

GUJARAT TECHNOLOGICAL UNIVERSITY**ME Semester –I Examination Feb. - 2012****Subject code: 710808N****Date: 21/02/2012****Subject Name: Material Science and Materials****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 the name of seven crystalline structure and discuss on three structure which are found in most metals at room temperature **07**
(b) Explain the factors to be considered for selecting materials for engineering application. **07**
- Q.2** (a) What are the types of Fractures in Metals? Discuss in detail the Brittle fracture. **07**
(b) Derive and discuss the Debye's theory. **07**
- OR**
- (b) State the assumption made in Einstein classical model and also state what modification Debye has made in his specific heat theory. **07**
- Q.3** (a) What do you mean by Smart material? Discuss about the engineering applications of Smart material. **07**
(b) Explain effects of service condition on the performance of materials. **07**
- OR**
- Q.3** (a) Explain the effect of High & low temperatures on Performance of materials. **07**
(b) What are advance magnetic materials? Explain properties and application of these materials. **07**
- Q.4** (a) Define the term "thermal conductivity" and derive the equation for the Wrideman-Franz ratio. **07**
(b) Explain principle & process of X-ray radiography. **07**
- OR**
- Q.4** (a) State and explain the principle of operation of laser **07**
(b) Discuss trends in development of Bio materials and its characterization. **07**
- OR**
- Q.5** (a) Write a short note on delayed fracture and explain in details about cyclic fatigue of metal **07**
(b) Explain any one Ceramic processing process. **07**
- OR**
- Q.5** (a) Give your thoughts on Radiation damage in materials and how damages are to be recovered. **07**
(b) State in brief about factors to be considered in deciding of safe working stress. **07**
