

Printed Pages: 02

Subject Code: NME301

Paper Id: 140312

Roll No: 

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**B TECH**  
**(SEM-III) THEORY EXAMINATION 2018-19**  
**MATERIAL SCIENCE**

*Time: 3 Hours*

*Total Marks:100*

*Notes: Assume any Missing Data.*

**SECTION-A**

**1. Attempt all questions in brief. (2x10 = 20)**

- a) Define the terms Slip and Twinning.
- b) Explain the term corrosion and its types.
- c) What are hyper and hypo eutectoid steels?
- d) What are refractory materials? Give some examples
- e) Define the term nanotechnology.
- f) What are dielectric materials?
- g) What are Bravais's space lattices?
- h) Define smart materials?
- i) Compare annealing and normalizing.
- j) What are p-type and n-type semiconductors?

**SECTION B**

**2. Attempt any three parts of the following : (10x3=30)**

- a) What is creep? Explain the mechanism and the stages of it.
- b) What is 'heat treatment'? Why are the metals heat treated? Describe various heat-treatment processes.
- c) What are various techniques of grain size determination? Explain any one in details.
- d) Draw a neat sketch of iron-carbon diagram and explain the various phases present in it and the important reactions occurring.
- e) What is the basic mechanism of super conduction? Explain type-1 and type-2 super conductors. What are the advantages and limitations of super conductors?

**SECTION C**

**3. Attempt any one part of the following : (10x1=10)**

- a) Draw hysteresis curve and explain it in detail. What is the roll of domains for Differentiate between hard and soft magnetic materials.
- b) Define smart materials and nano-materials. Also mention their important applications.

**4. Attempt any one part of the following : (10x1=10)**

- a) What is a dislocation? What are different types of dislocation? Explain. Draw their neat sketches and mark burger vector in each case.
- b) Draw stress strain diagram for mild steel. Explain phenomenon of yielding and strain hardening in it.

**5. Attempt any one part of the following :** **(10x1=10)**

- a) Write short notes on Solid solution and its types.
- b) What is non-destructive testing (NDT)? Explain in detail any two NDT methods for surface crack detection.

**6. Attempt any one part of the following :** **(10x1=10)**

- a) Draw and explain the TTT diagram for eutectoid steel. Explain important transformations taking place in it on cooling.
- b) Define the term diffusion. Explain fick's law in case of steady state diffusion.

**7. Attempt any one part of the following :** **(10x1=10)**

- a) Write short notes on characteristics, classification and applications of various carbon steels.
- b) Explain in detail classification and applications of composite materials.