

Roll No. ....

**24049**

**B.Tech. 3rd Sem. (Mechanical Engg.)**

**Examination – December, 2012**

**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 complain in this regard, will be entertained after examination.*

*Note : Attempt five questions in total, at least one*

*question from each Part. All questions carry equal*

*marks. Question No, 1 is compulsory.*

1. (i) Define the co-ordination number. 20

(ii) Define the atomic packing factor.

(iii) Define the Gibb's phase rule.

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- (iv) What do you understand by nitriding ?
- (v) What is Bauschinger effect ?
- (vi) What are the characteristics of fatigue ?
- (vii) Define the composite material with suitable example.
- (viii) Define the corrosion with suitable example.
- (ix) What is TTT diagram.
- (x) What are different types of ceramics ?

**PART – A**

2. Explain the point defects, line defects, edge & screw dislocations, surface defects in details. 20
3. Explain the crystal plane, crystal directions, No of atoms per unit cell, atomic packing factor in detail. 20

**PART – B**

4. Explain the iron carbon equilibrium diagram and TTT diagram in detail. 20
5. What is heat treatment ? Explain the different types of heat treatment in detail. 20

**PART – C**

6. Write short note on the following :
- (i) Mechanism of plastic deformation. 10
- (ii) Types of fracture. 10
7. Write short note on the following :
- (i) Bauschinger effect. 10
- (ii) Re-crystallization and grain growth. 10

**PART – D**

8. What is creep curve ? What is the mechanism of creep ?

Explain the impact of time and temperature on creep. 20

9. Explain the following :

(i) Mechanism and effect of corrosion. 10

(ii) Ceramic forming techniques. 10