

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER– VII (New) EXAMINATION – WINTER 2019****Subject Code: 2170107****Date: 28/11/2019****Subject Name: Mechanics of Composite Materials****Time: 10:30 AM TO 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.

		MARKS
Q.1	(a) What is the significance of fibre and matrix in composite material?	03
	(b) What is the limitation of a unidirectional lamina? How it can be overcome by laminate? Explain with neat sketch.	04
	(c) Carry out the comparison of composite material with metals in detail.	07
Q.2	(a) Give the classification of composite material.	03
	(b) Define composite material. Explain basic constituent materials of composites	04
	(c) Discuss the applications of composite materials in Aerospace engineering field.	07
	OR	
	(c) Identify the types of laminate given below.	07
	1. $[0/30/60]_s$	
	2. $[0/90_2/0/90]$	
	3. $[-40/40/-40/40]$	
	4. $[45/60/-60/-45]$	
	5. $[30/40/-30/30/-30/-40]$	
	6. $[0/\pm 60]$	
	7. $[0/90]_s$	
Q.3	(a) Sketch the variation of stress and strain through a laminate.	03
	(b) Derive Inplane Shear modulus with neat sketch.	04
	(c) Write a short note on [A], [B] and [D] matrices.	07
	OR	
Q.3	(a) What is plane stress assumption?	03
	(b) Determine the transverse modulus of a unidirectional lamina with neat sketch.	04
	(c) Derive Strain-Displacement relationship of a laminate using a neat sketch.	07
Q.4	(a) Write down the difference between micromechanics and macromechanics.	03
	(b) Write a short note on Poisson's ratio.	04
	(c) Write down the advantages and disadvantages of composite material.	07
	OR	
Q.4	(a) What is Prepeg? Explain.	03
	(b) Write down the significance of fillers and additives in composite materials in detail.	04

- (c) How the independent elastic constants have been reduced from 81 to 2 for different materials. Explain in detail with the use of stress-strain relations and neat sketches. **07**
- Q.5** (a) What is particulate composites? **03**
(b) Write a short note on symmetric laminate. **04**
(c) Derive the equations for volume fractions, weight fractions and density of composite material. **07**
- OR**
- Q.5** (a) What do you mean by balanced laminate **03**
(b) Write a short note on anti-symmetric laminate. **04**
(c) Discuss the application of composite materials in Automotive and Marine fields. **07**

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