

(Compulsory Question)

9. (a) Why equilibrium phase diagrams are preferred ?
(b) What is the measure of ductility ?
(c) What is the difference between Low carbon steel and Mild steel and Fatigue strength and Endurance strength ?
(d) How the microstructural and mechanical characteristics of a plastically deformed metal specimen may be restored to their pre-deformed states ?
(e) On quenching, high carbon steels get hardened but stainless steel does not, why ?
(f) How polymers are classified with regard to their behaviour at elevated temperature ?
(g) What are the different forms of metallic corrosion ?
(h) What the effect of stress and temperature on a creep curve ?
(i) Why are motor shafts made highly polished ?
(j) What is Work Hardening ? $1\frac{1}{2} \times 10 = 15$

Roll No.

Total Pages : 04

J-21-0024

B. Tech. EXAMINATION, 2021

Semester V (CBCS)

MATERIALS TECHNOLOGY (ME, AE)

ME-506

Time : 2 Hours

Maximum Marks : 60

The candidates shall limit their answers precisely within 20 pages only (A4 size sheets/assignment sheets), no extra sheet allowed. The candidates should write only on one side of the page and the back side of the page should remain blank. Only blue ball pen is admissible.

Note : Attempt *Four* questions in all, selecting *one* question from any of the Sections A, B, C and D.
Q. No. **9** is compulsory.

Section A

1. (a) Why is it essential for a materials engineer to have the systematic classification of materials ?

5

- (b) State the various factors which affect the mechanical properties of materials and state their effects. **10**
2. (a) Explain 'Gibbs' phase rule', defining all terms with examples. **7½**
- (b) Draw Fe-C phase diagram. Label all the phases and temperatures properly. **7½**

Section B

3. Difference between chemical heat treatment methods and conventional heat treatment methods on the basis of material characterization, mechanicals properties, temperature-time profiles and applications. **15**
4. (a) How do grain boundaries influence recrystallization ? Discuss the role of grain boundaries in imparting various properties to materials. **10**
- (b) Compare elastic and plastic materials when they are subjected to tensile loads. Mention the difference between elastic and plastic deformation. **5**

Section C

5. (a) What is meant by polymerization ? What are the two broad classifications of polymers ? Discuss them. **10**
- (b) What is the difference between matrix and dispersed phases in a composite material ? **5**
6. (a) Briefly, explain some of the properties of important alloys used in mechanical engineering practice. **10**
- (b) Why fibre glass reinforced composites are utilized extensively ? **5**

Section D

7. (a) Write factors which contribute to the onset of fatigue failure and those which tend to resist fatigue. **7½**
- (b) Discuss the examples of ductile and brittle fracture. **7½**
8. (a) Enlist various methods of corrosion. How is it controlled in actual practice ? **7½**
- (b) Draw a typical creep curve and explain the different stages on creep. **7½**