



17543

21415

3 Hours/100 Marks

Seat No.

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- Instructions:**
- (1) **All questions are compulsory.**
 - (2) **Illustrate your answers with neat sketches wherever necessary.**
 - (3) **Figures to the right indicate full marks.**
 - (4) **Assume suitable data, if necessary.**
 - (5) **Use of Non-programmable Electronic Pocket Calculator is permissible.**

MARKS

1. A) Attempt **any three** : **12**
- a) Define biomaterials. Give one example of metals, ceramics and polymers used as biomaterial.
 - b) Give composition of stainless steels and two applications of Ti based alloys.
 - c) Describe two routes for blood clot formation.
 - d) State mechanical properties of teeth.
- B) Attempt **any one** : **6**
- a) Give the testing and evaluation process of dental implants.
 - b) State the factors affecting bone formation and resorption. Give the mechanical properties of bone.
2. Attempt **any four** : **16**
- a) Define i) Surface energy ii) Contact angle. State the importance of sterilization.
 - b) State the testing methods of biomaterials.
 - c) Define polymer. State the types of polymer and give one example of each type of polymer.
 - d) Explain how analysis of ceramic surface is carried out.
 - e) Draw a labelled structure of Kidney.
 - f) State the need of dental materials, also give the teeth composition.

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3. Attempt **any four** : 16
- a) State the meaning of biocompatibility. Explain corrosion and wear.
 - b) State two properties and two applications of carbon.
 - c) Draw neat labelled stress-strain curve for ductile material.
 - d) State the function of heart including valves.
 - e) Describe bone regeneration with resorbable material.
4. A) Attempt **any three** : 12
- a) Explain electro kinetic theory in surface analysis.
 - b) Give two properties and two applications of Zirconia.
 - c) Draw a labelled structure of Lungs.
 - d) State and explain the use of collagen in dentistry.
- B) Attempt **any one** : 6
- a) State the procedure for reimplantation of natural teeth.
 - b) Describe temporary fixation of joints. Explain total Knee replacement.
5. Attempt **any four** : 16
- a) Draw the structure of covalent bond and ionic bond of solid state crystals.
 - b) State different implant applications of ceramics and polymers (two each). Describe their properties.
 - c) List one application of the following biomaterials :
 - 1) Acrylic polymer 2) Hydrogel
 - 3) Silicon rubber 4) Collagen.
 - d) Comment on electrical stimulation on bone healing.
 - e) Explain the term biological tolerance of implant metals with four examples.
 - f) List temporary fixation devices. State their importance.
6. Attempt **any four** : 16
- a) List advantages and disadvantages of PMMA and UHMPE with reference to total Knee replacement.
 - b) Draw and label structure of eye.
 - c) State and explain the biomaterial used for contact lenses.
 - d) Explain the terms :
 - i) Blood clot ii) Blood substitutes.
 - e) List factors that effect blood compatibility of synthetic vascular implant materials.
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