Roll No. | | | | | | | | | | | | | Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (Mechanical Engineering) (2012 Onwards)/
(Marine Engg.)(2013 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. Define Space Lattice?

b. Draw (111) plane in a BCC unit cell.

c. Why iron is said to be allotropic?

d. Differentiate between vacancy and interstitial defects.

e. Define Fick's first law of diffusion.

f. List any two applications of phase diagram.

g. What are the limitations of TTT diagram?

h. What do you mean by decarburization?

i. What are Ferrite Stabilizers?

j. List any four purpose of adding alloying elements to steels.

SECTION-B

2. Write a brief note on various point defects (imperfections) in crystalline materials.

3. Distinguish between the term 'Recovery' and the 'Recrystallization' involved in the process of heating cold-worked metals.

4. What is lever rule? Explain its application to binary isomorphous system.

5. Using suitable portion of Fe-C equilibrium diagram, explain the significance of critical temperature lines.

6. Define Hardenability of steel. On what factors does it depend?

SECTION-C

7. Discuss the construction of TTT diagram for eutectoid steels? In what way it is different from continuous cooling transformation (CCT) diagram?

8. What is the need of alloying in steels? Discuss the effect of various alloying elements on iron-iron carbide diagram.

9. Write brief notes on the following :

   a) Induction hardening

   b) Steady state *vs.* Non-steady state diffusion

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.