PART I (20 Marks)

Answer all questions.

Question 1

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

(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: [4x1]

(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:
   \[ P_1 \text{ TT} \times \text{ tt} \]
   \[ F_1 \text{ Tt} \]
   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: [4x1]

   (i) Wallace
   (ii) R. Mishra
   (iii) G. Gamow
(iv) Sanger
(d) Define the following:
   (i) Carrying capacity
   (ii) Homologous chromosomes
(e) Give a reason for each of the following:
   (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
Enumerate any four essential features of good and effective poultry farm management practices.

Question 3
What is a single cell protein? How is it significant for human welfare?

Question 4
(a) List four reasons for drug addiction.

OR

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

Question 5
State four features of flowers pollinated by insects.

Question 6
What is reproductive fitness? Explain it with the help of an example.

Question 7
Give one significant difference between primary lymphoid organs and secondary lymphoid organs. Give one example of each.

Question 8
(a) Explain the term biofortification. How is this technique useful for the production of golden rice?

OR

(b) Write a short note on Electrophoresis.
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.
(b) OR 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) OR Define:
   (1) Standing crop
   (2) Stenothermal organisms
   (3) Niche
(b) Explain the Rivet Popper hypothesis.

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 bio-control agent.
(vi) A symbiotic nitrogen fixing bacterium found in root nodules.

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 F₁-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.