U.S.N.										

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

Autonomous Institute Affiliated to VTU

June 2025 Semester End Main Examinations

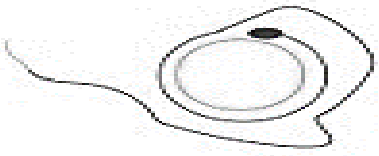
Programme: B.E. **Semester: III / IV**

Branch: Biotechnology **Duration: 3 hrs.**

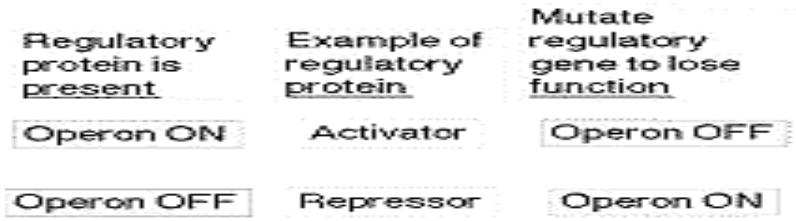
Course Code: 23BT3PCCMB / 22BT3PCCMB / 22BT4PCCMB **Max Marks: 100**

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.

			UNIT - I	*CO*	*PO*	Marks
1	a)		With neat labelled diagram discuss the structure and function of nucleus.	*CO1*	-	**8**
	c)		Identify the type of replication shown in the image below and answer the following:  a. List the organism in which the replication occurs b. The enzyme machinery required for completing the process c. Name the mode of replication. d. Discuss the mechanism involved? e. Reason why this mechanism of replication is useful? f. What is the direction of replication?	*CO2*	*PO1*	**12**
			OR			
2	a)		Discuss the arrangement and function of microtubules and their role in neurological disorders.	*CO4*	*PO6*	**8**
	b)		Differentiate between the mechanism of DNA replication initiation in Pro and Eukaryotic organism.	*CO2*	*PO1*	**12**
			UNIT - II			
3	a)		Deliberate on mutations and their types with examples.	*CO3*	*PO1*	**7**
	b)		Discuss a category of regulatory network in bacteria that addresses DNA damage and controls DNA repair functions in response to extensive DNA damage.	*CO3*	*PO1*	**7**

		c)	Below given is one of the crucial steps in recombination between two homologous DNA. Mention the step and add on to its relevance in recombination process. 	*CO3*	*PO1*	**6**
			OR			
	4	a)	Transposable element can knock off the gene functions and phenotypes in crops. With an example justify the statement.	*CO4*	*PO6*	**10**
		c)	In few circumstances survival of organism and replicating the Error-DNA becomes more important than repairing the damage. Discuss the type of repair mechanism that describes the statement given with neat figure.	*CO3*	*PO1*	**10**
			UNIT - III			
	5	a)	Differentiate between the two (a & b) below given chemical structure. Add a note on the significance as well as mechansim that leads to their formation. a) b) m7GpppNp-RNA (Cap 0) m7GpppNmp-RNA (Cap 1)	*CO 2*	*PO1*	**10**
		b)	With a neat labeled diagram differentiate between initiation of transcription in Bacteria and yeast.	*CO 2*	*PO1*	**10**
			OR			
	6	a)	How does the basal and general transcription factor differ from specific transcription factors?	*CO1*	*PO6*	**7**
		b)	What are transcription inhibitors. List at least 3 inhibitors with their mode of action.	*CO4*	*6*	**6**
		c)	A termination of RNA synthesis needs a protein/ factor as well as specific structure in the termination site. Discuss.	*CO4*	*PO1*	**7**
			UNIT - IV			
	7	a)	With respect to factors, complexes and mechanism involved differentiate between initiation process of protein synthesis in Bacteria and Yeast.	*CO2*	*PO1*	**12**
		b)	Addition of carbohydrates in Golgi/ ER is an essential steps of Post translational modification in proteins. With examples discuss the statement.	*CO1*	-	**08**

			OR			
	8	a)	Differentiate between termination of translation in E *coli* and Yeast.	*CO2*	*PO1*	**08**
		b)	With suitable justification discuss any two each, Co and post translation modifications in protein.	*CO1*	-	**12**
			UNIT - V			
	9	a)	The combined action of repression and attenuation regulates the expression of the tryptophan operon over a 500- to 600-fold range. Justify the statement with the complete mechanism of Trp regulation in Bacteria.	*CO4*	*PO6*	**12**
		b)	Genes regulated by steroid hormones possess binding regions in the sequence called steroid hormone response elements (HREs). Discuss the mechanism of expression in the presence and absence of Hormones.	*CO4*	*PO6*	**08**
			OR			
	10	a)	A system of gene regulation occurs in Eukaryotes similar to Bacteria. With an example discuss the mechanism of one such gene regulation in yeast.	*CO2*	*PO1*	**08**
		b)	Below given information describes positive and negative gene regulation. Identify each of the types and reason why they fall into the specific category. 	*CO4*	*PO6*	**12**

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