

# QUALITATIVE ANALYSIS

## BIOLOGY (SCIENCE PAPER-3 )

### **SECTION I (40 Marks)**

*Attempt all questions from this Section*

#### **Question 1**

(a) Name the following: [5]

- (i) The process by which root hairs absorb water from the soil.
- (ii) The organ which produces urea.
- (iii) The kind of lens required to correct Myopia.
- (iv) The pituitary hormone which stimulates contraction of uterus during child birth.
- (v) The international health organization which educates people in accident prevention.

(b) Choose the correct answer from each of the four options given below: [5]

- (i) The prime source of chlorofluorocarbons is:
  - A. Vehicular emissions
  - B. Industrial effluents
  - C. Domestic sewage
  - D. Refrigeration equipments
- (ii) Penicillin obtained from a fungus is:
  - A. Antibiotic
  - B. Antiseptic

C. Antibody

D. Antiserum

(iii) Marine fish when placed in tap water bursts because of:

A. Endosmosis

B. Exosmosis

C. Diffusion

D. Plasmolysis

(iv) Surgical method of sterilization in a woman involves cutting and tying of:

A. Ureter

B. Uterus

C. Urethra

D. Oviduct

(v) Synthesis phase in the cell cycle is called so, because of the synthesis of more:

A. RNA

B. RNA and proteins

C. DNA

D. Glucose

(c) The statements given below are *incorrect*. **Rewrite the correct statement** [5]  
by changing the underlined words of the statements.

(i) The Graafian follicle, after ovulation turns into a hormone producing tissue called Corpus callosum.

(ii) Deafness is caused due to the rupturing of the Pinna.

(iii) Gyri and Sulci are the folds of Cerebellum.

(iv) Free movement of solutes in and out of the cell takes place across the cell membrane.

(v) The solvent used to dissolve the chlorophyll pigments while testing a leaf for starch is Soda lime.

(d) Given below are sets of five terms each. Rewrite the terms in correct order in a logical sequence. [5]

*Example:* Large intestine, Stomach, Mouth, Small intestine, Oesophagus.

*Answer:* Mouth → Oesophagus → Stomach → Small intestine → Large intestine.

(i) Fibrin, Platelets, Thromboplastin, Fibrinogen, Thrombin.

(ii) Cochlea, Malleus, Pinna, Stapes, Incus.

(iii) Receptor, Spinal cord, Effector, Motor neuron, Sensory neuron.

(iv) Uterus, Parturition, Fertilisation, Gestation, Implantation.

(v) Caterpillar, Snake, Owl, Frog, Green leaves.

(e) Choose the **ODD** one out of the following terms given and name the **CATEGORY** to which the others belong: [5]

(i) Aqueous humour, Vitreous humour, Iris, Central canal

(ii) Formalin, Iodine, DDT, Lime

(iii) ACTH, TSH, ADH, FSH

(iv) Phosphate, RNA, Sugar, Nitrogenous base

(v) Bile, Urea, Uric acid, Ammonia

(f) Given below are groups of terms. In each group the first pair indicates the relationship between the two terms. Rewrite and complete the second pair on a similar basis. [5]

Example: Oxygen : Inspiration : : Carbondioxide : Expiration

(i) Eye : Optic nerve : : Ear : \_\_\_\_\_

(ii) Cytoplasm : Cytokinesis : : Nucleus : \_\_\_\_\_

(iii) TT : Homozygous : : Tt : \_\_\_\_\_

(iv) Foetus : Amnion : : Heart : \_\_\_\_\_

(v) Adenine : Thymine : : Cytosine : \_\_\_\_\_

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

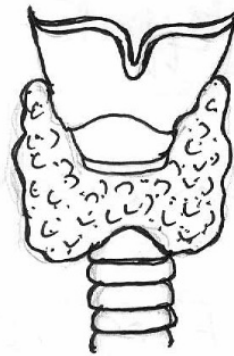
**Column A**

1. Sacculus
2. Birth rate
3. DNA and histones
4. Euro norms
5. Diabetes mellitus

**Column B**

- dynamic body balance
- Hyperglycemia
- Hypoglycemia
- Natality
- static body balance
- vehicular standards
- nucleosome

- (h) The diagram given below represents the location and structure of an endocrine gland. Study the same and answer the questions that follow: [5]



- (i) Name the endocrine gland shown in the diagram.
- (ii) Name the secretion of the gland which regulates basal metabolism.
- (iii) Name the mineral element required for the synthesis of the above mentioned hormone.
- (iv) Name the disease caused due to under secretion of the above mentioned hormone in children.
- (v) Name the disease caused due to hypersecretion of the above mentioned hormone.

