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

Total No. of Questions : 09

B.Tech (ME) (Sem.–3)

ENGINEERING MATERIALS METALLURGY

Subject Code : ME-205

Paper ID : [A0860]

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) Sketch Face centered cubic lattice.

b) Differentiate between recovery and re-crystallization.

c) Define hardness and hardenability.

d) Differentiate between crystalline and non-crystalline materials.

e) What do you understand by yield strength of engineering materials?

f) State the limitations of equilibrium diagrams.

g) Discuss the transformation of austenite into pearlite.

h) What is meant by 'Soaking time' in heat treatment?

i) Define nitriding. Which gas is used for nitriding?

j) State the applications of Gibbs phase rule.

SECTION-B

2. What are unit cell and space lattice? Calculate the radius and coordination number for SCC and BCC structure.

3. Explain the role of slip and twinning processes in plastic deformation of materials. What is a slip system?

4. How engineering materials are classified? What are the various physical properties of materials?

5. Describe the general principle of phase transformation in alloys. State and explain different stages of phase transformation.

6. Explain the various purposes of providing normalizing heat treatment to steels. Discuss the procedure involved.

SECTION-C

7. Draw and neatly label the iron-carbon diagram. Explain the various reactions involved while heating and cooling the steel.

8. Discuss effect produced by alloying Cr, Mn and Ni on properties and structure of steel. How it influences phase stabilization? Explain.

9. Write short note on the following :

   a) Jominy test

   b) Induction hardening process of case hardening

   c) Crystal imerfactions