



### End Term Examination (December 2019)

**School:** School of Engineering

**Program:** M.Tech Bio-Engineering (BM)

**Course:** Advances in biomaterials

**Course Code:** BEN502

**Semester:** I

**MaxMarks:** 40

**Duration(mins) :** 90

**All questions are compulsory.**

**(All questions carries 2 marks each.)**

**[40]**

1. Poly (methylmethacrylate), PMMA, is a commonly used biomedical polymer. Which of the listed properties are true?
  - a) It is flexible thermoplastic polymer
  - b) It can have good optical properties.
  - c) It can bond to bone.
  - d) It is thermosetting polymer
2. It is any material that once placed in the human body has minimal interaction with its surrounding tissue.
  - a) bioinert materials
  - b) metallics biomaterials
  - c) biominerals
  - d) Membrane lamination
3. Which of the following is true regarding biodegradable polymers?
  - a) The degradation products of the polymer are always harmless.
  - b) They always have a low melting point (lower than 150°C).
  - c) They always have a crystallinity below 90 %.
  - d) They have a lower glass transition temperature than bioinert polymers.

4. Which of the following tissues is a highly hydrated tissue most similar in structure to a hydrogel?
  - a) Bone
  - b) Liver
  - c) Cartilage
  - d) Neurons
5. Which one of the following statements best defines tissue engineering?
  - a) It is the replacement of tissues using techniques developed from a combination of biology and engineering principles.
  - b) It is the growth of tissue components in vitro that can be used to regenerate diseased or damaged tissue.
  - c) It is the implantation of scaffolds for the in situ repair of diseased or damaged tissue.
  - d) It is a form of bioactive fixation.
6. Which of the following bioceramics is NOT bioactive?
  - a) Titania
  - b) Synthetic HA
  - c) Coralline HA
  - d) Alumina
7. Enlist different bio-compatibility factors and explain performance of Biomaterials.
8. Explain ceramics as a drug delivery devices or materials.
9. What are the considerations for a biomaterial which is to be used as an orthopaedic implant?
10. Explain blood-biomaterial interaction and corrosion & wear of Biomaterials
11. Explain the bioinert ceramics in detail.
12. Enlist the biomaterials used in dental implants and explain any two of them in detail.
13. What is Biodegradable ceramics? Explain any two Biodegradable ceramics.
14. Explain in detail the applications of polymers as a biomaterial.
15. Explain the material selection criteria for biomaterials in detail.
16. Write a short Note: Titanium and Titanium alloys as biomaterial.
17. Give the properties of Glass Ceramic & explain its applications.
18. Give the properties & uses of Hydroxyapatite.
19. Ceramics are also present inside the body in the form of natural ceramics. Give two examples where they reside inside the body and how is this type of ceramic used synthetically?
20. Why is Ceramic head preferred over metal head against the acetabular cup?

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