Sub Code:KOE032

Paper Id: 199356 Roll No:

B. TECH
(SEM -III) THEORY EXAMINATION 2019-20
MATERIAL SCIENCE

Time: 3 Hours *Total Marks: 100*

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

SECTION A

a. What is phase in materials?
b. Compare annealing and normalizing.
c. Why yield-point occur in low-carbon steel?
d. Explain binary phase diagram.
e. Differentiate toughness and resilience.
f. What is superconductivity?
g. Define dielectric materials.
h. Define creep with example.
i. What are the objectives of heat treatment?
j. Explain the properties of stainless steel with application.

SECTION B

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

a. Draw and explain TTT diagram for eutectoid steel. Explain important transformation taking place in it on cooling.
b. Draw stress-strain curve for mild-steel and explain various points on this diagram
c. Explain in brief creep test and what is its importance?
d. Distinguish between Type-I and Type-II super conductors with suitable curves and examples.
e. What are some method by which processing of ceramic material is carried out? What are the applications of ceramic materials?

SECTION C

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

(a) What is solid solution? Enlist types of solid solution and explain it.
(b) Differentiate between ferrous and non-ferrous material with suitable examples.

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

(a) What do you mean by engineering materials? Give a detailed classification of engineering materials with suitable examples.
(b) A hardened steel ball of 0.50 cm diameter is used to indent a steel specimen in Brinell hardness test. Diameter of indentation measured by an optical microscope of magnification 10 X is observed to be 32.5mm Calculate Brinell hardness number of the steel specimen.

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

(a) Write short note on
(i) Eutectoid steel
(ii) Hypo and hypereutectoid steel
(b) Discuss the effect of alloying elements on the properties of steel.

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

(a) What is the roll of domains for differentiating between hard and soft magnetic materials?
(b) Draw the hysteresis curve and explain it in detail

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

(a) What are smart materials? Describe optical fiber and its application with suitable examples.
(b) Write short note on composite materials. Give a detailed classification of composite material along with their properties.