

GUJARAT TECHNOLOGICAL UNIVERSITY**M. E. IST Semester–Remedial Examination – July- 2011****Subject code: 710808N****Subject Name: Material Science and Materials****Date: 12/07/2011****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 ionic, covalent and metallic bond **07**
- Q.2** (a) State the assumption made in Einstein classical model and also state what modification Debye has made in his specific heat theory. **07**
(b) Define and explain its significance **07**
(i) heat capacity
(ii) thermal expansion coefficient
(iii) thermal conductivity
- OR**
- (b) Define corrosion and explain how it can be controlled? **07**
- Q.3** (a) Discuss on material performance on elevated temperature in context with creep and oxidation **07**
(b) State and explain the causes of failure. **07**
- OR**
- Q.3** (a) Explain the damage that may occur in crystal structure due to neutron radiation. **07**
(b) **07**
(I) Explain how state of stress is defined at a point in three dimensions. **04**
(II) Define and explain (I) Elasticity (II) Plasticity (III) Anelasticity **03**
- Q.4** (a) Define the dielectric material and state its properties. **07**
(b) Explain in brief the processing methods for ceramics. **07**
- OR**
- Q.4** (a) State the favorable aspects of composite material and explain its classification **07**
(b) Write short note on soft and hard magnets **07**
- Q.5** (a) **07**
(I) Write short note on x-ray radiography. **04**
(II) State the advantages of non destructive testing over destructive testing. **03**
(b) State in brief about factors to be considered in deciding of safe working stress. **07**
- OR**
- Q.5** (a) Explain what is delayed fracture and explain in details about cyclic fatigue of metal **07**
(b) State and explain the principle of operation of laser **07**
