Total No. of Questions :5] *[Total No. of Printed Pages :2*

Roll No .....

AU/IP/IEM/PR/ME - 402

B.E. IV Semester

Examination, December 2015

Material Science And Metallurgy

Time : Three Hours

Maximum Marks : 70

Note: i) Answer five questions. In each question part A, B, C is compulsory and D part has internal choice.

ii) All parts of each questions are to be attempted at one place.

iii) All questions carry equal marks, out of which part A and B (Max.50 words) carry 2 marks, part C (Max.100 words) carry 3 marks, part D (Max.400 words) carry 7 marks.

iv) Except numericals, Derivation, Design and Drawing etc.

1. a) Define crystal structures.
   b) Define covalent bonding in atoms with example.
   c) Draw crystal structure for simple cubic, BCC, FCC and HCP structures.
   d) Explain casting method used manufacturing of metal components.

   OR

   Explain types and applications of ceramic materials.

2. a) Define vacancy point defects in atomic structure.
   b) Define Frenkel defects in crystal structure.
   c) What do you understand by dislocations? How they are measured?
   d) Explain screw dislocations with neat diagram.

OR

Draw Stress-Strain diagram for a ductile material and explain its important features.

3. a) Write Gibbs phase rule used for phase diagrams.
   b) How phase diagram can be classified?
   c) What information can be gathered from a phase diagram?
   d) Draw and explain phase diagram for an Isomorphous binary system.

   OR

   Draw and explain iron carbon equilibrium diagram.

4. a) What is the purpose of thermal processing of metal?
   b) What are various factors considered in heat treatment of components?
   c) Write Induction hardening and flame hardening in short.
   d) Draw and explain TTT diagram for eutectoid steel.

   OR

   Explain various types of annealing processes.

5. a) Define fatigue failure. In which components it is occurred.
   b) What are Three basic requisites for occurrence of a fatigue fracture?
   c) What is the classification of plastics?
   d) Draw and explain typical creep curve.

   OR

   What are composite materials? What are their constituents and how they are classified?

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