

B.Tech II Year I Semester (R13) Supplementary Examinations June 2016

MATERIAL SCIENCE & ENGINEERING

(Mechanical Engineering)

Time: 3 hours

Max. Marks: 70

PART – A
(Compulsory Question)

- 1 Answer the following: (10 X 02 = 20 Marks)
- Define grain and grain boundary.
 - Define packing factor.
 - What is the significance of phase rule?
 - What do you understand by eutectic and eutectoid reactions?
 - What are four basic types of cast irons?
 - What is meant by super alloy and wrought alloy?
 - What is recrystallization?
 - Define hardness and hardenability.
 - What is the difference between tempered and laminated glass?
 - What is meant by whiskers and yarns?

PART – B

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

UNIT – I

- Define crystallization of metal. Explain briefly about crystal dislocation.
 - Explain in brief about the conditions of Hume-Rothery rules.

OR

- Calculate atomic packing factors for following structures:
 - Body centred cubic structure.
 - Face centred cubic structure.

UNIT – II

- What is the significance of lever rule? Explain in detail.
 - List five suitable applications where eutectic alloys are used.

OR

- Draw Iron-Iron carbide equilibrium diagram and label temperatures, composition and phases.

UNIT – III

- Explain briefly about classification of steels.
 - Discuss about Cupronickels and Beryllium Bronze alloys.

OR

- Write short notes on the following:
 - Ferritic stainless steels.
 - Martensitic stainless steels.
 - Austenitic stainless steels.
 - Describe alloy and temper designation of A1 and its alloys.

UNIT – IV

- What is the significance of TTT diagram? Draw TTT diagrams for eutectoid, hypo-eutectoid and Hyper-eutectoid steels. What are the effects of carbon on TTT diagram?

OR

- Explain briefly about four simple heat treatment processes.
 - Explain briefly about any two surface treatment processes.

UNIT – V

- Explain briefly about the properties of ceramics.
 - What is the significance of polymers matrix material in fibre-reinforced composites? Explain briefly.

OR

- List any five types of glasses with composition and uses.
 - Briefly explain about carbon-carbon composites and hybrid composites.