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) *Purines* and *pyrimidines.*

(ii) *Triploids* and *haploids*.

(iii) *Lac operon* and *Trp operon*

(iv) *Blunt end* and *sticky end*.

(v) *Genomics* and *proteomics.*

(b) Answer the following questions: **[5]**

(i) Name the scientists who discovered the genetic code.

(ii) Name *any two* growth regulators used in a culture medium.

(iii) What are *cell lines?*

(iv) Name the vitamin present in golden rice.

(v) What is *gynogenesis?*

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

(i) ICMR

(ii) FBS

(iii) BAC

(iv) IEF

(v) PAGE

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

(i) Polyadenylation

(ii) Reverse transcription

(iii) Edible vaccine

(iv) De 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) Write the use of the following instruments: **[4]**

(i) Centrifuge

(ii) LAF

(iii) T flask

(iv) Co_2 incubator

(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) State the significance of Evan's blue test. **[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 working and application of FACS. **[4]**

(c) Write *two* differences between *Southern* and *Northern blotting techniques*. **[2]**

Question 6

(a) Describe the procedure of sequencing of DNA by Sanger's method. **[4]**

(b) Name and explain *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 rDNA technology has been used to create the following: **[4]**

(i) Tomatoes with delayed ripening.

(ii) Bt crops

(iii) Dolly sheep

(iv) Oil eating bacteria

(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) Draw a well labelled diagram of a bioreactor. **[4]**

(c) Differentiate between the following: **[2]**

(i) *Local alignment* and *Global alignment*.

(ii) *EST* and *STS*.