

U.S.N.								
--------	--	--	--	--	--	--	--	--

B.M.S. College of Engineering, Bengaluru-560019

Autonomous Institute Affiliated to VTU

January / February 2025 Semester End Main Examinations

Programme: B.E.

Semester: III

Branch: Biotechnology

Duration: 3 hrs.

Course Code: 23BT3PCCMB / 22BT3PCCMB

Max Marks: 100

Course: Cell and Molecular Biology

Instructions: 1. Answer any FIVE full questions, choosing one full question from each unit.
2. Missing data, if any, may be suitably assumed.

UNIT - I			CO	PO	Marks
1	a)	How do prokaryotic and eukaryotic cells differ in terms of their cellular structure, and how do these differences support their respective roles in living organisms?	CO1	-	6
	b)	Explain the significance of the central dogma in understanding how genetic information is expressed in living organisms?	CO1	-	6
	c)	How is DNA organized into chromosomes in prokaryotic cells compared to eukaryotic cells, and what are the biological implications of these differences?	CO1	-	8
OR					
2	a)	What role does the nucleus play in transcription, and how is chromatin organization linked to the regulation of gene expression?	CO1	-	8
	b)	How does DNA replication differ between prokaryotic and eukaryotic cells in terms of origin of replication, process speed, and complexity?	CO1	-	6
	c)	What are the processes involved in post-translational modifications of proteins within the Golgi?	CO1	-	6
UNIT - II					
3	a)	What is the role of p53 in responding to DNA damage, and how does its mutation or loss contribute to tumorigenesis?	CO 2	PO 1	8
	b)	What are the different types of mutations, and how do they affect the genetic sequence and protein function?	CO 2	PO 1	8
	c)	What is nucleotide excision repair (NER), and how does it repair bulky DNA lesions caused by UV radiation?	CO 2	PO 1	4

Important Note: Completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages. Revealing of identification, appeal to evaluator will be treated as malpractice.

OR					
4	a)	How does the regulation of genetic recombination differ between eukaryotes and prokaryotes, particularly in relation to their respective reproductive strategies?	CO 2	PO1	8
	b)	What is the process of retroviral integration, and how do retroviruses incorporate their genetic material into the host genome?	CO 2	PO1	8
	c)	How do DNA transposons move within the genome, and what enzymes are involved in their cut-and-paste mechanism?	CO 2	PO1	4
UNIT - III					
5	a)	What is the function of the mediator complex in eukaryotic transcription, and how does it differ from the simpler transcriptional regulation in prokaryotes?	CO3	PO1	8
	b)	How does RNA splicing contribute to the generation of diverse protein isoforms, and what are the mechanisms that regulate this process?	CO3	PO1	8
	c)	What is the role of the TATA box and other core promoter elements in the recruitment of general transcription factors?	CO3	PO1	4
OR					
6	a)	Discuss the RNA processing mechanisms in eukaryotes. How does the system handle mRNA maturation?	CO 3	PO 1	14
	b)	Explain how transcription inhibitors affect the process of RNA synthesis in a cell.	CO 3	PO 1	6
UNIT - IV					
7	a)	Compare the structure of ribosomes in prokaryotic and eukaryotic cells. How do the differences in their structures contribute to their function in translation?	CO 4	PO 2	8
	b)	Explain how the translation initiation process differs between prokaryotic and eukaryotic cells.	CO 4	PO 2	8
	c)	What is the role of codons in the genetic code, and how do they correspond to specific amino acids during translation?	CO 4	PO 2	4
OR					
8	a)	Analyze the differences in the initiation processes of translation in prokaryotes versus eukaryotes. How do these differences affect overall protein synthesis?	CO 4	PO2	8
	b)	Explain the difference between post-translational and co-translational modifications in terms of timing and processes involved.	CO4	PO2	8

		c)	What are protein misfolding disorders, and how do they occur at the molecular level?	<i>CO4</i>	<i>PO 2</i>	4
			UNIT - V			
	9	a)	What is the difference between constitutive and inducible gene expression, and how do cells control when and where genes are expressed?	<i>CO5</i>	<i>PO2</i>	10
		b)	What happens to the lac operon when glucose is present in the environment, and how does catabolite repression influence the operon's expression?	<i>CO5</i>	<i>PO2</i>	10
			OR			
	10	a)	Explain the process of gene expression regulation in eukaryotic cells. How do transcription factors influence gene activity?	<i>CO5</i>	<i>PO2</i>	10
		b)	Discuss the regulation of tryptophan synthesis through different mechanism.	<i>CO5</i>	<i>PO2</i>	10

B.M.S.C.E. - ODD SEM 2022/2023