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

(ii) Questions : 9 Sub. Code : 2 5 9 4 7

Exam. Code : 0 4 3 7

M.Sc. Bio-Technology 3rd Semester

(2125)

GENETIC ENGINEERING

Paper : MBIO-302

Time Allowed : Three Hours] **[Maximum Marks : 80**

Note :— Attempt **five** questions in all. Selecting **one** question from each unit. Q.No. **1** is compulsory.

1. (a) List different ways to prevent vector self-ligation?

(b) Justify the use of yeast for the production of therapeutic proteins.

(c) Explain the effect of insertional inactivation of *Sup4* gene in YAC?

(d) What is the difference between cosmid and phagemid?

(e) Explain plasmid rescue.

(f) What is the principle of Taqman PCR?

(g) How yeast two hybrid system can identify interacting proteins?

(h) What is the importance of transgenic mice in biotechnology?

8×2

UNIT—I

2. (a) Describe DNA and RNA polymerase which are used in genetic engineering.

   (b) Describe the characteristics of an ideal primer pair for PCR along with justification. Discuss the applications of PCR. 8,8

3. (a) What is the difference between DNases and restriction endonucleases? Justify the importance of Type II restriction endonucleases in recombinant DNA technology.

   (b) How DNA ligase carries out the intermolecular ligation? What is the difference between *E.coli* and T4 ligases? 8,8

UNIT—II

4. (a) Explain the structure of pGEM3Z and compare it with pUC8 in terms of utility.

   (b) What is the importance of cDNA? Outline the preparation of full length cDNA to be cloned in *E.coli*. 8,8

5. (a) Compare the characteristics and uses of Lambda ZAP and Lambda EMBL vectors.

   (b) Explain the screening of genomic library by DNA hybridization and antibody based method. 8,8

UNIT—III

6. (a) How site directed mutagenesis is different from random mutations? How site directed mutagenesis can be used to improve commercially useful proteins?

   (b) How S1 nuclease is used to identify the transcription start and end point? 8,8

7. (a) What is transposon tagging? Describe different transposable elements used in *Drosophila.*

   (b) How filamentous phages are used to display proteins on their surface? Explain biopanning to select the phage displaying desired protein. 8,8

UNIT—IV

8. (a) Explain the key features of an expression vector. Describe inducible and strong promoters commonly used in *E.coli.*

   (b) What is Northern blotting? How it can be used to study differential gene expression? 8,8

9. (a) Explain cell free translation and its applications.

   (b) Compare Cre-LoxP and FLP recombinase system to create knock out mice. 8,8