
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: [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 organisation which educates people in accident prevention.

This paper consists of 11 printed pages and 1 blank page.

- (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** by changing the underlined words of the statements. [5]
- (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]

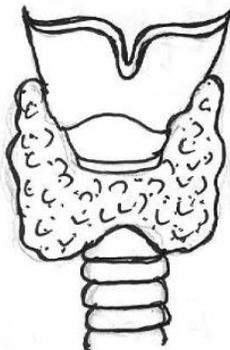
Column A

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.

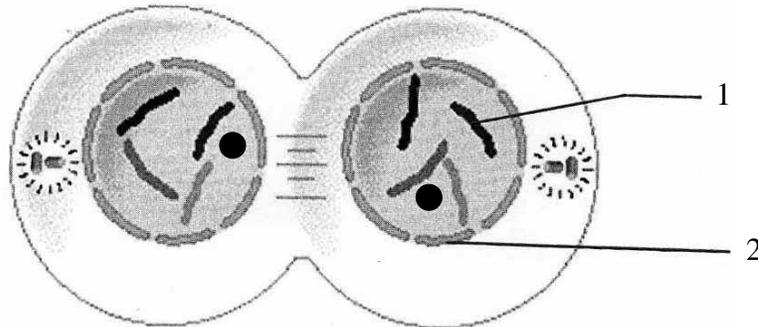
- (iii) Name the mineral element required for the synthesis of the above mentioned hormone.
- (iv) Name the disease caused due to undersecretion of the above mentioned hormone in children.
- (v) Name the disease caused due to hypersecretion of the above mentioned hormone.

SECTION II (40 Marks)

*Attempt any **four** questions from this Section*

Question 2

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



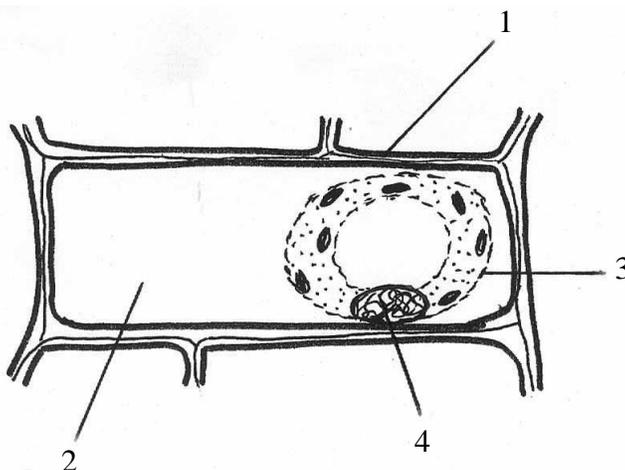
- (i) Identify the stage giving suitable reasons.
- (ii) Name the parts numbered 1 and 2.
- (iii) What is the technical term for the division of nucleus?
- (iv) Mention the stage that comes before the stage shown in the diagram. Draw a neat labelled diagram of the stage mentioned.
- (v) Which is the 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*]

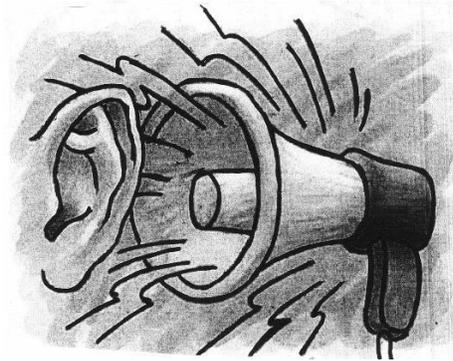
Question 3

(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.

