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B.TECH.
(SEM IV) THEORY EXAMINATION 2017-18
MATERIAL SCIENCE

Time: 3 Hours ***Total Marks: 100***

Note: Attempt all Sections. If require any missing data; then choose suitably.

SECTION A

1. Attempt *all* questions in brief. 2 x 10 = 20

a. What are Miller indices?
b. How are Miller indices determined?
c. Draw neat sketches of unit cells of simple cubic structures.
d. What do you understand grain size determination?
e. Define phase rules.
f. Write name of various type steel.
g. What are the properties of Aluminium Alloys?
h. What are the ferro magnetic materials?
i. What are the applications of ceramic materials?
j. Define the fracture.

SECTION B

2. Attempt any *three* of the following: 10 x 3 = 30

a. Draw the neat sketches of unit cells of BCC and FCC crystal structures. Calculate the number of atoms in each case.
b. Distinguish between following (i) Slip and twin mechanisms (ii) Hot and cold working
c. Draw neat-labeled Iron-carbide equilibrium diagram. Explain in variant reactions occur in this diagram.
d. Explain nitriding process of heat treatment of steps.
e. What are the constituents, properties and engineering application of PVC, PMMA?

SECTION C

3. Attempt any *one* part of the following: 10 x 1 = 10

(a) Describe and illustrate the edge and screw type dislocations?
(b) What is re-crystallization temperature? What are the factors which effect re-crystallization temperature?

4. Attempt any *one* part of the following: 10 x 1 = 10

(a) Define the following (i) toughness (ii) CI (iii) Brass (iv) Alloys
(b) Draw an equilibrium diagram of binary system with limited solid solubility in solid state.

5. Attempt any *one* part of the following: 10 x 1 = 10

(a) What is Martensitic transformations and also explain its characteristics.

(b) Differentiate the following (i) Austempring and Marteempering (ii) Annealing and Normalising

6. Attempt any *one* part of the following: 10 x 1 = 10

(a) Explain tensile test specifying standard specimen which is used for test?

(b) What are the super conductivity materials? And also write its application.

7. Attempt any *one* part of the following: 10 x 1 = 10

(a) What are the plasticizers? Why they are used in polymeric materials?

(b) Explain different processing steps used for producing high strength, high modulus carbon fibres from polyacrylonitrile processor material.