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B.E/B.Tech (Full-Time) DEGREE END SEMESTER EXAMINATIONS, APRIL/MAY 2013
MANUFACTURING ENGINEERING BRANCH
FOURTH SEMESTER-REGULATION 2008

ME9252 ENGINEERING MATERIALS AND METALLURGY

Time: 3Hr

Max.Mark:100

Answer ALL Questions

Part –A (10x2=20 Marks)

1. What are the elements non soluble in iron?
2. What is ternary alloy? Give an example.
3. What are the parameters that affect hardenability?
4. Carburizing is applicable for low and medium carbon steels? Is it true or false and justify your answer.
5. Write the designation of magnesium alloys.
6. What is the effect of addition of Ti on steel?
7. Distinguish between thermosetting and thermoplastic polymers.
8. Why properties of nanomaterials are superior to its micro counterpart?
9. Write the strain-strain relationship at plastic deformation region and also list out the significance of it
10. Write the relationship between true stress and engineering stress

Part – B (5x16 = 80 Marks)

- 11 (i) What is addition and condensation polymerization? (4)
- (ii) Write the properties and applications of (1) PE (2) HDPE (3) PVC (4) PMMA (8)
- (iii) What are the requirements for matrix and reinforcement materials used in MMC (4)
- 12a (i) Construct the eutectic alloy phase diagram form cooling curves and also explain the microstructure changes at hypo, eutectic and hyper eutectic regions (12)
- (ii) What are the factors affects the solid solution formation (4)
- OR
- 12b (i) Draw the Iron-Iron carbide equilibrium diagram and explain all the thermodynamic reactions and also explain the phase transformation at different cooling rates. (16)
- 13a (i) Explain the process of flame and induction hardening and also explain the Microstructural changes due to the process (8)
- (ii) Draw the sintering cycle and discuss the effects of different sintering atmosphere (8)
- OR
- 13b (i) What is martempering? Explain the process with TTT diagram (8)
- (ii) Write the procedure to conduct jominy end quench test? (8)

14a (i) Write the classifications of cast iron and also discuss the properties of them **(16)**

OR

14b (i) What are HSLA and TRIP steels **(4)**

(ii) Write the designation of aluminum alloys? and list down the applications of different aluminum alloys **(6)**

(iii) Write the properties and applications of brass and bronze **(6)**

15a (i) What is fatigue? Explain the mechanism of fatigue fracture **(8)**

(ii) What is ductile to brittle transition? **(4)**

(iii) With the characteristic curve explain visco- elastic behaviour **(4)**

OR

15b (i) With the characteristic curve , explain the creep deformation mechanism **(8)**

(ii) Explain (a) dislocation strengthening (b) precipitate strengthening **(8)**