

Q. P. Code: 37936

Time: 3 hours

Marks: 80

- N. B. 1) Question No. 1 is compulsory.
2) Attempt any three questions from remaining five questions.
3) Figures at right indicate marks.

- Q. 1 Write notes on **any four**:- (5x4=20)
a) Smart materials
b) Creep Test
c) Effect of Alloying elements on properties of steel.
d) Critical resolved shear stress
e) Classification of Stainless steels
- Q. 2 a) What do you understand by Composite materials? Explain their properties and applications. (10)
b) What is Fatigue? Explain fatigue testing in detail. (10)
- Q. 3 a) Draw Fe-Fe₃C Diagram and Explain cooling of 0.9 % C alloy in the Fe-Fe₃C Diagram. (10)
b) How are dislocations regenerated at Frank Reed Source? Explain with neat diagram. (10)
- Q. 4 a) Draw and explain construction of Time Temperature Transformation (TTT) diagram. Also indicate various cooling patterns on the diagram. (10)
b) Derive an expression for Griffith theory of brittle fracture. Explain Orowan's Modification. (10)
- Q. 5 a) Explain slip and twin mechanism of plastic deformation. (10)
b) Classify Crystal Imperfections. Distinguish between Edge and Screw dislocation. (10)
- Q. 6 Write **short notes** on **any four** (5x4=20)
a) Hardenability test
b) Martempering
c) Synthesis of Nanomaterials
d) Recrystallisation annealing
e) Rule of mixtures for composites
