Printed Pages :3

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NME-301

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

PAPER ID :140311

Roll No. | | | | | | | | | | |

B. Tech. (Semester-IV)

SPL. THEORY EXAMINATION, 2014-15

MATERIALS SCIENCE IN ENGINEERING

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

Note: Attempt all questions. All questions carry equal marks.

1. Attempt any four parts of the following:- 5×4=20

   (a) State and explain Bohr's model of an electron in an atom.

   (b) Classify various types of bonds and illustrate their examples.

   (c) What are Miller induces? How are they determined?

   (d) Differentiate between adge dislocation and screw dislocation. Illustrate with sketches.

   (e) Show the atomic packing factor of FCC crystal structure is 0.74.

(f) Briefly describe X-ray crystallography methods.

2. Attempt any four parts of the following: 5×4=20

(a) What is stress-strain diagram? Explain various factors affecting stress-strain diagram.

(b) Define creep. Explain its phase and mechanism.

(c) Differentiate between toughness and hardness.

(d) Explain the term percentage elongation and proof stress.

(e) Enumerate different kinds of destructive testing. Explain any of them in detail.

(f) Draw a neat labelled sketch of iron-carbon equilibrium diagram.

3. Attempt any two parts of the following:- 10×2=20

(a) Explain Time-Temperature-Transformation (TTT) diagram.

(b) What is 'heat treatment'? Why are steels streated? Describe various heat-treatment processes.

(c) Name any five alloys of ferrous and non-ferrous metals. Write their composition, properties and application.

4. Attempt any two parts of the following:- 10×2=20

(a) Compare the properties of diamagnetic and ferro-magnetic materials. Also write what are hard and soft magnetic materials? Explain with reference to hysteresis loop.

(b) Describe various types of semiconductor, its device and its applications.

(c) Explain P-N Junction and Transistor in detail.

5. Attempt any two parts of the following:- 10×2=20

(a) Discuss various types of plastics and their application.

(b) Write a short note on:-

1. Composite materials and its application
2. Corrosion and its prevention

(c) What are smart materials? Discuss optical fiber.

—X—