25MBP103

PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)

MSc DEGREE EXAMINATION DECEMBER 2025
(First Semester)

Branch – **APPLIED MICROBIOLOGY**

CELL BIOLOGY & MOLECULAR DYNAMICS

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	Which cyclin is primarily involved in G_1 phase progression? (a) Cyclin A (b) Cyclin B (c) Cyclin D (d) Cyclin E	K1	CO1
	2	In G-protein signaling, the G-protein becomes active when _____. (a) GDP binds to α-subunit (b) GTP binds to α-subunit (c) βγ complex binds to receptor (d) α-subunit dissociates from receptor	K2	CO1
2	3	DNA methylation generally results in _____. (a) Gene silencing (b) Gene activation (c) Increased transcription (d) Enhanced recombination	K1	CO2
	4	The enzyme _____ introduces a nick in the rolling circle mechanism. (a) DNA polymerase I (b) DNA ligase (c) Primase (d) Endonuclease	K2	CO2
3	5	The site of mRNA splicing is the _____. (a) Spliceosome complex (b) Cytoplasm (c) Nucleolus (d) Ribosome	K1	CO3
	6	5'-capping of mRNA involves addition of _____. (a) Methylated guanine (b) Poly-A tail (c) Methylated cytosine (d) Ribose sugar	K2	CO3
4	7	The P-site of ribosome holds _____. (a) Growing polypeptide chain (b) Incoming aminoacyl-tRNA (c) Empty tRNA (d) Release factor	K1	CO4
	8	Chaperone proteins assist in _____. (a) Translation (b) Transcription (c) Protein folding (d) mRNA degradation	K2	CO4
5	9	The cAMP–CAP complex in the lac operon acts as _____. (a) Repressor (b) Activator (c) Operator (d) Enhancer	K1	CO5
	10	Which virus is associated with cervical cancer? (a) Epstein–Barr virus (b) Hepatitis B virus (c) Human papillomavirus (HPV) (d) HTLV-1	K2	CO5

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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.	With diagrams, explain the stages of meiosis.	K4	CO1
		(OR)		
	11.b.	Present the principles of communication among a population of bacterial cells.		
2	12.a.	How does the organization prokaryotic genome differ from eukaryotic genome? Point out.	K4	CO2
		(OR)		
	12.b.	Explain D-loop model of DNA replication.		
3	13.a.	Summarize the enzymology of transcription.	K4	CO3
		(OR)		
	13.b.	Distinguish among the following: i) RNAi ii) miRNA & iii) Antisense RNA.		
4	14.a.	Define and state the properties of genetic code.	K4	CO4
		(OR)		
	14.b.	Explain *in-vitro* translation.		
5	15.a.	Exemplify synthetic biology. How is it important?	K4	CO5
		(OR)		
	15.b.	How do genetic changes cause cancer? Describe with suitable examples.		

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	With an example and diagrams, explain therapeutic cloning.	K4	CO1
2	17	Illustrate rolling circle model of DNA replication.	K4	CO2
3	18	List out and explain the differences between prokaryotic and eukaryotic transcriptions.	K4	CO3
4	19	Elaborate post- translational modifications.	K5	CO4
5	20	Explain positive and negative gene regulations based on operons learnt by you.	K5	CO5

Z-Z-Z END