


Name:			
Enrolment No:			
UPES			
End Semester Examination, May 2024			
Course: Materials for Biomedical Devices			
Semester: 4			
Program: BT- Biomedical Engineering			
Course Code: HSBE2003		Duration: 3 Hours	
		Max. Marks: 100	
Instructions: Attempt all the questions			
S. No.	Section A	Marks	COs
	Short answer questions/ MCQ/T&F (20Qx1.5M= 30 Marks)		
Q 1	Name one metallic implant material commonly used in biomedical applications.	1.5	CO1
Q 2	What is stress-corrosion cracking?	1.5	CO2
Q 3	Give an example of a hard tissue replacement implant.	1.5	CO2
Q 4	Name a type of soft tissue replacement implant.	1.5	CO5
Q 5	What are the hydrophilic and hydrophobic surface properties of polymers?	1.5	CO5
Q 6	Name one physiochemical characteristic of biopolymers.	1.5	CO3
Q 7	What are biodegradable polymers used for in medical purposes?	1.5	CO3
Q 8	Name three common types of bio ceramics used in implant materials.	1.5	CO6
Q 9	Define biocompatibility.	1.5	CO6
Q 10	What are the three types of compatibility relevant to biomaterials?	1.5	CO6
Q 11	Name one type of toxicity test used in toxicological screening of biomaterials.	1.5	CO6
Q 12	List one sterilization technique for biomaterials.	1.5	CO4
Q 13	Name one type of mechanical test used in in vitro testing of biomaterials.	1.5	CO5
Q 14	Mention one standard governing implant materials.	1.5	CO5
Q 15	Name one application of nanomaterials in biomedical engineering.	1.5	CO3
Q 16	What is the definition of biomaterials? a) Materials derived from biological sources such as plants and animals. b) Materials used in biomedical applications that interact with biological systems. c) Materials exclusively used in industrial manufacturing processes.	1.5	CO3

	d) Materials with no application in medical or biological fields		
Q 17	What are the primary requirements of biomaterials? a) Electrical conductivity and magnetic properties. b) High cost and scarcity. c) Biocompatibility, mechanical properties, and durability. d) Low stability and degradation	1.5	CO5
Q 18	Which of the following is NOT a classification of biomaterials based on origin? a) Natural biomaterials b) Synthetic biomaterials c) Composite biomaterials d) Metallic biomaterials	1.5	CO2
Q 19	What are the properties commonly compared when evaluating different biomaterials? a) Density, color, and electrical conductivity. b) Biodegradability, surface roughness, and electrical conductivity. c) Strength, stiffness, and biocompatibility. d) Transparency, odor, and electrical conductivity.	1.5	CO2
Q 20	Which biomaterial is known for its excellent biocompatibility and mechanical properties, making it suitable for bone implants? a) Polystyrene b) Polyethylene c) Titanium alloy d) Polyvinyl chloride	1.5	CO4
Section B (4Qx5M=20 Marks)			
Q 1	Why is wear resistance important in ceramic implant materials?	5	CO5
Q 2	Explain the significance of host tissue reactions in the context of ceramic implants, particularly focusing on interfacial tissue reactions.	5	CO6
Q 3	Describe the composite theory of fiber reinforcement and explain the roles of short and long fibers in enhancing mechanical properties.	5	CO4
Q 4	What are the host tissue reactions associated with composite implant materials, and how do they influence the long-term performance of implants?	5	CO4
Section C (2Qx15M=30 Marks)			
Q 1	What is ex vivo testing, and how does it simulate in vivo conditions for biomaterial assessment?	15	CO3

Q 2	Provide examples of how nanomaterials enhance the effectiveness of drug delivery systems.	15	CO4
Section D (2Qx10M=20 Marks)			
Q 1	list and briefly explain the various toxicity tests conducted on biomaterials, including acute and chronic toxicity studies.	10	CO5
Q 2	Describe the different methods used for sterilization of biomaterials, such as ETO, gamma radiation, and autoclaving, and discuss their effects on material properties	10	CO6