

GUJARAT TECHNOLOGICAL UNIVERSITY**B. E. - SEMESTER – III • EXAMINATION – WINTER 2012****Subject code: 131904****Date: 10-01-2013****Subject Name: Material Science & Metallurgy****Time: 10.30 am – 01.00 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) State utmost required engineering properties for following applications: 1. Bolt 2. Gear 3. Helical Spring 4. Shaft 5. Cutting Tool 6. Cylinder of I.C. Engine 7. Gas Turbine Blade **07**
- (b) State chief Advantages, Limitations and Applications of Powder Metallurgy. **07**
- Q.2** (a) With neat sketches, explain Solidification of Metal. **07**
- (b) Briefly explain Steel region of Iron Carbon Diagram. State critical reactions in the region. **07**
- OR**
- (b) What is metallurgy? What useful information can be obtained from it? **07**
- Q.3** (a) State composition, specific properties and applications of White Cast Iron. **07**
- (b) Define the term “Non Ferrous”. State composition, specific properties and applications of 1. Muntz Metal 2. Duralumin **07**
- OR**
- Q.3** (a) State the Qualities Required in Bearing Metals. State composition, specific properties and applications of Babbitt Metal. **07**
- (b) State composition, specific properties and applications of high carbon steel. **07**
- Q.4** (a) Define Heat Treatment. Explain the importance of TTT diagram in heat treatment. **07**
- (b) State Case Hardening processes and explain any one in detail. **07**
- OR**
- Q.4** (a) For hardening of steels, which quenchant would you prefer, water or oil? Explain reasons. **07**
- (b) State Surface Hardening processes and explain any one. **07**
- Q.5** (a) How would you assess the quality of welded joints using NDT methods? **07**
- (b) Define “corrosion”. Explain different types of corrosion. **07**
- OR**
- Q.5** (a) How would you determine internal flaws in a cast engineering component made of ferrous alloy without damaging the part? **07**
- (b) State various methods of prevention of corrosion and briefly explain any two. **07**
