

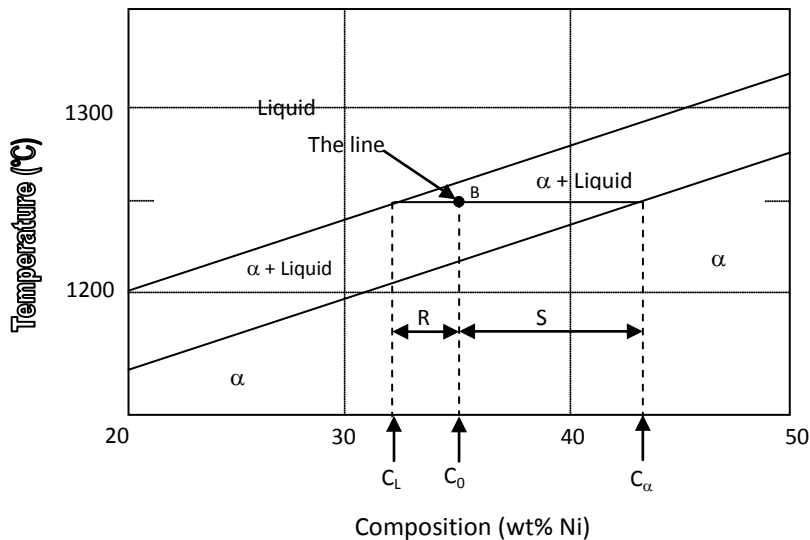
B.Tech II Year I Semester (R13) Supplementary Examinations June 2017
MATERIAL SCIENCE & ENGINEERING
 (Mechanical Engineering)

Time: 3 hours

Max. Marks: 70

PART – A
 (Compulsory Question)

- 1 Answer the following: (10 X 02 = 20 Marks)
- What is unit cell? List any two metallic structures with examples.
 - If the atomic radius of A1 is 0.143 nm then, calculate the volume of its unit cell.
 - What are different reactions in binary phase diagram.
 - How Grain boundaries influence the ductility of materials.
 - What is the difference between brass & bronze?
 - Briefly explain why grey cast iron is brittle.
 - What is the difference between hardness & hardenability?
 - Explain the normalizing treatment.
 - Compute the fractions of each of α and liquid phases of given phase diagram. Given $C_0 = 35$ wt% Ni, $C_\alpha = 42.5$ wt% Ni, $C_L = 31.5$ wt% Ni.



- (j) What are the advantages of fiber reinforcement in composites?

PART – B

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

UNIT – I

- 2 Define APF (Atomic Packing Factor) and derive unit cell length & calculate APF for FCC, BCC if the radius of atom is 'R'.

OR

- 3 Explain different crystalline defects with neat sketch.

UNIT – II

- 4 Explain any three heat treatment processes in detail.

OR

- 5 Explain the time-temperature-transformation (TTT) characteristics of eutectoid steel.

UNIT – III

6 Write about different types of cast iron and explain their properties?

OR

7 How does carbon influences the properties of iron? What are the different types of steels?

UNIT – IV

8 Explain any two manufacturing methods of FRP (Fiber Reinforced Plastics).

OR

9 What are the benefits of composite materials over the metals and alloys? What are cermets?

UNIT – V

10 Draw “Fe-Fe₃C” diagram. Explain different reactions that occur in Iron Carbon diagram.

OR

11 What are different non-ferrous alloys? Explain the alloys of copper and aluminium.
