**Printed Pages : 2** **Roll No.** | | | | | | | | | | | **NOE047**

# B.TECH.

## THEORY EXAMINATION (SEM–IV) 2016-17

## MATERIAL SCIENCE

***Time : 3 Hours*** ***Max. Marks : 100***

***Note :*** *Be precise in your answer. In case of numerical problem assume data wherever not provided.*

### SECTION – A

**1. Attempt the following:** **10 x 2 = 20**

**a)** Define the term 'Miller Indices'.

**b)** What is a composite material? Give any two examples.

**c)** Write the eutectic and eutectoid reactions.

**d)** Define the term 'Packing efficiency'. Also give the formula for the same.

**e)** Explain about Gibbs phase rule.

**f)** What is difference between Hardness and Toughness?

**g)** What is refractory material? Give an example, main property and application.

**h)** Differentiate between ferrous and nonferrous materials with suitable example.

**i)** What is messier effect? Explain

**j)** Classify solids on basis of energy gaps. Briefly discuss any one.



### SECTION – B

**2. Attempt any five parts of the following question:** **5 x 10 = 50**

**a)** Draw the stress-strain diagram for a mild –steel specimen and also, mark the points and classify them. & define the term Hardenability and give the factor affecting Hardenability.

**b)** Briefly describe the process of making steel and also give the name of furnace for making wrought iron and cast iron.

**c)** Briefly describe the phenomenon of magnetic hysteresis, and why it occurs for ferromagnetism and ferromagnetic materials. Discuss Coercive force and retentively with help of B-H curve.

**d)** What do mean by corrosion and how to control it? Explain the processing of plastics and also explain injection moulding.

**e)** How TTT diagram is is obtained? What is its importance over Iron Carbon equilibrium diagram?

**f)** **Write short notes on any three of the following**

(i) Semiconductors. (ii) Thermistors

(iii) Messier effect (iv) High temperature superconductors

**g)** How do thermoplastics differ from thermosetting plastics? Give their properties and industrial applications.

**h)** Explain the term NDT's (Non Destructive Test) and also classify it. Also explain one in brief.

### SECTION – C

**Attempt any two parts of the following :** **2 x 15 = 30**

**3.** Derive the expression for Griffith's criterion for crack propagation. Is this necessary and sufficient condition for crack propagation in brittle fracture, explain.

**4.** What is meant by Superconductivity? And explain diffusion and why the diffusion of nickel in iron is slower than diffusion of carbon in iron and differentiate between self diffusion and inter diffusion.

**5.** **Write short notes on any three of the following;**

(i) Gun metal (ii) Duralumin

(iii) Babbitt metal (iv) Heat resisting steel

(v) Cyaniding