Seat No.: _____ Enrolment No._____

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 electrorehological (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**

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