



B.E/B.Tech (Full-Time) DEGREE END SEMESTER EXAMINATIONS, NOV/DEC2011
MECHANICAL ENGINEERING BRANCH
FOURTH SEMSTER-REGULATION 2004

ME282 - ENGINEERING MATERIALS AND METALLURGY

Time: 3Hr

Max.Mark:100

Answer ALL Questions

Part –A (10x2=20 Marks)

1. What is limited solubility? Give an example
2. Draw the phase diagram of isomorphous system and identify the phases.
3. Mention two reasons why martensite is so hard and brittle.
4. What is hardenability?
5. What is maraging steels? Explain the applications of it.
6. What does HSLA stand for?
7. Differentiate addition and condensation polymerization.
8. Discuss the important properties of ceramics.
9. What is transgranular and intergranular fracture?
10. Fatigue failure occurs due to tensile stress-True or false justify your answer

Part – B (5x16 = 80 Marks)

- 11 Draw the iron-iron carbide phase diagrams and explain all the thermodynamic equilibrium reactions with microstructures formation at different temperature. (16)
- 12a (i) Explain matempering and Austempering with T-T-T diagram (10)
(ii) Explain the process of cyaniding? (6)
- OR**
- 12b (i) Explain the jominy quench test for hardenability measurement? Discuss the factors affect the hardenability? (16)
- 13a (i) Explain the mechanism of precipitation strengthening (10)
(ii) Explain the properties of different types of cast iron (6)
- OR**
- 13b (i) Explain the effects of addition of α and β stabilizers on steel (10)
(ii) Discuss the properties of Cu alloys (6)
- 14a (i) Explain the properties and application of important engineering ceramics (8)
(ii) Define the term 'composite'. Classify the composite materials based on matrix materials. (8)
- 14b (i) Briefly discuss the structure-property-Applications of the following (8)
(a) PEEK (b) PMMA (c) PE
(ii) Explain the strengthening mechanism of particle and fiber reinforced composites (8)
- 15a (i) Explain different mechanisms of plastic deformation? (16)
- OR**
- 15b (i) What is fatigue? Explain the mechanism of fatigue failure. (8)
(ii) What is creep? Explain the stages in the creep failure. (8)