



(Following Paper ID and Roll No. to be filled in your Answer Book)

**PAPER ID : 140301**

Roll No.

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## B. Tech.

(SEM. III) (ODD SEM.) THEORY  
EXAMINATION, 2014-15  
MATERIAL SCIENCE IN ENGINEERING

Time : 3 Hours]

[Total Marks : 100

1 Attempt any **FOUR** parts : (5x4=20)

- What are some of the typical characteristics of ceramic materials ?
- Name some applications where ceramics are used.
- What are the special properties of plastics that make them useful engineering materials ?
- What are the factors which determine the mechanical behavior of plastics ?
- Write short notes on Smart material with its application
- Briefly explain mechanism of fatigue and corrosion with neat sketches.

2 Attempt any **TWO** parts : (10x2=20)

- What do you mean by Miller Indices ? Explain the procedure for finding Miller Indices.
- NACL structure has FCC Structure. The density of NACL is  $2.18 \text{ cm}^3$ . Calculate the distance between two adjacent atoms.

- c) Enumerate the various atomic models proposed by scientist over the last few decades.

3 Attempt any **TWO** parts : (10x2=20)

- a) What is a fatigue failure ? How is a fatigue test carried out ?
- b) What is specimen preparation ? Explain the steps involved in specimen preparation.
- c) Draw the Iron-carbon equilibrium diagram and explain the features.

4 Attempt any **TWO** parts : (10x2=20)

- a) State and explain Fick's First and Second Law.
- b) What is TTT Diagram? Explain briefly with neat sketch stating its importance.
- c) I. State the comparison of Cast iron, Wrought iron and Mild steel.  
II. Classify Brass and explain any two type stating its composition.

5 Attempt any **TWO** parts : (10x2=20)

- a) Explain the following :  
I. Ferromagnetism  
II. Diamagnetism.
- b) Distinguish between intrinsic and extrinsic semiconductor. Discuss why intrinsic semiconductor is not used in semiconductor devices.
- c) Define superconductivity. Explain Type II superconductor in detail and application of Type II superconductor in detail.