

**BIOLOGY**  
**PAPER – 1**  
**(THEORY)**  
**(Botany and Zoology)**

*(Three hours)*

**Maximum Marks: 70**

*(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 are *vestigial organs*?
  - (ii) Define root *pressure*.
  - (iii) What is *incomplete dominance*?
  - (iv) What is *genetic conservation*?
- (b) Each of the following question(s)/ statement(s) has four suggested answers. Choose the correct option in each case. [4]
1. Monadelphous stamens are those which:
- (i) united into more than two bundles
  - (ii) united into two bundles
  - (iii) unite into one bundle
  - (iv) remain free

2. Determination of skin colour is an example of:

- (i) co-dominance
- (ii) polygenic inheritance
- (iii) incomplete dominance
- (iv) Pleiotropy

3. 'Bt' cotton is resistant to:

- (i) insects
- (ii) draught
- (iii) salt
- (iv) Herbicides

4. Haemophilia is a:

- (i) Y linked disorder
- (ii) Autosomal sex disorder
- (iii) X linked disorder
- (iv) Deficiency disorder

(c) Give a scientific term for each of the following:

[4]

- (i) Maximum number of individuals that an environment can support.
- (ii) Exhibition of superiority of the hybrid over both of its parents.
- (iii) The functional unit of gene.
- (iv) The development of an embryo without the occurrence of fertilization.

(d) Expand the following abbreviations:

[4]

- (i) SCP
- (ii) ZIFT
- (iii) IPM
- (iv) PGA

- (e) Name the scientists who are associated with the following: [4]
- (i) Reverse transcription
  - (ii) DNA fingerprinting
  - (iii) Mutation
  - (iv) Mass Flow Hypothesis

## **PART II (50 Marks)**

### **SECTION A**

*Answer any two questions.*

#### **Question 2**

- (a) Give *three* differences between living and non-living organisms in levels of organization. [3]
- (b) State the Theory of Recapitulation. [1]
- (c) Give the difference between frame-shift mutation and substitution mutation. [1]

#### **Question 3**

- (a) State *three* similarities between *Australopithecus* and *Apes*. [3]
- (b) Define genetic drift. [1]
- (c) What is *abiogenesis*? [1]

#### **Question 4**

- (a) Give an account of the different types of natural selection. [3]
- (b) Define Neo-Darwinism. [1]
- (c) What are coacervates? [1]

## SECTION B

Answer any *two* questions

### Question 5

- (a) Give *four* anatomical differences between a dicot root and monocot root. [4]
- (b) State the importance of water to plants. [4]
- (c) Differentiate between: [2]
  - (i) Absorption spectrum and action spectrum
  - (ii) Racemose and cymose inflorescence

### Question 6

- (a) Give an account of the follicular phase of the menstrual cycle. [4]
- (b) Explain the process of spermatogenesis. [4]
- (c) Define: [2]
  - (i) Implantation
  - (ii) Capacitation

### Question 7

- (a) Give the functions of placenta in human females. [4]
- (b) Explain the development of micro sporangium in plants. [4]
- (c) Define: [2]
  - (i) Triple fusion
  - (ii) Porogamy

## SECTION C

Answer any *two* questions.

### Question 8

- (a) Give *four* differences between *linkage* and *crossing over*. [4]
- (b) Explain the Meselson and Stahl's experiment for semiconservative replication of DNA. [4]
- (c) State *two* goals of the Human Genome Project. [2]

### Question 9

- (a) What is biodiversity? Mention the implications of the loss of biodiversity. [4]
- (b) Give *any four* causes of cancer. [4]
- (c) Mention the causative agent and the preventive measures for each of the following: [2]
  - (i) Dengue
  - (ii) Amoebiasis

### Question 10

- (a) Briefly discuss the reasons for addiction to alcohol. [4]
- (b) Explain sex determination in honey bees. [4]
- (c) What is *bio fortification*? What role does it play in improving food production? [2]