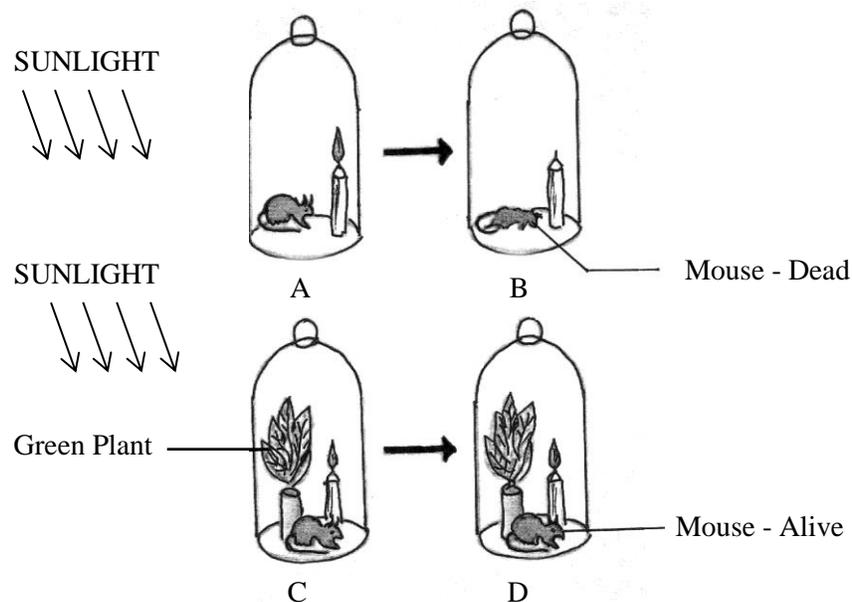
- (b) Given below is a representation of a kind of pollution. Study the same and answer the questions that follow: [5]



- (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.

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]



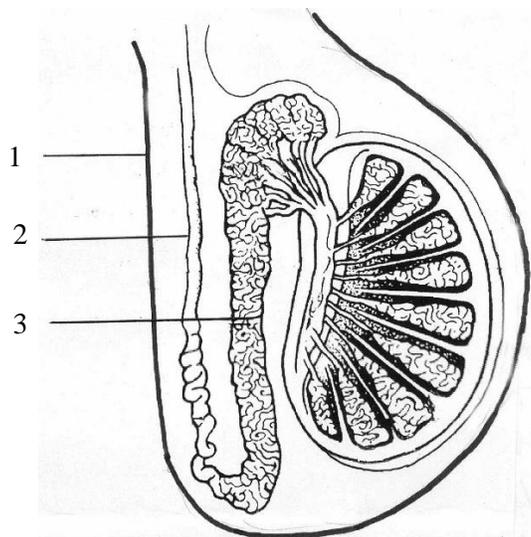
- (i) Name the physiological process occurring in the green plant that has kept the mouse alive.
- (ii) Explain the physiological process mentioned above.
- (iii) Why did the mouse die in bell jar **B**?
- (iv) What is the significance of the process as stated in (i) for life on earth.
- (v) Represent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

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]

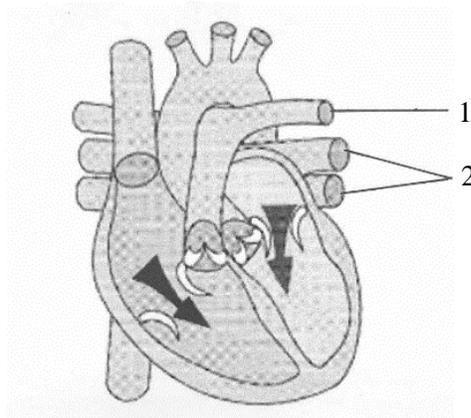


- (i) Label the parts numbered 1 to 3 in the diagram.
- (ii) In which part of the testis are the sperms produced?
- (iii) State the functions of the parts labelled 1 and 3 in the diagram.

- (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.

Question 6

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



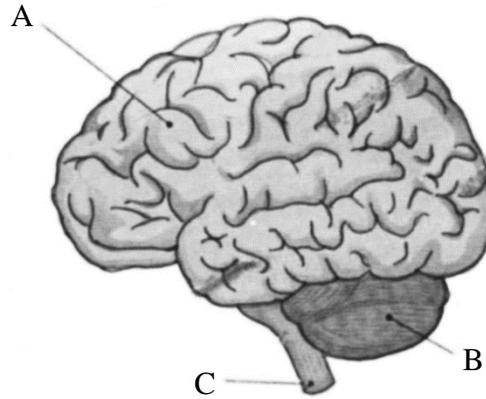
- (i) Which parts of heart are in the diastolic phase? Give a reason to support your answer.
- (ii) Label the parts numbered 1 and 2 in the diagram. What type of blood flows through them?
- (iii) What causes the heart sounds 'LUBB' and 'DUP'?
- (iv) Name the blood vessels that supply oxygenated blood 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.

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 **F₁** 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 offsprings 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?