

**B. Tech. 3rd Semester (ME) F-Scheme  
Examination, December – 2016**

**MATERIAL SCIENCE**

**Paper–ME-207-F**

*Time allowed : 3 hours ]*

*[Maximum marks : 100*

*Note : Attempt any five questions in total, at least one question from each section. Question no. 1 is compulsory. Each question carries equal marks. (20 marks)*

**1. Explain the following –**

- (a) Space Lattice
- (b) Induction Hardening
- (c) Objectives of heat treatment processes
- (d) Properties of Martensite
- (e) Strain ageing
- (f) Bauschinger's effect
- (g) Binary phase diagrams
- (h) Types of fracture
- (i) Critical cooling rate
- (j) Tempering.

20

**Section-A**

2. (a) Discuss the classification of crystal imperfections in details. 14  
(b) Discuss atomic packing factor and number of atoms per unit cell in detail. 6
3. (a) What different types of structures are found in different materials? How are these formed? 10  
(b) What is crystallography? Explain crystal structure, space lattice and crystal directions. 10

**Section-B**

4. (a) Explain the Iron carbon equilibrium diagram in detail. What are its limitations? 10  
(b) Explain the TTT curve with its applications. 10
5. (a) Explain the difference between annealing and normalizing in detail. 10  
(b) Explain any two surface hardening techniques in detail. 10

**Section-C**

6. (a) What do you understand by plastic deformation? Explain mechanism of plastic deformation. 10  
(b) Explain the recovery, recrystallisation and grain growth in detail with application. 10

7. (a) Explain types and mechanism of fractures in detail. 10  
(b) Explain fatigue limit and the factors affecting fatigue. 10

**Section-D**

8. (a) Define creep and creep limit. How creep test is carried out and explain creep curve. 10  
(b) Discuss dry and wet corrosion. Explain the methods of corrosion protection. 10
9. (a) Explain various types of polymers and formation of polymers. 10  
(b) What are ceramics, types of ceramics, their properties and formation techniques? 10