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

MECHANICAL ENGINEERING BRANCH

54

FOURTH SEMESTER - (REGULATION 2004)

ME 282 – ENGINEERING MATERIALS AND METALLURGY

Time: 3 hr Max. Mark: 100

PART- A (10X2 = 20 Mark)

1. What do you mean by solidus and liquidus line in phase diagram?
2. What is the significance of Eutectic reaction?
3. What is the purpose of tempering?
4. Define Hardenability.
5. Give TWO examples for bearing alloys.
6. Draw a typical microstructure of grey Cast Iron (C.I.)
7. Why ceramics are brittle in nature?
8. Define Composite.
9. Sketch edge and screw dislocation.
10. What is the difference between fracture surface for ductile and brittle material?

PART- B (5 X16 = 80 Mark)

11. (a) Draw Temperature-Time-Transformation (T-T-T) curve for eutectoid steel and discuss on the various phase and microstructure evolved for different cooling rates super imposed on TTT curve.

12. (a) Based on Fe-FeC equilibrium diagram elaborate the various phase transformation reactions involved at various temperatures and at different carbon composition, upto 6.67%.

(OR)

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

13. (a) (i) Discuss on the effect of effect of alloying of Mn, Si, Cr, Mo and Ti on steel. (8)

(ii) Brief on any TWO type of copper based alloy, their properties and applications. (8)

(OR)

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

(ii) List any TWO types of stainless steel and their properties and applications. (8)

14. (a). Describe the properties and application of the following materials:

(i) Partially stabilized Zirconia (PSZ) (4)

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

(iii) Silicon Carbide (4)

(iv) Phenol Formaldehyde (4)

(OR)

(b) Elaborate on Fibre and particulate reinforced composite with regard to types, their properties applications.

15. (a) (i) Compare and contrast Rockwell, Brinell and Vickers hardness test. (10)

(ii) Differentiate Izod and Charpy impact test. (6)

(OR)

(b) Brief the process and properties/parameters evaluated out of following:

(i) Fatigue test (4)

(ii) Creep test (4)

(iii) Tensile test (8)