Sub Code:NME301

Paper Id: 140312 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

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

a.	What is the effect of grain size on mechanical properties?
b.	State Gibb's Phase rule.
c.	Distinguish between low carbon, medium carbon and high carbon steels.
d.	Draw the creep curve and show the different stages of creep on the creep curve.
e.	Explain eutectic and eutectoid reaction.
f.	Explain Eutectic reaction in Fe-Fe3C diagram.
g.	Explain eutectic and eutectoid reaction.
h.	Differentiate between ferrous and nonferrous materials with suitable example.
i.	What is plastic deformation? How plastic deformation occurs in a single crystal?
j.	What is an alloy? Name four alloy steels.

SECTION B

2. Attempt any *three* of the following: 10x3=30

a.	How do thermoplastics differ from thermosetting plastics? Give their properties and industrial applications.
b.	Explain fatigue limit (fatigue test) using S-N diagram.
c.	What is the effect of grain size on mechanical properties?
d.	Explain P-N junction and transistor in details.
e.	What is the difference between carburizing and nitriding? Define creep. What is the effect of temperature on creep?

SECTION C

3. Attempt any *one* part of the following: 10x1=10

a.	Shown by graph Brittle &Ductile fracture of materials, Explain in brief Griffith's Theory of Brittle fracture.
b.	Draw the stress-strain diagram for a mild –steel specimen and also, mark the points and classify them. & define the term Hardenability and give the factor affecting Hardenability.

4. Attempt any *one* part of the following: 10x1=10

a.	What are the influences of alloying Al, Cr, Ni, Mo, Si, Mn, V AND Cu in steel? Explain in brief.
b.	Briefly describe the phenomenon of magnetic hysteresis, and why it occurs for ferromagnetism and ferromagnetic materials. Discuss Coercive force and retentively with help of B-H curve.

5. Attempt any *one* part of the following: 10x1=10

a.	Define the term cold working and state its advantages and limitation. Explain the recrystallization process and state the main factors which affect this process.
b.	How do you draw a creep curve by conducting suitable creep test? Explain different stages of a creep curve.

6. Attempt any *one* part of the following: 10x1=10

a.	How TTT diagram is obtained? What is its importance over Iron Carbon equilibrium diagram?
b.	What is super conductivity and super conducting transition temperature? Explain what is Messier effect shown by super-conduction material & what are its possible uses?

7. Attempt any *one* part of the following: 10x1=10

a.	What is smart material? Discuses optical fibers.
b.	Classify various heat treatment processes in detail. What is the effect of heating on the properties of material?