

GUJARAT TECHNOLOGICAL UNIVERSITY**B.E. Sem-III Examination December 2009****Subject code: 131904****Subject Name: Material Science & Metallurgy****Date: 19 / 12 / 2009****Time: 11.00 am – 1.30 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) [1] Give differences between metals and non metals. **04**
[2] Define (1) Creep, (2) Malleability (3) Hardness **03**
(b) Which are advantages and limitations of powder metallurgy? **07**
- Q.2** (a) What is non destructive test? List various non destructive tests. **07**
Explain X ray Radiography.
(b) Explain selection criteria for engineering materials. **07**
- OR**
- (b) [1] List properties of wrought Iron. **03**
[2] Define (1) Creep, (2) Malleability (3) Hardness **04**
- Q.3** (a) [1] Define Allotropy. Explain allotropy of Iron. **03**
[2] Draw Iron Carbon Equilibrium diagram. **04**
(b) Give composition, properties and uses of malleable cast iron. **07**
- OR**
- Q.3** (a) Draw neat sketch of metallurgical microscope. Explain its construction. **07**
(b) What is solid solution? Explain types of solid solution. Also give Hume Rothery's Rules. **07**
- Q.4** (a) Give composition, properties and uses of Y alloy. **07**
(b) What is cathodic protection? **07**
- OR**
- Q.4** (a) What are the purposes of alloying? Give effects of Nickel as an alloying element. **07**
(b) Give composition and uses of Monel metal and Nichrome. **07**
- Q.5** (a) Explain Ultrasonic testing with advantages and limitations. **07**
(b) Which are various Surface Hardening processes? Explain Induction Hardening process with sketch. **07**
- OR**
- Q.5** (a) Explain any two methods for production of metal powders. **07**
(b) [1] Which are the objectives of Heat Treatment? **03**
[2] Give difference between Annealing and Normalising. **04**
