

THAPAR INSTITUTE OF ENGINEERING AND TECHNOLOGY: PATIALA
 (Department of Biotechnology & Environmental Sciences)
 End-Semester Exam. (Sem-I, 2006-2007), M.Sc. Biotech 1st Year

Cell and Molecular Biology (BH-005)

Maximum Marks: 36

Time: 3.0 Hrs
11-Dec-2006

Attempt all the questions.

(Answers should be precise and to the point. Provide diagram as required to improve the quality of your answers)

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|-------|---|---------|
| 1. a) | What are the physical mutagens? How do they affect cellular components? | 1.0+1.0 |
| b) | Differentiate between point mutations & gross mutations. Highlight on <u>any three</u> types of point mutations. | 1.0+1.5 |
| c) | Provide the mechanism of action of the following chemical mutagens: <i>5-Bromouracil, Acridine orange & Nitrous acid</i> | 1.5 |

OR

- | | | |
|----|---|-------|
| a) | Distinguish between prototrophs and auxotrophs with examples. | 2.0 |
| b) | Give your critical comments on <u>temperature sensitive</u> and <u>constitutive</u> mutants. | 2.0 |
| c) | Distinguish between 'mismatch DNA repair' and 'base excision repair'. Also name the enzyme/protein components involved in the first case. | 2.0 |
| 2. | Attempt <u>any three</u> of the following questions: | 2.0x3 |
| a) | What are the major events associated with general recombination? | |
| b) | In terms of biochemical attributes distinguish between DNA polymerase I and DNA polymerase III of <i>E. coli</i> . | |
| c) | Differentiate between 'θ-mode' & 'σ-mode' of DNA replication. | |
| d) | What are the major control points involved in the regulation of gene expression. | |
| 3. | a) Write a short note on the Lac repressor. Can we dissect its biochemical functions? | 2.0 |
| | b) Give your critical comments on the phenotype of the following <u>any four</u> bacterial mutants: | 1.0x4 |
| | $lacY^-$, cya^- , $pro^-(Ts)/pro^+$, $lacI^d$, $lacI^s/lacI^+$ | |
| 4. | a) What are the cellular components involved in the initiation of protein synthesis in bacteria? | 1.5 |
| | b) You are given a bacterial DNA sequence of 1.5 kb. How do you establish the presence of a functional gene in this DNA fragment? | 1.5 |
| | c) The genetic code is 'degenerate' but 'unambiguous'. What do you mean by this statement? What is 'codon usage'? | 2.0 |
| | d) Write a brief note on <u>Polynucleotide Phosphorylase</u> . | 1.0 |

See the Overleaf

5. Attempt *any three* of the following questions:

2.0x3

- a) How do you establish that ribosomes are the site of protein synthesis?
- b) What are the steps involved in the processing of eukaryotic primary transcript?
- c) How do you demonstrate the transmembrane arrangement of membrane proteins?
- d) Show the dynamics of tubulin polymerization *in vitro*.
- e) With the help of diagram describe the following: *Uniport, Symport & Antiport*

6. a) Some enzymes do require lipid environment for proper function. Provide evidence in support of this statement.
- b) What is subcellular fractionation? What is its importance?
- c) With the help of genetic approaches how do you study the mechanism of protein translocation in the yeast?

2.0

2.0

2.0