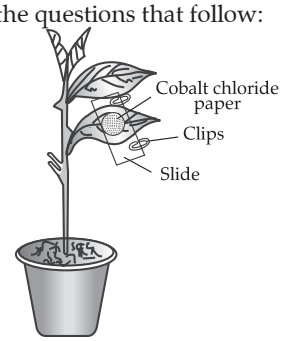
(iv) In what manner do the leaves 1 and 2 differ at the end of the starch test? **[1]**
- **(a)** Leaf 1 turns brown, Leaf 2 turns blue black.
- **(b)** Leaf 1 turns blue black, Leaf 2 turns brown.
- **(c)** Leaf 1,turns purple, Leaf 2 remains green.
- **(d)** There is no change in the colour of the

(v) What is the important step that should be taken before performing this experiment? **[1]**
- **(a)** The plant should be placed in dark for 24 hours to destarch the entire plant.
- **(b)** The plant should be placed in dark for 24 hours to remove chlorophyll from the leaves.
- **(c)** The plant should be placed in dark for 24 hours to destarch the leaves.
- **(d)** The plant should be placed in dark for 24 hours for the roots to absorb water.

Question 8.

Given below is the diagram of an experimental setup to study the process of Transpiration. Cobalt chloride papers are fixed on the upper as well as lower surface of the leaf.

Answer the questions that follow:



(i) What is the aim of the experiment? **[1]**
- **(a)** To prove that more transpiration occurs from the lower surface of a dicot leaf.
- **(b)** To prove that more transpiration occurs from the upper surface of a dicot leaf.
- **(c)** To prove that transpiration is equal on both sides of the leaf.
- **(d)** To prove that transpiration does not take place in a dicot leaf.

(ii) What is the colour of dry cobalt chloride paper? **[1]**
- **(a)** Pink **(b)** Blue
- **(c)** Brown **(d)** White

(iii) After about an hour, what change if any, would you expect to find in the cobalt chloride paper placed on the upper and lower surface of the leaf? **[1]**
- **(a)** Upper surface – Pink, Lower Surface – Blue.
- **(b)** Upper surface – White, Lower surface – Blue.
- **(c)** Upper surface – less pink, Lower surface – more pink.
- **(d)** Upper surface – more pink, Lower surface – less pink.

(iv) Two adaptations in plants to reduce Transpiration are: **[1]**
- **(a)** Narrow leaves, Thin cuticle.
- **(b)** Fewer stomata, Broad lamina of leaves.
- **(c)** Thin cuticle, Sunken stomata.
- **(d)** Narrow leaves, Fewer stomata.

(v) The rate of transpiration is less when there is: **[1]**
- **(a)** High humidity in the air and low temperature.
- **(b)** Less humidity in the air and decrease in atmospheric pressure.
- **(c)** Bright sunlight and high temperature.
- **(d)** More wind and low intensity of sunlight.

ANSWERS

1. (i) Correct option is (b).

Explanation: The process in which conversion of ADP to form ATP takes place by utilizing the energy of sunlight is termed as photophosphorylation. This takes place during the first phase of photosynthesis. There are two types of photophosphorylation: Cyclic photophosphorylation and non-cyclic photophosphorylation.

(ii) Correct option is (c).

Explanation: Lenticels are permanently open structures seen on the barks of old woody stems. They make a porous tissue on the bark and help in the gaseous exchange of carbon dioxide and oxygen.

(iii) Correct option is (a).

Explanation: The pressure developed in the roots due to continued inward movement of water through cell to cell osmosis is known as root pressure. It helps in the ascent of cell sap upward through the stem. It is caused by active transport of mineral nutrient ions into the root xylem.

(iv) Correct option is (d).

Explanation: Recessive is the type of gene which in the presence of a contrasting allele is not

(v) Correct option is (a).

Explanation: Mitosis is an equational division that produces daughter cells with same number of chromosomes as that of a parent cell. So, mitosis in a human female cell would produce progeny cells with 44 + XX chromosomes.

