

# GUJARAT TECHNOLOGICAL UNIVERSITY

B.E. Sem-V<sup>th</sup> Examination December 2010

**Subject code: 150106**

**Subject Name: Composite Material and Smart Structures**

**Date: 21 /12 /2010**

**Time: 03.00 pm - 05.30 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) Give the detail Classification of composite material. **07**  
(b) Enlist the advantages and disadvantages of composite material. **07**
- Q.2** (a) What do you understand by smart material? And enlist different smart Materials and explain about them in brief. **07**  
(b) Explain about Magnetostrictive materials. And write its applications. **07**
- OR**
- (b) Explain about Acoustic Emission (AE) Techniques. **07**
- Q.3** (a) Briefly explain the fabrication process of boron fiber and Enlist the properties and application of boron fiber. **07**  
(b) Enlist the desirable properties of matrix material. **07**
- OR**
- Q.3** (a) Enlist the properties and application of Carbon carbon composite. **07**  
(b) List the properties and application of Glass fiber. **07**
- Q.4** (a) List the criteria used during ply orientation in laminate composite and explain about symmetric lay up with coding. **07**  
(b) Explain Micromechanical and Macromechanical aspects of Composites. **07**
- OR**
- Q.4** (a) Explain buckling of laminates and buckling of fibers. **07**  
(b) Explain Stress based failure theory. **07**
- Q.5** (a) Explain about Micro Electromechanical systems (MEMs). State its advantages and applications. **07**  
(b) Write short-note on self-healing composite. **07**
- OR**
- Q.5** (a) Explain about Shape Memory Alloy (SMA) and state its applications and advantages. **07**  
(b) Explain about Smart Materials and smart Systems? Explain about Piezoelectric material. **07**

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