Exam.Code:0437
Sub. Code: 3480

2021

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. Answer the following:-

a) If gene sequence is not known, is it possible to design primer and amplify this unknown gen using PCRe, if yes how?

b) Differentiate in brief in between adaptor and linker molecules.

c) Draw circular map of any YAC based vector and label its various sites.

d) What do you mean by mRNA enrichment?

e) What is reporter gene, Name two reporters genes used in expression studies?

f) In yeast two hybrid system, what is the basis of identifying the two interacting proteins in Y2H system?

g) A researcher tried to express a bacterial gene in *E. coli,* but to his/her surprise despite of correct gene sequence and despite in frame cloning with respect to promoter, no expression happened, can you comment such observation?

h) What is the signal sequence why it needs to be added during cloning process of certain genes? (8x2)

UNIT – I

II. a) What are degenerate primers? How one can design degenerate primers? What are the parameters one need to keep in mind while designing the ideal primers? (8+8)

b) What are various DNA modifying enzymes? Name and explain the function of terminal deoxynucleotide transferase, alkaline phosphatase, kinases and Polymerases. (8+8)

III. a) What is the function of solution LI, and solution III during its alkaline lysis method of plasmid DNA extraction?

b) Explain important applications of PCR. (8+8)

P.T.O.

UNIT – II

IV. a) Explain various strategies employed to use bacteriophage as cloning vector. How selection of recombinant clone is carried out in bacteriophage cloning system?

b) How cloning can be carried out in cosmid and BAC vectors. Explain and draw circular map of BAC and cosmid vectors. (8+8)

V. Write short notes on following:-

a) Nucleic acid microarray and its applications

b) Cloning of differentially expressed genes and its importance. (8+8)

UNIT – III

VI. Write short note on following:-

a) Northern blotting and its applications

b) Transposon Tagging and its importance. (8+8)

VII. a) What are transgenic organisms? Describe various strategies employed in creating transgenic organisms?

b) How genes knock out can be used in studying function of gene? Explain in detail the gene knock out citing an example. (8+8)

UNIT – IV

VIII. a) Explain in detail the pET expression system used in heterologous expression. How protein expression is controlled in this system. How the soluble and insoluble protein can be extracted from the expressed cells.

b) How protein can be expressed in mammalian and plant cells? (8+8)

IX. a) What is codon? How many codons are there in genetic codon? How one can o ptimize codon system for its successful expression, explain with example?

b) What do you mean by protein engineering? Explain various techniques used in protein engineering. (8+8)

x-x-x