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: VII**

Branch: Mechanical Engineering **Duration: 3 hrs.**

Course Code: 20ME7BSBFE / 23ME7BSBFE **Max Marks: 100**

Course: Biology for Engineers

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)	Discuss the different types of chemical bonds with relevant sketches and examples.	CO1	PO1	**10**
	b)	Explain how protein structure is formed through peptide bonds.	CO1	PO1	**10**
		OR			
2		Discuss the different transport mechanisms across the cell membrane with neat sketches.	CO1	PO1	**20**
		UNIT - II			
3	a)	Discuss bone strength and how it adapts to an increase in load. How can this knowledge help prevent bone diseases?	CO1	PO1	**12**
	b)	Discuss the factors affecting bone growth and maintenance.	CO1	PO1	**08**
		OR			
4	a)	Explain the structure of a long bone with a neat sketch.	CO1	PO1	**10**
	b)	Discuss different types of bone fractures with neat sketches.	CO1	PO1	**10**
		UNIT - III			
5		Draw a schematic of the Hill Muscle Model. Also, draw the Active Force-Length, Passive Force-Length, Force-Velocity, and Tendon Force-Length curves, and describe them.	CO1	PO1	**20**
		OR			
6		With neat sketches explain the cross-bridge cycle and the sliding filament theory of muscular contraction.	CO1	PO1	**20**

			UNIT - IV			
	7		Explain how an impulse is conducted along the length of a neuron with neat sketches.	*CO1*	*PO1*	**20**
			OR			
	8	a)	What is an electromyogram? Discuss its applications.	*CO1*	*PO1*	**10**
		b)	Discuss the structure of a neuron with a neat sketch.	*CO1*	*PO1*	**10**
			UNIT - V			
	9		List five case studies of biomechanical engineering applications and explain any one in detail with appropriate sketches.	*CO2* *CO3*	*PO1* *PO3*	**20**
			OR			
	10	a)	Discuss how muscle coordination retraining could reduce the risk of osteoarthritis.	*CO2* *CO3*	*PO1* *PO3*	**10**
		b)	Discuss the concept of an exoskeleton and its applications.	*CO2* *CO3*	*PO1* *PO3*	**10**

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