



Name :

Roll No. :

Invigilator's Signature :

**CS/M.Tech(LT)/SEM-1/MLT-103/2009-10
2009**

BIOTECHNOLOGY – I

Time Allotted : 3 Hours

Full Marks : 70

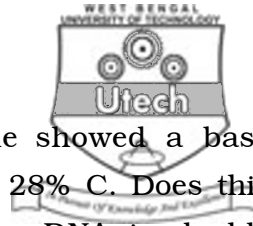
The figures in the margin indicate full marks.

Candidates are required to give their answers in their own words as far as practicable.

Answer any *seven* questions. 7 × 10 = 70

All answers should be very focussed.

1. You have a pool of epidermal cells and a biotech company assigned you a job to purify the Mitochondria and Golgi body and they also want to know the ultrastructure of a lipoprotein part of a cell. How will you proceed to satisfy the company manager in an excellent infrastructure and lab technicians. 4 + 6
2. Describe a popular model that has been proposed to account for the organisation of chromatin. Comment on the role of H₁ histone in the model. Give proper diagram. 4 + 2 + 4
3. Using Meselson-Stahl technique what would be the pattern of band formation after 4th generation in the cesium chloride gradient assuming DNA replication is semiconservative ? What is meant by DNA denaturation ? How does denaturation depend on G – C content of DNA ? 6 + 2 + 2



4. DNA extracted from an unknown sample showed a base composition of 35% A, 33% T, 34% G and 28% C. Does this support the Chargoff's rule assuming the DNA is double stranded. The nucleic acid is a covalent structure. Discuss with a neat diagram. 4 + 6
5. How are the *mRNA* sequences interpreted to amino acid sequences in prokaryotes with respect to (i) charging of *tRNA* (ii) initiation of polypeptide chain synthesis ? 5 + 5
6. "Microorganisms are haploid and rearrangements between alleles do not normally occur". So, how do they acquire the new genetic information from other sources ? How will you design an experiment for a specific lipase preparation that only degrades grease and has no action on proteins ? 3 + 7
7. Define the regulation of *lac* operon using a neat diagram. 6 + 4
8. What are cell cycle checkpoints and how do they act ? What is the role of cell cycle checkpoint proteins to maintain the normal growth of a human finger ? 2 + 4 + 4
9. Propose five measures using biotechnology for reducing pollution load of aquatic ecosystem by tannery industries. 5 × 2
10. Write short notes on the following : 4 × 2 $\frac{1}{2}$
- Peptides and their use in leather processing.
 - Prospect of Nanotechnology in 21st century.
 - Enzymatic dehairing.
 - Use of genome sequence of Grazers.