R13

B.Tech II Year I Semester (R13) Regular Examinations December 2014
MATERIAL SCIENCE & ENGINEERING
(Mechanical Engineering)
(Graph paper may be Issued)

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 crystallization of metals?
  (b)   What is a solid solution? Give an example.
  (c)   What is Gibb's phase rule?
  (d)   For a binary eutectic alloy, how does a typical cooling curve looks like?
  (e)   Which cast iron is called as temper carbon? Why?
  (f)   How can the properties of gray cast iron varied?
  (g)   Why is cryogenic treatment done to alloys?
  (h)   Differentiate age hardening from hardenability.
  (i)   What are cermets? Give examples.
  (j)   Give the applications of metal ceramic mixtures.

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

UNIT - I

2   Explain about various types of bonds with examples.
OR
3   What are Hume Rotherys rules? Discuss in detail.

UNIT - II

4   With a neat sketch, explain the importance of Fe-Fe$_3$C equilibrium diagram.
OR
5   Draw an equilibrium diagram for an isomorphous system of your choice to scale and label all the points. Explain its important features.

UNIT - III

6   Classify steel. Explain about the structure and properties of plain carbon steel.
OR
7   Discuss about the structure and properties of Aluminium and its alloys.

UNIT – IV

8   Explain about various hardening methods in use for alloys
OR
9   Discuss in detail about the heat treatment of plastics.

UNIT – V

10   What are cermets? What are their properties? How are they manufactured? Give examples?
OR
11   What are carbon composites? Discuss about their micro structure and properties.