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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: Aerospace Engineering **Duration: 3 hrs.**

Course Code: 22AS7BSBFE **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)	How does the knowledge of biology help an engineer in the field of biomedicine?	*CO1*	*PO1*	**5**
	b)	"From organelles to biospheres". Elaborate the various levels involved with examples.	*CO1*	*PO1*	**8**
	c)	With neat diagram Explain the structure and components of DNA	*CO1*	*PO1*	**7**
		OR			
2	a)	Distinguish between the two types of transport across membranes with example.	*CO1*	*PO1*	**8**
	b)	What are the different phases of the cell cycle? Write the significance of meiosis.	*CO1*	*PO1*	**8**
	c)	Elaborate the role of ribosomes in protein synthesis.	*CO1*	*PO1*	**4**
		UNIT - II			
3	a)	What are the different bone cells that make up bone tissue? Indicate the role of each.	*CO1*	*PO1*	**6**
	b)	Calcium is often promoted as a supplement for healthy bones. How exactly does calcium lead to "healthy bones"? What is bone remodeling? Explain	*CO1*	*PO1*	**8**
	c)	Elaborate on stages of bone fracture.	*CO1*	*PO1*	**6**
		OR			
4	a)	Give a diagrammatic representation of the Sliding Filament Model of Contraction of muscles.	*CO1*	*PO1*	**8**

		b)	Differentiate between voluntary and involuntary movement of muscles with examples. What are the three types of muscle tissue in the human body?	*CO1*	*PO1*	**7**
		c)	Muscles usually obtain energy from aerobic respiration. However, in certain situations muscles also rely on anaerobic respiration. Highlight such an example.	*CO1*	*PO1*	**5**
			UNIT - III			
	5	a)	What are the two divisions of peripheral nervous system? Draw the structure of a neuron with distinct labeling.	*CO1*	*PO1*	**8**
		b)	What is a synapse? With the help of examples, elaborate the role of neurotransmitters.	*CO1*	*PO1*	**5**
		c)	Elucidate the applications of EMG in ergonomics with an emphasis on its benefits and scope.	*CO3*	*PO3*	**7**
			OR			
	6	a)	Illustrate the conduction of Nerve impulse with a neatly labelled diagram.	*CO1*	*PO1*	**8**
		b)	Present an overview of the technique EMG.	*CO2*	*PO2*	**6**
		c)	What are the major functions of a Neuron?	*CO1*	*PO1*	**6**
			UNIT - IV			
	7	a)	Formation of universe and development is based on epochs. Mention four epochs of Exobiology. Explain each epoch.	*CO1*	*PO1*	**8**
		b)	Given below is a depiction of a well-known experiment that was disproved later. Discuss the basis of this experiment: 	*CO1*	*PO1*	**7**
		c)	Birds are taken inspiration for Aircraft design. Briefly discuss about Fellow' fly concept.	*CO3*	*PO3*	**5**
			OR			
	8	a)	What are the goals of NASA's Exobiology Program?	*CO3*	*PO3*	**8**
		b)	How was formation of Eukaryotes was understood by Endosymbiosis? Explain	*CO3*	*PO3*	**6**
		c)	Illuminate the relationship between the two diagrams presented below which became a huge success in the field of biomimetics.	*CO3*	*PO3*	**6**

			 			
			UNIT - V			
	9	a)	How has marine life, especially creatures like shark, have been offering inspiration to Aerospace engineers?	*CO3*	*PO3*	**6**
		b)	Give an example of bio-inspired materials being used in Aerospace engineering.	*CO3*	*PO3*	**6**
		c)	Scientists and engineers have developed hummingbird-inspired MAVs. Write the significance of these air vehicles.	*CO3*	*PO3*	**8**
			OR			
	10	a)	Nature perform task what is called In situ resource utilization. Explain the concept of ISRU in space and its importance in sustainability.	*CO3*	*PO3*	**6**
		b)	Emperor penguins swim acrobatically and taking inspiration how this concept can be utilized in taming sonic boom. Explain.	*CO3*	*PO3*	**6**
		c)	Aerospace medicine has a significant role in field of Cardiovascular medicine and Radiation Biology. Elaborate on this.	*CO3*	*PO3*	**8**

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