

(3 Hours)



[Total Marks: 80]

N.B. (1) Question no.1 is compulsory

(2) Answer any 3 questions out of the remaining questions.

(3) Assume suitable data if necessary.

- Q.1. Write Short notes on the following: -- 20
- (a) Material Science and Engineering (MSE) tetrahedron.
 - (b) Edge and screw dislocations.
 - (c) Alloys of Copper.
 - (d) Biomaterials.
- Q.2. (a) Draw iron- iron carbide phase diagram and explain various phase transformation reactions from different regions of the diagram. 10
- (b) Explain recovery, recrystallization and grain growth. 10
- Q.3. (a) Write short note on how composites are classified on the basis of matrix material. Give example of each type with applications. 10
- (b) Explain in brief at least two types of stainless steels in terms of properties and applications. 10
- Q.4. (a) Differentiate between Martempering and Austempering heat treatment processes. 10
- (b) Write short note on creep testing, data representation and analysis. 10
- Q.5. (a) Write about the unique features of Nano-structured materials. 5
- (b) Define hardenability? How is hardenability determined? Explain Jomny end quench hardenability test. 10
- (c) Briefly describe fatigue failure and the factors affecting fatigue life. 5
- Q.6. Write short notes on :- 20
- (a) Eutectoid type of alloy phase diagram.
 - (b) Ductile and Brittle Fracture.
 - (c) Crystal defects.
 - (d) Effect of alloying on carbide.
