

GUJARAT TECHNOLOGICAL UNIVERSITY**B. E. - SEMESTER – IV • EXAMINATION – WINTER 2012****Subject code: 142104****Date: 31/12/2012****Subject Name: Metallurgy for non metallurgists****Time: 02.30 pm - 05.00 pm****Total Marks: 70****Instructions:**

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

- Q.1 (a)** Define the following terms. **10**
- | | |
|--------------------|---------------------|
| i) Bond. | ii) Solid solution. |
| iii) Phase. | iv) Equilibrium. |
| v) Heat treatment. | vi) Hot working. |
| vii) Soldering. | viii) Fatigue. |
| ix) Toughness. | x) Crystal. |
- (b)** (b) Explain in brief Anodic and cathodic coating. **04**
- Q.2 (a)** Explain in brief the following terms.
- | | |
|--|-----------|
| i) Allotropy of metal | 03 |
| ii) Material failure due to the wear and high temperature. | 04 |
- (b)** i) What is metallurgy? Classify the metallurgy. **04**
 ii) Classify the engineering materials. **03**
- OR**
- (b)** Explain thermo plastic & thermo set plastics in detail giving application of each **07**
- Q.3 (a)** What are the imperfections of crystals? Explain in brief any four. **07**
(b) List the advantages & limitations of electrochemical series give one illustration. **07**
- OR**
- Q.3 (a)** Explain the mechanism of plastic deformation of metals. **07**
(b) What is critical temperature? Explain the hot working & cold working process in context with the critical temperature. **07**
- Q.4 (a)** What is eutectic and Peritectic transformation? Explain it by giving example of each one. **07**
(b) What is dendrite? How it is formed? **07**
- OR**
- Q.4 (a)** Draw a neat sketch of optical system of metallurgical microscope & explain in brief. **07**
- Q.4 (b)** i) Explain the effect of carbon on plain carbon steels. **04**
 ii) Explain the effect of microstructure on the properties of steels. **03**
- Q.5 (a)** List the alloying elements and explain the effect on aluminum alloy. **07**
(b) Explain the methods of powder production by which high purity copper powder is produce commercially. **07**
- OR**
- Q.5 (a)** Explain the importance of TTT curves on heat treatment. **07**
(b) Explain in brief the factors effecting on hardenability. **07**
