PAPER ID-311732

Subject Code: BME303

Roll No: | | | | | | | | | | | | | |

BTECH
(SEM III) THEORY EXAMINATION 2023-24
MATERIALS ENGINEERING

TIME: 3HRS **M.MARKS: 70**

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

SECTION A

1. Attempt *all* questions in brief.

Q no.	Question	Marks
a.	Define unit cell in crystal structure.	2
b.	Write down % composition of carbon in steel and cast iron.	2
c.	What is substitutional solid solution?	2
d.	Explain the properties of stainless steel.	2
e.	Explain matrix and reinforcement of composite materials.	2
f.	What do you mean by Austempering?	2
g.	Define the term fatigue strength.	2

SECTION B

2. Attempt any *three* of the following:

a.	State and explain the Hume-Rothery rule for the formation of a solid solution.	7
b.	Classify the defect in crystal and explain point defect in detail with neat sketch.	7
c.	Explain the term heat treatment and its objective.	7
d.	Define composite material and its classification based on matrix and reinforcement.	7
e.	Differentiate between ductile failure and brittle failure. Also explain fracture mechanism with neat diagram.	7

SECTION C

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

a.	Draw a neat Iron carbon equilibrium diagram. Explain the microstructure of pearlite and Eutectoid Steels.	7
b.	What is the use of tie lines and lever rule within two phase regions? Explain it with copper nickel binary phase diagram.	7

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

a.	Discuss effects of alloying elements on the properties of steel.	7
b.	What is solid solution? Enlist types of solid solution and explain it.	7

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

a.	Explain in detail stainless steel and tool steel.	7
b.	Describe cast iron .Also explain carbon fiber and its properties.	7

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

a.	Draw and explain TTT diagram for eutectoid steel. Explain important transformation taking place in it on cooling.	7
b.	Explain the following term- Carburizing Annealing Normalizing Quenching	7

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

a.	Explain creep failure. Also explain creep curve with creep mechanism.	7
b.	Discuss Ultra Sonic test and Magnetic Particle Test in case of Non-Destructive Test.	7