

QP Code : NP-19868

(3 Hours)

[Total Marks : 80

- N. B. :** (1) Question No. 1 is compulsory.
 (2) Attempt any three questions out of remaining five questions.
 (3) Assume suitable data if necessary.
 (4) Figures to the right indicate full marks.

1. Write short notes on :- 20
 - (a) Point Defects
 - (b) Mechanism and types of creep
 - (c) Dispersion hardening
 - (d) Spheroidizing annealing
 - (e) Cemented carbide.
2. (a) Write short note on recovery, recrystallization and grain growth 8
 (b) Draw and label a TTT diagram for 0.8% carbon steel. Superimpose various cooling curves on it and explain the processes. 8
 (c) Write Engineering applications of ceramics. 4
3. (a) Explain powder metallurgy process. Also write limitations of powder metallurgy 12
 (b) Draw Iron-Iron carbide phase diagram and explain various phase transformations in different regions of the diagram. 8
4. (a) What is fatigue testing? Write about mechanism of fatigue and write important factors which influence fatigue. 10
 (b) What is rule of mixtures? Also classification of composites on the basis of matrix materials 10
5. Write short notes on :- 20
 - (a) Austempering
 - (b) martempering
 - (c) Solid (or Pack) Carburizing
 - (d) Effect of alloying elements on ferrite, carbide and austenite
6. (a) Define and introduce Nano technology. Write unique features of nano-structured material and typical applications 10
 (b) State and explain various types of ingot defects and suggest remedies for these defects. 10