

B. Tech Degree III Semester Examination, November 2009

ME 305 METALLURGY AND MATERIAL SCIENCE (2006 Scheme)

Time : 3 Hours

Maximum Marks : 100

PART - A (Answer ALL questions)

(8 x 5 = 40)

- I. (a) Explain the inter planar spacing of crystal.
(b) Explain the mechanism of diffusion.
(c) Describe the characteristics of phase diagrams.
(d) Why heat treatment is required for metals or alloys?
(e) Differentiate between plastic and elastic deformation.
(f) Define fracture.
(g) Explain different kinds of cast iron, based on their composition.
(h) Mention some of the commercial alloy steels.

PART – B

(4 x 15 = 60)

- II. Calculate the Atomic Packing Factor for (i) Simple Cubic (ii) FCC
(iii) BCC (iv) HCP.

OR

- III. Explain the various kinds of imperfections found in crystals.

- IV. With the help of a neat sketch explain the Copper – Nickel phase diagram.

OR

- V. Why surface hardening is necessary? Explain the various methods of surface hardening and case hardening with advantages and disadvantages.

- VI. Explain the following :

- (i) Mechanism of slip dislocation
(ii) Deformation of Twining.

OR

- VII. Explain the following :

- (i) Mechanism of creep
(ii) Mechanism of fatigue
(iii) Griffith's theory of fracture.

- VIII. What are the important alloying elements used in alloy steel?
How it affects the quality of steel?

OR

- IX. Discuss briefly the properties of a bearing material. Explain the important bearing materials.

