



B.E / B.Tech (Full Time) DEGREE END SEMESTER EXAMINATIONS, APRIL-MAY 2011

MATERIALS SCIENCE AND ENGINEERING BRANCH

SIXTH SEMESTER - (REGULATION 2008)

28

ML 9351 – BIO AND SMART MATERIALS

Time: 3 hr

Max. Mark: 100

**PART- A (10X2 = 20 Mark)**

**Choose the answer and justify for the following questions.**

**(i) A only (ii) B only (iii) Either A or B (iv) Neither A nor B (v) Both A & B**

1. Evaluation of biocompatibility of materials should be done:  
(A) *in vitro* (B) *in vivo*
2. A material which exhibit piezoelectric effect will necessarily have:  
(A) non centrosymmetry crystal structure (B) net polarisation
3. The effect of alloying NiTi shape memory metal alloys will alter  
(A) hysteresis (B) recoverable strain
4. The best nonthrombogenic treatment of materials is by incorporation of:  
(A) heparin (B) PEO
5. The desired property of a material as soft hydrogel contact lens:  
(A) retain higher water content (B) ionic nature

**State True or False. Justify.**

6. Bone is a piezoelectric material
7. Intrinsic type of electrorheological fluid exhibit better performance than extrinsic type.
8. Shape memory effect of polymers is an intrinsic property of the material.
9. Autologous Saphenous vein is the gold standard for vascular graft.
10. Externally regulated drug delivery system is the best.

**PART- B (5 X16 = 80 Mark)**

11. Brief on the following:

- (i) Wolff's Law (4)
- (ii) host reaction to biomaterial implantation. (12)

12. (a) (i) Brief on the various mechanism of Electrorheological fluid. (10)  
(ii) List THREE application of ERF. (6)

(OR)

- (b) (i) Explain the mechanism involved in piezoelectric materials.

13. (a) Elaborate the mechanism of shape memory effect exhibited by Nitinol.

(OR)

- (b) Brief on mechanism of shape memory effect exhibited by shape memory polymers.

14. (a) Write short notes on the following:

(i) Architecture of bone (6)

(ii) Different phases of bone remodeling (10)

(OR)

- (b) Brief on the mechanism of blood coagulation and control mechanism.

15. (a) (i) Brief on different methods of treatment for skin regeneration. (10)

(ii) Name few applications of endosseous and subperiosteal implants. (6)

(OR)

- (b) (i) Comment on the various materials used in ophthalmology. (8)

(ii) Brief on the various type of drug delivery system. (8)