Roll No

AU/IP/IEM/PR/ME-402

B.E. IV Semester

Examination, June 2016

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 question 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 ionic bonding with an example.
   b) Define unit cells in crystal structure.
   c) Write important properties of unit cells.
   d) Explain forming processes used for manufacturing of metal components.

   OR

   Explain fabrication processes of glass products.

2. a) Define interstitial and substitutional point defects.
   b) Define Schottky defects in crystal structure.
   c) Explain Edge dislocations in short.
   d) Explain interfacial defects grain boundaries with a neat diagram.

   OR

   Explain ductile fracture. Write and show diagrammatically its various stages.

3. a) What important information is given by a phase diagram?
   b) Write Hume Rothery rules used in phase solubility.
   c) What do you understand by an eutectic system.
   d) Draw and explain iron carbon equilibrium diagram.

   OR

   What are invariant reactions? Write its various types.

4. a) What is the purpose of heat treatment of metals?
   b) What are benefits of annealing process. Write its various types.
   c) Write about cyaniding and nitriding in short.
   d) Draw and compare TTT and CCT (Continuous Cooling Transformation) curve.

   OR

   What is the purpose tempering? Explain its various types.

5. a) What are characteristics of fatigue failure?
   b) Define endurance limit and endurance ratio.
   c) Write various stages occurs during fatigue failure.
   d) What are structural composites? Explain.

   OR

   Draw and explain typical stress-strain curve for polymers.

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