No. of Printed Pages : 4

MBC–002

M. SC. (BIOCHEMISTRY)

(MSCBCH)

Term-End Examination

June, 2025

MBC-002 : CELL AND MOLECULAR BIOLOGY

Time : 3 Hours *Maximum Marks : 100*

Note : *Answer any* ***five*** *questions. All questions carry equal marks.*

1. (a) Discuss the structure, types and functions of collagen and elastin. 10

   (b) How do small and large molecules move across the cell membrane ? Explain with the help of a suitable diagram. 10

2. (a) What is C-value paradox ? Discuss its salient features and significance in genomic study. 2 + 8

(b) Explain the following : 5 + 5 = 10

(i) Chromosome banding pattern

(ii) Histone proteins

3. (a) Define the following terms in 2-3 lines : 5 × 2 = 10

(i) Shine-Dalgarno sequence

(ii) Pseudogene

(iii) Mitochondrial cristae

(iv) Uniport transport

(v) Okazaki fragment

(b) Describe activation of amino acids during protein synthesis in *E.coli*. 5

(c) Write the mechanism of the following protein synthesis inhibitors : 5 × 1 = 5

(i) Tetracycline

(ii) Streptomycin

(iii) Rifamycin

(iv) Ricin

(v) Puromycin

4. (a) Differentiate between the following :

2×5=10

(i) Prokaryotic and Eukaryotic RNA polymerase

(ii) Smooth E-R and Rough E-R

(b) Discuss the poly-U experiment with a suitable diagram. 5

(c) Give the salient features of genetic code. 5

5. (a) With the help of a diagram, explain the mechanism of direct DNA repair. 10

(b) What is attenuation ? How does it work to control tryptophan operon in *E. coli* ? 2 + 8

6. (a) List and discuss the levels of control of gene expression in eukaryotes. 10

(b) Write about any *two* the following :

5+5

(i) Eukaryotic DNA replisome complex

(ii) Elongation step of bacterial DNA replication

(iii) Inhibitors of bacterial transcription

7. Describe any *two* of the following : 10+10=20

   (a) Dynamic behavior of microtubules

   (b) Gap junctions

   (c) Apoptosis

8. (a) What are DNA-binding motifs ? Explain. 10

   (b) Distinguish between the following : 2×5=10

      (i) Mitosis and meiosis

      (ii) Prokaryotic ribosomes and eukaryotic ribosomes.

× × × × ×