

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 contains one question of 20 marks having four subparts.

Part II consists of Section A,B and 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.

PART I (20 Marks)

Answer all questions

Questions 1

(a) Answer the following questions briefly and to the point: [8x1]

- (i) How are biofortified maize and bean considered nutritionally improved?
- (ii) Mention the difference between spermiogenesis and spermiation.
- (iii) Mention the shape of pyramid of number in an aquatic ecosystem.
- (iv) What is unusual about bamboo flowering?
- (v) What is meant by metastasis?
- (vi) What will happen if a child does not get colostrum in his early childhood?
- (vii) What is meant by ecological services? Give the estimated cost.
- (viii) What is the significance of crossing over?

(b) Each of the following questions has four choices. Choose the best option in each case: [4x1]

(i) A restriction enzyme called Eco RI is expected to cleave DNA at the following sequence

- (1) G T A T A C
- (2) G A A T T C
- (3) A A G T T C
- (4) A A G C T T

(ii) In ecological succession from pioneer to climax community, the biomass

- (1) is not related with ecosystem
- (2) decreases continuously
- (3) increases continuously
- (4) is maximum in the middle succession

(iii) In commensalism

- (1) Both partners are benefited
- (2) Both partners are harmed
- (3) Weaker is benefited while stronger is unharmed
- (4) None of the above

(iv) Darwin finches are an excellent example of

- (1) Brood parasitism
- (2) Connecting link
- (3) Adaptive radiation
- (4) Seasonal migration

(c) (i) Give one significant contribution of each of the following scientists:

[4x1

- (1) G. Gamow
- (2) R. Mishra
- (3) A. Sturtevant
- (4) Temin and Baltimore

(ii) Expand the following

[4x

- (1) IUCN
- (2) IARI
- (3) MALT
- (4) MRI

(d) Define the following

- (1) Somaclone
- (2) Sere

(e) Give a reason for each of the following

- (1) Hybrid seeds have to be raised every year
- (2) Aneuploidy leads to variation

PART II
SECTION A (14 Marks)

Answer *all* questions

Question 2

(a) Discuss the contrivances to prevent self pollination.

OR

(b) Give the steps in decomposition

Question 3

Explain latitudinal gradient in the distribution of species

Question 4

Explain how sticky ends are formed and get joined during rDNA technology

Question 5

Give two characteristic features of each of the following

- (a) Dryopithecus
- (b) Homo-neanderthalensis

Question 6

List any four symptoms of Down's syndrome

Question 7

(a) What is the number of chromosomes in the following cells of a human female?

- (i) Primary oocyte
- (ii) Ootid
- (iii) Secondary Oocyte
- (iv) Follicle cells

OR

(b) How is the milk production regulated by hormones in human female? Explain.

Question 8

Write a short note on electrostatic precipitators.

SECTION B (21 Marks)

Answer *all* questions

Question 9

Explain pleiotropy with references to starch synthesis in pea seeds

Question 10

Study the table given below. Do not copy the table, but write the answers in the correct order.

Crop	Variety	Resistant to
Wheat	(a) -----	Leaf and stripe rust
(b) -----	Pusa A-4	Shoot and fruit borer
Cow pea	(c) -----	Bacterial blight
(d) -----	Pusa Sadabahar	TMV
Flat bean	(e) -----	Aphids
Brassica	(f) -----	White rust

Question 11

(a) Explain the steps involved in artificial hybridisation

OR

(b) Give the steps in plant breeding

Question 12

Explain isolation of gene of interest by electrophoresis

Question 13

(a) Draw a labelled diagram of human ovum

OR

(b) Draw a labelled diagram of human sperm

Question 14

Describe the effect of oxygen on evolution to show that reducing atmosphere is essential for a synthesis.

Question 15

Explain the mechanism of sex determination in human. How is it different in birds?

SECTION C (15 Marks)

Answer *all* questions

Question 16

- Explain the events between pollination and fertilization in plants
- What makes the nucleopolyhedrovirus a desirable biological control agent?
- What is the significance of ecological succession?

OR

- Explain the different steps in xerarch succession.
- What is a bioreactor? Name the different types and mention two points of difference between the two.

Question 17

(a) Describe the process of transcription in prokaryotes

OR

(b) What is an operon? Who first proposed this concept? Describe the major steps involved in lac operon.

Question 18

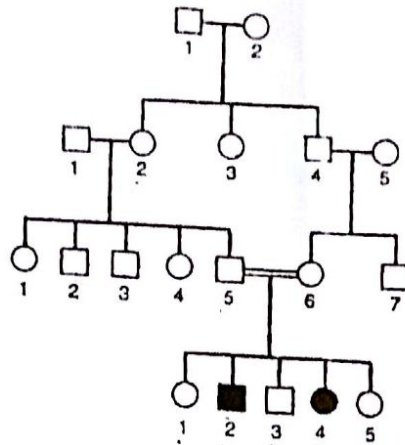
(i) Geitonogamy is functionally a cross pollination, but genetically similar to autogamy. Explain. [5]

(ii) Give the importance of these bioactive product

(a) alpha-1-antitrypsin

(b) alpha-lactalbumin

(iii) Study the given pedigree chart and answer the questions that follow



(a) Is the trait sex linked or autosomal

(b) Is the trait recessive or dominant

(c) Why two lines are drawn between 5 and 6 of the third generation?

(d) Give the genotype of the parent of the first generation and all the members of the fourth generation.

OR

(i) Explain the ZIFT. How is IUT different from it?

(ii) Mention how e-waste is produced and disposed off. Write the solution for its treatment.

(iii) Who demonstrated the semi-conservative replication of DNA? Explain the experiment in details. [5]