Question 1

(a) Mention any one significant difference between each of the following: [5]

(i) Reducing sugar and non-reducing sugar.
(ii) Triploids and haploids.
(iii) Lac operon and Trp operon
(iv) Blunt end and sticky end.
(v) Spectroscopy and colorimetry.

(b) Answer the following questions: [5]

(i) Who developed the microbe called super bug, which was designed to degrade spilled oil?
(ii) Name any two growth regulators used in a culture medium.
(iii) What is an apoenzyme?
(iv) How is the disease albinism caused?
(v) State any one limitation of gynogenesis.

(c) Write the full form of each of the following: [5]

(i) AFLP
(ii) SSBs
(iii) BAC
(iv) CIMAP
(v) PAGE
(d) Explain briefly:

(i) Polyadenylation  
(ii) Lock and key model of enzyme action  
(iii) Edible vaccine  
(iv) Vascular differentiation  
(v) Seedless crops

PART II (50 Marks)

Answer any five questions.

Question 2

(a) Briefly explain the structure of tRNA. Write its function in protein synthesis. [4]

(b) With reference to lipids, explain its:

(i) Building blocks. [4]

(ii) Any two chemical properties.

(c) What is a DNA probe? [2]

Question 3

(a) Explain the process involved in the transcription of DNA to mRNA. [4]

(b) What are stem cells? Explain the various types of stem cells. [4]

(c) Name any two chemicals used to determine the amino acid sequence in protein. [2]

Question 4

(a) Explain the following methods of selection of recombinant cells:

(i) Insertional inactivation. [4]

(ii) Blue white colony

(b) Enumerate the steps involved in regenerating a plant from a single cell. [4]

(c) What is wobble effect? [2]
Question 5
(a) Discuss the working of PCR technique in detail. [4]

(b) Explain the principle and any two applications of each of the following biochemical techniques:
   (i) Iso electric focussing.
   (ii) Centrifugation.

(c) Where do we find the following carbohydrates:
   (i) Glycogen
   (ii) Chitin

[2]

Question 6
(a) Describe the procedure of sequencing of DNA by Sanger’s method. [4]

(b) Explain any two physical and any two chemical methods used to synchronize suspension cultures.

(c) Name any two industrial enzymes and give their uses.

[2]

Question 7
(a) Briefly explain the essential features of a vector. [4]

(b) What is the principle of cryopreservation? Mention the steps of cryopreservation. [4]

(c) What is the importance of pH and solidifying agents in cell cultures? [2]

Question 8
(a) Explain how DNA technology has been used to create the following: [4]
   (i) Tomatoes with delayed ripening.
   (ii) Bt crops
   (iii) Virus free crops
   (iv) Biodegradable plastic

(b) List the functions of the following bioinformatics tools: [4]
   (i) GENSCAN
   (ii) ENTREZ
   (iii) FASTA
   (iv) PIR

(c) Name any two media used in plant tissue culture. [2]
Question 9

(a) What are restriction enzymes? How do they work? What are the different types of restriction enzymes? [4]

(b) Define the term proteomics. Explain the various types of proteomics. [4]

(c) Differentiate between the following: [2]

(i) Local alignment and Global alignment.

(ii) EST and STS.