



B.E / B.Tech (Full Time) DEGREE END SEMESTER EXAMINATIONS, APRIL – MAY 2012

MATERIALS SCIENCE AND ENGINEERING BRANCH

SIXTH SEMESTER - (REGULATION 2004)

ML 381 – BIO AND SMART MATERIALS

Time: 3 hr

Max. Mark: 100

PART- A (10X2 = 20 Mark)

What do you mean by the following:

1. Biomimetics
2. Biocompatibility
3. Poling
4. Electrorheology
5. Two way shape memory effect
6. Pseudoelasticity
7. Bioinert material
8. Stress shielding effect
9. Tissue Engineering
10. Therapeutic index of drug

PART- B (5 X16 = 80 Mark)

11. Brief on the following:

- (i) Characteristics of Smart Materials (4)
- (ii) Host reaction to implantation of biomaterial (12)

12. (a) (i) Discuss the mechanism of Electrorheological fluid. (8)
- (ii) Brief on characteristics and design parameters of electro-rheological fluids. (8)

(OR)

- (b)(i) Explain the mechanism involved in piezoelectric materials. (8)
- (ii) Illustrate with examples the application of piezoelectric materials. (8)

13. (a) Brief on mechanism of shape memory effect in Nitinol and polyvinylidene difluoride.

(OR)

- (b) With suitable examples explain the applications of shape memory materials as actuator, sensor and vibration damper.

14. (a) Comment on the desired materials properties and choice of materials for any TWO:

- (i) Orthopaedic applications (8)
- (ii) Blood contact applications (8)

(OR)

- (b) Brief on mechanism of blood clotting and its control.

15. (a) Brief on the defects and materials/methods used for restoration with suitable examples for the ophthalmological application (or) burn dressing.

(OR)

- (b) Compare the mechanism and application of several of drug delivery systems