Code: 13A03301

R13

B.Tech II Year I Semester (R13) Supplementary Examinations June 2015

MATERIAL SCIENCE AND ENGINEERING

(Mechanical Engineering)

Time: 3 hours Max. Marks: 70

PART - A

(Compulsory Question)

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1 Answer the following: (10 X 02 = 20 Marks)

(a) What is metallic bond? Give an example.
(b) What is the necessity of alloying?
(c) What is the lever rule?
(d) What is an eutectic system?
(e) What do you mean by red-hardness?
(f) List the applications of tool steels.
(g) What is age hardening?
(h) How is annealing different from normalizing?
(i) What are crystalline ceramics? Give an example.
(j) Classify composites.

PART - B

(Answer all five units, 5 X 10 = 50 Marks)

UNIT - I

2 Explain about the effect of grain boundaries on the properties of alloys.

OR

3 What are the various types of solid solutions? Discuss and give examples.

UNIT - II

4 Draw the Fe-Fe_3 C equilibrium diagram to scale on a graph paper and label all points, lines and areas.

OR

5 Draw an equilibrium diagram for a Cu-Ni system to scale and label all the points. Explain its important features.

UNIT - III

6 Classify cast irons? List their properties.

OR

7 Discuss about the structure and properties of titanium and its alloys.

UNIT - IV

8 What are TTT diagrams? How are they prepared? What is their significance?

OR

9 What is cryogenic treatment? How is it done for the alloys? Discuss.

UNIT - V

10 What are glasses? Discuss about their micro structure and properties.

OR

11 Explain about various methods of component manufacture of composites.

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