

Code: ME3T4

**II B.Tech - I Semester–Regular/Supplementary Examinations –
November 2017**

**METALLURGY AND MATERIAL SCIENCE
(MECHANICAL ENGINEERING)**

Duration: 3 hours

Max. Marks: 70

PART – A

Answer *all* the questions. All questions carry equal marks
11 x 2 = 22 M

1. a) What are Bravis Lattice? Explain its significance with a example.
- b) What are different crystal imperfections.
- c) Write a short on Substitutional and Interstitial Solid Solution.
- d) State Gibbs Phase Rule and define the terms used.
- e) Write about Stainless Steels.
- f) Write a short note on Copper and its properties.
- g) What is Tempering and classify them?
- h) Write a short note on Annealing and Normalising process.
- i) What is Sintering?
- j) What is Composite? Write the advantages and limitations of Composites?
- k) What are different manufacturing methods of composites?

PART – B

Answer any **THREE** questions. All questions carry equal marks. 3 x 16 = 48 M

2. a) What is Grain size and explain about the determination of Grain Size? 10 M

b) What is Crystallization? Explain its significance in metals. 6 M

3. Define Fe-Fe₃C equilibrium diagram. Explain its important features with the help of equilibrium diagram. 16 M

4. What is Cast iron? Explain the structure and properties of Spheroidal and Gray Cast iron with its properties and applications. 16 M

5. a) What is TTT diagram and explain the various Iron-Carbon phases on TTT with a neat sketch? 12 M

b) What is Heat Treatment? Write the various stages of Heat Treatment Process. 4 M

6. a) Write about applications of the Powder Metallurgy. 4 M

b) Write a short note on: 12 M
 - (i) Fibre Reinforced Composite Materials
 - (ii) Metal - Matrix Composites
 - (iii) Autoclave molding