

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.)

This paper comprises **TWO PARTS** – Part I and Part II.

Answer **all** questions.

Part I consists of **one** question of 20 marks having six subparts.

Part II consists of Sections A, B and C.

Section A consists of **seven** questions of **two** marks each.

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

Section C consists of **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.

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

PART I (20 Marks)

Answer **all** questions.

Question 1

(a) Answer the following questions briefly and to the point:

[8×1]

- (i) How many chromosomes are present in male gamete of a rat?
- (ii) Why is haemophilia uncommon in females?
- (iii) Name the disease-resistant variety of cowpea developed by plant breeding technique.
- (iv) Define *Brood parasitism*.
- (v) Name the vegetative propagule of *Bryophyllum*.
- (vi) Which geological era was dominated by reptiles?
- (vii) Define *polygenic inheritance*.
- (viii) What is *Dobson unit*?

- (b) Each of the following sub-parts, (i) to (iv) has four choices. Choose the best [4×1]
option in each case:
- (i) If 10 individuals in a laboratory population of 100 mice die during the period of one year, the death rate in this population will be:
- (1) 110
 - (2) 0·01
 - (3) 0·1
 - (4) 90
- (ii) The flowers which open their petals to expose their reproductive parts to allow pollination are called:
- (1) Cleistogamous
 - (2) Geitonogamous
 - (3) Chasmogamous
 - (4) Autogamous
- (iii) Which of the following is paired incorrectly:
- (1) Cyclosporin A - *Trichoderma polysporum*
 - (2) Streptokinase - *Saccharomyces cerevisiae*
 - (3) Swiss Cheese - *Propionibacterium*
 - (4) Penicillin - *Penicillium*
- (iv) The pathogen which causes Syphilis:
- (1) *Neisseria*
 - (2) *Chlamydia*
 - (3) *Treponema*
 - (4) *Papilloma virus*
- (c) Give *one* significant contribution of each of the following scientists: [2×1]
- (i) F. Griffith
 - (ii) P. Ehrlich
- (d) Expand the following: [2×1]
- (i) IUI
 - (ii) ADA
- (e) Define the following: [2×1]
- (i) Biopiracy
 - (ii) Aneuploidy

- (f) Give a reason for each of the following: [2×1]
- (i) Cyanobacteria increase the productivity in paddy fields.
 - (ii) The shape of the pyramid of biomass in an aquatic ecosystem is inverted.

PART II

SECTION A (14 Marks)

(Answer *all* questions)

Question 2

[2]

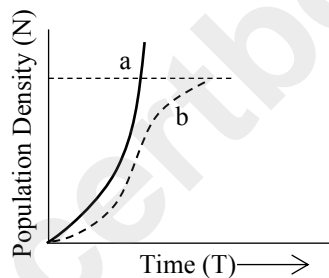
Give one significant difference between the following:

- (i) *Linkage* and *crossing over*
- (ii) *Transition* and *transversion*

Question 3

[2]

Study the graph given below and answer the questions that follow:



- (i) In the absence of predators which one of the two curves would appropriately depict the prey population? Give a reason.
- (ii) Time has been shown on X-axis and there is a parallel dotted line shown above. Explain the significance of this dotted line.

Question 4

[2]

What is biogas? Name *any two* main constituents of biogas.

Question 5

[2]

Explain two characteristics of cancer cells.

Question 6 [2]

(a) Draw a labelled diagram of a germinating pollen grain with at least *four* labellings.

OR

(b) Draw a labelled diagram of a mature human ovum with at least *four* labellings.

Question 7 [2]

What is *outbreeding*? How is it useful in animal breeding?

Question 8 [2]

(a) What is *biomagnification*? Write *two* effects of biomagnification.

OR

(b) Write a short note on the contribution of Ahmed Khan of Bangalore.

SECTION B (21 Marks)

(Answer *all* questions)

Question 9 [3]

Give *three* adaptations in organisms by which they avoid predation.

Question 10 [3]

(a) Define *decomposition*. Explain main steps involved in the process of decomposition.

OR

(b) Write *three* causes and *three* effects of cultural eutrophication.

Question 11 [3]

- (i) Write *two* differences between *homologous* organs and *analogous* organs.
- (ii) Give *one* example of homologous organs and *one* example of analogous organs found in plants.

Question 12 [3]

Describe the process of double fertilization in angiosperms. What is its significance?

Question 13 [3]

What is a *bioreactor*? Explain important features of a Stirred tank bioreactor.

Question 14 [3]

Give *three* significant differences between *asexual reproduction* and *sexual reproduction*.

Question 15 [3]

(a) Explain the process of *spermatogenesis* in humans.

OR

(b) Give an account of *hormonal control* of oogenesis.

SECTION C (15 Marks)

(Answer *all* questions)

Question 16 [5]

(a) Explain the various steps involved in Recombinant DNA technology.

OR

(b) Explain the steps involved in the production of human insulin by Recombinant DNA technology.

Question 17 [5]

(a) (i) Give an account of Meselson and Stahl's experiment.

(ii) What is the significance of Meselson and Stahl's experiment?

OR

(b) (i) Describe the Oparin Haldane Theory of origin of life.

(ii) The tadpole larva of amphibians resembles fishes. How does this observation support evolution?

Question 18 [5]

(a) Draw a labelled diagram to show the life cycle of *Plasmodium*.

OR

(b) Draw a labelled diagram to show replication of HIV in human cells.