2. (i) Correct option is (d).

Explanation: Cytokinesis begins in anaphase and ends in telophase, reaching completion as the next interphase begins.

(ii) Correct option is (c).

Explanation: In humans, tongue rolling is a dominant trait (R), those with the recessive condition cannot roll their tongues.

(iii) Correct option is (b).

Explanation: If a plant cell is placed in a hypertonic solution, the plant cell loses water and hence, the cell will shrink i.e., get plasmolysed.

(iv) Correct option is (a).

Explanation: In base pairing, adenine always pairs with thymine, and guanine always pairs with cytosine.

(v) Correct option is (c).

Explanation: A gene is the basic physical and functional unit of heredity.

3. (i) Correct option is (b).

Explanation: NADP stands for Nicotinamide Adenine Dinucleotide Phosphate (NADP), a major role of NADP is as co-enzyme in cellular electron transfer reactions.

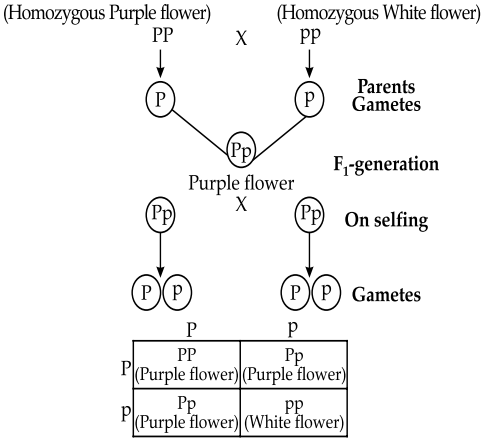
(ii) Correct option is (a).

Explanation: Transpiration process in plants creates a suction pressure which pulls up water from the xylem of the roots to the stem and then to the leaves.

(iii) Correct option is (d).

Explanation: When a homozygous pea plant having purple flowers is crossed with a homozygous pea plant bearing white flowers, the phenotypic ratio of the offspring obtained in F_2 generation is 3:1 (i.e. 3 Purple flowers and 1 White flower).

Cross:



Phenotypic ratio Purple : White
3 : 1
Genotypic ratio PP : Pp : pp
1 : 2 : 1

(iv) Correct option is (a).

Explanation: Eosin is a water-soluble stain. When the cut end of the plant is immersed in an eosin solution, the colored solution enters the xylem vessels, which appear red indicating that water uptake in plants is through xylem only.

(v) Correct option is (c).

Explanation: S-phase is the period during which DNA replication occurs.

4. (i) Correct option is (a).

Explanation: Karyokinesis is the process of the division of a cell's nucleus during mitosis or meiosis. It is followed by the division of the cytoplasm, which is known as cytokinesis.

(ii) Correct option is (b).

Explanation: Law of dominance is known as the first law of inheritance. It states that in a given cross between two organisms with pure contrasting alleles or characters, only one allele is expressed in F_1 generation; the character which is expressed is called dominant and the other which is not expressed is called recessive.

(iii) Correct option is (a).

Explanation: A mutation is a change in a DNA sequence. Mutations can result from DNA copying mistakes made during cell division, exposure to ionizing radiation, exposure to chemicals called mutagens, or infection by viruses.

(iv) Correct option is (d).

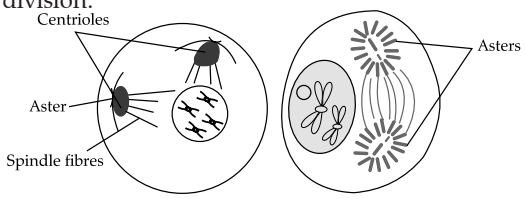
Explanation: Photosynthesis is the process by which green plants and certain other organisms transform light energy into chemical energy. During the process, the plants take in carbon dioxide from the air and water from the soil. This water is oxidized (loses electrons) while the carbon dioxide is reduced (gains electrons). Hence, the water is transformed into oxygen and the carbon dioxide is transformed into glucose. After this, the plants release oxygen into the air and stores the energy in the form of glucose molecules.

