

QP Code :3480

Question .1 is compulsory.

Time: 3hours

Solve any three questions from the remaining.

Marks: 80

Marks are indicated on the right.

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- Q.1** Answer any four from the following: 20
- a. Discuss the allotropic modifications of pure Iron.
 - b. Define fracture and discuss various types of fracture.
 - c. What are dislocations? Classify them and discuss any one of them.
 - d. What is nitriding? How is it practised?
 - e. What are composites? Give a classification of composites.
- Q.2**
- a. What is deformation? Explain the slip mode of deformation. 7
 - b. Define Fatigue. Draw the S-N curve and explain its interpretation. 7
 - c. Derive an expression for CRSS. 6
- Q.3**
- a. Draw a neat and labeled Fe-Fe₃C diagram. 7
 - b. Discuss the cooling of 0.4 % C steel. 6
 - c. Explain the method of carburizing; also give examples of parts that are carburized. 7
- Q.4**
- a. State Griffith's criteria of brittle fracture and derive the equation. 7
 - b. Draw neat and labelled microstructures of grey cast iron, 0.8% C steel and low carbon steel. 7
 - c. Define Hardenability and discuss factors affecting it. 6
- Q.5**
- a. What are the various methods used for processing of polymers? Explain any one in detail. 7
 - b. What are High speed steels? How are they heat treated? 7
 - c. How are stainless steels classified? Discuss their properties and applications. 6
- Q.6** Write short notes on any four: 20
- a. Recrystallisation annealing
 - b. Stages of Creep
 - c. Methods used for nanomaterials synthesis
 - d. TTT diagram and its importance
 - e. Types of Cast irons.