

IV B.Tech. II Semester Supplementary Examinations, July -2005
BIOMATERIALS
(Bio-Medical Engineering)

Time: 3 hours

Max Marks: 80

Answer any FIVE Questions
All Questions carry equal marks

1. Briefly explain the properties of an ideal biomaterial.
2. (a) Justify the use of metals as biomaterials.
(b) Explain the applications metals as biomaterials in medical applications.
3. (a) Compare the features of polymers and ceramics.
(b) Explain the characteristics of different dialysis membranes.
4. Explain the differing reactions of the body to implants made of metals, polymers and ceramics.
5. (a) Explain in detail the various factors which influence biocompatibility.
(b) Discuss how tissue culture is used to test the implants.
6. (a) Explain the features of lower limb orthopedic implant.
(b) Explain the features of the metals used in orthopedic applications.
7. (a) Discuss the different types of dental implants.
(b) Explain the advantages with reimplantation of natural teeth as compared to dentures.
8. Write short notes on:
 - (a) Wound healing
 - (b) Hydrogels.

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1. What are the desirable properties of an ideal biomaterial? Explain.
2. (a) Discuss about the suitability of metals and alloys as implant materials.
(b) List the metals and alloys which are used as biomaterials and give their specific applications.
3. (a) Compare the performance features of polymers and ceramics.
(b) Explain the features of resorbable polymers.
4. Explain the wound healing process.
5. (a) How are the biomaterials tested for their performance? Explain any two tests.
(b) Write few sentences about biocompatibility.
6. (a) Explain in detail the different types of dental implants?
(b) Write few sentences on alveolar bone replacements.
7. Discuss about surface energy, contact angle and critical surface tension.
8. Write short notes on the following:
 - (a) Metallic implant fractures.
 - (b) Bone cements.

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1. Discuss the factors which influence the performance of a biomaterial.
2. (a) Describe the disadvantages of polymers to be used as a biomaterial.
(b) Discuss the different types of dialysis membranes.
3. (a) Explain the conditions which promote fast wound healing.
(b) Write the desirable properties of a material to be used as a tissue adhesive.
4. (a) Explain the use of ceramics as biomaterials.
(b) Discuss in detail any two medical applications of ceramics.
5. (a) Discuss the in vitro testing of implants.
(b) What are the desirable features of vascular implants?
6. (a) Explain the functional features of the orthopedic fixation devices for the upper limb.
(b) Explain the conditions in which the joint replacement has to be carried out.
7. (a) Describe the applications of hydrogels in medicine.
(b) Explain the characteristics required for the materials used for blood oxygenation.
8. Write short notes on the following:
 - (a) Non-thrombogenic surfaces
 - (b) Bone healing

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1. (a) Explain the process of metallic implant corrosion.
(b) What are the common reasons for metallic implant fractures?
2. (a) What are the desirable features of sutures used for medical applications?
(b) Explain the medical applications of any two biopolymers.
3. Classify the biomaterials used for medical applications. Give the example and application for each of them.
4. (a) Explain the different phases of wound healing.
(b) Discuss the effect of wear particles on the performance of the implant.
5. (a) Describe the in vitro testing of medical implants.
(b) Explain the precautions to be taken while handling implants.
6. (a) What are the most common problems encountered with artificial joints?
(b) Write few sentences about bone replacements.
7. (a) What steps have to be taken while handling the implants to prevent thrombosis.
(b) Classify the types of artificial joints.
8. Write short notes on the following:
 - (a) Vascular implants.
 - (b) Bone cements.
