

--	--	--	--	--	--	--

B.E. / B.Tech. (Full Time) DEGREE ARREAR EXAMINATIONS, NOV / DEC 2011  
MATERIALS SCIENCE AND ENGINEERING BRANCH  
SIXTH SEMESTER – (REGULATIONS 2008)  
**ML 9351 – BIO AND SMART MATERIALS**

Time : 3 hrs

Max. Mark: 100

Answer ALL Questions

Part – A (10 x 2 = 20 Marks)

1. Classify biomaterials according to their bulk and surface properties.
2. Why metals are generally less Biocompatible than Polymers and Ceramics?
3. Define Thrombogenicity.
4. What are the advantages of magnetorheological fluids over Electrorheological fluids?
5. What is bioglass? Give the biomedical applications of bioglass.
6. What do you mean by "Training" and "Programming" in case of Shape Memory Materials?
7. Use of Autologous Saphenous vein as Vascular Graft is 100% free of failure. Justify.
8. Define Tissue Engineering.
9. What is polydispersity index?
10. Which polymers have applications in hard tissue replacement?

Part – B (5 x 16 = 80 Marks)

11. a. (i) What do you understand by Wolff's law? (4)  
(ii) Describe the concept of Biomimetics in evolution of intelligent material. (8)
12. a. Explain the mechanism of charge – migration in Electro – Rheological fluids and also list the principle characteristics and design parameters of Electro-Rheological fluid.  
(OR)  
b. Compare the mechanism involved in piezoelectric polymers and ceramics.

.....2

13. a. Describe in detail the mechanism of shape memory involved in Shape memory polymers.

(OR)

b. Explain the influence of alloying in SMA materials with an example.

14. a. Comment on the selection of materials in disc type mechanical Heart valves.

(OR)

b. Describe the mechanism of blood coagulation and the logic behind the approaches of nonthrombogenic treatments of biomaterials.

15. a. Explain the architecture and characteristics of skin and list the materials used as dental adhesives.

(OR)

b. Brief on the various types of dental implant, their materials selection and manufacturing.

\*\*\*\*\*