

GUJARAT TECHNOLOGICAL UNIVERSITY
BE - SEMESTER-V • EXAMINATION – WINTER 2013

Subject Code: 150106**Date: 09-12-2013****Subject Name: Composite Materials and Smart Structures****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) What is the meaning of composite material? Compare the characteristics of composite materials with metallic materials. **07**

(b) Explain about piezoelectric material and write its application. **07**

Q.2 (a) List the different materials used as a fiber in a composite material and explain the properties and applications of boron fiber. **07**

(b) Enlist the desired properties and selection criteria of matrix material. **07**

OR

(b) Explain about structure health monitoring system. **07**

Q.3 (a) Describe with neat sketch, the different wave pattern of fibers used in composite. **07**

(b) Which are the different types of thermosets and thermoplastics resin used? Explain the advantages of epoxies resin. **07**

OR

Q.3 (a) Explain the production process of glass fiber. **07**

(b) Describe about carbon-carbon composite material. **07**

Q.4 (a) Explain the stress strain law for a single ply in laminate axes for off-Axis Laminates. **07**

(b) Explain major poisson's ratio and in-plane shear modulus of unidirectional lamina for composite material. **07**

OR

Q.4 (a) List the criteria used during ply orientation for laminate material. Explain Hybrid Laminate code with suitable example. **07**

(b) Explain about Acoustic Emission (AE) Techniques. **07**

Q.5 (a) Explain buckling of laminate and buckling of fibers. **07**

(b) What is electrorheological (ER) effect? Explain ER fluids. **07**

OR

Q.5 (a) Explain magnetostriction and magnetostrictive material. **07**

(b) Explain about Micro Electromechanical systems (MEMs) list its applications. **07**