## Comments of Examiners

- (a) (i) Most candidates wrote the correct answer. 'Inhibition' was written as an incorrect answer by some candidates.
- (ii) Most candidates answered correctly. A few wrote 'kidney' instead of 'liver'.
- (iii) The name of the lens was correctly written by most of the candidates.
- (iv) Many candidates answered correctly, but in several scripts spelling errors were noticed.
- (v) Some candidates wrote 'WHO' instead of 'Red Cross'.
- (b) (i) Most candidates wrote the correct answer. A few wrote 'vehicular emissions' instead of 'refrigeration equipments'.
- (ii) Most candidates answered correctly.
- (iii) Some candidates were confused between 'endosmosis' and 'exosmosis'.
- (iv) Most candidates answered correctly the surgical method of sterilization in a woman.
- (v) Most candidates were unsure of the correct option.
- (c) (i) (iii) Most of the candidates wrote the correct answer.
- (iv) A few candidates wrote 'semi permeable membrane' as the incorrect answer.
- (v) Most of candidates wrote 'iodine' instead of 'alcohol'.
- (d) (i) (iv) Many candidates misplaced the terms and hence could not write the correct logical sequence.
- (v) In the given set of terms, most candidates were able to write the correct order.

## Suggestions for teachers

- Stress upon learning the correct spellings of biological terms.
- While teaching the lesson on brain, stress on the structure and functions of Cerebrum, Cerebellum and medulla oblongata.
- The concept of endosmosis and exosmosis using hypotonic and hypertonic solution must be taught in laboratory with the help of practical experiments.
- Differentiate clearly between Corpus callosum and corpus luteum, disinfectant and antiseptic.
- Significance of semipermeable membrane in osmosis should be stressed upon.
- Appropriate biological terms should be used to show difference between the permeability of cell wall and cell membrane.
- Teach students the lesson on pollution keeping in mind the various pollutants, their sources, the effect on environment and ways and means to curb them.
- Explain the symptoms of Diabetes mellitus clearly to eliminate confusion regarding hyperglycemia and hypoglycaemia.

- (e) (i) The odd term was identified correctly by most candidates but the category was vague and mentioned as 'eye' in several cases.  
(ii) Most candidates were confused whether DDT was an antiseptic or a disinfectant.  
(iii) Most of the candidates chose the correct odd term and named the category correctly.  
(iv) Some candidates wrote 'nucleosome' instead of 'nucleotide'.  
(v) Many candidates identified the odd term as 'Ammonia' instead of 'Bile'.
- (f) (i) (v) Most candidates wrote the correct relationship between the terms. A few were unable to spell Guanine correctly.
- (g) (i) (v) Most candidates wrote the correct matching pairs. Some were confused with the function of Saccules.
- (h) (i) The endocrine gland shown in the diagram was correctly named by most candidates.  
(ii) Most of the candidates answered this part correctly.  
(iii) A large number of candidates were able to attempt this part correctly. A few wrote 'calcium' instead of 'Iodine'.  
(iv) Only a few candidates wrote the correct answer. Majority of them were confused between Cretinism and Myxoedema.  
(v) Many candidates wrote an explanation of the disease instead of its name.

## MARKING SCHEME

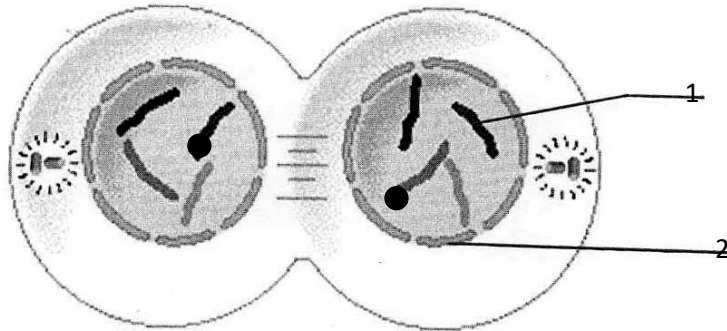
### Question 1

(a)	Name the following: (i) Endosmosis (ii) Liver (iii) Concave (iv) Oxytocin (v) Red Cross
(b)	Choose the correct answer: (i) D. Refrigeration equipments (ii) A. Antibiotic (iii) A. Endosmosis (iv) D. Oviduct (v) C. DNA
(c)	Correct Statements: (i) Corpus luteum (ii) Ear drum (iii) Cerebrum (iv) Cell wall (v) Methylated spirit / alcohol

(d)	<p>Terms in logical sequence:</p> <p>(i) Platelets → Thromboplastin → Thrombin → Fibrinogen → Fibrin</p> <p>(ii) Pinna → Malleus → Inus → Stapes → Cochlea</p> <p>(iii) Receptor → Sensory neuron → Spinal cord → Motor neuron → Effector</p> <p>(iv) Fertilisation → Uterus → Implantation → Gestation → Parturition</p> <p>(v) Green leaves → Caterpillar → Frog → Snake → Owl</p>
(e)	<p>Odd term and category:</p> <p>(i) Odd term – Central Canal Category – Parts of eye</p> <p>(ii) Odd term – Iodine Category – Disinfectants</p> <p>(iii) Odd term – ADH Category – Hormones of Anterior lobe of Pituitary gland</p> <p>(iv) Odd term – RNA Category – Parts of Nucleotide</p> <p>(v) Odd term – Bile Category – Nitrogenous wastes / Excretory substances</p>
(f)	<p>Words of second pair:</p> <p>(i) Auditory nerve</p> <p>(ii) Karyokinesis</p> <p>(iii) Heterozygous</p> <p>(iv) Pericardium</p> <p>(v) Guanine</p>
(g)	<p>Matching pairs:</p> <p>1. Sacculus — Static body balance</p> <p>2. Birth rate — Natality</p> <p>3. DNA and histones — Nucleosome</p> <p>4. Euronorms — Vehicular standards</p> <p>5. Diabetes mellitus — Hyperglycemia</p>
(h)	<p>(i) Thyroid</p> <p>(ii) Thyroxine</p> <p>(iii) Iodine / I<sub>2</sub> / I</p> <p>(iv) Cretinism</p> <p>(v) Exophthalmic goitre</p>

