

BIOLOGY
SCIENCE Paper - 3

III. ANALYSIS OF PERFORMANCE

Question 1

- (a) Name the following:
- (i) The process of uptake of mineral ions against the concentration gradient using energy from cell.
 - (ii) The form in which glucose is stored in liver.
 - (iii) The vein that carries oxygenated blood.
 - (iv) The cross between two parents having one pair of contrasting characters.
 - (v) The structure formed by the villi of the embryo and the uterus of the mother. [5]
- (b) The statements given below are False. Rewrite the correct form of the statement by changing the word which is underlined:
- (i) Alpha cells of pancreas secrete Insulin.
 - (ii) Formalin is an example of an Antiseptic.
 - (iii) CNG is mainly responsible for the formation of acid rain.
 - (iv) Sulphadiazine is an example of an Antiseptic.
 - (v) Cretinism is caused due to deficiency of Adrenaline. [5]
- (c) Choose the correct answer from the four options given below:
- (i) A single highly coiled tube where sperms are stored, gets concentrated and mature is known as:
 - A. Epididymis
 - B. Vas efferentia
 - C. Vas deferens
 - D. Seminiferous tubule.
 - (ii) Chromosomes get aligned at the center of the cell during :
 - A. Metaphase
 - B. Anaphase
 - C. Prophase
 - D. Telophase.

- (iii) BCG vaccine is effective against:
- Cholera
 - Mumps
 - Tuberculosis
 - Measles
- (iv) Which one of the following is mainly associated with the maintenance of the posture?
- Cerebrum
 - Cerebellum
 - Thalamus
 - Pons.
- (v) An example of non-biodegradable waste is:
- Vegetable peels
 - Sewage
 - Livestock waste
 - DDT.

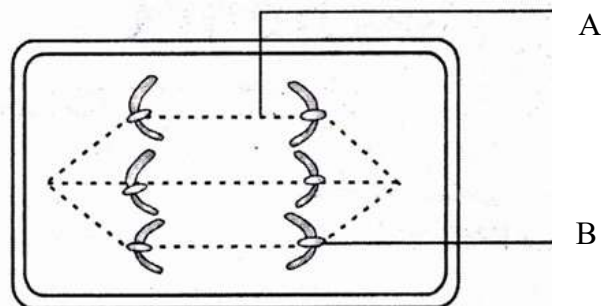
[5]

(d) Mention the exact location of the following structures:

- Thylakoids
- Organ of Corti
- Lenticels
- Bicuspid valve
- Loop of Henle.

[5]

(e) The diagram given below represents a certain stage of mitosis:



- Identify the stage of cell division.
- Name the parts labelled A and B.
- What is the unique feature observed in this stage?
- How many daughter cells are formed from this type of cell division?

[5]

- (f) Given below is an example of a certain structure and its special functional activity. On a similar pattern fill in the blanks with suitable functions:

Example: Chloroplast and Photosynthesis:

- (i) Xylem and _____.
- (ii) Ciliary Body and _____.
- (iii) Seminiferous Tubule and _____.
- (iv) Thyroid gland and _____.
- (v) Eustachian Tube and _____.

[5]

- (g) Rewrite and complete the following sentences by inserting the correct word in the space indicated:

- (i) The phenomenon of loss of water through a cut stem or injured part of plant is called _____.
- (ii) _____ is the scientific name of garden pea, which Mendel used for his experiments.
- (iii) A fluid that occupies the larger cavity of the eye ball behind the lens is _____.
- (iv) Oxygen combines with haemoglobin present in RBC and forms _____.
- (v) _____ causes corrosion of the marble or brick surface.

[5]

- (h) Match the items in Column 'A' with those which are most appropriate in Column 'B'.

Rewrite the matching pairs as shown in the example:

Example: Fibrinogen – Clotting of blood.

Column A

Column B

- | | |
|-------------------|-----------------------------------|
| (1) Allele | (a) Control of automobile exhaust |
| (2) Leydig cells | (b) Tourniquet |
| (3) Utriculus | (c) Alternate forms of genes |
| (4) Snake bite | (d) Dynamic equilibrium |
| (5) Euro IV norms | (e) Testosterone |
| | (f) Sudden change in genes |
| | (g) Static equilibrium |

[5]

