

(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) Stainless Steels.
(b) Crystal Defects.
(c) Carburising.
(d) Classification of Composites.
- Q.2. (a) Explain the importance of phase diagram in the development of new alloys. Also, explain the lever rule with an example in connection with phase diagrams. 10
(b) Differentiate between edge and screw dislocations. 10
- Q.3. (a) What do you mean by TTT diagram? Plot the diagram for 0.8% carbon steel and superimpose various cooling curves on it to describe the end products of such transformations. Also explain the concept of critical cooling rate. 10
(b) What is fatigue failure? Elaborate on fatigue testing, data representation and analysis. 10
- Q.4. (a) Explain the difference between hardening and hardenability. Also explain Jominy End quench test for measurement of hardenability. 10
(b) Define fracture and explain the phenomenon of brittle and ductile fracture. Also, explain ductile-to-brittle transition with suitable examples. 10
- Q.5. (a) Explain the heat treatment processes of Hardening and Tempering. 10
(b) Explain the heat treatment processes of Annealing and Normalizing. 10
- Q.6. Write short notes on :- 20
(a) Strain Hardening.
(b) Tool Steels.
(c) Alloys of Copper.
(d) Nano Structured Materials.
