

B.Tech. Degree IV Semester Examination ***May 2003***

ME 402 METALLURGY AND MATERIAL SCIENCE *(1999 Admissions onwards)*

Time: 3 Hours

Maximum Marks: 100

- I. (a) Define the terms:
 (i) Atomic Packing Factor and
 (ii) Co-ordination number.
 What are the coordination numbers of BCC and FCC structure? (6)
- (b) In a unit cell of simple cubic structure, find the angle between the normals to the pair of planes whose miller Indices are
 (i) (1 0 0) and (0 1 0)
 (ii) (1 2 1) and (1 1 1) (6)
- (c) Write notes on:
 (i) Burger vector
 (ii) Tilt and Twin boundaries (8)
- OR**
- II. (a) Explain homogenous and heterogenous nucleation. (8)
 (b) State and explain Ficks Laws of diffusion. (9)
 (c) Explain the engineering importance of diffusion. (3)
- III. (a) Explain Gibb's phase rule. (8)
 (b) What is peritectic reaction? Draw the phase diagram between silver and platinum. (12)
- OR**
- IV. (a) Write short notes on:
 (i) Solid solution (ii) Lever Rule (8)
 (b) Explain Binary diagram with an example. (12)
- V. (a) Explain the processes of annealing and full annealing. (8)
 (b) Write short notes on:
 (i) Jomini test (ii) Hot dipping
 (iii) Metal spraying (12)
- OR**
- VI. (a) Briefly explain the difference between hardness and hardenability. (4)
 (b) Write short notes on:
 (i) Normalising (ii) Tempering
 (iii) Case hardening (iv) Electroplating (16)
- VII. (a) Differentiate between Cold working and Hot working processes. (6)
 (b) What is fracture? What are the effects of cracks on fracture strength?
 Explain Griffith's theory of metals. (14)
- OR**
- VIII. (a) Write short notes on:
 (i) Plastic deformation and (ii) Recrystallisation (8)
 (b) Differentiate between ductile and brittle fracture. (8)
 (c) How do temperature and stress effect creep? (4)
- IX. (a) Write short notes on the following:
 (i) Malleable Cast Iron (ii) Magnesium Alloys (8)
 (b) What are the functions and uses of alloying elements in steel? (12)
- OR**
- (a) What are the main properties and uses of Gray Cast Iron and White Cast Iron? (8)
 (b) Write short notes on:
 (i) Copper alloys (ii) Alloy steels
 (iii) Bearing metals. (12)