Examiners' Comments

- (a) (i) Most candidates wrote the correct answer. However, a few were unsure of the scientific term and wrote 'Active absorption' instead of 'Active transport'.
- (ii) Most candidates wrote the correct answer. A few misspelt 'glycogen' as 'glucogen' that was incorrect.
- (iii) This question was answered correctly by most candidates.
- (iv) Some candidates wrote 'Dihybrid' instead of 'Monohybrid cross' that was an incorrect answer.
- (v) Most candidates wrote the correct answer. A few however were confused with 'umbilical cord'.
- (b) (i) Most candidates answered correctly. However a few were unsure and wrote 'glycogen' instead of the hormone 'glucagon'.
- (ii) Some candidates answered correctly. A few were confused with examples of antiseptics & disinfectants.
- (iii) There was general confusion regarding Greenhouse gases and gases forming acid rain with many candidates writing incorrect answers.
- (iv) A few candidates answered correctly as others appeared to be unaware of the examples of Sulfa drugs.
- (c) (i) Answered correctly by candidates.
- (ii) Candidates wrote the correct answer.
- (iii) Most candidates wrote the answer correctly
- (iv) A few candidates were confused with the function of cerebellum and wrote other options.
- (v) Most candidates did not know the difference between non-biodegradable and biodegradable wastes and hence wrote sewage or livestock waste.
- (d) (i) Most candidates failed to mention the term 'Chloroplast and merely wrote 'stroma'.
- (ii) Majority of candidates did not write the correct answer. They vaguely mentioned 'inner ear'.
- (iii) Most candidates wrote the correct answer.
- (iv) Most candidates did not specify the location as 'between left auricle and left ventricle' and instead wrote 'on the left side of heart'.
- (v) Most candidates wrote the correct answer. A few could not give the exact location and wrote 'medulla'.
- (e) (i) Most candidates wrote the correct stage of Mitosis. A few were unsure and wrote 'Early Telophase'.
- (ii) Candidates were able to label the parts correctly. A few wrote 'centrosome' for 'Centromere'.
- (iii) A few candidates wrote the correct answer. Most failed to explain the changes completely.

Suggestions for teachers

- Train students on conceptual learning.
- Students must be taught the form in which glucose is stored in animals and plants.
- Advise students to read statements carefully and understand them before writing answers.
- Insist on correct spellings of biological/technical terms.
- Train students to list out examples of Sulfa drugs, Antiseptics, Disinfectants and their mode of action.
- Stress on the importance of prepositions like 'in', 'on', 'between', 'around' while stating the exact location of structures and organs.
- Train students to understand the changes visible in nucleus during mitotic cell division as a result of which the stages can be identified.
- Clarify the concept of duplication of chromosomes during prophase and separation of chromatids during Anaphase.
- Make use of charts, models and interactive boards to explain the parts of functions of eye and ear.
- The lesson on pollution must be taught keeping in mind the various pollutants, their source, the effect on environment and various means to curb them.

- (iv) Most candidates wrote the correct answer, but some were confused with meiosis and wrote four daughter cells instead of two.
- (f) (i) Majority of candidates wrote the correct answer.
- (ii) Many candidates failed to score as they wrote the function of suspensory ligament instead of ciliary body.
- (iii) Most candidates wrote a one-word answer – ‘sperms’ and did not give a clear explanation.
- (iv) Most candidates wrote the correct answer. A few lost marks as they just wrote ‘thyroxine’ instead of ‘secretes thyroxine’.
- (v) Candidates did not know the specific function of Eustachian tube and hence did not mention in which part of the ear air pressure is equalised.
- (g) (i) Most candidates answered correctly.
- (ii) Most candidates wrote the correct answer.
- (iii) This question was answered correctly by most candidates.
- (iv) Most candidates wrote the answer correctly.
- (v) Only a few candidates wrote the correct answer. Most wrote ‘Air Pollution’ instead of ‘Acid Rain’.
- (h) (i) Most candidates wrote the correct pair.
- (ii) Correct pairing was done by most candidates.
- (iii) Confusion between dynamic and static equilibrium led to incorrect pairing.
- (iv) Answered correctly by most candidates.
- (v) Most candidates wrote the correct matching pair.

MARKING SCHEME

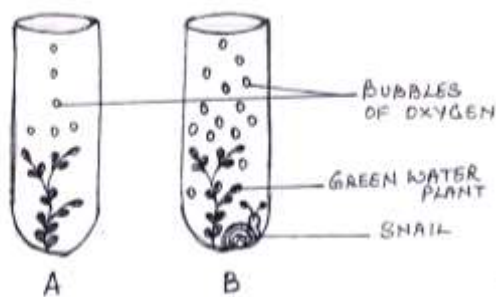
Question - 1

- (a) (i) Active Transport
- (ii) Glycogen
- (iii) Pulmonary vein
- (iv) Monohybrid cross
- (v) Placenta
- (b) (i) Alpha cells of pancreas secrete Glucagon.
- (ii) Formalin is an example of a Disinfectant.
- (iii) $\text{SO}_2/\text{SO}_3/\text{NO}/\text{NO}_2$ is mainly responsible for the formation of acid rain.
- (iv) Sulphadiazine is an example of a Sulpha drug.
- (v) Cretinism is caused due to deficiency of Thyroxin.
- (c) (i) A single highly coiled tube where sperms are stored, get concentrated and mature is known as-Epididymis.
- (ii) The chromosome get aligned at the centre of the cell during – Metaphase
- (iii) BCG vaccine is effective against - Tuberculosis
- (iv) Which one of the following is mainly associated with the maintenance of the posture – Cerebellum.
- (v) An example of non-biodegradable waste is – DDT.

