

**GUJARAT TECHNOLOGICAL UNIVERSITY**  
**PDDC– SEMESTER III– • EXAMINATION –WINTER- 2016**

**Subject Code: X31902****Date:02/01/2017****Subject Name: Material Science and Metallurgy****Time:10:30 AM to 1:00 PM****Total Marks: 70****Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

- Q.1 (a)** Explain the following terms: **07**
1. Creep
  2. Hardness
  3. Toughness
  4. Malleability
  5. Elasticity
  6. Ductility
  7. Resilience
- (b)** Explain in detail the criteria for selection of materials for engineering applications. **07**
- Q.2 (a)** What is atomic packing factor? Calculate the same for BCC and FCC structures. **07**
- (b)** What is compacting and sintering process? Explain any one. **07**
- OR**
- (b)** Draw neat sketch of metallurgical microscope. Explain its construction. **07**
- Q.3 (a)** Explain annealing process and justify its requirement. **07**
- (b)** Explain eutectic, eutectoid and peritectic reaction. **07**
- OR**
- Q.3 (a)** Draw completely labeled iron carbide diagram and state critical reactions of the same. **07**
- (b)** Explain thermal equilibrium diagrams of binary alloy completely soluble in solid state. **07**
- Q.4 (a)** Define Corrosion. Explain difference between dry type and Wet type corrosion. **07**
- (b)** What is non-destructive test? List various non-destructive tests. Explain “Dye penetration testing” **07**
- OR**
- Q.4 (a)** Explain TTT diagram with neat sketch. **07**
- (b)** Explain cathodic protection against corrosion. **07**
- Q.5 (a)** Explain the following in brief : **07**
- (i) Wrought Iron
  - (ii) Grey cast Iron
- (b)** What is Powder metallurgy? State advantages and limitations of powder metallurgy. **07**
- OR**
- Q.5 (a)** Explain Jiminy Quench Test. **07**
- (b)** Which are various surface hardening processes? Explain Induction hardening process with neat sketch. **07**

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