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25BTP101/22BTP101N

PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)

MSc DEGREE EXAMINATION DECEMBER 2025
(First Semester)

Branch – **BIOTECHNOLOGY**

CELL AND MOLECULAR BIOLOGY

Time: Three Hours Maximum: 75 Marks

SECTION-A (10 Marks)
Answer **ALL** questions
ALL questions carry **EQUAL** marks (10 × 1 = 10)

Module No.	Question No.	Question	K Level	CO
1	1	The interaction of a cell with the extracellular matrix, mediated by multi-protein adhesion structures is ____. a) Cell-matrix adhesion b) Cell-cell interaction c) Cell-cell adhesion d) Cell-cell juncttion	K1	CO1
	2	A multistep process that starts in the nucleolus and culminates in the formation of functional ribosomes in the cell _____. a) Ribosomal RNAs b) Ribosome biogenesis c) Protein biogenesis d) Peptide biogenesis	K2	CO1
2	3	The formation of Z-DNA occurs with the methylation of_____. a)Deoxycytosine residues b) Deoxyguanosine residues c) Deoxythymidine residues d) Deoxyadenosine residues	K1	CO1
	4	The structure has a complex outer surface; depending on the perspective, it appears as a wedge or as a flat disk a) Nucleoid b) Nucleus c) Nucleolus d) Nucleosome	K2	CO1
3	5	The group of cellular enzymes that remove RNA primers include the proteins FEN1 and_____. a) RNase H b) Replication protein A c) Cdc6 d) Cdt1	K1	CO1
	6	Repair mechanism using homologous sequences after 5'-3' degradation occurs by_____. a) Conjunction b) Adherence c) Resection d) Coupling	K2	CO1
4	7	Cells can be characterized by the spectrum of mRNA molecules present within_____. a) Ribosome b) Transcriptome c) Metabolome d) Genome	K1	CO1
	8	A short tail of amino acids that directs a protein to a specific cellular compartment is termed as_____. a) N-terminus sequence b) Protein sequence c) Aminoacid sequence d) Signal sequence	K2	CO1
5	9	The mRNA elements that bind metabolites or metal ions as ligands and regulate mRNA expression are _____. a) RNA domain b) Riboswitches c) Aptamer Domain d) Ribosomes	K1	CO1
	10	In the bound state, the protein that cleaves the m-RNA, either destroying other gene silencing protein is called_____. a) Argonaute protein b) Dicer protein c) RNA- binding protein d) RNA helicase	K2	CO1

Cont...

SECTION - B (35 Marks)

Answer **ALL** questions

ALL questions carry **EQUAL** Marks (5 × 7 = 35)

Module No.	Question No.	Question	K Level	CO
1	11.a.	Discuss the different types of membrane proteins and their functions.	K2	CO1
		(OR)		
	11.b.	Interpret the mechanism of export and sorting of proteins to Mitochondria.		
2	12.a.	Predict the structure and functions of B and Z forms of DNA.	K3	CO2
		(OR)		
	12.b.	Describe the importance of Mitochondrial DNA.		
3	13.a.	Differentiate between Homologous and Non-Homologous Recombination in Prokaryotes and Eukaryotes.	K4	CO3
		(OR)		
	13.b.	Explore the types of Transposons and its importance in mutagenesis.		
4	14.a.	Determine the effects of activators and repressors in Transcription.	K5	CO4
		(OR)		
	14.b.	Summarize the role of RNA polymerases, enhancers and activators in Transcription.		
5	15.a.	Organize the specific regulatory elements and genes that control the transcription of the Galactose and Arabinose operon.	K6	CO5
		(OR)		
	15.b.	Specify the role of Nucleosome remodeling and post transcriptional modification in Eukaryotes.		

SECTION -C (30 Marks)

Answer **ANY THREE** questions

ALL questions carry **EQUAL** Marks (3 × 10 = 30)

Module No.	Question No.	Question	K Level	CO
1	16	Elaborate the function of Ribosomes in both prokaryotic and eukaryotic cells.	K2	CO1
2	17	Illustrate the basic structure of the DNA molecule as proposed by Watson and Crick.	K3	CO2
3	18	Examine the key enzymes and proteins involved in different types of DNA repair mechanism.	K4	CO3
4	19	Interpret the sequence of mechanism that occurs in translation and protein synthesis.	K5	CO4
5	20	Explain the regulatory mechanism of gene expression in Eukaryotes.	K6	CO5

Z-Z-Z END