

B.Tech I Year II Semester (R15) Regular & Supplementary Examinations May/June 2019

MATERIAL SCIENCE & ENGINEERING

(Mechanical Engineering)

Time: 3 hours

Max. Marks: 70

PART – A
(Compulsory Question)

1 Answer the following: (10 X 02 = 20 Marks)

- (a) Why is the grain boundary irregular?
- (b) What is an alloy? Write examples.
- (c) List the independent variables which are to be controlled in the state of a system in equilibrium.
- (d) What parameters will you consider to construct the equilibrium diagram?
- (e) How do you vary the properties of gray cast iron?
- (f) List the most important properties of copper.
- (g) Define Annealing.
- (h) If the primary consideration is hardenability, which alloy steel should be selected?
- (i) What are ceramics? Write examples.
- (j) What are composite materials?

PART – B
(Answer all five units, 5 X 10 = 50 Marks)**UNIT – I**

2 How does the metallic bond differ from the ionic and covalent bonds? Explain.

OR

3 Sketch and explain the schematic representation of substitutional and interstitial solid solutions.

UNIT – II

4 List and explain the methods used to construct the equilibrium diagrams.

OR

5 Sketch and explain the phase diagram of two metals completely soluble in the liquid and solid states.

UNIT – III

6 Sketch and explain the microstructure and properties of malleable cast iron.

OR

7 How do you designate the aluminum alloys? Explain in brief.

UNIT – IV

8 Sketch and explain the hardening effect of various elements as dissolved in alpha iron.

OR

9 What is hardening? Explain the method of flame hardening in brief.

UNIT – V

10 Explain the influence of fiber length on strength of the composites.

OR

11 List and explain the polymer matrix composites in brief.