- (d) (i) Present in colourless ground substance/Stroma/Matrix of chloroplast
(ii) In the Cochlea / On the basilar membrane of median canal in Cochlea
(iii) On the surface of old woody stems.
(iv) Between left auricle and left ventricle
(v) In Renal Medulla of kidneys / Part of Nephron
- (e) (i) Anaphase
(ii) A – Spindle fibre; B – Centromere
(iii) Chromosomes are seen moving towards the poles.
(iv) Two daughter cells.
- (f) (i) Xylem and Helps in the conduction of water and minerals.
(ii) Ciliary Body and Alters the focal length of lens.
(iii) Seminiferous Tubule and Production of sperms.
(iv) Thyroid gland and secretion of Thyroxin for regulation of nasal metabolism/ growth/body temperature / ossification of bones /mental development
(v) Eustachian Tube and Equalizes air pressure on either side of ear drum.
- (g) (i) The phenomenon of loss of water through a cut stem or injured part of plant is called Bleeding.
(ii) *Pisum Sativum* is the scientific name of the garden pea
(iii) A fluid that occupies the larger cavity of the eye ball behind the lens is Vitreous humour.
(iv) Oxygen combines with haemoglobin present in RBC and forms Oxyhaemoglobin .
(v) Acid rain causes corrosion of the marble or brick surface.
- (h) (i) Allele – Alternate forms of genes.
(ii) Leydig cells – Testosterone.
(iii) Utriculus – Static equilibrium.
(iv) Snake bite – tourniquet.
(v) Euro IV norms – Control of automobile exhaust.

Question 2

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



- (i) Name the physiological process that releases the bubbles of oxygen.
 - (ii) Explain the physiological process as mentioned above in Q.2(a)(i).
 - (iii) What is the purpose of keeping a snail in test-tube 'B'?
 - (iv) Why does test-tube 'B' have more bubbles of oxygen?
 - (v) Give an example of a water plant that can be used in the above experiment.
 - (vi) Write the overall chemical equation for the above process. [5]
- (b) Give the biological /technical terms for the following:
- (i) A mixture of smoke and fog.
 - (ii) Capacity of our body to resist diseases.
 - (iii) Fixing of developing zygote on the uterine wall.
 - (iv) The permanent stoppage of menstruation at about the age of 45 years in a female.
 - (v) The hormone increasing reabsorption of water by kidney tubules.
 - (vi) A thin membrane covering the entire front part of the eye.
 - (vii) The lens of eye losing flexibility resulting in a kind of long-sightedness in middle aged people.
 - (viii) The number of persons living per square kilometre at any given time.
 - (ix) The sound produced when the atrio-ventricular valves close in the heart.
 - (x) The process by which white blood cells engulf bacteria. [5]

Examiners' Comments

- (a) (i) Most candidates failed to comprehend the question and wrote 'Respiration' instead of 'Photosynthesis'.
- (ii) Candidates who wrote 'Respiration' for the previous answer gave an incorrect explanation. Some candidates failed to mention the raw materials or the end products.
- (iii) Most candidates failed to score as they explained about the 'food chain'.
- (iv) Some candidates wrote the correct answer. Majority were confused and wrote that both plant and snail evolved bubbles. They could not relate photosynthesis to respiration.
- (v) This question was answered correctly by most candidates.
- (vi) Majority of candidates answered correctly. A few were careless and did not mention the factors – sunlight and chlorophyll. Some were unable to balance the equation.

Suggestions for teachers

- Students must be enlightened on the names of various apparatus used in experiments on plant physiology.
- Confusion regarding Vasectomy and Tubectomy, Menarche and Menopause must be eliminated by citing suitable examples.
- Instruct and guide students to answer precisely and clearly the aim of an experiment in plant physiology.
- Ensure students practise writing a balanced equation to represent photosynthesis.

- (b)(i) Most candidates answered correctly.
- (ii) Answered correctly by most candidates.
- (iii) Majority of candidates answered correctly.
- (iv) A few candidates incorrectly wrote menarche instead of menopause.
- (v) Correctly answered by candidates.
- (vi) Majority of candidates wrote the correct term. A few however were unsure of the content and wrote cornea instead of conjunctiva.
- (vii) Most candidates wrote the correct term. Some were unsure of the concept and wrote hyperopia instead of Presbyopia.
- (viii) Many candidates answered correctly. A few were not familiar with population density and hence wrote census.
- (ix) There was a general confusion regarding the sounds of heart and hence most candidates wrote “Dup” for “Lubb”.
- (x) Most candidates answered correctly.

– Stress on the use of biological/technical terms rather than common names.

– On Endocrine glands, train students to draw a tabular column stating the gland, its secretion, function of the hormone and the disorders due to Hypo and Hyper section.

