

# 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 five 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**

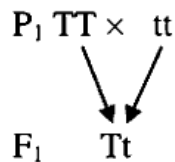
- (a) Answer the following questions briefly and to the point: [8×1]
- (i) Name the antibody which is most effective in allergies.
  - (ii) What is the function of GEAC ?
  - (iii) What is a *clone*?
  - (iv) What do detritus food chains begin with?
  - (v) Give the full form of EFB.
  - (vi) How many chromosomes are present in meiocytes of a fruit fly?
  - (vii) Name the common ancestor of apes and man.
  - (viii) Give the scientific term used for the preservation of germplasm at a very low temperature.

(b) Each of the following sub-parts, (i) to (iv) has four choices. Choose the best option in each case: [4×1]

(i) Eyelids in human foetus separate in:

- (1) 14 weeks
- (2) 16 weeks
- (3) 24 weeks
- (4) 40 weeks

(ii) Study the given monohybrid cross:



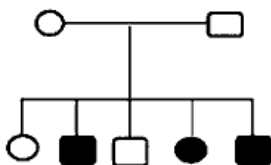
A test cross for this  $F_1$  will be:

- (1)  $\text{Tt} \times \text{TT}$
- (2)  $\text{Tt} \times \text{tt}$
- (3)  $\text{Tt} \times \text{Tt}$
- (4)  $\text{TT} \times \text{tt}$

(iii) Montreal Protocol aims at:

- (1) Reduction of ozone depleting substances
- (2) Biodiversity conservation
- (3) Control of water pollution
- (4) Control of  $\text{CO}_2$  emission.

(iv) In the given pedigree chart, the trait shown is:



- (1) Autosomal dominant
- (2) Autosomal recessive
- (3) X-linked
- (4) Y-linked

- (c) Give *one* significant contribution of each of the following scientists: [4×1]
- (i) Wallace
  - (ii) R. Mishra
  - (iii) G. Gamow
  - (iv) Sanger
- (d) Define the following: [2×1]
- (i) Carrying capacity
  - (ii) Homologous chromosomes
- (e) Give a reason for each of the following: [2×1]
- (i) Bagging is essential in artificial hybridisation.
  - (ii) Climax stage is achieved quickly in secondary succession as compared to primary succession.

## PART II

### SECTION A (14 Marks)

(Answer *all* questions)

**Question 2** [2]

Enumerate *any four* essential features of good and effective poultry farm management practices.

**Question 3** [2]

What is a *single cell protein*? How is it significant for human welfare?

**Question 4** [2]

(a) List *four* reasons for drug addiction.

**OR**

(b) List *four* effects of alcoholism on human health.

**Question 5** [2]

State *four* features of flowers pollinated by insects.

**Question 6** [2]

What is *reproductive fitness*? Explain it with the help of an example.

**Question 7****[2]**

Give *one* significant difference between *primary lymphoid organs* and *secondary lymphoid organs*. Give *one* example of each.

**Question 8****[2]**

(a) Explain the term *biofortification*. How is this technique useful for the production of *golden rice*?

**OR**

(b) Write a short note on *Electrophoresis*.

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**SECTION B (21 Marks)**

(Answer *all* questions)

**Question 9****[3]**

Explain the evolution of long neck of giraffe according to Charles Darwin.

**Question 10****[3]**

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

**OR**

(b) Draw a labelled diagram of the internal structure of human ovary.

**Question 11****[3]**

Describe the structure of a nucleosome with the help of a well-labelled diagram.

**Question 12****[3]**

(a) Explain the *Rivet Popper* hypothesis.

**OR**

(b) Define:

- (1) Standing crop
- (2) Stenothermal organisms
- (3) Niche

**Question 13****[3]**

Give the biological names of the following:

- (i) The mould from which penicillin is obtained.
- (ii) Baker's yeast.
- (iii) The microbe used to control insect larvae growing on cotton.
- (iv) The microbe used to produce Swiss cheese.
- (v) The fungus that is being developed as a biocontrol agent.

**Question 14****[3]**

Explain the different types of endosperms in angiosperms.

**Question 15****[3]**

A homozygous pea plant with round seed coat and yellow cotyledons is crossed with another homozygous pea plant having wrinkled seed coat and green cotyledons.

- (i) Give the types of gametes produced by plants of  $F_1$ -generation.
- (ii) Give the dihybrid phenotypic ratio with the corresponding phenotypes.

- (iii) State the Mendel's principle involved in this cross.

**SECTION C (15 Marks)**

(Answer *all* questions)

**Question 16****[5]**

- (a) Describe the physico-chemical events that take place during fertilization in humans.

**OR**

- (b)
  - (i) Define and give the role of amniocentesis.
  - (ii) Name the causative agent and give *any one* symptom of Gonorrhoea.
  - (iii) What is the significance of dispersal of seeds? Give any two points.
  - (iv) What are seasonal breeders? Give an example.
  - (v) How is the chromosome number maintained in sexually reproducing organisms?

**Question 17****[5]**

- (a)
  - (i) What are *restriction endonucleases*? Give the rules of their nomenclature.
  - (ii) Explain the mechanism of action of restriction endonucleases that makes them suitable for genetic engineering.

**OR**

- (b)
  - (i) Explain what are the desirable characteristics of an ideal cloning vector used in rDNA technology.
  - (ii) Describe *two* vectorless methods of gene transfer used in rDNA technology.

**Question 18****[5]**

- (a) Give a graphic representation of carbon cycle in nature.

**OR**

- (b) Give a graphic representation of phosphorus cycle in nature.