

Total Pages—4

(Set-T<sub>1</sub>)

**B.Tech-7th (M&M)**

**Biomaterials**

Full Marks : 70

Time : 3 hours

Answer six questions including Q. No. 1  
which is compulsory

*The figures in the right-hand margin indicate marks*

Symbols carry usual meaning

1. Answer all questions :-

2 × 10

(a) What are the advantages of using ceramics as a biomaterial ?

(b) What are the various microscopic changes those occur during Bioerosion ?

(c) State the factors on which biocompatibility depends upon ?

(d) Mention the advantages of titanium alloy over stainless steel as a biomaterial.

( Turn Over )

- (e) Why are the benefits of using CNT in polyethylene?
- (f) Briefly explain the synthesis of Co-Cr alloy.
- (g) What is Genotoxicity?
- (h) Why do certain types of materials exhibit "Chronic Effect"?
- (i) What do you mean by "Degree of Polymerization"?
- (j) How can one improve cell adhesion and growth using polymer?
2. (a) Explain the methods of modifying the surface properties of a material. 5
- (b) Discuss on the "Testing of Biomaterials". 5
3. (a) Explain sintering mechanism. What are the differences between liquid phase sintering and solid phase sintering? 5
- (b) Explain the mechanism of electrostatic spraying. 5
- attributes*

4. (a) What are the <sup>blood</sup> constituents present in the blood? Briefly explain the interactions in between blood and biomaterial? → 3 5

(b) What are the advantages and applications of hydroxy apitite ceramics? → 2.5 2.5 5

5. (a) Discuss on the types of Bioerosion. → 3 → 2 5

(b) What are the advantages, disadvantages and application of biomaterials? → 1.5 1.5 5

6. (a) What are the disadvantages of using polyethylene matrix in biomaterials? Explain how we can one improve the mechanical properties of polyethylene. → 2 → 2 ↓ 3 5

(b) What is a copolymer? Write down the classification of polymers. → 2 5

7. (a) Show microstructure of Titanium alloy. How can one modify the microstructure and properties of titanium alloy? → 3 → 1.5 ↓ 2 5

(b) What are the advantages of thermal spraying technique? Explain on which factor the coating properties depends. ↓ 1.5 ↓ 3 5

( 4 )

8. Write short notes on any two :  $5 \times 2$

(i) Poly caprolactone

(ii) Porous ceramic

(iii) Systemic effect

(iv) Poly amino acid.