Exam.Code:0437
Sub. Code: 3480

2012

M. Sc. (Biotechnology) Third Semester

MBIO-302: Genetic Engineering

Time allowed: 3 Hours Max. Marks: 80

NOTE: *Attempt five questions in all, including Question No. I which is compulsory and selecting one question from each Unit.*

x-x-x

I. Write notes on the following:-

1. What is codon bias?
2. Multiplex PCR.
3. Significance of using ssDNA containing virus as a vector
4. Degenerate primers and arbitrary primers
5. Biopanning
6. Isoschizomers and neoschizomers with suitable example.
7. Plasmid Incompatibility
8. Gene knockout (8X2)

UNIT - I

II a) What are restriction endonucleases. Tabulate the differences between type I, II and III restriction endonucleases.

b) What is PCR. Discuss main features of primers required for PCR. What is nested and real time PCR.

c) How will you modify cut ends of a DNA molecule for increasing the efficiency of ligation? Give any two methods. (6, 6, 4)

III a) Wrte the source, mode of action and application of following enzymes:
i) Alkaline Phosphatase ii) DNase I

b) How is plasmid DNA purified and give any one method for purification based on its conformation and yield analysis.

c) What are the ideal features of a DNA marker? Explain RFLPs and its significance in polymorphism. . (6, 6, 4)

P.T.O.

UNIT - II

IV a) What are Nucleic acid microarrays? Explain principle and its various types.

b) What is cosmid and explain its significance as a vector. (8 X2)

V. a) Explain significance of pUC8 and pGEM3Z as a vector

b) Any two methods for library screening.

c) Discuss the significance of DD-PCR and RDA-PCR in cloning differentially expressed genes. (6, 4, 6)

UNIT - III

VI a) Role of S1 mapping and Primer extension assay to study gene regulation.

b) Explain Phage Display. Explain various types of phage display and major applications of the technique. What are the advantages and disadvantages of the method. (8 X2)

VII. a) Discuss the significance of yeast two hybrid screening in studying protein-protein interactions.

b) Explain transposon tagging in Drosophila. (8 X2)

UNIT - IV

VIII. Write note on:

a) Expression Vector for high level expression of transgene in bacterial cells. What are the problems which one can face for expression in bacteria. Explain T7 bacterial expression system.

b) What are transcriptional and translational fusion proteins. Give significance of adding tags and signals for processing of recombinant proteins. (8 X2)

IX. a) Explain the problems faced during expression in yeast cells. Why is it beneficial to use mammalian expression vectors for eukaryotic genes?

b) Describe in detail any two methods of site directed mutagenesis and its role in protein engineering. (8 X2)

x-x-x