

GANPAT UNIVERSITY**B. TECH SEM- IV (BME) REGULAR EXAMINATION- APRIL-JUNE 2017****2BM405: Biomaterials & Implants****TIME: 3 HRS****TOTAL MARKS: 60**

- Instructions:** (1) This Question paper has two sections. Attempt each section in separate answer book.
 (2) Figures on right indicate marks.
 (3) Be precise and to the point in answering the descriptive questions.

SECTION: I**Q.1 Answer the following questions:**

- a) Enlist the mechanical property of biomaterials and explain. (10)
 (03)
 b) Draw the stress strain curve of Traditional engineering material & Biological soft tissue material and explain in detail (04)
 c) Define Metal. What are the characteristics of metal? (03)

OR**Q.1 Answer the following questions:**

- a) Explain the following thermal treatment process for metals: (10)
 (04)
 i) Annealing • ii) Ageing
 b) Which type of stainless steel is used as an implant material? What is the micro structure of it? (04)
 c) Define Solubility and erosion. (02)

Q.2 Answer the following questions:

- a) Define following terms (10)
 (06)
 i) Surface Energy
 ii) Critical Surface tension
 iii) Contact angle
 b) Mention the sequence involving for selection of biomaterial. (03)
 c) What is the concentration of cobalt and chromium in cobalt based alloys? (01)

OR**Q.2 Answer the following questions:**

- a) What is quenching? Explain quenching process in detail. (10)
 (04)
 b) Differentiate hot and cold working. (06)

- Q.3 Answer the following questions:** (10)
- a) Explain the following terms in terms of extensive quality assurance program: (05)
 - i) Standard Specification
 - ii) Material Evaluation
 - iii) Clinical Trials
 - b) Enlist the advantages, disadvantages and examples of Polymer, Metal & Ceramic (05)

SECTION: II

- Q.4 Answer the following questions:** (10)
- a) Define "Polymer". Enlist the factors influence the mechanical properties of polymers. (03)
 - b) What is bone cement? What is its composition? (03)
 - c) Enlist the different materials are used in the creation of artificial heart valves (02)
 - d) What is biodegradable? (02)

OR

- Q.4 Answer the following questions:** (10)
- a) How is a hydrogel used for drug delivery & wound dressing? (03)
 - b) Classify the polymer based on source and explain. (03)
 - c) What is TKR? Explain in detail. (04)

- Q.5 Answer the following questions:** (10)
- a) What properties are desirable in polymers for contact lenses? (03)
 - b) Draw the functional block diagram to represent the preparation of a ceramic material. (03)
 - c) Explain total hip replacement process. (04)

OR

- Q.5 Answer the following questions:** (10)
- a) What are dentures? Enlist the types of dentures and explain. (04)
 - b) Enlist the properties of ceramic material? (02)
 - c) Define Control Valve. Draw the cages structure ball valve and explain its function. (04)

- Q.6 Answer the following questions:** (10)
- a) Enlist different temporary fixation devices used in orthopedic implants. (01)
 - b) Which part of body acts as a natural pacemaker? Enlist the parts of implantable pacemaker. (05)
Which types of material are used to make a particular part?
 - c) What is condensation polymerization? Explain the process of Nylon 6.6. (04)

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