Exam.Code:1033
Sub. Code: 35401

2015

M.E. (Bio-Technology) Second Semester

ME-BIO-204: Genetic Engineering

Time allowed: 3 Hours Max. Marks: 50

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

x-x-x

I. Attempt the following:-

a) A DNA fragment subjected to restriction digestion by two different enzymes, MspI and its isoschizomer HpaII, gave different restriction digestion pattern on agarose gel. What is the likely explanation of this observation?

b) Which enzymes are used for nick translation of DNA and why?

c) What is the basis of alpha complementation that is used to detect inserts in vectors?

d) What is touchdown PCR?

e) What are transposable elements?

f) What data would be required to construct a linkage map for a human chromosome?

g) How do fosmids differ from cosmids?

h) What is a negative selection marker? Give an example.

i) What is a shuttle vector?

j) The heterologous expression of a restriction enzyme in *E. coli* results in degradation of the host DNA. Suggest a way to circumvent this problem. (10x1)

UNIT - I

II. a) Describe the potential problems in expressing a gene from a eukaryote in *E. coli*.

b) What are genomic and cDNA libraries? Explain the construction of cDNA library. (2x5)

III. a) Differentiate between Class I and Class II restriction enzymes.

b) Describe the general features of plasmid vectors.

c) What information does the melting curve analysis provide at the end of real time PCR? (4,4,2)

P.T.O.

IV. a) To clone a gene of 250 kb, which vector would you prefer? Describe the features and the screening principles of the vector.

b) Describe a strategy for increasing the stability of a protein that has (i) no cysteine residues or (ii) an odd number of cysteine residues. (2x5)

UNIT - II

V. a) Describe and discuss the PCR/OLA detection protocol for genetic diseases.

b) Describe *Agrobacterium tumefaciens* mediated gene transfer in plants. (2x5)

VI. a) What is a molecular beacon probe? How does it work? How can molecular beacon probes be used to detect several genes in the same sample?

b) What are humanized monoclonal antibodies? Describe how they are generated. (2x5)

VII. a) What general strategies can be employed in genetically engineering the plants to be resistant to herbicides?

b) Write short notes on:

i) Challenges of gene therapy

ii) SNP markers in plant breeding (2x5)

x-x-x