U.S.N.										

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

Autonomous Institute Affiliated to VTU

February / March 2023 Semester End Main Examinations

Programme: B.E. **Semester: V**
Branch: MEDICAL ELECTRONICS ENGINEERING **Duration: 3 hrs.**
Course Code: 19ML5PE2BM **Max Marks: 100**
Course: BIOMATERIALS **Date: 03.03.2023**

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

1	a)	Describe the categories of materials based on their chemical makeup and bonding. Also mention medical application for each type of the material.	**10**
	b)	Explain Biocompatibility of biomaterials and summarize the various biocompatibility testing services.	**10**

UNIT - II

2	a)	Analyze the corrosion study of metallic biomaterials in simulated body fluid as a case study.	**10**
	b)	Explain primary roles of any five macro elements in human body.	**10**

UNIT - III

3	a)	Explain Stress Corrosion Cracking in detail.	**10**
	b)	Discuss about various hardness testing techniques of medical implant materials.	**10**

UNIT - IV

4	a)	Explain the four groups of metallic biomaterials based on the matrix alloying element. Mention their applications as implants.	**10**
	b)	Describe in detail the mechanism of corrosion resistance of Cr, Mo, and Ni alloying elements in stainless steel.	**10**

OR

5	a)	Examine the role of Titanium and Titanium Based Alloys as Metallic Biomaterials in Medical Applications using a Spine Implant Case Study.	**10**
	b)	Discuss on the biocompatibility, corrosion and mechanical properties of Magnesium alloys.	**10**

UNIT - V

6	a)	Examine the structure of Polytetrafluoroethylene (PTFE) and mention its medical applications.	**10**

b) Explain the classification and mechanical properties of Thermoset elastomers. **10**

OR

7 a) Explain the molecular structure, properties and applications of a Bioinert polymer. **10**

b) Examine the properties and drawbacks of poly-methyl methacrylate(PMMA) bone cement for hip prosthesis fixation. **10**

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