C 3093

B.E./B.Tech. DEGREE EXAMINATION, MAY/JUNE 2007.

Fifth Semester

Biotechnology

BT 1305 — GENETIC ENGINEERING

(Regulation 2004)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Although all human cell do have the same genes, they are not identical in their expression – Why?

2. Identify the DNA elements responsible for transcription of eukaryotic gene.

3. Write the principle features of pUC cloning system.

4. How is a fusion protein created?

5. Partial digestion of DNA is preferred for constructing genomic libraries – Why?

6. Explain the main feature of an extrachromosomal mammalian cell expression vector.

7. "Primer Walking" – What for?

8. Name any two method of synthesizing a 0.5 – kb gene.

9. How could you increase the activity of plant promotor?

10. What is nuclear cloning?

PART B — (5 × 16 = 80 marks)

11. (a) Explain with suitable example (s), the differences among the four lands of restriction and modification enzymes. (4 × 4)

Or

(b) (i) What criteria are followed by FDA for accepting a recombinant protein as a food or food additive?

(ii) Discuss the premise that recombinant DNA technology is a radical technology that violates the fundamental laws of nature. (8)

12. (a) Explain four different ways of plasmid introduction into E.Coli. (4 × 4)

Or

(b) (i) What is bacmid? How is it used? (6)

(ii) Enumerate the criteria used to decide, if a particular recombinant protein should be produced in a yeast, insect or mammalian cell system. (10)

13. (a) Outline two different strategies employed to detect a cloned target gene within a library in E.Coli. What conditions must be satisfied for each type of detection. (8 + 8)

Or

(b) (i) How would you use a bacteriophage λ or BAC as a cloning vector. (8)

(ii) Plasmid pRIT 454 was cut with Pst I, Hind III and Eco RI. From the data given below, determine the map. The frequent in Kb and the name of the restriction enzyme used are given below :

Pst	6.8	5.9		
Hind III	6.5	6.2		
Eco RI	9.2	3.5		
Pst + Hind III	4.8	4.2	2.0	1.7
Pst + Eco RI	5.4	3.8	3.0	0.5
Eco RI + Hind III	6.2	3.5	1.8	1.2

14. (a) (i) Why is it necessary to make DNA single stranded before determining its sequence? (6)

(ii) Describe how bacteriophage M 13 is used for sequencing a cloned DNA frequent. (10)

Or

(b) Write short note on :

(i) Molecular beacon

(ii) RACE

(iii) RAPD and

(iv) Tagman assay. (4 × 4)

15. (a) (i) Differentiate binary from co-integrate Ti plasmid based vectors. (8)

(ii) How would you produce a transgenic plant that does not contain a marker gene? (8)

Or

(b) (i) How and why are knockout mice established? (8)

(ii) Discuss how transgenesis could be useful to improve organ transplantation and to produce human monoclonal antibodies. (4 + 4)