Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–V • EXAMINATION – SUMMER 2013

Subject Code: 150106 **Date: 23-05-2013**

Subject Name: Composite Material 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)**	Compare the characteristics of composite materials with metallic materials.	**07**
	(b)	Explain about composite material and Give the detail Classification of composite on the basis of matrix material.	**07**
Q.2	**(a)**	Explain about Smart Materials and smart Systems? Explain about Piezoelectric material.	**07**
	(b)	Explain about A-scan, B-scan and C-scan.	**07**
		OR	
	(b)	Explain about Acoustic Emission (AE) Techniques.	**07**
Q.3	**(a)**	Give the name of commercially available aramid fibers and enlist the properties and application of aramid fibers.	**07**
	(b)	Describe the ceramic matrix composite material.	**07**
		OR	
Q.3	**(a)**	Explain about hybrid fibers and its combinations in detail.	**07**
	(b)	Enlist the different properties of epoxies as a matrix material.	**07**
Q.4	**(a)**	Write short-note on self-healing composite.	**07**
	(b)	Explain about Micro Electromechanical systems (MEMs). State its advantages and applications.	**07**
		OR	
Q.4	**(a)**	What do you mean by smart fluid? Explain about ER fluid and MR fluid.	**07**
Q.4	**(b)**	Explain about Shape Memory Alloy (SMA) and state its applications and advantages.	**07**
Q.5	**(a)**	Enlist the assumption taken in laminate theory and state the stress strain law for single ply in the material axes for unidirectional laminate.	**07**
	(b)	Explain Longitudinal Modulus and Transverse Modulus of unidirectional lamina for composite material.	**07**
		OR	
Q.5	**(a)**	Explain the Stress concentration for laminate with neat sketches.	**07**
	(b)	Explain about Symmetric Laminates and Balanced laminates.	**07**

****