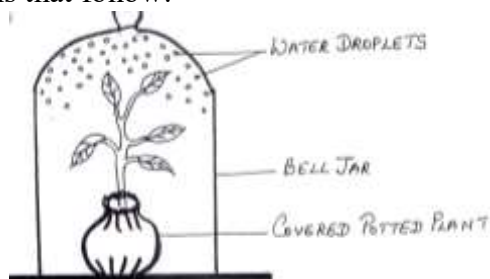
MARKING SCHEME

Question - 2

- (a)
 - (i) Photosynthesis.....(1)
 - (ii) The process by which plant cells containing chlorophyll prepare food / glucose from Carbon dioxide and water in the presence of Sunlight.....(2)
 - (iii) The Snail respire and gives out carbon dioxide. More CO₂ dissolved in water is available for photosynthesis(2)
 - (iv) The rate of photosynthesis increases as more CO₂ is available from the Snail that is respiring. Hence, more bubbles of oxygen are released(2)
 - (v) Hydrilla / Elodea(1)
 - (vi)
$$6 \text{CO}_2 + 12\text{H}_2\text{O} \xrightarrow[\text{Chlorophyll}]{\text{Sunlight}} \text{C}_6\text{H}_{12}\text{O}_6 + 6\text{H}_2\text{O} + 6\text{O}_2 \dots\dots\dots (2)$$
- (b)
 - (i) Smog(1)
 - (ii) Immunity....(1)
 - (iii) Implantation(1)
 - (iv) Menopause.....(1)
 - (v) ADH / Vasopressin.....(1)
 - (vi) Conjunctiva(1)
 - (vii) Presbyopia.....(1)
 - (viii) Population Density(1)
 - (ix) LUBB(1)
 - (x) Phagocytosis.....(1)

Question 3

- (a) An apparatus as shown below was set up to investigate a physiological process in plants. The setup was kept in sunlight for two hours. Droplets of water were then seen inside the bell jar. Answer the questions that follow:



- (i) Name the process being studied.
 - (ii) Explain the process named above in Q.3 (a) (i).
 - (iii) Why was the pot covered with a plastic sheet?
 - (iv) Suggest a suitable control for this experiment.
 - (v) Mention two ways in which this process is beneficial to plants.
 - (vi) List three adaptations in plants to reduce the above mentioned process. [5]
- (b) Briefly answer the following questions:
- (i) State two reasons for the increase of population in India.
 - (ii) What is the significance of amniotic fluid?
 - (iii) What is the function of ear ossicles?
 - (iv) Mention any two activities of the WHO.
 - (v) State Mendel's law of Dominance. [5]

Examiners' Comments

- (a) (i) Answered correctly by candidates.
(ii) A few candidates were unable to give a complete explanation.
(iii) Most candidates answered correctly, but a few failed to score as they did not mention that the prevention of water loss is from the soil.
(iv) Only a few candidates wrote the correct answer. Majority were unaware that even the stems of plants can transpire.
(v) The question was correctly answered by most candidates.

Suggestions for teachers

- Advise students to take Practical work seriously to enable them to learn the concepts in Osmosis, Photosynthesis and Transpiration.
- Ensure that answers are complete and relevant during examinations.
- Familiarise students with the activities of Red Cross and WHO.
- Give a clear understanding of reasons of Population explosion in India and World.

- (b) (i) Most candidates wrote the correct answer. However, a few did not read the question carefully and wrote about the population explosion in the world instead.
- (ii) Most candidates answered correctly.
- (iii) Most candidates lost marks as they related the function of ear ossicles to sound waves and not sound vibrations.
- (iv) Majority of candidates answered correctly. A few were confused and wrote the activity of the Red Cross instead of the WHO.
- (vi) Most candidates were confused with the three laws of Mendel and were unable to write the correct one.

- Make the study of genetics simple and clear. Students must be given a clear understanding of technical terms like Genotype, Phenotype, Genotypic ratio, Phenotypic ratio
- Students must practise examples of Monohybrid and Dihybrid Cross using Punnett square.
- Textbook explanations must be simplified for students so that they convey the answers in simple, short sentences.
- Students must practise writing definitions / explanations emphasising on operative terms.

MARKING SCHEME

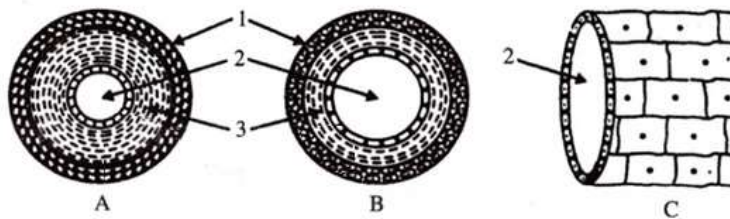
Question - 3

- (a) (i) Transpiration.....(1)
- (ii) It is the loss of water as water vapour from the aerial parts / stems and leaves of the plants...(2)
- (iii) To prevent evaporation of water from the soil....(1)
- (iv) An empty polythene bag with its mouth tied and kept in sunlight will show no droplets of water inside(1)
- (v) – Gives a cooling effect to the plant on hot days
 – Suction force is created for ascent of sap
 – Distribution of water and mineral salts (Any two(2)
- (vi) – Sunken Stomata
 – Stomata covered by hair
 – Fewer Stomata
 – Narrow leaves
 – Rolled or folded leaves
 – Leaves absent or modified into spines
 – Thick cuticle on leaves (Any three -----(3)
- (b) (i) – Illiteracy.
 – Traditional beliefs.
 – Mortality rate.

