

GUJARAT TECHNOLOGICAL UNIVERSITY**BE- Vth SEMESTER-EXAMINATION – MAY/JUNE - 2012****Subject code: 150106****Date: 07/06/2012****Subject Name: Composite Materials and Smart Structures****Time: 02:30 pm – 05:00 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) Briefly explain about composite material and classify composite material on the basis of fiber reinforcement. **07**

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

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

(b) Explain about Micro Electromechanical systems. Enlist its advantages and applications. **07**

OR

(b) Explain the Tsai-Wu tensor failure criteria in detail. **07**

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

(b) Enlist the significant properties of Poly-Ether-Ether-Ketone (PEEK) as a matrix material. **07**

OR

Q.3 (a) Describe polymer matrix composite material. **07**

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

Q.4 (a) What is electroreological (ER) effect? Explain ER fluids. **07**

(b) Explain the potential application of smart structure. **07**

OR

Q.4 (a) What is Shape Memory Alloy? List its applications. **07**

(b) Explain magnetostriction and magnetostrictive material. **07**

Q.5 (a) Which criteria should be specified in laminate lay up code? Explain Hybrid Laminate code with suitable example. **07**

(b) Explain compression molding and pultrusion technique for manufacturing of composite material. **07**

OR

Q.5 (a) Describe Finite Element modeling of plate and shell element for composite structure. **07**

(b) Estimate tensile strength on the basis of micromechanics approach for fiber reinforced composite material. **07**
