

GUJARAT TECHNOLOGICAL UNIVERSITY**BE- SEMESTER-VII (NEW) EXAMINATION – WINTER 2024****Subject Code:3173411****Date:07-12-2024****Subject Name: Composite Technology****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.
4. Simple and non-programmable scientific calculators are allowed.

MARKS

Q.1	(a) Differentiate between thermosetting and thermoplastic polymer matrices.	03
	(b) What is composite material and how are composites classified?	04
	(c) Explain how the desired properties of a polymer matrix influence its application in specific industries.	07
Q.2	(a) Give classification of fibers.	03
	(b) Compare and contrast the mechanical properties of natural fibers with synthetic fibers.	04
	(c) Explain how the determinant of a matrix can be linked to desirable properties in materials science.	07
OR		
	(c) Compare and contrast the desired properties of matrices in metals, polymers, ceramics, carbon, and glass composites.	07
Q.3	(a) Discuss the types of reinforcement materials commonly used in polymer matrix composites.	03
	(b) Provide examples of applications where organic matrix composites are commonly used.	04
	(c) Give detailed classification of composites based on reinforcements with examples.	07
OR		
Q.3	(a) Define autoclave curing and explain its significance in the production of composite materials.	03
	(b) Discuss the principles and advantages of compression molding in the production of composite components.	04
	(c) Explain the role of specialty materials in composite manufacturing, including their benefits and challenges.	07
Q.4	(a) Discuss the mechanical properties of short fiber systems in composite materials.	03
	(b) Explain how the volume and weight fractions of reinforcing fibers and matrix material influence the stiffness and strength of composite materials.	04
	(c) Describe the unique properties of composites with unidirectional continuous fiber reinforcement. How does the alignment of fibers contribute to stiffness and strength?	07
OR		
Q.4	(a) Write short note on unidirectional continuous fiber.	03
	(b) Explain the factors that need to be considered in mechanical testing to obtain accurate and reliable results for composite materials	04
	(c) Explain the role of discontinuous fibers in composite materials. How do these fibers impact stiffness and strength in comparison to continuous fibers	07

- Q.5** (a) Explain 3D composites. **03**
(b) Define tensile testing and its relevance in assessing the tensile strength of composite materials. How does the orientation of fibers impact tensile properties **04**
(c) What do you mean by Nondestructive testing explain in detail with examples. **07**
- OR**
- Q.5** (a) Explain Nano composites. **03**
(b) Define fracture testing and its relevance in understanding the failure mechanisms of composite materials. **04**
(c) Explain the advantages and limitations of non-destructive testing techniques for composites. How do they complement traditional mechanical testing methods? **07**
