S.E Sem. III Mech R-2019-C Scheme - Nov-23

30/11/23

Time: 3 Hour

Max. Marks: 80

N. B.
1) Question No.1 is compulsory.
2) Attempt any three questions from remaining five questions.
3) All questions carry equal marks.

Q1. Write notes on any FOUR [20]
(a) Burgers vector.
(b) Allotropic form of iron.
(c) Sub-zero treatment.
(d) Fracture toughness.
(e) Composite Materials.

Q2. (a) What is recrystallization annealing? Discuss the various stages of recrystallization annealing in detail. [10]
(b) Draw neat Fe-Fe3Ccarbide diagram indicating all important temperature, phases and composition. Also write the invariant reactions. [10]

Q3. (a) Define strain hardening. Explain the phenomenon on the basis of dislocation theory. [10]
(b) Define Critical Cooling Rate. Describe various cooling curves on TTT diagram for eutectoid steel. [10]

Q4. (a) How is surface hardening different from case hardening? Discuss any one of the case hardening methods in detail. [10]
(b) Define fatigue failure. Discuss fatigue testing. Explain interpretation of S-N curve for ferrous and non –ferrous metals. [10]

Q5. (a) What are Nano Materials? Explain methods used for Nano materials synthesis. [8]
(b) What are polymers and its types? Explain the advantages of polymer over metallic materials [7]
(c) Explain Tempering and its different types. [5]

Q6. (a) Explain Creep resistant materials. [6]
(b) What is Nondestructive testing and explain any one type of it in detail? [8]
(c) What are smart materials? Explain any one in detail. [6]