## Question 2

- (a) Study the diagram given below which represents a stage during the mitotic cell division and answer the questions that follow: [5]



- (i) Identify the stage giving suitable reasons.
- (ii) Name the parts numbered 1 and 2.
- (iii) What is the technical term for the division of nucleus?
- (iv) Mention the stage that comes before the stage shown in the diagram. Draw a neat labelled diagram of the stage mentioned.
- (v) Which is the cell division that results in half the number of chromosomes in daughter cells?
- (b) Differentiate between the following pairs on the basis of what is mentioned in brackets: [5]
- (i) Active Transport and Diffusion [*significance in plants*]
- (ii) Demography and Population density [*Definition*]
- (iii) Antibiotic and Antibody [*Source*]
- (iv) Renal cortex and Renal medulla [*Parts of the nephrons present*]
- (v) NADP and ATP [*Expand the abbreviation*]



## Comments of Examiners

- (a)(i) Majority of candidates could identify the stage correctly but could not give valid reasons.
- (ii) Most candidates answered correctly. Some candidates labelled nuclear membrane as cell membrane.
- (iii) Most candidates answered correctly the technical term for the division of nucleus.
- (iv) Most candidates were unsure of the sequence of mitotic stages. They drew metaphase instead of telophase. Many of them did not draw the required number of chromosomes.
- (v) This part of the question was answered correctly by most candidates.
- (b)(i) Most candidates wrote the definitions of active transport and diffusion instead of their significance in plants.
- (ii) Many candidates defined 'demography' correctly but the definition of 'population density' was incomplete.
- (iii) A number of candidates were vague in writing the source of antibody. They wrote 'WBC' instead of 'lymphocytes'.
- (iv) This part of the question was answered correctly by majority of the candidates.
- (v) Most candidates were unable to expand the abbreviation NADP.

### Suggestions for teachers

- Emphasise on the definite functions of each type of WBC.
- Give practice to students on the diagram of a vertical section of kidney and the arrangement of nephrons in it.
- Train students to clearly distinguish between Chromosome and Chromatid.
- Draw attention of the students towards the significance of diffusion, osmosis and active transport.
- Written practice must be given for definitions, emphasizing on operative terms.
- Advise students to use simple and short sentences to convey their answers.
- Make a list of all the biological abbreviations related to the syllabus.

## MARKING SCHEME

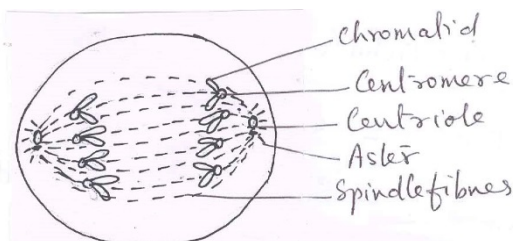
### Question 2

(a) (i) Telophase. Nuclear membrane reappears / Spindle fibres disappears / Cytokinesis begins / Chromatids become thin / daughter nuclei are formed. *(Any one)*

(ii) 1 – Chromosome  
2 – Nuclear membrane

(iii) Karyokinesis

(iv) Anaphase



Chromosomes moving towards the poles.

One labelling / Correct No. of Chromosomes.

(v) Meiosis

(b) (i) Active Transport – To absorb mineral ions from soil.

Diffusion – To take in carbon dioxide for photosynthesis and oxygen for respiration /  
Removal of Water vapour during transpiration / attract  
insects for pollination by spreading fragrance of flowers.

(ii) Demography – Statistical study of human population with reference to size, density and distribution.

Population density – Number of individuals per square km at any given time.

