Exam.Code:0038
Sub. Code: 0987

1058

B.Sc. (Hons.) Biotechnology
Sixth Semester
BIOT- Sem-VI-I-T: Genetic Engineering

Time allowed: 3 Hours Max. Marks: 67

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

x-x-x

I. Attempt the following:

a) Why it is important to clone a gene?

b) Why type II restriction enzyme is preferred for genetic engineering work?

c) How the pBR322 was named? Discuss about its antibiotic resistance genes and their importance in gene cloning.

d) Discuss the method used to confirm the expression of a particular gene during embryonic development.

e) What is codon biasing? Explain with help of example. How this problem can be tackled for successful expression of gene? (5x3)

UNIT – I

II. a) What are the pattern adopted for nomenclature of restriction enzyme? Explain with help of two examples. Identify their Restriction sequences and cutting pattern.

b) What are 5' and 3' overhangs? Name at least one restriction enzyme each for producing 5' and 3' overhangs. (13)

III. a) Which enzyme is used both for chewing as well as for filling the single strand DNA ends? Name the enzymatic property of the enzyme useful for fill in and chewing of DNA ends. Discuss the mode of action.

b) What is polymerase chain reaction? What are the different steps of this technique? Discuss the important points taken into consideration while designing a primer. (13)

UNIT – II

IV. a) What are the basic features of a cloning vector? Discuss in detail. What is the antibiotic resistance gene? Name any two antibiotics and discuss their mechanism of action. How the antibiotic resistance genes for these antibiotics help the bacteria to grow? Explain.

P.T.O.

b) What is the role of insertional inactivation in gene cloning? Name any two vectors and discuss the role of insertional inactivation in gene cloning. (13)

V. Write in brief about:-
   a) Shuttle vector
   b) EMBL vectors
   c) BAC (13)

UNIT – III

VI. a) What is the partial digestion of DNA? While making a genomic library, the genomic DNA is digested partially while plasmid DNA is completely digested with restriction enzyme. Why?

b) How many recombinants has to be screened with 99% probability of getting a gene, if the size of genome is 8000 kb and the library was constructed in pUC vector? (13)

VII. a) Discuss at least two methods to screen the gene from the genomic library.

b) Discuss the procedure of labeling a DNA probe by nick translation? Which phosphate of dNTP, used in this process, is labeled and why? How is it different in end labeling? Discuss with help of diagram. (13)

UNIT – IV

VIII. Write short notes on:-
   a) Cassette mutagenesis
   b) Sangers method of sequencing (13)

IX. a) What are the basic components of an expression vector? What is T7 promoter? Why a special host is needed if we want to express the gene using T7 promoter? Name the host.

b) What are the general problems associated with production of recombinant protein in E. coli and how we can overcome these? Discuss. (13)

x-x-x