BTS(C) – III – 08 –0 66 – K

B.Tech. Degree III Semester Examination, November 2008

ME 305 METALLURGY AND MATERIAL SCIENCE

(2006 Scheme)

Time: 3 Hours Maximum Marks: 100

(8 x 5 = 40)

PART A

(Answer ***All*** questions)

I a) Define packing factor. Calculate the packing factor for SC and BCC structures.
b) Explain how the structure of a crystal can be determined by X-ray diffraction.
c) State Gibb's phase rule. What are its applications?
d) Distinguish between the hardness and hardenability of steel..
e) Distinguish between hot working and cold working.
f) State and explain Griffth's theory of fracture.
g) What is malleable cast iron? List its characteristics.
h) What are the important properties of bearing materials?

PART B

(4 x 15 = 60)

II a) What are Bravai's Lattices? Give their names and characteristics. (9)
b) Draw the plains $(0,2,0),(1,2,0)$ and $(2,2,0)$ in a face centred cubic structure. (6)

OR

III a) Explain Schottky imperfection. (5)
b) What is a twin boundary? Explain with the help of figure. (5)
c) Describe the Fick's law of diffusion. (5)

IV Draw and explain iron-carbon equilibrium diagram. (15)

OR

V What is annealing? What are different types of annealing processes? (15)

VI What is creep? Explain the mechanism of creep. (15)

OR

VII What is fatigue? What are the importance of SN curve in fatigue behaviour of a metal? (15)

VIII a) Write a note on:
i) Plain Carbon steel
ii) Tool steels
iii) German silvers
iv) Bronzes
v) Gunmetal (10)
b) Give the composition and uses of any two alloy steels. (5)

OR

IX a) What are the characteristics of aluminum alloys? Give the composition and uses of any two aluminum alloys. (10)
b) What are Babbit metals? What are their engineering application. (5)

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