(iii) Antibiotic – Micro organisms

Antibody – Lymphocytes

(iv) Renal Cortex – Malpighian capsule, Proximal and distal convoluted tubules

Renal medulla – Loop Henle, Collecting ducts

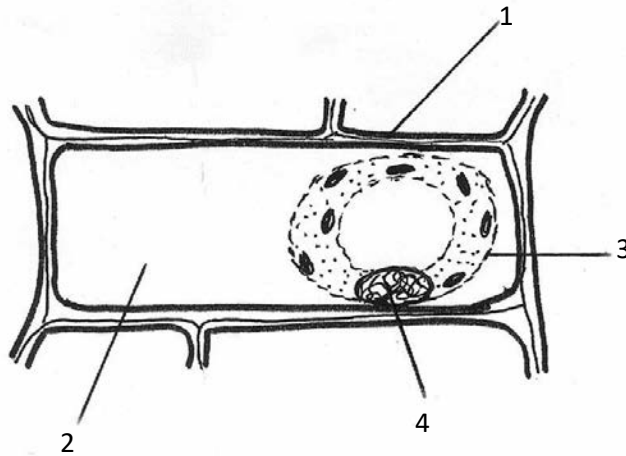
(v) NADP – Nicotinamide Adenine Dinucleotide Phosphate

ATP – Adenosine Tri Phosphate

### Question 3

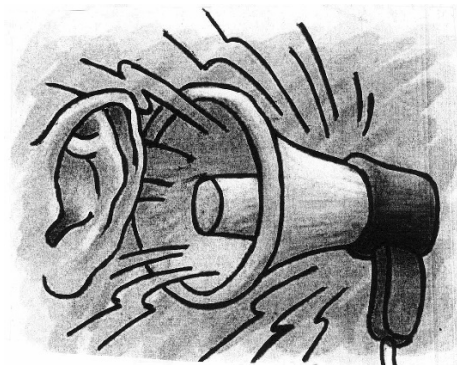
- (a) The diagram given below represents a plant cell after being placed in a strong sugar solution. Study the diagram and answer the questions that follow:

[5]



- (i) What is the state of the cell shown in the diagram?
- (ii) Name the structure that acts as a selectively permeable membrane.
- (iii) Label the parts numbered 1 to 4 in the diagram.
- (iv) How can the above cell be brought back to its original condition? Mention the scientific term for the recovery of the cell.
- (v) State any two features of the above plant cell which is not present in animal cells.
- (b) Given below is a representation of a kind of pollution. Study the same and answer the questions that follow:

[5]



- (i) Name the kind of pollution.

- (ii) List any three common sources of this pollution.
- (iii) Mention three harmful effects of this pollution on human health.
- (iv) Explain the term 'Pollutant'.
- (v) Name two soil pollutants.

### Comments of Examiners

- (a) (i) Majority of the candidates mentioned the process instead of the state of cell.
- (ii) Many candidates were unsure of the part of the cell which is selectively permeable.
- (iii) Most of the candidates labelled the diagram correctly. A few wrote 'space' instead of 'strong sugar solution' for the part numbered '2' in the diagram.
- (iv) Some candidates did not mention the term 'deplasmolysis' for the recovery of the cell.
- (v) Most of the candidates answered correctly the two features of the plant cell shown in the diagram.
- (b) Sub-parts (i), (ii), and (iii) were answered correctly by all candidates.
- (iv) Most candidates wrote incomplete explanation for the term 'Pollutant'.
- (v) Most candidates could name two soil pollutants correctly.

### Suggestions for teachers

- Teach students physiological processes in plants and the related experiments with a clear understanding of the aim of the experiment.
- In the laboratory, show students the changes observed in the state of the cell when placed in hypertonic and hypotonic solutions.
- Train students to be specific and to give clear and complete answers.
- Draw diagrams on the blackboard to help students assimilate and develop the required skill.
- Stress upon drawing accurate, neat and well labelled diagrams.

## MARKING SCHEME

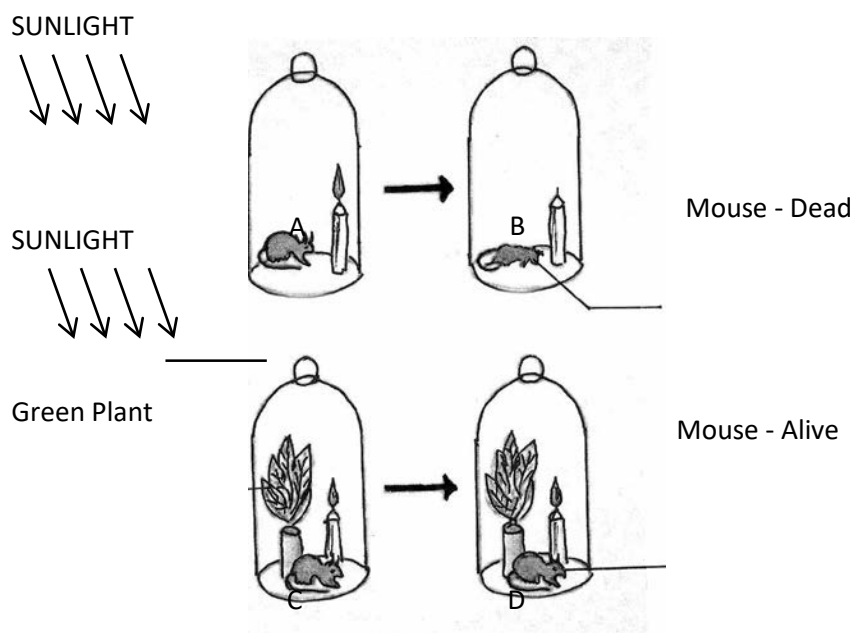
### Question 3

- |     |   |
|-----|---|
| (a) | (i) Flaccid / Plasmolysed                               |
|     | (ii) Plasma membrane                                    |
|     | (iii) 1. Cell wall                                      |
|     | 2. Strong sugar solution                                |
|     | 3. Cell membrane  |
|     | 4. Nucleus  |
|     | (iv) Keeping the cell in tap water / hypotonic solution |

