

3. : (1) Question No. 1 is **compulsory**.  
 (2) Attempt any **four** questions from remaining **six** questions.  
 (3) **Figures** to the **right** indicate **full** marks.
- (a) (i) Define biomaterials. Classify biomaterials broadly. 4  
 (ii) Explain biocompatibility of biomaterials. Explain corrosion and wear of biomaterials. 4  
 (iii) What are the properties and applications of bioglass ? 4  
 (iv) Explain in short types of leathers used in prosthesis and orthotics devices. 4  
 (v) Explain properties and biomedical applications of Nitinol. 4
- (a) Explain grades of stainless steel with their composition and properties. 12  
 (b) Explain in detail processing steps of leathers. 8
- (a) Classify Cobalt based alloys on the basis of their composition with their properties. 10  
 (b) What is biological testing of biomaterials ? Explain invitro and invivo methods used to test biomaterials biologically. 10
- (a) Explain advantages and disadvantages of metallic biomaterials used for orthopedic load bearing and fixation devices. 10  
 (b) Ceramic materials like Alumina Zirconia are used for hip and knee prosthesis, dental implants etc. Justify their advantages and disadvantages. 10
- (a) Explain types of plastic biomaterials used in prosthesis and orthotics devices with their properties. 10  
 (b) Explain the applications of metallic biomaterials used for prosthesis and orthotics devices. 10
- (a) What are the properties and applications of polyethylene and polypropylene ? 5  
 (b) Define ceramic biomaterials. What are the properties of calcium phosphate ? 5  
 (c) Explain use of wood and binding biomaterials in prosthesis and orthotics devices. 10
- (a) Explain biomedical applications of any two composite biomaterials. 5  
 (b) What are the methods used to test surface properties of biomaterials which properties are tested ? Explain in detail electron spectroscopy for Chemical Analysis. 15