Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VII • EXAMINATION – SUMMER • 2014

Subject Code: 170103 **Date: 05-06-2014**

Subject Name: Mechanics of Composite Materials

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)**	Sketch the variation of stress, strain and deformation in a laminate. Explain in detail stress resultants and their importance. Maximize the use of relevant sketches.	**07**
	(b)	Define micromechanical analysis and macro-mechanical analysis and describe major differences between the two	**07**
Q.2	**(a)**	Describe and explain strength and stiffness of a composite material.	**07**
	(b)	What are the uses of composite materials? Mention their advantages and disadvantages	**07**
		OR	
	(b)	Describe and cite the applications of composites and their use in different industries Explain in detail and with sketches the mechanical behavior of isotropic, orthotropic and anisotropic materials	**07**
Q.3	**(a)**	Write a short note on symmetric laminates with two examples	**07**
	(b)	Define anisotropic, monoclinic, orthotropic and transversely isotropic materials	**07**
		OR	
Q.3	**(a)**	Describe the stress strain relations for plane stress in an orthotropic material	**07**
	(b)	Describe the macro mechanical behavior of a composite lamina in detail	**07**
Q.4	**(a)**	Explain in detail volume and weight fractions and write a short note on derivation of transverse modulus	**07**
	(b)	Write a short note on unsymmetric and anti-symmetric laminates with two example	**07**
		OR	
Q.4	**(a)**	Discuss the types of composite materials	**07**
	(b)	Describe [A], [B] and [D] matrices and explain its importance	**07**
Q.5	**(a)**	Describe a failure envelope and also explain different types of failure criteria	**07**
	(b)	Derive inplane-shear modulus and Poisson's ratio for a uni-directional composite	**07**
		OR	
Q.5	**(a)**	Derive transverse modulus for a uni-directional composite	**07**
	(b)	Write a short note on micromechanics of failure of unidirectional lamina including Longitudinal compression	**07**

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