PAPER ID-411530

Roll No:

BTECH
(SEM III) THEORY EXAMINATION 2021-22
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 x 10 = 20

Q no.	Question	Marks	CO
a.	Define solid solution strengthening.	2	1
b.	Explain concept of magnetism.	2	1
c.	Write down % composition of carbon in steel and cast iron.	2	2
d.	What is the purpose of Tempering?	2	2
e.	Explain the properties of stainless steel with application	2	3
f.	What do you mean by superconductivity?	2	3
g.	Differentiate annealing vs normalizing.	2	4
h.	Define creep with example.	2	4
i.	Explain matrix and reinforcement of composite materials.	2	5
j.	What are the objectives of heat treatment?	2	5

SECTION B

2.   Attempt any *three* of the following:

a.	State and explain the Hume-Rothery rule for the formation of a solid solution.	10	1
b.	Explain in brief creep test and what is its importance?	10	2
c.	What are dielectric materials? Explain the application of dielectrics.	10	3
d.	Draw and explain TTT diagram for eutectoid steel. Explain important transformation taking place in it on cooling.	10	4
e.	Draw Stress – Strain Curve for any metal. Elaborate all points associated with explanation.	10	5

SECTION C

3.   Attempt any *one* part of the following:

a.	Draw neat Iron carbon equilibrium diagram with explanation of each phase, compositions, and temperature. Explain the microstructure of pearlite and Eutectoid Steels.	10	1
b.	Differentiate between Rockwell, Brinell and Vickers Hardness testing.	10	1

4.   Attempt any *one* part of the following:

a.	Explain:(i) Ferromagnetism ii) Diamagnetism (iii) shape memory alloys	10	2
b.	What is solid solution? Enlist types of solid solution and explain it.	10	2

5.   Attempt any *one* part of the following:

a.	Define composites? Write down the types of composites and explain them briefly.	10	3
b.	What is diffusion? Illustrate the Fick's laws of diffusion.	10	3

6.   Attempt any *one* part of the following:

a.	What is polarization? Discuss the frequency effects on polarization.	10	4
b.	Draw the hysteresis curve and explain it in detail.	10	4

7.   Attempt any *one* part of the following:

a.	What is nanomaterials? State the potential application of nanomaterials.	10	5
b.	Explain the types, properties and applications of carbon nanotubes.	10	5