(v) Correct option is (d).

Explanation: The biological process in which the water from various aerial parts (like leaves, stems and flowers) of the plant evaporate in the form of water vapour, is called transpiration. This happens mainly through the stomata of the leaves.

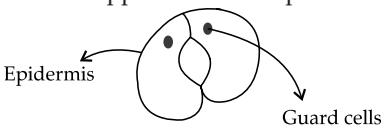
5. (i) Correct option is (b).

Explanation: An aster is a star-shaped cellular structure. It is located around the centrioles in animal cells. Its main function is to hold the two centrioles at the two opposite poles and help the spindle apparatus to position during nuclear division.



(ii) Correct option is (d).

Explanation: A pair of guard cells surround the stomata on the upper and lower epidermis of leaf.



(iii) Correct option is (a).

Explanation: Xylem is a plant vascular tissue. This tissue transports water and other dissolved minerals from the roots to aerial parts of the plants. It is generally located at the center of the vascular bundle, deep inside the plant.

(iv) Correct option is (c).

Explanation: Centrioles are minute microscopic cylindrical structures located in the cytoplasm of animal cells, near the nuclear envelope.

(v) Correct option is (c).

Explanation: Genes are present on the chromosomes, which are in the cell's nucleus. A chromosome contains hundreds to thousands of genes.

6. (i) Correct option is (c).

Explanation: Plant cells have a rigid cell wall that surrounds the cell membrane and gives rigidity and shape to plant cell.

(ii) Correct option is (a).

Explanation: The centromere links a pair of sister chromatids together during cell division.

(iii) Correct option is (b).

Explanation: Plant cuticle is a water impervious protective layer covering the epidermal cells of leaves and other parts. It protects plants against drought, extreme temperature, etc., by reducing the transpiration rate.

(iv) Correct option is (d).

Explanation: Hydathodes are the structures that discharge water from the interior of the leaf to its surface in a process called guttation.

(v) Correct option is (a).

Explanation: Grana of chloroplast is site of light dependent reaction and not light independent reaction.

7. (i) Correct option is (d).

Explanation: In the given experimental set up, potassium hydroxide in the flask absorbs carbon dioxide. Thus, due to the absence of CO_2, the leaf fails to produce starch, which proves that carbon dioxide is necessary for photosynthesis.

(ii) Correct option is (b).

Explanation: The leaf inside the flask does not get atmospheric carbon dioxide because KOH absorbs all of it.

(iii) Correct option is (a).

Explanation: An alternative chemical that can be used instead of KOH is NaOH as it can also absorb CO_2 from the flask.

(iv) Correct option is (a).

Explanation: In leaf 1, there is no change in colour, confirmed with starch test whereas leaf 2, will turn blue black at the end of starch test.

(v) Correct option is (c).

Explanation: Before starting an experiment on photosynthesis, the plant should be placed in the dark for 24-48 hours to destarch the leaves. During this period, all the starch from the leaves is used up and the leaves will not show the presence of starch.

8. (i) Correct option is (a).

Explanation: The given experimental set-up proves that more transpiration occurs from the lower surface of a dicot leaf due to the presence of more stomatal openings.

(ii) Correct option is (b).

Explanation: The color of cobalt chloride paper is blue.

(iii) Correct option is (c).

Explanation: The cobalt chloride paper placed on the lower surface of the leaf will be more pink as there are more **stomatal** openings. The upper surface has less stomata than the lower surface, so it will be less pink.

(iv) Correct option is (d).

Explanation: Rate of transpiration will be less if leaf is narrow and has fewer stomata.

(v) Correct option is (a).

Explanation: Rate of transpiration is less when relative humidity is high and temperature is low.

