B. Tech Degree IV Semester Examination in Marine Engineering July 2010

MRE 403 METALLURGY AND MATERIAL SCIENCE

Time : 3 Hours Maximum Marks : 100

I. (a) Explain the following :
(i) Space lattice
(ii) Co-ordination number
(iii) Polymorphism (12)

(b) Explain miller indices and what are its important features. Explain the procedure for determining miller indices. (8)

OR

II. (a) What is dislocation in solids and what are the different types of dislocation? Explain with examples. (10)

(b) Write notes on line defects and point defects. (10)

III. (a) Explain homogeneous and heterogeneous nucleus formation. (10)

(b) Explain the construction of equilibrium diagrams of binary alloys. (10)

OR

IV. (a) Write short note with sketches :
(i) Eutectic system
(ii) Peritectic system
(iii) Intermetalic compounds. (12)

(b) With neat sketch explain the Iron Carbon equilibrium diagram showing all the salient features. (8)

V. (a) Write short notes on the important surface treatment methods for metals. (12)

(b) Explain the construction of TTT diagram for eutectoid steel. (8)

OR

VI. (a) Write short notes on :
(i) Case hardening
(ii) Carburizing
(iii) Cyaniding (10)

(b) Explain the different types of cast iron. (10)

VII. (a) Explain with sketch the mechanism of slip and twinning. (10)

(b) Explain work hardening and grain boundary hardening. (10)

OR

VIII. (a) Compare hot working and cold working processes of metals. (10)

(b) Differentiate between ductile and brittle fracture and explain them. (10)

IX. (a) Write short notes on :
(i) Hardness test
(ii) Impact test
(iii) Torsion test. (12)

(b) Write short note on non destructive testing of metals, explain any one method in detail. (8)

OR

X. (a) Explain radiographic test for metals. (10)

(b) What are the characteristics and applications of chromium, titanium, PTFE and ceramics in ship board applications? (10)

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