- Economic reason
- Religious & social customs.
- Desire for a male child.
- Lack of recreation. (any other relevant answer). Any two.....(2)
- Protects the embryo from mechanical shocks.
- (ii) - Keeps even pressure all around the embryo.
- Allows the foetus, some restricted movement.
- Prevents sticking of the foetus to the amnion. Any two.....(2)
- (iii) Amplifies sound vibration received by the tympanum & transmit it to inner ear/ Transfers sound vibrations from tympanum to cochlea.....(2)
- (iv) - To collect & supply information about occurrence of diseases of epidemic nature.
- To promote & support projects for research on diseases.
- To supply information on latest developments about the use of vaccines, cancer research, nutritional discoveries, and control of drug addiction.
- To suggest quarantine measures.
- To lay pharmaceutical standards.
- To organise campaigns for the control of epidemic & endemic diseases. Any two.....(2)
- (v) Law of Dominance: In a pair of Contrasting characters, only one is able to express itself while the other remains suppressed.....(2)

Question 4

(a) The diagrams given below are cross sections of blood vessels:



- (i) Identify the blood vessels A, B and C.
- (ii) Name the parts labelled 1 to 3.
- (iii) Name the type of blood that flows through A.
- (iv) Mention one structural difference between A and B.
- (v) In which of the above vessels does exchange of gases actually take place? [5]

(b) Differentiate between the following pairs on the basis of what is mentioned within brackets:

- (i) Diffusion and Osmosis (Definition)
- (ii) RBC and WBC (Shape)
- (iii) Tubectomy and Vasectomy (Part cut and tied)
- (iv) Vasopressin and Insulin (Deficiency disorder)
- (v) Rods and Cones of Retina (Type of pigment).

[5]

Examiners' Comments

- (a) (i) Most candidates answered correctly. Some did not observe the diagrams properly and labelled the blood vessels as RBC, WBC and platelet.
- (ii) A few candidates labelled the parts correctly. Most lost marks for writing inner, middle and outer layers.
- (iii) Candidates who did not identify the blood vessels correctly, wrote incorrect answers.
- (iv) Candidates who identified the blood vessels as blood cells lost marks.
- (v) Most candidates wrote the correct answer.
- (b) (i) Most candidates wrote the correct answers. However, a few failed to score as they wrote particles for molecules.
- (ii) Answered correctly by candidates. A few did not mention the exact shape of RBCs.
- (iii) Most candidates answered correctly. Some were confused with the male & female reproductive parts which are ligated and wrote one for the other.
- (iv) Many candidates were unsure of the hormone and the related disorder and were unable to score marks.
- (v) Most candidates wrote answers. A few misspelt the names of pigments.

Suggestions for teachers

- Train students to related photosynthesis and respiration as the end products of one process becomes the raw material for the other.
- While teaching the functions of sensory cells of retina, emphasis must be laid on the pigments and their functions in bright and dim light.
- Students must be advised to read the instructions given in the question carefully before answering.
- Guide students to differentiate between Pulmonary artery and Pulmonary vein, Placenta and Umbilical cord, chromatid and chromosome.
- Insist on students drawing labelled diagrams of the different phases in mitosis with a given number of chromosomes.
- Emphasize on the differences between Plant and Animal mitotic cell division.
- Train students to understand and state Mendel's laws in simple words, giving importance to operative words. Stress on the difference between Monohybrid and Dihybrid cross, F_1 and F_2 generation.

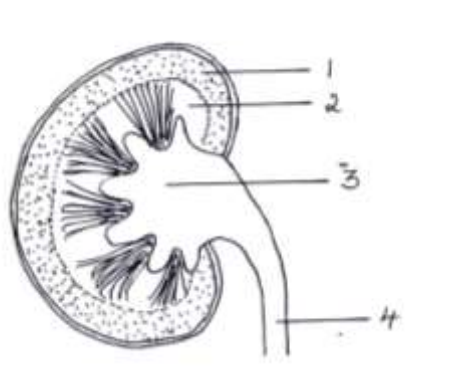
MARKING SCHEME

Question - 4

- (a) (i) A- Artery, B- Vein, C-Capillary.....(3)
- (ii) 1 – Connective tissue/ Tunica externa
2 – Lumen
3 - Muscular tissue/ Tunica media.....(3)
- (iii) A - Oxygenated.....(1)
- (iv)
- | <u>ARTERY</u> | <u>VEIN</u> |
|-------------------------|----------------------------------|
| a) Narrow lumen | a) Wide lumen |
| b) Thick muscular layer | b) Thin muscular layer |
| c) Valves are absent | c) Valves present |
| d) Elastic | d) Non Elastic (Any one)(2) |
- (v) Capillary.....(1)
- (b) (i) **Diffusion** – It is the free movement of molecules of a substance from the region of their higher concentration to the region of their lower concentration when the two are in a direct contact.
- Osmosis** - It is the diffusion of water molecules across a semi-permeable membrane from a more dilute solution to less dilute solution.(2)
- (ii) RBC – Biconcave disc shape; 7 micron in diameter.
WBC – Irregular amoeboid shape; 8-20 micron in diameter(2)
Tubectomy – Oviducts/Fallopian tubes
- (iii) Vasectomy – Sperm ducts/ Vasdeferens(2)
Vasopressin – Diabetes insipidus
- (iv) Insulin - Diabetes mellitus(2)
- (v) Rods - Rhodopsin
Cones - Iodopsin(2)

