

# BIOLOGY

## PAPER – 1

### (THEORY)

(Maximum Marks: 70)

(Time allowed: 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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*This paper comprises of TWO PARTS – Part I and Part II.*

*Answer all questions.*

*Part I contains twenty questions of one mark each.*

*Part II consists of Section A, B & C.*

*Section A contains seven questions of two marks each*

*Section B contains seven questions of three marks each, and*

*Section C contains three questions of five marks each.*

***Internal choices have been provided in two questions in Section A, two questions in Section B and in all three questions of Section C.***

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### PART I (20 Marks)

*Answer all questions.*

#### Question 1

- (a) Answer the following questions briefly and to the point: [8×1]
- (i) Name the most common motile spore of fungi.
  - (ii) State the chromosome number in the endosperm of onion.
  - (iii) Give the use of *test cross*.
  - (iv) Mention the use of *Lactobacillus*.
  - (v) What will happen if a child does not get colostrum in his early childhood?
  - (vi) What is the shape of the pyramid of number in a single tree ecosystem?
  - (vii) What is the biological significance of golden rice production?
  - (viii) *Bt crops are resistant to pests*. Name the gene responsible for pest resistance.

- (b) Each of the following questions has four choices. Choose the best option in each case: [4×1]
- (i) Capacitation refers to the process of changes in the:
- (1) Testis
  - (2) Sperm
  - (3) Ovary
  - (4) Ovum
- (ii) MTP is considered to be safe up to how many weeks of pregnancy?
- (1) Six
  - (2) Eight
  - (3) Twelve
  - (4) Eighteen
- (iii) Which of the following is a vestigial organ in humans?
- (1) Pinna
  - (2) Coccyx
  - (3) Tail
  - (4) Molars
- (iv) Secondary sewage treatment is mainly a:
- (1) Chemical process
  - (2) Biological process
  - (3) Mechanical process
  - (4) Physical process
- (c) Give one significant contribution of each of the following scientists: [4×1]
- (i) Gamow
  - (ii) Chargaff
  - (iii) T.H. Morgan
  - (iv) Alec Jeffery
- (d) Define the following: [2×1]
- (i) Life span
  - (ii) Natality

- (e) Give reason: [2×1]
- (i) Retrovirus is considered to be an exception to the central dogma.
  - (ii) The rate of Ozone depletion is greater in Antarctica.

## PART II

### SECTION A (14 Marks)

(Answer *all* questions)

**Question 2** [2]

- (a) Draw a labelled diagram of human ovum.

**OR**

- (b) Draw a labelled diagram of human sperm.

**Question 3** [2]

If phenotype of father is blood group 'O' and genotype of mother is heterozygous 'A', what are the possible genotypes and phenotypes of the offspring?

**Question 4** [2]

Mention *four* features of pBR<sub>322</sub>.

**Question 5** [2]

State four measures taken by the government to control high level of air pollution in cities.

**Question 6** [2]

In recent years, there has been large scale loss of biodiversity. Mention *four ways* in which humans are responsible for it.

**Question 7** [2]

Mention *any one* symptom of elephantiasis. Name its causative agent.

**Question 8** [2]

- (a) Mention any two properties of DNA that make it an ideal genetic material.

**OR**

- (b) Give *two* differences between Darwinism and the theory of mutation.

**SECTION B (21 Marks)**

*(Answer all questions)*

**Question 9**

[3]

(a) Explain the steps involved in artificial hybridization.

**OR**

(b) What are the main objectives of plant breeding programmes?

**Question 10**

[3]

Differentiate between infectious diseases and non-infectious diseases. Give *two* examples of each.

**Question 11**

[3]

Define:

(a) Mutualism

(b) Commensalism

(c) Amensalism.

**Question 12**

[3]

Define species-area relationship. What is the significance of the slope of regression? Show with the help of a graph.

**Question 13**

[3]

Give *six* features of genetic code.

**Question 14**

[3]

State the measures to be taken by the owner of a dairy farm to improve the quality of milk and the quantity of its production.

**Question 15**

[3]

(a) Draw a labelled diagram of the T.S of anther.

**OR**

(b) Draw a labelled diagram of the LS of anatropous ovule.

**SECTION C (15 Marks)**

(Answer *all* questions)

**Question 16**

[5]

- (a) How has biotechnology been useful in controlling nematode infection in plants? Explain the technique involved in this process.

**OR**

- (b) Answer the following:

- (i) What are *molecular scissors*? What is their role in rDT?  
(ii) Explain the steps involved in *downstream processing*, in biotechnology.

**Question 17**

[5]

- (a) Expand the following terms and explain them briefly:

- (i) GIFT  
(ii) ZIFT  
(iii) RCH  
(iv) ICSI  
(v) IVF

**OR**

- (b) Classify the methods of contraception. Write short notes on *any two* of the methods mentioned by you.

**Question 18**

[5]

- (a) Answer the following questions:

- (i) If 10000 K cal energy is available at the level of producers, calculate the amount of energy at the level of secondary consumer.  
(ii) A snapdragon plant with red flowers was crossed with a plant with white flowers. It produced pink progeny in the F1 generation. Explain the principle of inheritance involved with the help of Punnett square.

**OR**

- (b) Describe the process of DNA replication in prokaryotes.