(i) Printed Pages : 3 Roll No. .....

(ii) Questions : 9 Sub. Code : 2 9 9 1

Exam. Code : 4 3 7

M.Sc. 3rd Semester

1125

BIOTECHNOLOGY

Paper–MBIO-302 : Genetic Engineering

Time Allowed : Three Hours] [Maximum Marks : 80

Note : Attempt **five** questions in all, by selecting **one** question from each Unit. Section A is compulsory. All questions carry equal marks.

SECTION–A

1. Compulsory Question :

(a) Give major differences between type I and type II Restriction Enzymes.

(b) Why is it that sometimes after extraction, more than one band of plasmid is visible on the gel ?

(c) What are cosmids ?

(d) Nested PCR.

(e) What is alpha complementation ?

(f) Explain chromosome walking.

(g) Synthetic genes.

(h) Site directed mutagenesis. 2×8=16

UNIT–I

2. (a) Discuss the international guidelines set up for genetic engineering and its use in biotechnology. 6

(b) Give the mechanism of action of ligases. 4

(c) In PCR primer designing plays an important role. Mention the various criteria for designing primers. 6

3. (a) Give the principle for purification of both genomic and plasmid DNA and give the method for quantifying the yield of the same. 6

(b) Discuss the role of linkers and adaptors. 4

(c) Discuss inverse PCR and multiplex PCR. 6

UNIT–II

4. (a) What are artificial chromosomes ? Describe the BAC and PAC and their use as cloning vector. 8

(b) Discuss how does genomic library construction vary from cDNA library construction. 8

5. (a) What is Restriction Map ? Construct a map and present diagrammatically from the given restriction fragments obtained after digestion of a cloned 7.0 kb DNA with two RE (Hind-III and Sal-I) separately and a double digestion with both RE. Following were the results :

(i) Uncut - 7.0 kb

(ii) Hind - III - 6.2 kb and 0.8 kb

(iii) Sal-I - 5.8 kb and 1.2 kb

(iv) Hind-III and Sal-I - 5.8 kb, 0.8 kb, 0.4 kb. 8

(b) Enumerate the various screening strategies for genomic and expression libraries. 8

UNIT–III

6. (a) Describe primer extension assay and RNA protection assay to study gene regulation at transcriptional level. 8

   (b) Explain the gene knockout technology and its application in biotechnology. 8

7. (a) Explain with diagram how is transposon mutagenesis carried out and what is its application ? 8

   (b) Describe the use of Phage display to study protein-protein interaction. 8

UNIT–IV

8. (a) Describe the process of Baculovirus vector designing and its use for production of recombinant proteins in insect cells. 8

   (b) How does protein tagging and singling help in processing of the proteins after expression ? Explain with example. 8

9. (a) Describe in vitro mutagenesis with special reference to site directed mutagenesis. 8

   (b) What do you understand by translational fusion and how can it be used for expression of proteins in bacteria ? 8