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Code No: 133BG **R16**

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B.Tech II Year I Semester Examinations, April/May - 2018
METALLURGY AND MATERIALS SCIENCE
(Common to ME, MCT, MSNT)

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) Differentiate between crystallize ceramics and cermet's. [2]
b) What is congruent melting intermediate phase? [3]
c) Define composite. [2]
d) Define allotropy and give examples. [3]
e) Differentiate between annealing and normalizing. [2]
f) Explain why grain boundaries look darker under the microscope, while the grains look brighter. [3]
g) Which alloy of $Fe\text{-}Fe_3C$ system has the lowest melting point? [2]
h) Differentiate between spheroidal graphite cast Iron & gray cast Iron. [3]
i) Differentiate between hardness and hardenability. [2]
j) What are α-Stabilizers in titanium alloys? [3]

PART- B

(50 Marks)

2.a) What is the effect of grain boundaries on the properties of metal & Alloys?
b) Distinguish between Metallic bond and chemical bond. [5+5]

OR

3.a) State Hume-Roothery's rules for the formation of substitutional solid solution.
b) Differentiate between metal and alloy. [5+5]

4.a) What is phase rule, Lever rule and cooling curve.
b) What is Isomorphous alloy system explain with suitable example. [5+5]

OR

5.a) Draw and explain TTT Diagrams.
b) Explain about chemical case hardening techniques. [5+5]

6. Write explanatory notes on Annealing, Normalizing, Hardening and Tempering. [10]

OR

7. Differentiate between construction of TTT curves and Phase diagrams. [10]

8. Write explanatory notes on:
a) Copper and its Alloys
b) Aluminium and its Alloys. [5+5]

OR

9. Enumerate the characteristics, properties and applications of Titanium alloys. [10]

10. Write Short notes on:
a) Metal ceramic mixtures
b) C-Composites. [5+5]

OR

11. Write short notes on:
a) Polymers
b) Ceramics. [5+5]

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