

R16

Code No: 133BG

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**B.Tech II Year I Semester Examinations, November/December - 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) Explain why grain boundaries look darker under the microscope, while the grains look brighter. [2]
- b) Draw the plane (100). [3]
- c) What is lever rule? [2]
- d) Differentiate between tool steel and Die steel. [3]
- e) Differentiate between annealing and normalizing. [2]
- f) Distinguish between peritectoid and eutectoid reactions. [3]
- g) Write the composition of cartridge brass. [2]
- h) Copper and Al are highly ductile compare to Iron. Why? [3]
- i) Differentiate between crystalline ceramics and cermet's. [2]
- j) Define ceramic and composite. [3]

PART- B**(50 Marks)**

- 2.a) Write about crystallization of metals.
 - b) What is the role of grain size on the properties of materials? [5+5]
- OR**
- 3.a) State Hume-Rothery's rules for the formation of substitutional solid solution.
 - b) How do you determine the Miller Indices? Explain it with suitable example. [5+5]
- OR**
- 4.a) What is phase rule? Give suitable examples.
 - b) Draw and explain Isomorphous system. [5+5]
- OR**
5. Write short notes on Transformations in the solid state. [10]
 6. Draw the Fe-Fe₃C Diagram and label all the points, lines, temperatures and reactions. [10]
- OR**
7. Draw neatly the TTT curves for Eutectoid steels. [10]
 - 8.a) What is cast Iron and Classify it and write the properties.
 - b) Write notes on Al-Cu alloys. [5+5]
- OR**
- 9.a) Write about structure, properties, heat treatment cycles and Applications of Titanium and its alloys.
 - b) Explain why extensive coring occurs in bronzes compared to brasses. [5+5]

10.

Enumerate the characteristics, properties and applications of cermet's and Glasses.

[10]

OR

11.

Write short notes on:

a) Metal Matrix composites.

b) Fiber reinforced materials.

[5+5]

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