	Deplasmolysis (v) Cell wall, Chloroplasts, large vacuole (Any two)
(b)	(i) Noise pollution (ii) Loudspeaker, Television, Radio, Loud conversation, Musical bands, etc (Any three) (iii) Loss of concentration, disturbs sleep, damage to eardrum, deafness, irritability, etc. (Any three) (iv) Any constituent when added to the environment / air, water or land deteriorates its natural quality. (v) Industrial wastes, Fertilizers, domestic wastes, Plastics, Pesticides, Biomedical wastes, etc. (Any two)

## Question 4

- (a) The diagrams given below represent the relationship between a mouse and a physiological process that occurs in green plants. Study the diagrams and answer the questions that follow: [5]



- Name the physiological process occurring in the green plant that has kept the mouse alive.
- Explain the physiological process mentioned above.
- Why did the mouse die in bell jar **B**?
- What is the significance of the process as stated in (i) for life on earth.

(v) Represent the above mentioned physiological process in the form of a chemical equation.

(b) Mention the exact location of the following:

[5]

(i) Prostate gland

(ii) Myelin sheath

(iii) Islets of Langerhans

(iv) Semi-circular canals

(v) Eustachian tube

### Comments of Examiners

- (a) (i) Most candidates wrote this process to be 'respiration' because of the presence of a mouse.  
(ii) Many candidates identified the process and explained it correctly.  
(iii) Most candidates did not relate photosynthesis to respiration.  
(iv) This sub-part was correctly answered by most candidates.  
(v) Majority of the candidates wrote the correct chemical equation, however, a few did not mention the factors.
- (b) (i) Most candidates were unable to give the exact location of the prostate gland.  
(ii) Many candidates answered correctly. A few mentioned it as 'around the neuron' instead of it surrounds the axon of neuron'. Sub-parts (iii), (iv) and (v) were answered correctly by most candidates.

### Suggestions for teachers

- Make use of charts, models and interactive smart boards to explain the parts of eye and ear.
- Acquaint students with the exact location of endocrine glands, the hormones secreted by them and their importance.
- Stress upon prepositions like 'in, on, between, around' while stating the exact location of organs and structures.
- Advise students to read the questions carefully before answering.
- Experiments must be set up to enable students to identify the factors necessary for photosynthesis.
- Explain to the students the location and role of the male accessory glands clearly.

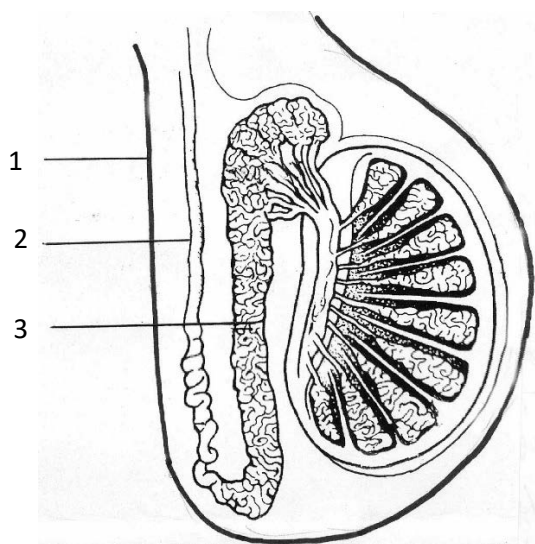
## MARKING SCHEME

### Question 4

- (a)
- (i) Photosynthesis
  - (ii) It is a process by which plant cells containing chlorophyll prepare food / glucose from  $\text{CO}_2$  and water using sunlight.
  - (iii)  $\text{O}_2$  was used up by the burning candle. Mouse dies due to lack of oxygen / asphyxiation.
  - (iv) – Provides food for all organisms  
– Provides  $\text{O}_2$  for respiration.
  - (v)  $6\text{CO}_2 + 12\text{H}_2\text{O} \xrightarrow[\text{Chlorophyll}]{\text{Sunlight}} \text{C}_6\text{H}_{12}\text{O}_6 + 6\text{H}_2\text{O} + 6\text{O}_2$
- (b)
- (i) Surrounds urethra close to its origin from urinary bladder.
  - (ii) Surrounds the axon of neuron.
  - (iii) In Pancreas
  - (iv) Inner ear / Part of the membranous labyrinth
  - (v) Connects middle ear to throat.

