



17543

14115

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) **Use of Non-programmable Electronic Pocket Calculator is permissible.**
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| 1. A) Attempt any three : | 12 |
| a) Explain what do you mean by biocompatibility. | |
| b) Give two applications and two mechanical properties of stainless steel and its alloys. | |
| c) Sketch the schematic of heart illustrating prosthetic heart valve. | |
| d) State the meaning of oral implants. | |
| B) Attempt any one : | 6 |
| a) Give the constituents (composition) of dentine and state its mechanical properties. | |
| b) Give in detail the sequential cellular event taking place in bone healing. | |
| 2. Attempt any four : | 16 |
| a) State the meaning of point defect and give its types. | |
| b) Give any four names of international and national organizations of different countries which set standards for biomedical materials and devices. | |
| c) Draw the structure of hydrogels and list any four. | |
| d) Give the categorization of ceramic materials on the basis of their reactivity with the environment. | |
| e) List four types of prosthetic heart valves and draw any 2 among them. | |
| f) State the meaning of the term 'dental amalgam' and give its two mechanical properties. | |
| 3. Attempt any four : | 16 |
| a) List names of four techniques used for surface analysis of biomaterials. | |
| b) Give the meaning of sterilization and state need for the same. | |

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- c) Give four applications of silicon rubber.
- d) State the need for cardiac pacemaker.
- e) List four biomaterials used in total joint replacement.
4. A) Attempt **any three** : 12
- a) Describe electrokinetic theory.
 - b) Give four properties of zirconia.
 - c) Give the function of heart with the help of neat and labelled diagram.
 - d) Comment on osteoblasts and osteoclasts found in bone marrow.
- B) Attempt **any one** : 6
- a) List three uses of collagen in dentistry. Draw 3 types of self tapping dental implants.
 - b) Sketch graphically bone healing assisted by resorbable bone plate and explain it.
5. Attempt **any four** : 16
- a) A strip of rubber originally 75 cm long is stretched until it is 100 mm long. What is the tensile strain ? (Comment on its unit).
 - b) Give four applications of alumina.
 - c) Give four applications of Acrylic polymer.
 - d) State the meaning of temporary fixation device and give its two examples.
 - e) State how corrosion is measured and give the effect of corroded metallic implant on surrounding tissue.
 - f) List four types of total hip replacement devices and sketch any one.
6. Attempt **any four** : 16
- a) List advantages and disadvantages of PMMA and UHMWPE with reference to total knee replacement.
 - b) Classify electromeric lenses and state materials used for the same.
 - c) Give mechanical properties of ocular tissue.
 - d) Give the classification of dialyzer on the basis of clinical use and draw any one among them.
 - e) Sketch the labelled structure of kidney.
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