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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-Fe<sub>3</sub>C 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-Rothery'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]

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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]

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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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