



Time: 3 hours

Marks: 80

01 JUN 2018

- 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 (10)

- properties and applications.
- b) What is Fatigue? Explain fatigue testing in detail. (10)

Q. 3 a) Draw Fe-Fe<sub>3</sub>C Diagram and Explain cooling of 0.9 % C alloy in (10)

- the Fe-Fe<sub>3</sub>C Diagram.
- b) How are dislocations regenerated at Frank Reed Source? Explain (10)

Q. 4 a) Draw and explain construction of Time Temperature (10)

- Transformation (TTT) diagram. Also indicate various cooling patterns on the diagram.
- b) Derive an expression for Griffith theory of brittle fracture. Explain (10)

Orowan's Modification.

Q. 5 a) Explain slip and twin mechanism of plastic deformation. (10)

- b) Classify Crystal Imperfections. Distinguish between Edge and (10)

Screw dislocation.

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

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