

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 examples **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**
