

B. Tech Degree IV Semester Examination April 2011

ME 402 METALLURGY AND MATERIAL SCIENCE (2002 Scheme)

Time : 3 Hours

Maximum Marks : 100

- I. (a) What is Atomic packing factor (APF)? Find APF of a Body Centered Cube and a Face Centered Cube? (10)
 (b) (i) What is polymorphism?
 (ii) Explain homogeneous and heterogeneous nucleation. (10)
- OR**
- II. (a) Compare screw dislocation and edge dislocation. Give features of both the defects. (10)
 (b) (i) What is Diffusion?
 (ii) What are the factors affecting diffusion?
 (iii) Give examples of metallurgical applications of diffusion. (10)
- III. (a) State Gibb's Phase rule. What is its importance? (10)
 (b) Explain 'Lever rule'. (10)
- OR**
- IV. (a) What is meant by Solid Solution? Give an account of different types. (10)
 (b) Draw Cd – Bi (Cadmium - bismuth) System Equilibrium diagram and explain its specialities? (10)
- V. (a) What are the aims of heat treatment? Give examples. (10)
 (b) Draw TTT diagram. How it is prepared? What is its use? (10)
- OR**
- VI. (a) What is 'Jomini test'? Explain how it is done. (10)
 (b) Explain the process of
 (i) Cladding
 (ii) Case hardening (10)
- VII. (a) Explain 'Work hardening'. (10)
 (b) What are the advantages and disadvantages of cold working and hot working? (10)
- OR**
- VIII. (a) Explain Griffith's theory of fracture. (10)
 (b) Describe mechanism of fatigue and SN curve. (10)
- IX. (a) What is the product of –
 (i) Blast furnace
 (ii) Cupola
 (iii) Arc furnace (10)
 (b) (i) What are the advantages of Alloying?
 (ii) Explain the effect of adding the following alloying elements in steel.
 • Chromium
 • Nickel
 • Vanadium
 • Tungsten
 • Molybdenum (10)
- OR**
- X. What are the common alloys of copper? Give composition and properties of two widely used alloys of copper. (20)