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ICSE SEMESTER-2 EXAMINATION

Biology (SCIENCE PAPER 3)

Solved Paper - 2021-22

Class-10th

Maximum Marks : 40

Time allowed : One and a half hours

Answers to this Paper must be written on the paper provided separately.

You will not be allowed to write during the first 10 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.

Attempt all questions from Section A and any three questions from Section B.

The marks intended for questions are given in brackets [ ]

Section-A

(Attempt all questions from this Section.)

Question 1

Choose the correct answers to the questions from the given options. (Do not copy the question. Write the correct answer only.) **[10]**

(i) The mineral element in haemoglobin :
- **(a)** Manganese
- **(b)** Iron
- **(c)** Sodium
- **(d)** Calcium

(ii) The number of cranial nerves in humans are :
- **(a)** 12
- **(b)** 31 pairs
- **(c)** 31
- **(d)** 12 pairs

(iii) Gigantism and Acromegaly are due to :
- **(a)** Hypersecretion of Growth hormone
- **(b)** Hypersecretion of Thyroxine
- **(c)** Hyposecretion of Growth hormone
- **(d)** Hyposecretion of Thyroxine

(iv) Pericardium covers the :
- **(a)** Heart
- **(b)** Brain
- **(c)** Spinal cord
- **(d)** Eyeball

(v) The circular opening in the centre of iris :
- **(a)** Lens
- **(b)** Cornea
- **(c)** Sclera
- **(d)** Pupil

(vi) The blood vessel that carries oxygenated blood is :
- **(a)** Pulmonary artery
- **(b)** Pulmonary vein
- **(c)** Renal vein
- **(d)** Hepatic vein

(vii) Organ of corti is present inside the :
- **(a)** Cochlea
- **(b)** Semicircular canals
- **(c)** Sacculus
- **(d)** Utriculus

(viii) The structure that stores urine temporarily is :
- **(a)** Ureter
- **(b)** Urethra
- **(c)** Urinary bladder
- **(d)** Kidneys

(ix) Islets of Langerhans are located in :
- **(a)** Liver
- **(b)** Pituitary gland
- **(c)** Spleen
- **(d)** Pancreas

(x) The main nitrogenous waste formed in the human body :
- **(a)** Uric acid
- **(b)** Urea
- **(c)** Ammonia
- **(d)** Creatinine

Section-B

(Attempt any three questions from this Section.)

Question 2

(i) Simple goitre is usually seen in people living in the hilly regions.
Give two reasons for the statement. **[2]**

(ii) What are the two types of blood circulation in humans? **[2]**

(iii) Mention the three major steps involved in the production of urine. **[3]**

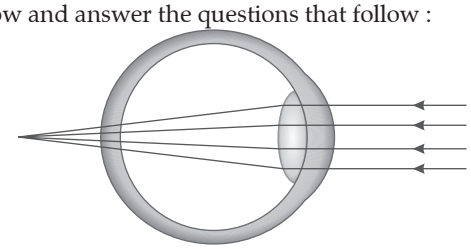
(iv) Draw a neat diagram of a Neuron and label any two parts. **[3]**

Question 3

(i) What is Adrenal Virilism? What causes this condition? **[2]**

(ii) Which is the light sensitive layer of the eyeball? **[2]**
Where exactly is the image formed on this layer?

(iii) Study the diagram given below and answer the questions that follow : **[3]**



(a) Identify the defect of the eye by mentioning the technical term.

(b) Mention one reason for this defect.

(c) Name the type of lens used to correct this defect.

(iv) Give the biological terms for the three tiny bones present in the middle ear. **[3]**

Question 4

(i) Name the endocrine gland that secretes Thyroxine. **[2]**
Give any one function of Thyroxine.

(ii) Give the full form of the abbreviation ACTH. **[2]**
Which gland secretes this hormone?