### Question 5

- (a) The diagram shown below is the longitudinal section of a testis of man. Study it carefully and answer the questions that follow: [5]



- (i) Label the parts numbered 1 to 3 in the diagram.

- (ii) In which part of the testis are the sperms produced?
- (iii) State the functions of the parts labelled 1 and 3 in the diagram.
- (iv) Name the cells that secrete Testosterone.
- (v) Draw a neat, labelled diagram of a sperm.
- (b) Give biological reasons for the following statements: [5]
- (i) Some women have facial hair like beard and moustache.
- (ii) Cutting of trees should be discouraged.
- (iii) In some xerophytes leaves are modified into spines.
- (iv) There is frequent urination in winter than in summer.
- (v) The left ventricle of the heart has a thicker wall than the right ventricle.

## Comments of Examiners

- (a) (i) Majority of candidates were able to label the parts asked in the diagram.
- (ii) Most candidates could name the part of the testis in which sperms are produced.
- (iii) Many candidates could not relate temperature regulation, storage and maturation of sperms to the functions of scrotum and epididymis.
- (iv) Most candidates answered this sub-part correctly.
- (v) The diagram of a sperm was largely drawn and labelled correctly.
- (b) (i) Few candidates could attempt this sub-part correctly. 'Overgrowth or over secretion of cortisones' was missing in most answers.
- (ii) A number of candidates were able to explain the biological reason for the statement 'cutting of trees should be discouraged'.
- (iii) Most of the candidates answered correctly.
- (iv) Many candidates did not relate the concept of sweat formation to urine output.
- (v) Most candidates answered this sub-part only partially. The reason for thickening of the right ventricle was missing in many answers.

## Suggestions for teachers

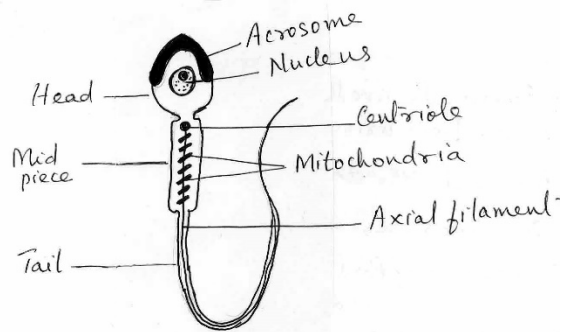
- Explain the importance of drawing neat, labelled, and accurate diagrams.
- Urine output in different seasons must be taught clearly and the effect of diuretics must also be discussed.
- Students must be familiarised with the location and function of the different parts of testis.
- Construct similar questions in Unit Tests and Term Examinations for practice and clarify the possible errors.
- Teach students to reason out practical examples in daily life related to the environment.



## MARKING SCHEME

### Question 5

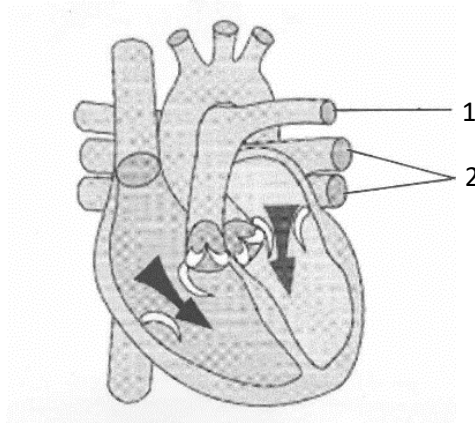
- (a)
- (i) 1. Scrotum / Scrotal sac  
2. Sperm duct / Vas deferens  
3. Epididymis
  - (ii) Seminiferous tubules
  - (iii) 1. maintains a temperature of 2 to 3° C less than body temperature for the maturation of sperms.  
3. Stores the sperms till they become mature.
  - (iv) Ley dig cells / Interstitial cells
  - (v)



- (b)
- (i) Overgrowth of Adrenal Cortex and more secretion of Cortisones stimulates development of certain male characteristics.
  - (ii) – Contribute to bringing rain  
– Provide O<sub>2</sub> for breathing  
– Natural homes for wild animals  
– Can result in soil erosion, droughts, flash floods. (Any two)
  - (iii) – To reduce the surface area exposed to sunlight, number of stomata are reduced.  
– To prevent excessive transpiration.
  - (iv) Sweat glands are less active in winter, all the excess water in the body has to be eliminated as urine by the kidneys.
  - (v) Left ventricle has to pump blood till our toes and to the head against gravity. So its walls are thicker. Right ventricle has thinner walls because it pumps blood only upto the lungs.

