Code No: 113AQ

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JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B.Tech II Year I Semester Examinations, May/June - 2015
METALLURGY AND MATERIALS SCIENCE
(Common to ME, MCT, AME)

Time: 3 Hours **Max. Marks: 75**

Note: This question paper contains two parts A and B.
Part A is compulsory which carries 25 marks. Answer all questions in Part A.
Part B consists of 5 Units. Answer any one full question from each unit.
Each question carries 10 marks and may have a, b, c as sub questions.

PART- A

(25 Marks)

1.a) What is co-ordination number? [2M]
b) What are intermediate alloy phases? [3M]
c) Define the phase. [2M]
d) What is Lever rule? [3M]
e) Distinguish between steels and cast irons. [2M]
f) Distinguish between hardness and hardenability. [3M]
g) Gray cast irons are used for machine beds. Why? [2M]
h) Give at least three advantages of steels over the family of cast irons. [3M]
i) Why Powder Metallurgy products are self lubricant? [2M]
j) Thermoplastic polymers can be recycled but thermosetting polymers cannot be recycled. Why? [3M]

PART-B

(50 Marks)

2.a) What is the necessity of alloying?
b) What are the governing rules for the formation of substitutional solid solutions? [5+5]

OR

3.a) How the grains and grain boundaries are defined?
b) Explain the role of grains and grain boundaries on material properties. [5+5]

4.a) Explain the construction of eutectic phase diagram.
b) Differentiate between cooling curves for pure metals and eutectic alloys. [5+5]

OR

5.a) Explain the eutectic and eutectoid phase transformation reactions with examples.
b) Explain phase rule and its importance. [5+5]

6.a) Distinguish between plain carbon steels and alloy steels.
b) Explain three phase transformation reactions in Fe-Fe_3C system. [5+5]

OR

7.a) Enumerate the different types of annealing with their applications.
b) What is secondary hardening? Where it is appeared? [5+5]

8.a) What is malleablization treatment? Explain.
b) Why malleable cast iron is more ductile than white cast iron? [5+5]

OR

9.a) Write short notes on classification of titanium alloys giving examples and applications.

b) What is duralumin? Give its composition, properties and applications. [5+5]

10. Write short notes on the following:
a) Cermets
b) Glasses. [5+5]

OR

11.a) Distinguish between ceramics, polymers and composites.

b) Explain about crystalline ceramics. [5+5]

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