

C 3088

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

Fourth Semester

Biotechnology

BT 1255 — MOLECULAR BIOLOGY

(Regulation 2004)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Explain how hydrophobic interactions are important in stabilizing the DNA structure.
2. What is denaturation mapping? Where is it used?
3. Theoretical limit of recombination due to crossing over is 50%. Why?
4. Explain generalized transduction.
5. Highlight the difference between prokaryotic and eukaryotic promoters.
6. What do you understand by cyclically permuted? Explain.
7. Distinguish redundant and synonyms in genetic code.
8. Define cot value.
9. Explain okazaki fragment.
10. Define leaky mutation.

PART B — (5 × 16 = 80 marks)

11. (a) (i) Discuss the transformation process. Explain how this process be used in gene mapping. (10)
- (ii) In four Hfr strains of bacteria, all derived from an original F+ culture grown over several months, a group of hypothetical genes was studied and shown to be transferred in the following orders :

Hfr strain	Order of transfer
1.	E R I U M B
2.	U M B A C T
3.	C T E R I U
4.	R E T C A B

Assuming that B is the first gene along the chromosome, determine the sequence of all the genes shown. One strain creates an apparent dilemma. Which one is it? Explain why the dilemma is only apparent and not real? (6)

Or

- (b) (i) Discuss the classical experiments carried out by Hershey and Chase. (8)
- (ii) Avery McLeod and McCarty. (8)
12. (a) Write a note on the following :
- (i) discontinuous replication (8)
- (ii) bidirectional replication. (8)

Or

- (b) Write a note on :
- (i) organization of nucleosomes (8)
- (ii) complex DNA structure of E.coli chromosome (8)
13. (a) Discuss the geometry of the replication of circular DNA molecules. Add a note on action of DNA gyrase.

Or

- (b) Explain the transcription events in eukaryotes.

14. (a) Discuss the decoding system.

Or

(b) Explain the physical and chemical differences between eukaryotic and prokaryotic ribosomes

15. (a) Discuss in detail the following :

(i) Mutagenesis (8)

(ii) Reversion. (8)

Or

(b) Describe in detail the tryptophan operon system with diagrams.
