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# M. Tech. (Biotechnology)

## SECOND SEMESTER EXAMINATION, 2009-10

## GENETIC ENGINEERING

Time : 3 Hours

Total Marks : 100

Note : (i) Attempt any FIVE questions.
(ii) Marks are indicated against each question.

1. Compare any Four of the following : 5 x 4 = 20

   (a) Cloning vector vs expression vector

   (b) Genomic library vs cDNA library

   (c) Promoters vs terminators

   (d) Isoschizomers vs Neoschizomers

   (e) Chemical Transformation vs electroporation

2. (a) Describe M13 vectors and their role in DNA sequencing. Compare the Sanger's method of DNA sequencing with that of Maxm and Gilbert's method. 10

   (b) Design an experiment to clone a human gene of 15kb in an expression vector and transformation of E. *Coli* using this vector. Illustrate your answer using suitable diagram. 10

3. Describe the reaction mechanism and role of any Four of the following enzymes used in recombinant DNA technology experiments : 5 x 4 = 20

   (a) Restriction endonucleases - II

   (b) DNA ligase

   (c) Taq DNA polymerase



P.T.O.

(e) Polynucleotide kinase

4. (a) Describe the natural genetic engineer. Enumerate the advantages of genetic transformation mediated by *Agrobacterium tumifaecians* over microprojectile bombardment method. 10

(b) Describe λ replacement & insertional vector & also explain cloning strategies with the help of suitable example. 10

5. (a) What is site directed mutagenesis? Give detail account of different procedures used for site directed mutagenesis and its application in protein engineering. 10

(b) What is polymerase chain reaction (PCR)? How does RT-PCR differ from real time PCR? Enumerate the applications of real time PCR. 10

6. Distinguish between : 4 x 5 = 20

(a) Selectable markers and reporter genes

(b) Northern hybridisation and Southern hybridisation

(c) Anti sense RNA technology and RNAi technology

(d) RFLP and AFLP

(e) Linkers & adaptors

7. Write short notes on nay **Four** of the following : 5 x 4 = 20

(a) Phagemids

(b) Yeast artificial chromosome

(c) Suntractive hybridisation

(d) Stringent and relaxed plasmids

(e) Biosafety of GMOs.