

# 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]