Question 5

- (a) The diagram given below shows a section of a human kidney. Study the diagram carefully and answer the questions that follow:



- (i) Label the parts numbered 1 to 4.
- (ii) Why does part '2' have a striped appearance?
- (iii) What is the fluid that passes down part '4'? Name the main nitrogenous waste present in it.
- (iv) Mention the structural and functional units of kidneys.
- (v) Name the two major steps in the formation of the fluid mentioned in Q. 5(a) (iii) [5]
- (b) Draw neat and labelled diagrams of the following:
- (i) Malpighian Capsule.
- (ii) A Myelinated Neuron: [5]

Examiners' Comments

- (a) (i) The question was correctly answered by most candidates.
- (ii) Most candidates wrote the correct answer. Some were unsure of the parts of the kidney and hence could not explain the striped appearance of medulla.
- (iii) Answered correctly by all candidates.
- (iv) Most candidates wrote the correct answer. A few were careless and wrote neuron for nephron.
- (v) Most candidates answered correctly.
- (b) (i) Majority of candidates drew the diagram of the entire nephron instead of just the Malpighian capsule. Some were unaware of the difference in diameter of the Afferent and Efferent arteriole. It was evident that candidates were not trained to draw this diagram.

Suggestions for teachers

- Interactive boards may be used to explain the process of urine formation.
- Advise students not to draw the entire nephron for Malpighian capsule.
- Significance related to difference in diameter of Afferent and Efferent arteriole must be explained.
- While teaching the structure of nephron, the different parts lying in Renal Cortex and Renal medulla must be emphasized.

(ii) Most candidates drew the correct diagram but some made labelling errors specially with Cyton and Axon and labelled one for the other. A few did not draw dendrites and Axon endings for the neuron.

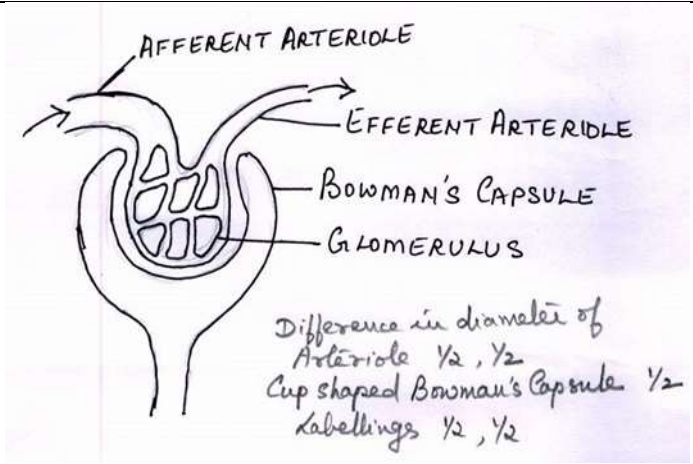
- Regular practice of diagrams showing cross sections of artery, vein and capillary and their structural differences must be stressed upon.
- Students must practice drawing the vertical section of the kidney. They must know as to why they draw stripes for medulla and dots for cortex.

MARKING SCHEME

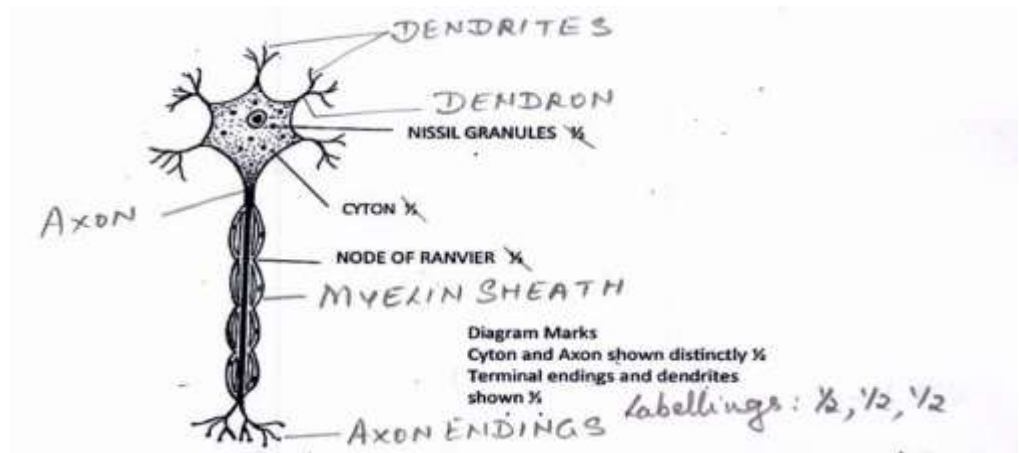
Question - 5

- (a) (i) 1. Cortex 2. Medulla 3. Pelvis 4. Ureter(4)
 (ii) Due to the presence of Henle's loops and collecting ducts of nephrons(1)
 (iii) Urine. Urea(2)
 (iv) Nephrons / Uriniferous tubules / Renal tubules / Kidney Tubules -----(1) tubes -- (0)
 (v) --- Ultrafiltration
 ----- Selective Reabsorption ----- (2)

