

17543

21718

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) Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.

Marks

1. (A) Attempt any THREE : 3 × 4 = 12

- (a) Define the following terms :
 - (i) Biomaterial
 - (ii) Biocompatibility
- (b) Give four applications of polymer which is known to be / as 'fake diamond'.
- (c) State the need of cardiac pacemaker and list the biomaterials used in different parts of it.
- (d) List the four biomaterials used in dental implant.

(B) Attempt any ONE :

6

- (a) Sketch any two types of self-tapping dental implant. Also state the testing and evaluation process of dental implant.
- (b) Sketch a labelled diagram of an osteon, also explain the concept of osteoblasts & osteoclasts.

2. Attempt any FOUR :**4 × 4 = 16**

- (a) Explain contact angle method.
- (b) Sketch different types of point defects and explain them.
- (c) State and explain the conditions of Ti-6AL-4V alloy in which it is used.
- (d) Explain the biological tolerance of the following implant metals :
 - (i) Titanium
 - (ii) Chromium
 - (iii) Molybdenum
 - (iv) Manganese
- (e) List four types of passive-fixation endocardial electrodes and draw two among them.
- (f) List four biomaterials used as filling and restoration materials in dentistry.

3. Attempt any FOUR :**4 × 4 = 16**

- (a) Define wear and explain any three types of it.
- (b) State the four techniques used to study the surface of a biomaterial.
- (c) Give the four applications of carbon.
- (d) Draw and explain flat-plate / parallel-plate dialyzer.
- (e) Explain the process of bone healing assisted by resorbable bone plate.

4. (A) Attempt any THREE :

3 × 4 = 12

- (a) State the importance of sterilization & explain any two methods of it.
- (b) Give two applications each of the following synthetic polymer :
 - (i) Silicon rubber
 - (ii) Hydrogels
- (c) State four functions of kidney.
- (d) Explain bone healing process with a diagram.

(B) Attempt any ONE :

1 × 6 = 6

- (a) State the procedure for reimplantation of natural teeth.
- (b) Sketch a labelled diagram of typical long bone. Also list the factors affecting bone formation and resorption.

5. Attempt any FOUR :

4 × 4 = 16

- (a) List the three types of crystal structure & sketch them.
- (b) Define resorbable ceramics and give its two uses.
- (c) State the mechanical properties of Titanium & its alloy.
- (d) List the four biomaterials used in total joint replacement.
- (e) Describe PMMA and give its two applications.
- (f) State the purpose of temporary fixation devices and name three of them.

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6. Attempt any FOUR :**4 × 4 = 16**

- (a) List advantage & disadvantages of PMMA and UHMPE with respect to total knee replacement.
 - (b) Classify electrometric lenses and state biomaterials used in them.
 - (c) State & explain the biomaterials used for contact lenses.
 - (d) Draw the labelled cross-sectional diagram of artery & vein and explain the three layers present in them.
 - (e) State the location of aortic valve in heart & give the structural components of the heart valve.
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