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) *Plasmids* and *cosmids*

(ii) *Nucleotide* and *Nucleoside*

(iii) *Lagging strand* and *leading strand*

(iv) *Multipotent cells* and *unipotent cells*

(v) *Microinjection* and *biolistic*

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

(i) Who coined the term *vitamin?* Write the chemical name of vitamin D.

(ii) Why is amino acid said to be amphoteric?

(iii) What is *Bioremediation?*

(iv) What is a *primer?*

(v) What are *cryoprotectants?*

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

(i) NBPGR

(ii) ARS

(iii) RFLP

(iv) HEPA

(v) SCP

This paper consists of 4 printed pages.

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

(i) Gene splicing

(ii) Supramolecular assembly

(iii) Interferon

(iv) Gene scan

(v) Saponification

PART II (50 Marks)

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

Question 2

(a) Explain in detail, how Dolly, the sheep was created. **[4]**

(b) Mention *any two* chemical properties of each of the following: **[4]**

(i) Proteins

(ii) Carbohydrates

(c) What are *Okazaki fragments?* How are they joined? **[2]**

Question 3

(a) Describe the effect of each of the following factors on enzyme activity: **[4]**

(i) pH

(ii) Temperature

(iii) Enzyme concentration

(iv) Concentration of products

(b) With reference to suspension culture, explain the following: **[4]**

(i) A chemostat

(ii) A turbidostat

(c) What is *genomics?* What are its different types? **[2]**

Question 4

(a) What are the basic facilities that should be available for tissue culture in a biotechnology laboratory? **[4]**

(b) Explain the experiment which proves the semi-conservative mode of replication. **[4]**

(c) What is cDNA? **[2]**

Question 5

(a) Explain *any four* methods employed to induce haploid production. **[4]**

(b) Describe the automated method of DNA sequencing. **[4]**

(c) What is the difference between *gel electrophoresis* and *gel permeation*. **[2]**

Question 6

(a) What is *in vitro pollination*? Why is it done? Write the steps involved in this process. **[4]**

(b) Why is *Agrobacterium* called a natural genetic engineer? How does it help in creating transgenic plants? **[4]**

(c) Write a short note on *site directed mutagenesis*. **[2]**

Question 7

(a) What is HGP? Name *any two* scientists involved in this. Write *any two* achievements of HGP. **[4]**

(b) List the functions of the following in Bioinformatics: **[4]**

(i) ENTREZ

(ii) PDB

(iii) FASTA

(iv) MGD

(c) Mention *two* differences between the organisation of prokaryotic and eukaryotic genomes. **[2]**

Question 8

(a) Briefly describe the steps involved in the Southern blotting technique. **[4]**

(b) What is the need of germplasm conservation? Give an account of the in-situ and ex-situ conservation of germplasm. **[4]**

(c) What is *peptidoglycan?* Where is it found? **[2]**

Question 9

(a) How are biomolecules separated by the following techniques: **[4]**

(i) Ion exchange chromatography.

(ii) Partition chromatography.

(b) What is the cause and the symptoms of the following diseases: **[4]**

(i) Sickle cell anaemia

(ii) Alkaptonuria

(c) What is the difference between *peptide bond* and *phosphodiester bond?* **[2]**