(iii) Define the term Synapse.
How are Cytons and Axons of neurons placed in the Cerebrum? **[3]**

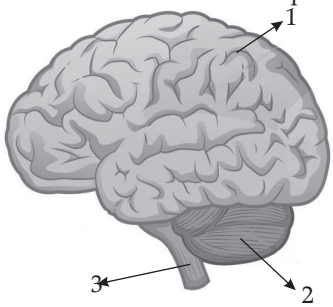
(iv) Name the three membranous coverings of the human brain. **[3]**

Question 5

(i) Name the nerve that transmits impulses to the brain from : **[2]**
(a) Ear **(b)** Eye

(ii) A mature mammalian erythrocyte lacks nucleus and mitochondria but is efficient in its functioning. Explain by giving suitable reasons. **[2]**

(iii) The diagram given below is that of a human brain. Answer the questions that follow : **[3]**



(a) Label the parts numbered 2 and 3.

(b) State any one function of the part numbered 1.

(iv) What is a reflex action? Name the two types of reflexes. **[3]**

Question 6

(i) Give the exact location of Pulmonary semilunar valve. When does it close? **[2]**

(ii) Name the hormones whose deficiency causes : **[2]**

(a) Diabetes mellitus

(b) Diabetes insipidus

(iii) Draw a neat diagram of a longitudinal section of a human kidney and label Renal Cortex and Renal Medulla on the diagram. **[3]**

(iv) Mention one function for each of the following : **[3]**

(a) Lymphocytes

(b) Thrombocytes

(c) Neutrophils

ANSWERS

Section-A

1. (i) Option (b) is correct. **(1×10)**

Explanation : Iron is a mineral found in every cell of the body. Iron is considered as an essential mineral because it is needed to make haemoglobin, a part of blood cells. About 70 percent of our's body's iron is in the red blood cells called haemoglobin.

(ii) Option (d) is correct.

Explanation : The cranial nerves are a set of 12 paired nerves in the back of your brain.

(iii) Option (a) is correct.

Explanation : Acromegaly and Gigantism are disorder in adults in which the pituitary gland produces too much of Growth hormone.

(iv) Option (a) is correct.

Explanation : Pericardium is a double walled membranous bag, enclosing the human heart.

(v) Option (d) is correct.

Explanation : Pupil is a small opening in the center of the iris, through which the light enters into the eye.

(vi) Option (b) is correct.

Explanation : The pulmonary arteries carry deoxygenated blood from the right ventricle to the lungs. The pulmonary veins carry oxygenated blood from the lungs to the left atrium.

(vii) Option (a) is correct.

Explanation : The Organ of corti is present in the cochlea. It is a structure present on the basilar membrane. It contains hair cells that act as auditory receptors.

(viii) Option (c) is correct.

Explanation : The ureters carry the urine away from kidneys to the urinary bladder, which acts as a store house for the urine temporarily.

(ix) Option (d) is correct.

Explanation : Islets of Langerhans are clusters of endocrine cells present throughout the pancreas.

(x) Option (b) is correct.

Explanation : Humans and most other mammals produce urea as the nitrogenous waste.

Section-B

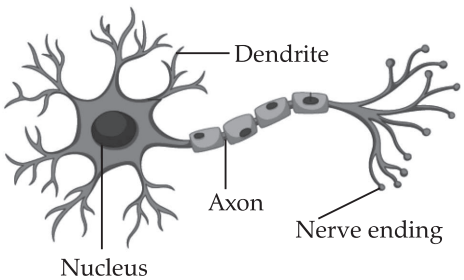
2. (i) (a) Increased ATP demand triggers the negative feedback regulation of thyroid hormone secretion.

