

Exam.Code:0910

Sub. Code: 6319 ✓

2054

B.E. (Biotechnology) Sixth Semester

BIO-615: Biomaterials ✓

Time allowed: 3 Hours

Max. Marks: 50

NOTE: Attempt five questions in all, including Question No. 1 which is compulsory and selecting two questions from each Unit.

x-x-x

I. Answer the following:-

- a) Define aphakia.
- b) Explain the process of scleral buckling. Why is it done?
- c) Differentiate between a Pontic and Abutment.
- d) Diagrammatically show inlays and onlays in dental implants.
- e) Enlist two major reasons that why do we need artificial blood.
- f) What is xenograft?
- g) Define Poisons ratio.
- h) Enlist the components of dental braces.
- i) Mention any four applications of contact lenses.
- j) Differentiate between an artery and a vein. (10x1)

UNIT - I

- II. a) A metal guide wire is 2.5 mm and 1.6 m long, when a force of 15 N is applied during surgery it stretches by 0.4 mm. Assuming the wire to be elastic determine stress, strain and modulus of elasticity in GPa.
- b) Using relevant examples, explain how physico-chemical properties govern the choice of material for a particular biomaterial application. (2x5)
- III. a) Explain the stress strain curve of metals, ceramics and polymers using a diagram. Mention the differences in stress strain curve of bone of 25-year-old person an 80-year-old person.
- b) What is an alloy? Elaborate on various applications of metallic implants in body.

(2x5)

P.T.O.

(2)

- IV. a) Enlist the characteristics of an ideal suture material and discuss the classification of suture material based on the origin, absorption and fiber construction.
- b) The following data was obtained for a polymethylacrylate, [monomer ($\text{H}_2\text{C}=\text{CHCOOCH}_3$)]. Calculate M_n , M_w , PDI and DP of this polymer. (2x5)

Mean M.W (g/mol)	Weight (g)	Number fraction
2500	3.0	0.4
4500	1.5	0.4
3500	1.5	0.2

UNIT - II

- V. a) Give detailed structure of skin. What do we mean by split- and full-thickness skin grafts? Describe in detail that how artificial skin is made.
- b) Discuss why blood substitutes are needed? Discuss the different types of blood substitutes currently available. (2x5)
- VI. a) Draw a labelled diagram of tooth, and comment on filling and restoration materials.
- b) Write a descriptive note on biomaterials in tissue regeneration and cosmetic surgery. (2x5)
- VII. Write short note on any two:-
- Graft rejection with a focus on blood groups
 - Wound healing process
 - Pace makers (2x5)