U.S.N.										

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

Autonomous Institute Affiliated to VTU

May / June 2025 Semester End Main Examinations

Programme: B.E. **Semester: VIII**

Branch: Medical Electronics Engineering **Duration: 3 hrs.**

Course Code: 22MD8PE4BA **Max Marks: 100**

Course: Biomaterials and Artificial Organs

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)		Classify biomaterials based on their interaction with biological systems. Give suitable examples.	*CO1*	*PO1*	**04**
	b)		What strategies are used to improve biocompatibility of biomaterials?	*CO1*	*PO1, 2*	**08**
	c)		How are biomaterials used in drug delivery systems? Discuss the properties required and challenges.	*CO2*	*PO2*	**08**
			OR			
2	a)		Elaborate on the physical and mechanical properties of biomaterials and their relevance in medical applications.	*CO1*	*PO1*	**10**
	b)		Describe the stages of host response to biomaterials.	*CO1*	*PO1*	**10**
			UNIT - II			
3	a)		Describe the mechanical and corrosion resistance properties of stainless steel used in biomaterials.	*CO2*	*PO2*	**10**
	b)		Discuss the different types of polymer sterilization methods.	*CO5*	*PO6*	**10**
			OR			
4	a)		What is tissue engineering? Explain the role of biomaterials as scaffolds in tissue regeneration.	*CO4*	*PO4*	**10**
	b)		What are the types of Bioceramics? Explain any two in detail?	*CO2*	*PO2*	**10**
			UNIT - III			
5	a)		Explain the working principle of Cardiopulmonary Bypass (CPB) with a neat diagram.	*CO3*	*PO3*	**10**
	b)		Define artificial organs and elucidate their significance.	*CO3*	*PO3*	**10**

			OR			
	6	a)	Discuss the need for cardiac valve prostheses and explain their classification.	*CO3*	*PO3*	**10**
		b)	Explain the different types of Artificial Hearts and Circulatory Assist Devices	*CO3*	*PO3*	**10**
			UNIT - IV			
	7	a)	What is in vitro testing? Explain the importance of in vitro testing in regulatory biocompatibility assessment.	*CO5*	*PO6*	**10**
		b)	Explain the effects of sterilization on material properties of implants.	*CO5*	*PO4*	**10**
			OR			
	8	a)	Explain the factors that determine the optimal sterilization technique for medical implants and devices.	*CO5*	*PO5*	**10**
		b)	Explain the Embryonic Stem Cell Test and its role in reproductive toxicity	*CO5*	*PO6*	**10**
			UNIT - V			
	9	a)	What are the critical design considerations for biomaterials used in neural applications?	*CO4*	*PO4*	**10**
		b)	Define 3D bioprinting. How could this technology be used to address current limitations in organ transplantation?	*CO4*	*PO4*	**10**
			OR			
	10	a)	Classify nanomaterials used in biomedicine with examples and applications.	*CO5*	*PO5*	**10**
		b)	Write a brief note on bioresorbable polymers and biomaterials	*CO5*	*PO6*	**10**

****