

(3 Hours)

[Total Marks: 80]

N.B. 1) Question No.1 is compulsory

- 2) Attempt **any three** questions from remaining five questions.
- 3) Draw neat labeled sketches
- 4) Figure at right side indicate marks

- Q1.** Attempt any four questions. **20**
- a) Describe toughening mechanism in ceramics.
 - b) Enlist types of cast iron and write two application of Grey cast iron.
 - c) Describe different types of point defects in crystals.
 - d) Describe semiconductor materials along with two examples.
 - e) Enlist unique features of Nano-structured materials.
- Q2.** (a) Enlist different types of surface defects. Describe sub-angle grain boundary, stacking fault and their significance. **10**
- (b) Classify different types of Magnetic materials. Explain metallic and ceramic magnetic materials. List applications of magnetic materials. **10**
- Q3.** (a) Differentiate between ductile and brittle fracture. **05**
- (b) Define fatigue and explain the significance of cyclic stress. **05**
- (c) Describe following processes -Annealing, Normalizing, Tempering , Surface Hardening **10**
- Q4.** (a) Draw Iron-Iron Carbide diagram and explain Eutectic transformation in detail. **10**
- (b) Describe smart materials with examples. Describe chromic materials. **10**
- Q5.** (a) Give classification of polymers. Describe thermosetting polymers and Elastomers. **10**
- (b) Explain in detail creep testing mechanism along with diagrams. **10**
- Q6.** (a) Explain alloys of copper along with their properties & applications. **10**
- (b) Explain the following - (i) Lasers (ii) Optical fibers in communication. **10**
-