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) *Nucleotide* and *Nucleoside*

(ii) *Gene* and *Genome*

(iii) *Finite cell lines* and *Continuous cell lines*

(iv) *Primer* and *Primase*

(v) *Micronutrients* and *Macronutrients*

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

(i) What are *Polylinker sites*?

(ii) What is *Subtilisin*?

(iii) Name *two* types of phage vectors.

(iv) What is the role of *Agrobacterium tumefaciens* in genetic engineering?

(v) Why is DNA replication called *semi-discontinuous*?

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

(i) DDBJ

(ii) HEPA

(iii) RFLP

(iv) VNTR

(v) MS Medium

This paper consists of 3 printed pages and 1 blank page.

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

(i) Reverse transcription

(ii) Electroporation

(iii) Biolistic

(iv) Synthetic seeds

(v) Flavr savr tomatoes

PART II (50 Marks)

*Answer **any** **five** questions.*

Question 2

(a) Describe the double helical structure of DNA. Mention *two* differences between RNA and DNA. **[4]**

(b) List the role of the following in protein synthesis: **[4]**

(i) mRNA

(ii) rRNA

(iii) tRNA

(iv) Ribosomes

(c) Why are cDNA libraries preferred over genomic libraries? **[2]**

Question 3

(a) Differentiate between each of the following: **[4]**

(i) *Blunt end* and *Sticky end*

(ii) *Hybrid* and *Cybrid*

(b) Discuss the role of Biotechnology in making the following: **[4]**

(i) Humulin

(ii) Hepatitis B vaccine

(c) What is FBS? What is its role in animal cell culture? **[2]**

Question 4

(a) What is SCP? Describe the advantages and disadvantages of SCP. **[4]**

(b) Explain the role of *any four* enzymes in the process of DNA replication. **[4]**

(c) What is *micropropagation*? Write its use. **[2]**

Question 5

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

(b) How did Messelson and Stahl prove the semi conservative mode of replication? **[4]**

(c) What is the use of haemocytometer? **[2]**

Question 6

(a) Give *four* points of difference between *inducible operon* and *repressible operon.* **[4]**

(b) Write short notes on the following: **[4]**

(i) Western blotting

(ii) Tissue engineering

(c) What is *embryo rescue*? **[2]**

Question 7

(a) Explain the role of the following in biotechnology: **[4]**

(i) *Thermus aquaticus*

(ii) *Bacillus thuringiensis*

(iii) *Escherichia coli*

(iv) CaMV

(b) Explain the methodology involved in the creation of the first mammalian clone, Dolly. **[4]**

(c) What is Golden rice? Why is it considered to be nutritionally superior to the normal rice? **[2]**

Question 8

(a) Enumerate the steps involved in the extraction and purification of DNA from bacterial cell. **[4]**

(b) Write short notes on the following: **[4]**

(i) EMBL

(ii) SWISS-PROT

(c) Write the difference between *defined media* and *differential media*. **[2]**

Question 9

(a) What is *somatic hybridization*? Explain the steps involved in this technique with the help of an example. **[4]**

(b) What is *genomics*? What are the basic criteria in selecting the organism for its genome sequencing? Write the names of *any two* types of DNA used for sequencing. **[4]**

(c) Write a short note on *Taxonomy Browser.* **[2]**
