Printed pages: 01 **Sub Code: NME 301/EME301/ME303**

Paper Id: | 4 | 0 | 4 | 2 | **.Roll No** | | | | | | | | | | |

B. TECH

(SEM III) THEORY EXAMINATION 2017-18

MATERIAL SCIENCE

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

Note: 1. Attempt all Sections. If require any missing data; then choose suitably.

SECTION A

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

a. What do you mean by amorphous materials?
b. Explain the edge dislocation in short.
c. Draw the stress strain diagram for brittle materials and explain.
d. What do you mean by solid solution?
e. What is quenching process?
f. Write any two applications of dielectric materials.
g. What is a ceramic material? Give any two examples.
h. What is Austempering process?
i. Mention difference between hard and soft magnetic materials.
j. What is a composite material? Give any two examples.

SECTION B

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

a. What do you mean by Miller Indices? Explain the procedure for finding Miller Indices.
b. Draw a typical 'creep test' curve, showing different stages of elongation for a long time high temperature creep test.
c. Explain different types of heat treatment processes in brief.
d. What is superconductivity? Discuss the properties of superconductors.
e. Describe the various mechanical properties of ceramics. Also explain the various electrical properties of ceramics?

SECTION C

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

(a) (a) Draw a neat sketch of BCC crystal structure and calculate its atomic packing factor and also find out the effective number of atoms.
(b) (b) Explain different types of bonds commonly found between atoms. How do these atomic bonds effect the properties of materials?

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

(a) Write short notes on the following:
(i) Yield strength
(ii) Ductility
(iii) Ultimate tensile strength
(b) Explain about iron carbon equilibrium diagram with a neat sketch.

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

(a) Draw a TTT diagram for a eutectoid steel and explain the effect of cooling rate on the transformation products and hardness obtained.
(b) What is case hardening and what are its various types? Describe briefly.

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

(a) Distinguish between diamagnetic, paramagnetic and ferromagnetic materials. Explain their properties and applications.
(b) What do you mean by Intrinsic type semiconductors? explain in detail.

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

(a) Discuss about various ceramic crystal structures.
(b) What do you understand by composite materials? Classify them.