No. of Printed Pages : 5

MBC–002

M. SC. (HONOURS) (BIOCHEMISTRY) (MSCBCH)

Term-End Examination

December, 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) Match the following : 5×1=5

Column A		Column B
(1) Rifampicin	(i)	binds to 30 S subunits of bacterial ribosome
(2) Actinomycin D	(ii)	Inhibits peptidyl transferare activity

(3) Tetracyclin	(iii)	N-linked glycosylation inhibitor
(4) Anisamycin	(iv)	Inhibits transcription initiation
(5) Tunicamycin	(v)	Blocks the enlongation step of *E. coli* transcription

(b) Explain the following in **2-3** lines each : 5×2=10

(i) Simple diffusion

(ii) C-value paradox

(iii) TATA box

(iv) 30 nm fibre of chromatin

(v) Extracellular matrix

(c) Name the organelles responsible for the following : 5×1=5

(i) Protein sorting and packaging

(ii) Autophagy

(iii) Cellular respiration

(iv) Xenobiotic metabolism

(v) mRNA synthesis

2. (a) Write a detailed account on cyclins and cyclin dependent kinases. 10

(b) Discuss the Singer and Nicholson model of plasma membrane with suitable diagram and explain the various factors affecting membrane fluidity. 10

3. (a) What are monocistronic genes ? Explain their key features. 5

(b) How is chromatin condensation regulated ? 5

(c) Describe the steps of *E. coli* DNA replication with the help of diagrams. 10

4. (a) Differentiate between any *two* of the following : 5+5

(i) Zinc-finger motif and Leucine-Zipper motif

(ii) messenger RNA (mRNA) and transfer RNA (tRNA)

(iii) Base-excision repair and Nucleotide excision repair

(iv) Lactose operon and Tryptophane operon

(b) Discuss the structure and roles of G-protein linked receptors with a suitable diagram. 10

5. (a) Explain the structure and characteristics of *E. coli* RNA polymerase. Discuss its mechanism of action. 5+5

(b) Describe the role of enhancers and transcription factors in eukaryotic transcription. 5+5

6. (a) List and discuss the salient features of genetic code. 10

(b) Describe the *three* steps involved in the polypeptide chain elongation in bacteria. 10

7. Write short notes on the following : 4×5=20

   (a) Post-transcription control mechanism in eukaryotes

   (b) Protein stability

   (c) Cell death

   (d) Topoisomerases

8. (a) What are cytoskeletal proteins ? Describe the importance of microtubules in cell cycle. 5+5

   (b) Enlist the different types of cell junctions. Explain any *two*. 10

× × × × ×