(b) (i)

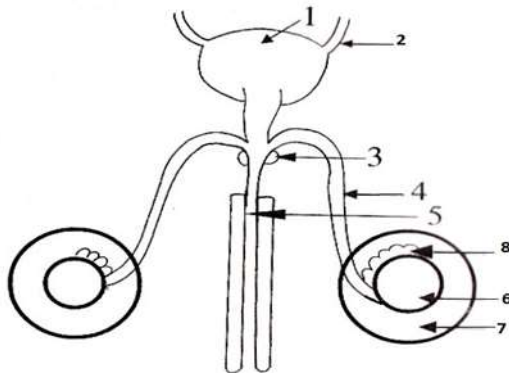


(ii)



Question 6

- (a) The diagram given below shows the male urinogenital system of a human being. Study the diagram and answer the questions that follow:



- (i) Label the parts numbered 1 to 8.
 (ii) Name the corresponding structure of part (4) in female reproductive system.
 (iii) What is the role of part 7? [5]
- (b) In a homozygous plant round seeds (R) are dominant over wrinkled seeds (r):
 (i) Draw a Punnett square to show the gametes and offspring when both the plants have heterozygous round seeds (Rr).
 (ii) Mention the Phenotype and Genotype ratios of the offsprings in F₂ generation.
 (iii) Name the sex chromosomes in human males and females.
 (iv) Briefly explain the term ‘Mutation’
 (v) What is the number of chromosomes in the gametes of human beings? [5]

Examiners’ Comments

- (a) (i) Most candidates were able to label the parts correctly. Part ‘3’ however was misspelt as ‘Prostrate’ instead of Prostate gland.
 (ii) Correctly answered by most candidates.
 (iii) Most candidates answered correctly.
- (b) (i) Most candidates did not know how to draw Punnett Square and hence answered using a criss cross method.
 (ii) Many candidates did not read and comprehend the question properly and hence lost marks for writing Dihybrid ratio instead of Monohybrid ratio.

Suggestions for teachers

- While teaching the reproductive system stress on the structure and function of every part.
- Give importance to the secretions of male accessory glands and their role in the production of semen.
- Students must practice a number of examples on Monohybrid and Dihybrid cross using various contrasting characters.

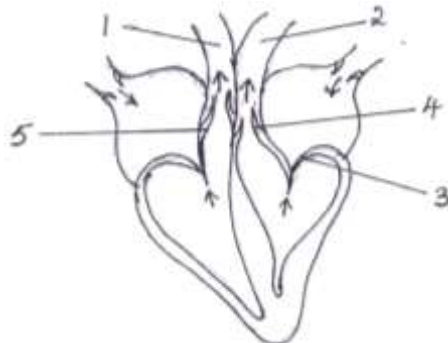
- (iii) Majority of candidates failed to score as they wrote just 'X' and 'Y' as sex chromosomes in males and females.
- (iv) Most candidates wrote the complete explanation, however, some missed out the word 'sudden' in the definition.
- (v) Most candidates were careless in answering this question. In haste they mentioned the number of chromosomes in somatic cells instead of gametes.

- Candidates must be made to practice diagrams of blood cells to know the difference in shape between RBCs and WBCs.
- Explain clearly the compounds formed by haemoglobin in combination with O₂, CO₂ and CO.
- Help students to make a list of vaccines and the diseases prevented as per the syllabus.

MARKING SCHEME													
Question - 6													
(a) (i)	1 – Urinary bladder 2 – Ureter 3 – Prostate gland 4 – Vas deferens/ Sperm duct 5 – Urethra 6 – Testis 7 – Scrotum / Scrotal sac 8 – Epididymus(8)												
(ii)	Oviduct.....(1)												
(iii)	To protect the testis & to regulate the temperature of the testis(1)												
(b) (i)	<table style="margin: auto; border-collapse: collapse;"> <tr> <td></td> <td style="text-align: center;">R</td> <td style="text-align: center;">r</td> <td></td> </tr> <tr> <td style="border: none;"></td> <td style="border: 1px solid black; padding: 5px; text-align: center;">RR</td> <td style="border: 1px solid black; padding: 5px; text-align: center;">Rr</td> <td style="border: none; padding-left: 5px;">R</td> </tr> <tr> <td style="border: none;"></td> <td style="border: 1px solid black; padding: 5px; text-align: center;">Rr</td> <td style="border: 1px solid black; padding: 5px; text-align: center;">rr</td> <td style="border: none; padding-left: 5px;">r</td> </tr> </table>		R	r			RR	Rr	R		Rr	rr	r
	R	r											
	RR	Rr	R										
	Rr	rr	r										
(ii)	Phenotype Ratio : 3 : 1 Genotype Ratio : 1 : 2 : 1(2)												
(iii)	Males - XY Females - XX.....(2)												
(iv)	Mutation: Sudden change in one or more genes/number and structure of chromosomes.....(1)												
(v)	23												

Question 7

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



- (i) Name the phase.
(ii) Which part of the heart is contracting in this phase? Give a reason to support your answer.
(iii) Name the parts labelled 1 to 4.
(iv) What type of blood flows through '2'?
(v) State the function of the part numbered '5'.
(vi) Name the membrane that covers the heart. [5]
- (b) Explain the following terms:
- (i) Greenhouse effect.
(ii) Turgor pressure.
(iii) Selective reabsorption.
(iv) Natality.
(v) Pulse.

