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

MECHANICAL ENGINEERING BRANCH

FOURTH SEMESTER - (REGULATION 2004)

ME 282 – ENGINEERING MATERIALS AND METALLURGY

Time: 3 hr Max. Mark: 100

PART- A (10X2 = 20 Mark)

1. What makes stainless steel corrosion resistant?
2. What is meant by Lever rule?
3. What is the purpose of tempering?
4. What is meant hardenability test?
5. Give TWO examples for bearing alloys.
6. What are HSLA steels?
7. Give an application of PEEK and PMMA.
8. What is special about nanomaterials?
9. Define twining.
10. What is meant by creep?

PART- B (5 X16 = 80 Mark)

11. (a) Write short notes on the following techniques of heat treatment specifying applicable materials and properties changes:

    (i) Induction hardening (4)

    (ii) Austempering (6)

    (iii) Stress relieving (6)

12. (a) Based on Fe-FeC equilibrium diagram elaborate the various phase transformation reactions involved.

    (OR)

    (b) Brief on the classification of cast iron, their microstructure, properties and applications.

13. (a) (i) Discuss on the properties of tool steel, maraging steel and Bronze.

    (OR)

    (b) (i) Brief on the precipitation strengthening treatment in case of Al-Cu system. (8)

(ii) Brief on the effect of alloying of Mn, Si, Cr, Mo and Ti on steel. (8)

14. (a). Describe the molecular structure, properties and application of the following polymers.

(i)Polypropylene (PP) (4)

(ii) Polyvinyl chloride (PVC) (4)

(iii) Poly tetra f1uoro ethylene (PTFE) (4)

(iv) Poly ethylene perethalate. (4)

(OR)

(b) Write short notes about the different types of matrix materials and reinforced materials used to make polymers matrix composites.

15. (a) (i) Explain the mechanisms of plastic deformation on metals by slip and twinning. (8)

(ii) List the types of fractures and factors influencing them. (8)

(OR)

(b) (i) Compare the various hardness tests (8)

(ii) How material is tested for fracture toughness. (8)