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B.E./B.Tech. (Full-TIME) DEGREE END SEMESTER EXAMINATIONS- NOV./DEC. 2012
MECHANICAL ENGINEERING BRANCH
IV SEMESTER - (REGULATION 2008)
ME 9252 – ENGINEERING MATERIALS AND METALLURGY
(ENGLISH AND TAMIL MEDIUM)

⑥

Time : 3 Hours

Max. Marks : 100

Answer ALL Questions

PART-A (10 x 2 = 20 Marks)

1. Differentiate between substitutional solid solution and interstitial solid solution.
2. Sketch the isomorphous phase diagram.
3. What is normalizing heat treatment?
4. What is austempering?
5. What are the effects of chromium addition in steel?
6. Give two applications of magnesium alloys.
7. What are the differences between thermoplastic polymer and thermosetting polymer?
8. Give two applications of superconductor.
9. Define an elastic behavior.
10. What are the differences between brittle fracture and ductile fracture?

PART – B (5 x 16 = 80 MARKS)

- 11 i) Draw the eutectic phase diagram and write down the eutectic phase reaction. (4)
ii) Draw the iron-iron carbide equilibrium diagram and label all regions in it. (12)
- 12.a) Define hardenability. Explain the method of determining hardenability by Jominy end quench test
- (OR)
- b) Briefly explain the following case hardening processes :
i) Pack carburizing ii) Nitriding iii) Cyaniding iv) Induction hardening
13. a) i) Give the properties and applications of different stainless steels. (8)
ii) Give the properties and applications of different cast irons. (8)
- (OR)
- b) Give the properties and applications of two Cu-Zn alloys, three aluminium alloys and three titanium alloys.
14. a) i) Give the molecular formula and applications of four polymers. (8)
ii) Give the properties and applications of two ceramics. (8)
- (OR)
- b) i) Give the properties and applications of two composite materials. (8)
ii) Write a short note on nanomaterials. (8)
15. a) i) Briefly explain four different strengthening mechanisms. (8)
ii) Draw the tensile stress vs. strain curve for mild steel and write down the various properties obtained from such curve. (8)
- (OR)
- b) i) Draw the creep curve and label all regions in it. Briefly explain the mechanism of creep. (8)
ii) Explain the method of conducting fatigue test and draw the S-N curve for medium carbon steel and aluminium alloy. (8)