(b) Insufficient availability of iodine in the soil of hilly areas also causes most people to suffer from goitre. **(2)**

(ii) Pulmonary circulation

Systemic circulation **(2)**

(iii) There are three main steps of urine formation: glomerular filtration, reabsorption and secretion. **(3)**



(label any two) (3)

3. **(i)** Adrenal virilism is a syndrome in which the excessive production of adrenal androgens causes virilization. Virilization is a condition in which a female develops male secondary sexual characteristics, like a beard, moustache, and even a deepening and hoarsening of voice. Adrenal virilism is caused due to excess production of androgens from the adrenal cortex in females. **(2)**

(ii) The retina is the light-sensitive tissue layer at the back of the eye. It has special cells called photoreceptors that turn the light into electrical signals. Image is formed in front of retina. **(2)**

(iii) **(a)** Long-sightedness, also known as hypermetropia or hyperopia. **(1)**

(b) Eyeball is too short or the lens cannot become round enough, causing the eye to not have enough power to see close or nearby objects. **(1)**

(c) This defect can be corrected by using a convex lens. **(1)**

(iv) There are three tiny bones in the ear known as the earossicles. They are : malleus, incus, and stapes. **(3)**

4. **(i)** Thyroid gland secretes : thyroxine.

Function : It plays vital roles in heart and muscle function, brain development, digestion and maintenance of bones. **(2)**

(ii) Adrenocorticotropic Hormone.

ACTH is a hormone produced by the pituitary gland, a small gland at the base of the brain. **(2)**

(iii) Synapse is the site of transmission of electric nerve impulses between two neurons or between a neuron and a gland or muscle cell (effector).

The inner portion of the cerebrum consists of white matter, mainly containing the axons (nerve fibers) of the neurons. The cytons of the neurons are present in the outer layers of cerebrum and outer layer of the brain looks dull grey in color.**(3)**

(iv) **1.** The dura mater (outer layer) **2.** The arachnoid mater (inner layer) **3.** The pia mater (middle layer). **(3)**

5. **(i)** **(a)** Auditory nerve **(1)**

(b) Optic nerve **(1)**

(ii) A mature erythrocyte lacks nucleus and mitochondria so as to make a place for more haemoglobin and hence more oxygen molecules. Also, without these organelles, it provides a specific biconcave appearance of RBCs that allows efficient diffusion. Young mammalian RBCs have nucleus. **(2)**

(iii) **(a)** 2-Cerebellum, 3-medulla oblongata. **(1+1)**

(b) The part labelled as 1 is cerebrum. Cerebrum initiates and coordinates movement and regulates temperature of the body. **(1)**

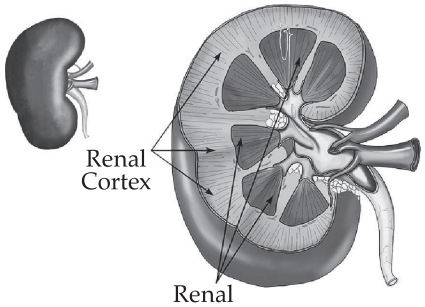
(iv) Reflex action is a rapid and automatic response to a stimulus. It is not under the voluntary control of the brain. The two types of reflexes are natural reflexes and conditional reflexes. **(3)**

6. **(i)** The Pulmonary semilunar valve is located in the right ventricle of the heart. It is an opening of the right ventricle into the pulmonary artery. It closes at the diastolic phase of the cardiac cycle. **(2)**

(ii) **(a)** Diabetes mellitus - Insulin

(b) Diabetes insipidus - Vasopressin **(2)**

(iii)



(3)

(iv) **(a)** Lymphocytes are primarily involved in the body's immune response mechanism. Lymphocytes are responsible for antibody production, direct cell-mediated killing of virus-infected and tumor cells, and regulation of the immune response. **(1)**

(b) Thrombocytes help to form blood clots in order to slow or stop bleeding and help wounds to heal. **(1)**

(c) Neutrophils remove bacterial and fungal pathogens through a process known as phagocytosis. They travel to the site of infection, where they destroy the microorganisms by ingesting them and releasing enzymes that kill them. **(1)**

■■