## Question 6

- (a) The diagram given below represents a section of the human heart. Answer the questions that follow: [5]



- (i) Which parts of heart are in the diastolic phase? Give a reason to support your answer.
- (ii) Label the parts numbered 1 and 2 in the diagram. What type of blood flows through them?
- (iii) What causes the heart sounds 'LUBB' and 'DUP'?
- (iv) Name the blood vessels that supply oxygenated blood to the heart muscles.
- (v) Draw neat labelled diagrams of a cross section of an artery and a vein.
- (b) Give appropriate **biological / technical** terms for the following: [5]
- (i) The type of immunity that exists in our body due to our genetic makeup.
- (ii) The suppressed allele of a gene.
- (iii) The accessory gland in human males whose secretion activates the sperms.
- (iv) An apparatus that measures the rate of water uptake in a cut shoot due to transpiration.
- (v) The kind of twins formed from two fertilised eggs.
- (vi) A pair of corresponding chromosomes of the same size and shape, one from each parent.
- (vii) The mild chemical substance which when applied on the body kills germs.

- (viii) The type of waste generated in hospitals and pathological laboratories.
- (ix) The antiseptic substance in tears.
- (x) Cellular components of blood containing haemoglobin.

## Comments of Examiners

- (a) (i) Most candidates identified the parts of the heart in diastolic phase but many of them could not give a reason to support the answer.
- (ii) Many candidates were confused in labelling the parts numbered 1 and 2 and the type of blood flowing in them.
- (iii) The causes, the heart sounds 'LUBB' and 'DUB' was answered correctly by most candidates.
- (iv) Majority of the candidates named the blood vessels that supply oxygenated blood to heart muscles correctly.
- (v) Several errors were noticed in drawing the cross section of an artery and a vein, their labelling and the size of lumen.
- (b) (i)-(ii) These sub parts were correctly answered by most candidates.
- (iii) Some candidates wrote 'Prostate gland' instead of 'Seminal Vesicles'.
- (iv)-(viii) Most candidates answered correctly.
- (ix) Most candidates wrote 'lysosome' instead of 'lysozyme'.
- (x) Most candidates could give the correct biological term for the cellular components of blood containing haemoglobin.

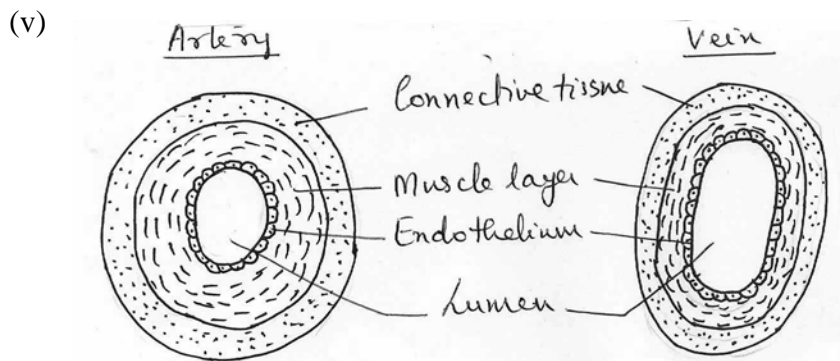
### Suggestions for teachers

- Give the technical terms for contraction and relaxation of heart and explain their importance.
- Regular practise of diagrams showing cross sections of artery, vein and capillary to be done in class. Structural differences between them to be stressed upon.
- Train students to draw a simple sketch of the heart, to learn the right and left side of the heart, position of valves and the blood vessels entering and leaving the heart.

## MARKING SCHEME

### Question 6

- (a) (i) Ventricles  
Tricuspid and Bicuspid valves are open / semilunar valves are closed.
- (ii) 1. Pulmonary artery, Deoxygenated blood.  
2. Pulmonary veins, Oxygenated blood.
- (iii) LUBB – Closure of Tricuspid and bicuspid valves.  
DUP – Closure of semilunar valves
- (iv) Coronary arteries

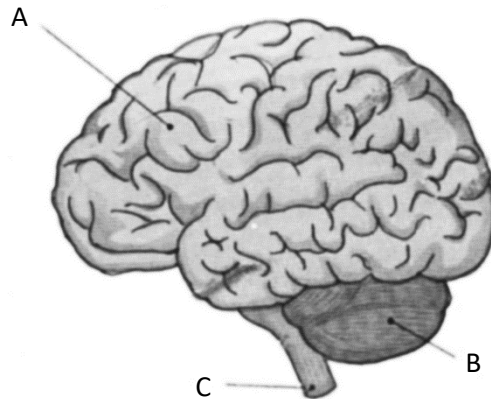


(Any two labelling).

- (b) (i) Innate / Inborn / Natural  
(ii) Recessive  
(iii) Seminal vesicles  
(iv) Potometer  
(v) Fraternal  
(vi) Homologous chromosomes  
(vii) Antiseptic  
(viii) Biomedical waste  
(ix) Lysozyme  
(x) RBCs / Erythrocytes

## Question 7

- (a) In a homozygous pea plant, axial flowers (**A**) are dominant over terminal flowers (**a**). [5]
- (i) What is the phenotype and genotype of the **F<sub>1</sub>** generation if a plant bearing pure axial flowers is crossed with a plant bearing pure terminal flowers?
  - (ii) Draw a Punnett square board to show the gametes and off springs when both the parent plants are heterozygous for axial flowers.
  - (iii) What is the phenotypic ratio and genotypic ratio of the above cross shown in (ii).
  - (iv) State Mendel's Law of Dominance.
  - (v) Name two genetic disorders commonly seen in human males.
- (b) The diagram given below is an external view of the human brain. Study the same and answer the questions that follow: [5]



- (i) Name the parts labelled A, B and C in the diagram.
- (ii) State the main functions of the parts labelled A and B.
- (iii) What are the structural and functional units of the brain? How are the parts of these units arranged in A and C?
- (iv) Mention the collective term for the membranes covering the brain.
- (v) What is the function of Cerebrospinal fluid?

