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Total No. of Pages : 02

Total No. of Questions : 09

B.Tech.(Marine Engineering) (2013 Onwards)/(ME) (2011 Onwards)
(Sem.-3)

ENGINEERING MATERIALS AND METALLURGY

Subject Code : BTME-306

M.Code : 59116

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

SECTION-A

1. Write briefly :

- a. Draw a BCC unit cell and calculate the number of atoms in this unit cell.
- b. What is co-ordination number?
- c. Differentiate between polymorphism and allotropy.
- d. Explain the activation energy of diffusion.
- e. What are elastic and plastic deformations?
- f. Define phase.
- g. What do you mean by critical cooling rate?
- h. Discuss the utility of lever rule in the context of phase diagrams.
- i. What do you mean by harden-ability?
- j. What are austenite stabilizers?



**SECTION-B**

2. Differentiate between edge dislocation and screw dislocation.
3. Give a comparison between slip and twinning.
4. With the help of suitable phase diagram, explain binary isomorphous system.
5. Differentiate between Annealing and normalizing processes.
6. Explain how Jominy end-quench test is used to determine harden-ability of steel.

SECTION-C

7. Draw Fe-C equilibrium diagram. Label all the phases and temperatures properly. Describe the phase changes during solidification of 0.40% C steel from liquid state to room temperature.
8. On what basis the alloying elements are classified? Discuss the effects of adding Si, Mn and Mo as alloying elements in steels.
9. Write brief notes on the following :
 - a. Carburizing heat treatment
 - b. Mechanisms of diffusion (**Any TWO**)

NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.

