C 31821 (Pages : 2)

Name.....

Reg. No.....

FOURTH SEMESTER B.TECH. (ENGINEERING) DEGREE EXAMINATION
JUNE 2007

ME/AM 04 404—METALLURGY AND MATERIAL SCIENCE

[2004 admissions]

Time : Three Hours Maximum : 100 Marks

Answer **all** *questions.*

I. (i) What are the three major groups of engineering materials ? Briefly explain each group with suitable examples. (5 marks)

(ii) Discuss Bragg law with an illustration. (5 marks)

(iii) Define "dislocation". With neat sketch explain edge type of dislocation. (5 marks)

(iv) Explain how S-N curve is constructed experimentally. (5 marks)

(v) Neatly draw binary isomorphous phase diagram and discuss. (5 marks)

(vi) Explain significance of annealing with an example. (5 marks)

(vii) Discuss functions of alloying elements in steel. (5 marks)

(viii) What are the properties of pure copper ? Name important copper alloys and indicate their application. (5 marks)

II. (A) (i) Give an account on microstructures, macrostructures and crystal structures with illustrations. (10 marks)

(ii) Write short notes on polymorphism and allotropy. (5 marks)

Or

(B) (i) Prove that FCC is closely packed than BCC by calculating atomic packing factor for both. (10 marks)

(ii) Differentiate between metallurgical microscope and electronic microscope. (5 marks)

III. (A) (i) Discuss deformation of crystals with reference to slip and twinning. (8 marks)

(ii) Draw the creep curve and explain various stages of it. (7 marks)

Or

(B) (i) Give an account on brittle and ductile fractures with examples. (8 marks)

(ii) Discuss recovery and recrystallization. (7 marks)

Turn over

IV. (A) (i) Define "solid solution". Name different types of solid solutions and briefly explain each one of them with examples. (10 marks)

(ii) Write short notes on austempering. (5 marks)

Or

(B) (i) Draw the iron-iron carbide diagram and label. (7 marks)

(ii) Neatly draw the T-T-T curve for eutectoi nd steel and explain. (8 marks)

V. (A) What are the characteristics of stainless steels ? Name different types of stainless steels and briefly explain each one of them. (15 marks)

Or

(B) What are composites ? Name different types of composites and briefly explain each one of them with suitable examples. (15 marks)