

2014
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 Section.

x-x-x

1. Answer the following:

(10x1 = 10)

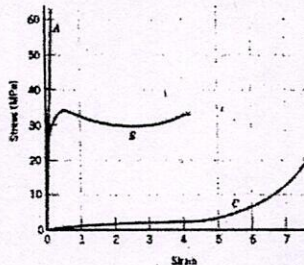
- What is rhinoplasty? Name any one material used in the process.
- Classify the polymers based on the arrangement of functional groups in the chains.
- Define scaffold, how is it used in tissue engineering?
- List one major advantage and a disadvantage of using 3D printed organs.
- What are the major factors that need to be considered while choosing a material for orthopedic implant?
- Name any three features that need to be there in the contact lenses.
- Define Hooke's Law.
- What is stenosis and regurgitation in terms of human heart?
- Ideal ophthalmic drug delivery system should have the following features _____.
- What is the advantage of using natural suture material with chromium salts?

SECTION-A

2. Materials can be broadly classified into various classes based on their composition. Discuss the advantages and disadvantages and applications of each class of materials. (10)

3 a. Why is the study of physico-chemical properties of biomaterials important before designing a material for any application? Name any two methods for studying them. (6)

b. The stress strain curves for three materials (A), (B), (C) are given below. Comment on the mechanical properties and any information that you can discern about the materials from this curve. (4)



P.T.O.

(2)

- 4 a. What are alloys? Mention any five applications of alloys. (4)
- b. A metal guide wire of 3 mm in diameter and 3.5m long. When a force of 10N is applied it stretches by 0.5mm. Assuming it to be elastic, calculate the stress, strain and the modulus of the wire. Represent the modulus on GPa. (6)

SECTION-B

- 5 a. Draw a labeled diagram of heart and describe pulmonary and systemic circulation. (5)
- b. 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. (5)
- 6 a. Discuss the reasons behind the huge requirement of blood substitutes. Elaborate on the different types of blood substitutes currently available. (5)
- b. What might be the reasons if the doctor prescribes a hip replacement surgery to a patient? Discuss the process of hip replacement surgery. Mention the components of an artificial hip joint, their composition and functions. (5)
- 7 Write a short note on: (2.5X4=10)
- a. Biofilms
 - b. Hydrogels
 - c. Dental braces
 - d. Sutures