## Comments of Examiners

- (a) (i) Most candidates answered correctly. However, a few mentioned heights of plants instead of the position of flowers.  
(ii) This sub part of the question was correctly answered by most candidates.  
(iii) The phenotypic ratio and genotypic ratio asked in the question was answered correctly by most candidates.  
(iv) Majority of candidates answered correctly but a few wrote the second or third law of Mendel.  
(v) The sub part was answered correctly by most candidates.
- (b) (i) Most candidates labelled cerebrum and cerebellum correctly. A few labelled the 'spinal cord' as 'medulla oblongata'.  
(ii) The main functions of the parts labelled A and B were stated correctly by majority of the candidates.  
(iii) Most candidates were confused with the arrangement of neurons in the cerebrum and the spinal cord.  
(iv) Most candidates could name the collective term for the membranes covering the brain.  
(v) The function of cerebrospinal fluid was answered correctly by most candidates.

## Suggestions for teachers

- Give a clear understanding of technical terms like Phenotype, Genotype, Genotypic ratio, Phenotypic ratio, etc.
- 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<sub>1</sub> and F<sub>2</sub> generations.
- Explain the structure of brain and the immediate emerging part of the brain, the medulla oblongata which continues down as the spinal cord.
- Give a number of examples on monohybrid cross for practise.
- Make the study of genetics simple and clear.

## MARKING SCHEME

### Question 7

- (a) (i) Phenotype – All bear axial flowers  
Genotype – All are heterozygous dominant for axial flowers.
- (ii)
- |   |    |    |
|---|----|----|
|   | A  | a  |
| A | AA | Aa |
| a | Aa | aa |
- (iii) Phenotypic ratio – 3 : 1  
Genotypic ratio – 1 : 2 : 1

	<p>(iv) Law of Dominance : Out of a pair of contrasting characters, only one is able to express while the other remains suppressed.</p> <p>(vi) Colour blindness, Haemophilia, Pattern baldness. (<i>Any two</i>)</p>
(b)	<p>(i) A – Cerebrum B – Cerebellum C – Spinal Cord</p> <p>(ii) A – Seat of memory, intelligence, consciousness, will power, control voluntary actions, helps us to think, reason, invent, plan (<i>Any one</i>) B – Maintains body balance, posture, equilibrium, co-ordinates muscular activities (<i>Any one</i>)</p> <p>(iii) Neurons / nerve cells A – Outer grey matter has cytons and inner white matter has axons. C – Outer white matter has axons and inner grey matter has cytons.</p> <p>(iv) Meninges</p> <p>(v) Protects the brain / spinal cord from injuries and shocks.</p>

## GENERAL COMMENTS

Topics found  
difficult /  
confusing by  
candidates

- Distinction between Myopia and Hyperopia and their correction.
- Medulla Oblongata from spinal cord.
- Monohybrid and Dihybrid cross.
- Activities of WHO and Red Cross.
- Functions of WBCs.
- Male Accessory glands – location and functions.
- Parts of Membranous labyrinth.
- Nuclear changes in Mitosis.
- Brain and Spinal cord with reference to arrangement of neurons.
- Plasmolysed cell – Labelling and causes.
- Arrangement of terms in logical sequence.
- Identifying odd term and mentioning the category of the rest.
- Tonicity of solution and its effect on cells.
- Biological abbreviations and expansions.
- Internal structure of human heart and its working.
- Structural differences between artery and vein.
- Types of immunity.
- Mendel's Laws.





**Suggestions  
for  
candidates**

- Read the scope and syllabus prescribed for Biology.
- Repeated revision of topics will help in better understanding of concepts.
- Maintain a list of abbreviations related to your syllabus.
- Practise drawing neat, labelled diagrams.
- Give importance to biological and technical terms.
- Make the best use of the 15 minutes reading time to understand and assimilate the questions. Make your choice of questions as per the rubrics and plan and organise your thoughts.
- Mark the four questions you know best in Section II.
- Follow carefully the instructions given for each question.
- Write the correct question number before answering.
- Be methodical and organised while answering. Do not separate the sub-sections of a question.
- Handwriting must be neat and legible.
- Do not attempt more questions than asked for in the question paper.
- Go through your answers carefully and check for mistakes in terms of spellings or expression.
- Do not be in a hurry to conclude an answer. Never omit any part of a question.
- Practise writing the overall balanced equation for Photosynthesis.
- Revise your answers thoroughly after completion so as to eliminate errors or terms/words missed out.