SCHOOL OF MARINE ENGINEERING
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K.M.

BT MRE – IV – 09 – 19

B. Tech Degree IV Semester Examination in Marine Engineering, June 2009

MRE 403 METALLURGY AND MATERIAL SCIENCES

Time : 3 Hours Maximum Marks : 100

I. Explain the following :
(i) Atomic packing factor
(ii) Miller indices of crystal planes and directions
(iii) Twist and twin boundaries
(iv) Polymorphism (4 x 5 = 20)

OR

II. (a) Explain homogeneous and heterogeneous nucleation. (10)
(b) What is crystal imperfections? Explain screw dislocation and edge dislocation in detail. (10)

III. (a) Draw and explain equilibrium diagram for Cu – Ni. (10)
(b) Differentiate between Eutectic and Eutectoid Reactions. (10)

OR

IV. (a) Differentiate between Interstitial and Substitutional solid solutions with example. (10)
(b) Mark eutectic, peritectic and eutectoid points on Iron – Carbon diagram. (10)

V. (a) Explain T T T diagram. How it is constructed? (10)
(b) Briefly explain the procedure for annealing, normalizing, hardening and tempering. (10)

OR

VI. (a) Explain composition, properties and use of common commercial alloys of copper. (10)
(b) Explain classification of Cast Iron mention properties and use of each type. (10)

VII. (a) Explain mechanism of slip. (5)
(b) What is work hardening? (5)
(c) Differentiate between Hot working and Cold working. What are the advantages and disadvantages of Hot working and Cold working? (10)

OR

VIII. (a) Explain Griffith's theory. (8)
(b) Explain brittle fracture. (4)
(c) Explain S N curve in fatigue. (8)

IX. (a) Explain different types of Non – destructive Tests of Materials. (10)
(b) Write characteristic of any two materials used for shipboard applications. (10)

OR

X. (a) Explain points to be noted while selecting materials for Marine Engineering. (10)
(b) What are the materials used for making Propellers and Rudders? Give composition, strength value and other requirements of the material. (10)

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