Roll No. | | | | | | | | | | |

ANNA UNIVERSITY (UNIVERSITY DEPARTMENTS)

B.E. /B.Tech / B. Arch (Full Time) - END SEMESTER EXAMINATIONS, NOV / DEC 2024

BE BIOMEDICAL ENGINEERING

IV Semester

BM5692 Introduction to Biomaterials

(Regulation2019)

Time:3hrs Max.Marks: 100

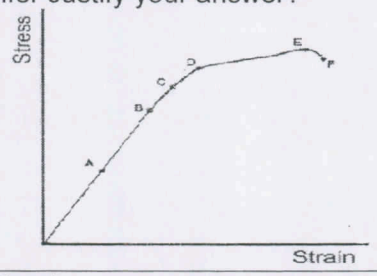
CO1	Understand the important concepts of biomaterials and their contribution towards Biomedical Engineering.
CO2	Perform combinations of materials that could be used as implants
CO3	Evaluate response of biomaterials in living system
CO4	Analyze different applications of biomaterials in biomedical field.
CO5	Assimilate information on the standards and rules involved in developing biomaterials.

BL – Bloom's Taxonomy Levels

(L1-Remembering, L2-Understanding, L3-Applying, L4-Analysing, L5-Evaluating, L6-Creating)

PART- A(10x2=20Marks)

(Answer all Questions)

Q.No.	Questions	Marks	CO	BL
1	List out the salient features of biomaterials?	2	1	L2
2	Distinguish the chemical bonds existing in water molecules?	2	1	L4
3	Define delocalized electron?	2	2	L2
4	In stress–strain curve given below, if point D and E are far apart, what does the material infer Justify your answer? 	2	2	L4
5	What is Vorman effect?	2	3	L1
6	Choose a suitable material for cell anchoring by highlighting its properties- justify your answer.	2	3	L5
7	Identify the regulatory bodies and its role in designing and assessing the quality of non thrombogenic medical device?	2	5	L4
8	Evaluate the cytotoxicity of a plant derived nanoparticles for drug delivery system?	2	3	L5
9	Stent is not considered as an extracorporeal device- justify.	2	4	L5
10	How the defect in corneal epithelium is rectified?	2	4	L2

PART- B(5x 13=65Marks)

(Restrict to a maximum of 2 subdivisions)

Q. No.	Questions	Marks	CO	BL
11 (a)	A research person working on material for biomedical applications need to visualize the surface of material so that he can decide its nature. Choose a suitable technique to study the topography and give detail information.	13	1	L3
	OR			
11 (b)	Identify a method to convert an inert material to reactive functional groups for nanocomposites preparation?	13	1	L3
12 (a)	How deformity favors the performance of a metallic structure?	13	2	L1
	OR			
12 (b)	Why CNT are widely used in medical applications?	13	2	L1
13 (a)	Explain the different stages of wound healing?	13	3	L2
	OR			
13 (b)	Illustrate the involvement of proteins in adsorption phenomenon on to the surface?	13	3	L2
14 (a)	A 52 yr old woman admitted to the emergency department with chest pain for 1 day. The chest pain started suddenly and was associated with arm movement. She denied palpitations, dizziness, shortness of breath, and trauma. Her vital were stable but ECG showed atrioventricular block. Analyze the current scenario and choose a suitable treatment and give a detail explanation.	13	4	L4
	OR			
14 (b)	Susan, 60 year old who lost the sight due to corneal infection. Examine her condition and suggest an ocular implant to restore her vision.	13	4	L4
15 (a)	A hybrid composite of PVA/ceramic is chosen for scaffold fabrication. Analyze its biocompatibility by carring out series of test analysis?	13	5	L4
	OR			
15 (b)	Inspect over the steps involved in the standardization of an orthopedic implant ethically and approval from regulatory bodies.	13	5	L4

PART- C(1x 15=15Marks)

(Q.No.16 is compulsory)

Q. No.	Questions	Mark	CO	BL
16.	R&D division of a medical company developed a new neurostimulator, consisting .of electrical controller fixed to lead wire that terminates with electrodes supposed to be positioned next to nerve. This is going to retain inside the patient's body forever. In course of time to avoid misalignment, the team has asked to design a sheath which encases the device in position.  Choose a material for the sheath and justify your answer by listing its merits? Interpret the biological response after implantation in an eventually manner. Suppose if metal wire shows pitting at the junction of metal -electrode junction, what will be consequence and its avoided?	15	4	L5