

Duration: 3 Hours

Total Marks: 80

N.B.:

- 1) Question No.1 is compulsory.
- 2) Solve any three from the remaining questions
- 3) Figures to RHS indicate full marks.
- 4) Draw neat sketches wherever necessary.

Q. 1 Solve any Four out of Six.

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- a) Differentiate between Slip and Twinning.
- b) Differentiate between Ductile fracture and Brittle fracture.
- c) Explain Hardenability Test.
- d) Explain Magnetic particle testing.
- e) Define composite and discuss its classification.
- f) Explain Classical creep curve.

Q. 2 a) Draw and explain Time Temperature Transformation diagram. Also indicate various cooling patterns on the diagram. 10

b) Draw and explain Screw type injection moulding process with its advantages, limitations. 10

Q. 3 a) What is fatigue? Explain fatigue testing in detail. 10

b) How surface hardening different from case hardening? Explain carbonitriding in detail. 10

Q. 4 a) Classify crystal imperfections. Distinguish between Edge and Screw dislocation. 10

b) Derive an expression for Griffith's theory of brittle fracture. 10

Q. 5 a) Explain Peritectic and Eutectic reaction with neat sketch. 10

b) Explain critical resolved shear stress, Derive an expression for the same. 10

Q. 6 Write short notes on (Any four) 20

- a) Classification of materials.
- b) Modes of deformation in materials.
- c) Nano materials and their synthesis route.
- d) Austempering Process.
- e) Isomorphous phase diagram.
- f) Work hardening.