

# BIOLOGY

## PAPER - 1

### (THEORY)

#### (Botany and Zoology)

*(Three hours)*

*(Candidates are allowed additional 15 minutes for **only** reading the paper.*

*They must NOT start writing during this time.)*

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*Answer **all** questions in Part I and **six** questions in Part II, choosing **two** questions from each of the three sections A, B and C.*

*All working including rough work, should be done on the same sheet as, and adjacent to, the rest of the answer.*

*The intended marks for questions or parts of questions are given in brackets [ ].*

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### PART I (20 Marks)

*Answer **all** questions.*

#### Question 1

- (a) Give a brief answer for each of the following: [4]
- (i) What happens if excess fertilizers are added to the soil?
  - (ii) Why are the annual rings absent in plants growing along the coastal areas?
  - (iii) What is a Punnett-square used for?
  - (iv) Malignant tumours are considered dangerous. Why?
- (b) Each of the following statements/ questions has four suggested answers. Choose the correct option in each case: [4]
- 1. Gene therapy can be used to correct one of the following:
    - (i) SCID
    - (ii) HIV
    - (iii) Typhoid
    - (iv) Hepatitis

2. The dark coloured dead wood present in the central region of old trees is called:
- (i) Spring wood
  - (ii) Sap wood
  - (iii) Duramen
  - (iv) Alburnum
3. Which of the following statements is correct?
- (i) Surgical methods of contraception do not prevent gamete formation.
  - (ii) In E.T. techniques, embryos are always transferred into the uterus.
  - (iii) Oral pills are very popular contraceptives among the rural women.
  - (iv) All STDs are not completely curable.
4. The Hardy Weinberg's equilibrium is associated with:
- (i) Ionic equilibrium.
  - (ii) Population genetics.
  - (iii) Osmotic balance.
  - (iv) None of these.
- (c) Give a scientific term for each of the following: [4]
- (i) Development of fruit without fertilization.
  - (ii) The process of mRNA synthesis on a DNA template.
  - (iii) A plant part excised from its original location and used for initiating a culture.
  - (iv) The surgical removal of a section of vas deferens.
- (d) Expand the following abbreviations: [4]
- (i) PKU
  - (ii) GIFT
  - (iii) DNA
  - (iv) GMO
- (e) Name the scientists who have contributed to the following: [4]
- (i) Principle of Limiting Factor.
  - (ii) The recapitulation theory.
  - (iii) Discovered the fossil of *Archaeopteryx*.
  - (iv) Described double fertilisation in plants.

## PART II (50 Marks)

### SECTION A

Answer any *two* questions.

#### Question 2

- (a) Describe different types of natural selection with the help of graphs. [3]
- (b) Give *two* chromosomal similarities between man and apes. [1]
- (c) Give *two* distinguishing features of the *Cro-Magnon man*. [1]

#### Question 3

- (a) Describe how the origin of life from abiotic substances was proved experimentally by Miller and Urey. [3]
- (b) Give *one* significant difference between *Biogeny* and *Cognogeny*. [1]
- (c) What is a *vestigial organ*? Give *one* example. [1]

#### Question 4

- (a) What are the basic postulates of Darwinism? What is the objection against Darwinism? [3]
- (b) Write *two* distinctive features of *Australopithecus*. [1]
- (c) Define *atavism*. [1]

### SECTION B

Answer any *two* questions.

#### Question 5

- (a) Draw a well labelled diagram of the L.S. of an anatropous ovule just before fertilization. [4]
- (b) Write short notes on the following: [4]
  - (i) Endosperm
  - (ii) Amniocentesis
- (c) Give *four* significant differences between *active* and *passive* absorption of water in plants. [2]

**Question 6**

- (a) Briefly describe the mechanism of development of a dicot embryo. [4]
- (b) Give *two* significant differences between each of the following: [4]
  - (i) Racemose and Cymose inflorescence
  - (ii) Self-pollination and Cross pollination
- (c) Write a brief note on MTP. [2]

**Question 7**

- (a) *Fertilization in humans is a physio-chemical process.* Explain. [4]
- (b) Give a graphical representation of the C<sub>4</sub> cycle. [4]
- (c) Give the names of foetal membranes in mammals. [2]

**SECTION C**

*Answer any two questions.*

**Question 8**

- (a) Describe *lac-operon*. [4]
- (b) What are *green manures*? Why are biofertilisers preferred over chemical fertilisers? [4]
- (c) Define: [2]
  - (i) Biopiracy
  - (ii) Pleiotropy

**Question 9**

- (a) Define *hybridization*. Explain the technique of hybridization in plants. [4]
- (b) What are the implications of the loss of biodiversity? [4]
- (c) Give *one* significant difference between: [2]
  - (i) Hydrophytes and Xerophytes
  - (ii) Inbreeding and Outbreeding

**Question 10**

- (a) Give *four* applications of recombinant DNA technology. [4]
- (b) Write short notes on: [4]
  - (i) Haemophilia
  - (ii) Down's Syndrome
- (c) Explain the process of sex determination in humans. [2]