

Printed Pages: 02

Subject Code: EME301

Paper Id: 140308

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B TECH
(SEM-III) THEORY EXAMINATION, 2018-19
MATERIAL SCIENCE IN ENGINEERING

Time: 3 Hours

Total Marks: 100

Notes: Assume any Missing Data.

SECTION-A

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

- (a) Define atomic number, atomic weight, isotopes and isobars.
- (b) What are non crystalline solids? Give its example.
- (c) Differentiate Toughness and Hardness.
- (d) What is annealing? Classify it.
- (e) What do you understand by NDT testing?
- (f) Write the application of brass and bronze.
- (g) What is the difference between unary and binary diagrams?
- (h) Differentiate between hard and soft magnetic materials.
- (i) Sketch the TTT diagram for Eutectoid steel.
- (j) Classify chemical bonds.

SECTION B

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

- a) List classification of carbon steels. Describe their properties and typical applications.
- b) Describe briefly different kinds of X-ray crystallography.
- c) What are various techniques of grain size determination? Explain any one in details.
- d) Explain the iron carbon equilibrium diagram with neat sketch.
- 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 it? Differentiate between hard and soft magnetic materials.
- b) Write short notes on ceramic materials and their 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) What are general alloying elements for steel and what are their effects on it? Explain in detail.
- 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) Differentiate between ductile and brittle fracture. Explain the significance of ductile brittle transition temperature.

7. Attempt any one part of the following :

(10x1=10)

- a) Write short notes on characteristics, classification and applications of various carbon steels.
- b) What is corrosion? Briefly describe types of corrosion and methods for corrosion prevention?