



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

MANUFACTURING ENGINEERING BRANCH

FOURTH SEMESTER - (REGULATION 2004)

MN 281 – ENGINEERING MATERIALS AND METALLURGY

Time: 3 hr

Max. Mark: 100

PART- A (10X2 = 20 Mark)

1. Define Peritectic and Eutectoid reactions.
2. What are the different types of solid solutions?
3. Case carburizing heat treatment is not generally carried out for medium carbon steels. Why?
4. What is the principle of surface hardening in induction hardening process?
5. What are the effect of chromium and molybdenum in low alloy steels?
6. What are bearing alloys?
7. Distinguish between thermoplastics and thermosetting plastics.
8. What is special about nanomaterials?
9. In general, HCP metals are hard and brittle while FCC metals are soft and ductile. Why?
10. Define endurance limit in fatigue test.

PART- B (5 X16 = 80 Mark)

11. (a) Draw Iron -Carbide equilibrium diagram and mark on it all salient temperature and composition fields.
12. (a) Explain in brief cooling curves in TTT diagram. Why this diagram is called as an isothermal temperature diagram and what products do we get?

{OR}

- (b) Define hardenability of steel .Explain the Jominy End Quench test used to determine hardenability of steel. How will you draw hardenability curves?

13. (a) Write short notes on:

- (i) High speed steel (4)
- (ii) HSLA steel (4)
- (iii) Maraging steel (4)
- (iv) Tool steel (4)

(OR)

- (b) (i) What are ALPHA brass and ALPHA/BETA brass? (8)
(ii) Discuss step involved in precipitation hardening treatment any one aluminum alloy as example. (8)

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

- (i) Polypropylene (PP) (4)
(ii) Polyvinyl chloride (PVC) (4)
(iii) SiC (4)
(iv) Alumina. (4)

(OR)

- (b) (i) Explain the strengthening mechanism of fibre-reinforced composites. (8)
(ii) List the advantages, limitations and applications of composite materials. (8)

15. (a) (i) Explain the mechanism of plastic deformation of metals by slip and twinning. (8)
(ii) Explain testing procedure for Fatigue test. (8)

(OR)

- (b) Explain the testing procedure of
(i) Brinell hardness test (8)
(ii) Charpy impact test (8)