

GUJARAT TECHNOLOGICAL UNIVERSITY
BE SEM-III Examination-Dec.-2011

Subject code: 132101**Date: 24/12/2011****Subject Name: Elements of Material Science & Metallurgy****Time: 2.30 pm -5.00 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) Define 'Metallurgy'. What are the important fields of Metallurgical Engineering? **04**
- (b) Explain the criteria for selection of materials for engineering Applications. **10**
- Q.2** (a) Define the following properties. **06**
- (i) Ductility (ii) Toughness (iii) Fatigue
(iv) Malleability (v) Hardness (vi) Creep
- (b) Give detailed classifications of engineering materials, giving their important properties & applications. **08**
- OR**
- (b) What do you mean by Destructive testing & Non destructive testing ? Enlist important NDT techniques & explain the principle & application of any one Testing Technique. **08**
- Q.3** (a) What is a Polymer ? What do you mean by Polymerization ? Name at least four different types of polymers & their uses. **07**
- (b) Explain the mechanism of addition, condensation & Co-polymerization. **07**
- OR**
- Q.3** (a) List various processes used for making glass objects. Explain them in brief. **07**
- (b) What are the methods for joining of metals ? Write the principle & application of fusion welding method. **07**
- Q.4** (a) How do you define Composite materials ? Give examples of of composite materials highlighting their importance. **04**
- (b) (i) What are the functions of Matrix in a composite material? **10**
(ii) Write brief notes on—Glass Fibers, Glass Wools & Bullet proof Glass.
- OR**
- Q.4** (a) What is a foundry ? Give a general classification of foundry **04**
- (b) (i) Draw a flow sheet showing important operations performed in a foundry **10**
(ii) Explain with the help of sketches how a casting is made ?
- Q.5** (a) What are the Ceramic materials? Give important steps followed for shaping ceramic materials. Write in brief about these steps. **10**
- (b) Give the definition of 'Metal'. Draw stress –strain curve for mild steel & cast iron, & highlight the difference. **04**
- OR**
- Q.5** (a) What is the Powder Metallurgy ? Give important methods of production of metal powders. **10**
- (b) Draw a neat sketch of a blast furnace & indicate various zones & their functions. **04**