Examiners' Comments

- (a) (i) Most candidates answered correctly.
(ii) Most candidates wrote the correct answer but a few could not write the correct reason as they failed to mention the closure of both cuspid valves.
(iii) Few candidates lost marks for labelling Pulmonary artery as Aorta and vice versa.
(iv) Candidates who incorrectly labelled parts 1 and 2 could not mention the type of blood in 2.
(v) Answered correctly by most candidates.
- (b) (i) Most candidates did not know the Greenhouse gases and hence wrote incorrectly. Many were confused with the gases of Acid rain and

Suggestions for teachers

- Train students to know the location of lenticels and stomata.
- Attach importance to technical terms for contraction and relaxation.
- Explain the structure of the heart with a simplified sketch to show the left and right sides of the heart, position of valves, blood vessels entering and leaving the heart.
- Lay emphasis on Acid rain and Greenhouse effect, the gases responsible and the hazards involved.

the Greenhouse effect.

- (ii) Few candidates wrote the correct answer. There was general confusion between Turgor and Wall pressure.
- (iii) Most candidates related Selective reabsorption to kidney instead of nephrons and failed to score.
- (vi) A complete explanation was missing in most answers. Candidates did not stress on keywords like – live, number and year. Many mistook Natality for Death rate.
- (v) Most candidates failed to score as their explanations were vague. They did not relate Pulse to heart beat.

- Train students to differentiate between Myopia and Hyperopia with the help of diagrams
- Use charts, models and diagrams to teach the different systems of the human body. Draw diagrams on the black board and instruct students to draw the same in their notebooks. The traditional chalk and talk method helps students to assimilate the concepts and develop drawing skills.

MARKING SCHEME	
Question - 7	
(a)	(i) Ventricular Diastole / Auricular Systole(1)
	(ii) Ventricles. - Tricuspid and Bicuspid valves are closed - Aortic and Pulmonary Semilunar valves.....(2)
(iii)	1. Pulmonary vein 2. Aorta 3. Bicuspid /Mitral/Left auriculo ventricular valve 4. Aortic Semilunar valve(4)
(iv)	Oxygenated blood(1)

(v)	Pulmonary Semilunar valves open during Ventricular systole and close during Ventricular diastole to prevent backflow of blood into ventricles (1)
(vi)	Pericardium(1)
(b) (i)	Phenomenon by which CO ₂ & other atmospheric gases like CH ₄ , N ₂ O, & CFC _s reflect the outgoing long wave infrared radiation back to earth , thereby warming the earth's surface.....(2)
(ii)	The pressure exerted by the protoplasm on the cell wall.....(2)
(iii)	Diffusion and reabsorption of useful molecules from the uriniferous tubule into blood....(2)
(iv)	Number of live births per thousand people per year.....(2)
(v)	Alternate expansion & elastic recoil of the wall of the artery during ventricular systole....(2)

Topics found confusing/difficult:

- Male reproductive system, accessory glands.
- Structure of human heart, location and functions of associated structures.
- Mendel's Laws, Monohybrid ratios of F₁ and F₂ generation.
- Activities of WHO and Red Cross.
- Interdependence of Photosynthesis and Respiration.
- Ear – parts and functions.
- Location of structures and organs in plants and animals.
- Definitions of Mutation, Photosynthesis, Pulse, Natality, Turgor Pressure
- Disorders due to Hypo and Hyper secretion of hormones.
- Identifying stages of Mitosis, Number of chromosomes in Somatic cells and gametes.
- Vaccines and the diseases prevented.
- Green House Effect and the gases that cause it.
- Acid rain and its effect on environment.
- Sulfa drugs and their action.
- Biodegradable and Non-biodegradable wastes
- Drawing and labelling Malpighian capsule.

Suggestions for Students :

- Make the best use of the 15 minute reading time to read the question paper thoroughly and plan writing answers.
- All questions are equally scoring and no question takes precedence over the other.
- Mark the 4 questions you know best in Section II.
- Do not overlook any part of a question and do not be hasty to conclude an answer.
- Do not be in a hurry to conclude an answer.
- Give importance to spellings of biological and technical terms.
- Explanations of biological terms/processes must be precise and complete.
- Importance must be given to drawing accurate, neat and labelled diagrams.
- Follow instructions given for each question.
- Answer the number of questions as asked in the rubrics of question paper.
- Repeated revision of topics will help in better understanding of concepts.
- Correct question number must be written for the answers before proceeding to answer.
- Do a comparative study of closely related topics.
- Make a list of abbreviations and vaccines related to your syllabus.
- Revise your answers after completion so as to identify errors or terms/words missed out while writing.
- Read the scope and syllabus prescribed for the subject.