

SR/II/NEP / Mechanical / Dec-2025 Date 10/12/2025

(2 Hours)

Qf. Code: 99690

Total Marks: 60

1/1

- N.B.** (1) Question no. 1 is **compulsory**.
 (2) Attempt any **three** questions out of remaining **questions**.
 (3) **Illustrate** your answer with **necessary** sketch wherever **necessary**.
 (4) **Figures** to the **right** indicate full **marks**.

- Q.1.** Attempt any **Three**: **15**
- (a) Write note on point defects. **5**
- (b) Explain the purpose of annealing and normalising. **5**
- (c) Illustrate and explain an isomorphous phase diagram. **5**
- (d) How does hot working differ from cold working? **5**
- Q.2.**
- (a) Define Fatigue and Creep. **4**
- (b) What are the stages of creep, explain with the creep curve. **5**
- (c) Draw and explain the S-N curve. **6**
- Q.3.**
- (a) Draw the Fe-Fe₃C diagram, label fully mentioning all important temperatures and compositions. **8**
- (b) Explain the cooling of 0.8 % C steel. **7**
- Q.4.**
- (a) What are the stages of recrystallisation annealing? **8**
- (b) What are the different types of cast irons? Explain properties and applications, also draw any one microstructure. **7**
- Q.5.**
- (a) Differentiate between case hardening and surface hardening. Explain any one of the case hardening methods. **8**
- (b) What are dislocations? How do they affect material behavior? **7**
- Q. 6.**
- (a) How does Ductile to Brittle Transition Temperature influence the material behavior? **4**
- (b) Derive an expression for Critical Resolved Shear Stress. **5**
- (c) What are stainless steels? Give classification, and also discuss their applications. **6**

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