

# 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 **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 [ ].

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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) 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)

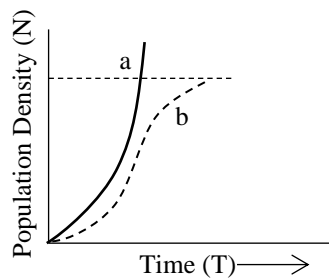
**Question 2** [2]

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.