

**BIOLOGY**  
**SCIENCE Paper -3**

(Two hours)

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

*You will not be allowed to write during the first 15 minutes.*

*This time is to be spent in reading the Question Paper.*

*The time given at the head of this Paper is the time allowed for writing the answers.*

*Attempt all questions from Section I and any four questions from Section II.*

*The intended marks for questions or parts of questions are given in brackets {}.*

**SECTION I (40 Marks)**

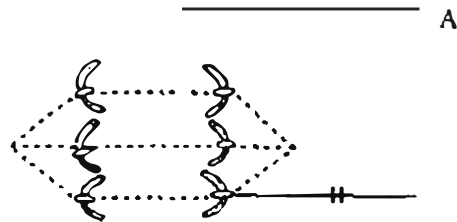
*Attempt all questions from this Section*

**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.
- (b) The statements given below are False. Rewrite the correct form of the statement by changing the word which is underlined: [5]
- (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 Antisel.**
  - (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:
- A. Cholera
  - B. Mumps
  - C. Tuberculosis
  - D. Measles
- (iv) Which one of the following is mainly associated with the maintenance of the posture?
- A. Cerebrum
  - B. Cerebellum
  - C. Thalamus
  - D. Pons.
- (v) An example of non-biodegradable waste is:
- A. Vegetable peels
  - B. Sewage
  - C. Livestock waste
  - D. DDT. [5]
- (d) Mention the exact location of the following structures:
- (i) Thylakoids
  - (ii) Organ of Corti
  - (iii) Lenticels
  - (iv) Bicuspid valve
  - (v) Loop of Henle. [5]

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



- (i) Identify the stage of cell division.
- (ii) Name the parts labelled A and B.
- (iii) What is the unique feature observed in this stage?
- (iv) 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            |

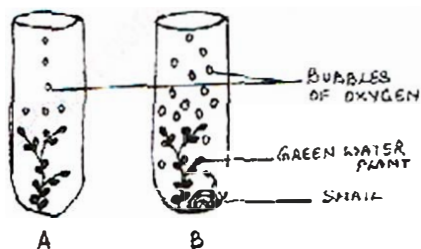
[5]

**SECTION II (40 Marks)**

*Attempt any four questions from this Section*

**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:



- Name the physiological process that releases the bubbles of oxygen.
- Explain the physiological process as mentioned above in Q.2(a)(i).
- What is the purpose of keeping a snail in test-tube 'B'?
- Why does test-tube 'B' have more bubbles of oxygen?

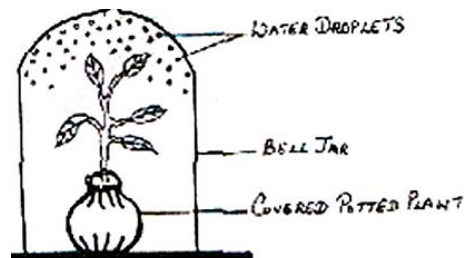
- (v) Give an example of a water plant that can be used in the above experiment.
- (vi) Write the overall chemical equation for the above process. [5]

(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]

### 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).

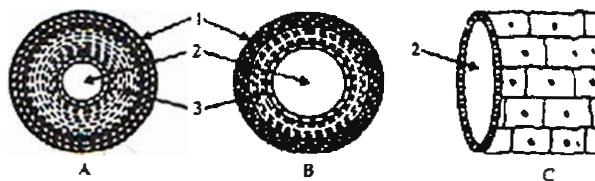
- (iii) Why was the pot covered with a plastic sheet?
- (iv) Suggest a suitable control for this experiment.
- (v) Mention two ways in which this process is beneficial to plants.
- (vi) List three adaptations in plants to reduce the above mentioned process. [5]

(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]

#### Question 4

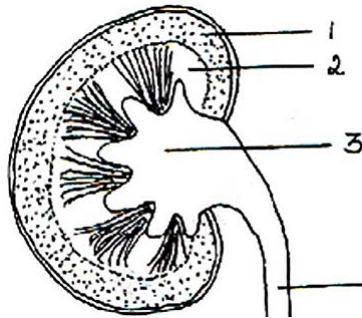
(a) The diagrams given below are cross sections of blood vessels:



- (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]

**Question 5**

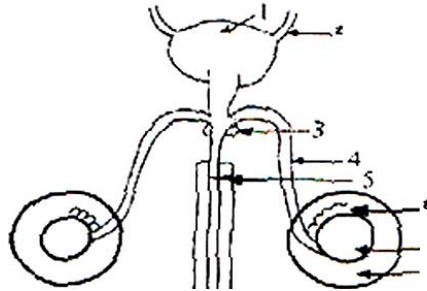
- (a) The diagram given below shows a section of a human kidney. Study the diagram carefully and answer the questions that follow:



- (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]

**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:

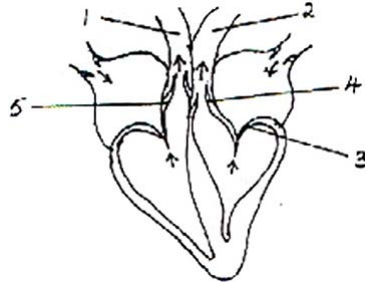


- (i) Label the parts numbered 1 to 8.
- (ii) Name the corresponding structure of part (4) in female reproductive system.
- (iii) What is the role of part 7? }5}
- (b) In a homozygous plant round seeds (R) are dominant over wrinkled seeds (r):
- (i) Draw a Punnett square to show the gametes and offspring when both the plants have heterozygous round seeds (Rr).
- (ii) Mention the Phenotype and Genotype ratios of the offsprings in F<sub>2</sub> 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}



**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. [5]