# 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.

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(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 $pBR_{322}$.

**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.