U.S.N.										

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

Autonomous Institute Affiliated to VTU

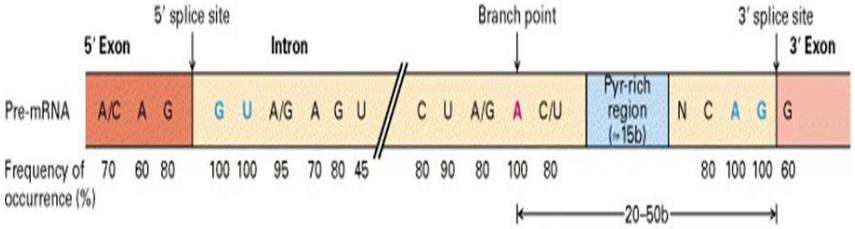
February 2025 Semester End Main Examinations

Programme: B.E. **Semester: IV**
Branch: Biotechnology **Duration: 3 hrs.**
Course Code: 22BT4PCCMB **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.

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.

			UNIT - I	CO	PO	Marks
1	a)		"Living organisms constantly receive and interpret signals from environment". Enumerate on the various stages involved in cell signaling and the signaling pathways with examples.	CO 2	PO 1	10
	b)		Compare and contrast prokaryotic and eukaryotic cell.	CO1	PO	5
	c)		Depict the structure of endoplasmic reticulum and label the parts.	CO1	PO	5
			OR			
2.	a)		Differentiate between rolling circle and theta model of replication in prokaryotes.	CO 2	PO 1	10
	b)		How is the replication of DNA regulated in eukaryotes? With specific mechanism, discuss the consequences of de-regulation of the process leading to cancer.	CO4	PO6	10
			UNIT - II			
3	a)		List various types of mutations and discuss any four types of mutation with suitable examples.	CO 3	PO 1	10
	b)		"In bacteria, the process of NER is completed by only three proteins, named UvrA, UvrB, and UvrC". Comment on the statement.	CO 3	PO 1	5
	c)		With suitable figure of holliday junction, write the products formed from the resolution of the junction.	CO 3	PO 1	5
			OR			
4	a)		What is error prone DNA repair mechanism. Discuss enzymes involved and the reason for a damaged cell to undergo error prone repair.	CO 3	PO 1	10
	b)		With suitable examples differentiate between Insertion sequences and transposon. Discuss their mode of transposition.	CO 3	PO 1	10

			UNIT - III			
	5	a)	Initiation of transcription of coding RNA in eukaryotes is a complicated process. Discuss the process with suitable justification to the statement.	***CO 2***	***PO 1***	**10**
		b)	Spliceosome are RNA splicing machinery involved in removal of introns. Apply the knowledge of splicing in the following image and discuss the mechanism as well as the consequences. 	***CO 2***	***PO 1***	**10**
			OR			
	6	a)	Post transcriptional modifications in mRNA protects it from nuclease actions. Validate the statement with the detailed process of capping.	***CO 2***	***PO 1***	**10**
		b)	In organisms lacking membrane-bound nuclei and other organelles, transcription occurs in the cytoplasm of the cell. Write the various subunits of RNA Pol, their interaction with promoters and role of sigma factor. Elaborate on all the processes involved in transcription.	***CO 2***	***PO 1***	**10**
			UNIT - IV			
	7	a)	Differentiate between translation initiation process in prokaryotic and eukaryotic organism.	***CO 2***	***PO 1***	**10**
		b)	Misfolded proteins need to undergo proteosomal degradation in order to save the cell from getting into a diseased condition. Justify the statement with the steps and machinery involved in proteosome meditated protein degradation.	***CO 2***	***PO 1***	**10**
			OR			
	8	a)	Discuss Post translation modification of protein involving addition of sugars and lipids to produce suitable glycoproteins and lipo-protein.	***CO 2***	***PO 1***	**10**
		b)	Elongation and termination of translation process vary between pro and eukaryotic cell. Justify the statement.	***CO 2***	***PO 1***	**10**
			UNIT - V			
	9	a)	Elaborate on Lac operon directed gene regulation with suitable mechanism	***CO 2***	***PO 1***	**10**
		b)	With any one suitable example deliberate gene regulation in eukaryotes.	***CO 2***	***PO 1***	**10**
			OR			
	10	a)	Discuss the role of chromatin in the process of eukaryotic gene expression.	***CO 2***	***PO 1***	**10**
		b)	Tryptophan synthesis involves both repressor and leader mechanism. Justify the statement with suitable figure and process.	***CO 2***	***PO 1***	**10**

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