

Roll No.

24049

**B. Tech. 3rd Sem. (ME)
Examination – December, 2015**

MATERIAL SCIENCE

Paper : ME-207-F

Time : Three Hours] [Maximum Marks : 100

Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.

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 : 20
- (a) Objectives of phase diagram
 - (b) Crystal imperfections
 - (c) Classification of heat treatment processes
 - (d) Gibbs's phase rule

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- (e) Eutectoid systems
- (f) Season cracking
- (g) Types of fracture
- (h) Work hardening
- (i) Polymer structure
- (j) Co-ordination number

SECTION - A

2. (a) What do you mean by surface defects in crystals? Classify them with neat sketches. 10
- (b) Differentiate between edge and screw dislocations with the help of suitable and neat sketches. 10
3. (a) What is crystal? In what pattern do formation of crystals takes place. 10
- (b) Explain number of atoms per unit cell and atomic packing factor in detail. 10

SECTION - B

4. (a) Explain the Iron carbon equilibrium diagram in detail. What are its applications? 10
- (b) Explain the principle of construction of TTT diagram and discuss the isothermal transformation in eutectoid steel using isothermal transformation diagram. 10
5. (a) Explain the following heat treatment methods : 10
 - (i) Case Hardening

- (ii) Normalizing

- (b) Explain the cyaniding and flame hardening processes in detail. 10

SECTION - C

6. (a) What do you understand by Elastic and plastic deformation? Explain mechanism of plastic deformation. 10
- (b) Explain the strain hardening, Bauschinger effect in detail with application. 10
7. (a) Explain the types of fractures in detail. Which types of fracture is more dangerous and why? 10
- (b) Explain the different factors affecting fatigue. 10

SECTION - D

8. (a) Define creep and creep limit. How creep test is carried out? What are the objectives of creep test? 10
- (b) Explain Corrosion Mechanism and prevention of corrosion. 10
9. (a) What are polymers, give the types, structure and application? 10
- (b) Explain Types of ceramics and mechanical behavior of ceramic in detail. 10