BIOTECHNOLOGY

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.)

Answer **Question 1** *(compulsory) from* ***Part I*** *and* **five** *questions from* ***Part II****.*

The intended marks for questions or parts of questions are given in brackets [ ].

PART I (20 Marks)

Answer ***all*** *questions.*

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

This paper consists of 4 printed pages.

(d) Explain briefly: **[5]**

(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: **[4]**

(i) Building blocks.

(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: **[4]**

(i) Insertional inactivation.

(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: **[4]**

(i) Iso electric focussing.

(ii) Centrifugation.

(c) Where do we find the following carbohydrates: **[2]**

(i) Glycogen

(ii) Chitin

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. **[4]**

(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*.