

GUJARAT TECHNOLOGICAL UNIVERSITY**M.E Sem-I Remedial Examination April 2010****Subject code: 710808****Subject Name: Material Science and Materials****Date: 09 / 04 / 2010****Time: 12.00 noon – 02.30 pm****Total Marks: 60****Instructions:**

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

- Q.1** (a) Discuss about primary and secondary bonds of solid materials. **06**
(b) Discuss about various mechanical properties of metals for engineering application. **06**
- Q.2** (a) Explain fracture behavior of materials. **06**
(b) Explain Creep behavior of materials. **06**
- OR**
- (b) Discuss various types of Cracks which are likely to appear in an engineering material under service conditions and briefly discuss modes of material deformation. **06**
- Q.3** (a) As a design engineer, you have designed a crankshaft for an automobile. Give your comments on its performance during operation. Is it possible to have substitute materials for the crankshaft? Suggest. **06**
(b) Write a Short note on Smart materials and its applications in engineering. **06**
- OR**
- Q.3** (a) List various Advanced materials. Discuss about processing of Advanced Composite materials. **06**
(b) Composite materials are known as Tailor made materials. Evaluate the statement **06**
- Q.4** (a) Discuss about the engineering requirements of materials in detail. **06**
(b) Explain why, on a cold day, the metal door handle of an automobile feels colder to the touch than a plastic steering wheel, even though both are at the same temperature. **06**
- OR**
- Q.4** (a) Briefly explain why the thermal conductivities are higher for crystalline than noncrystalline ceramics. **06**
(b) Discuss about Radiation damage in materials and its recovery. **06**
- Q.5** (a) Enlist the purposes of non destructive techniques for the material evaluation. Discuss the Ultrasonic testing for material evaluation. **06**
(b) Discuss Debye theory stating its importance in material properties. **06**
- OR**
- Q.5** (a) Discuss about Bio materials and its applications. **06**
(b) Discuss the effects of residual stresses in a welded component. **06**
