Enrolment No./Seat No_____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VI (NEW) EXAMINATION – SUMMER 2024

Subject Code:3160112 Date:20-05-2024

Subject Name: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.**
4. **Simple and non-programmable scientific calculators are allowed.**

			MARKS
Q.1	**(a)**	Why are Composites used in Aerospace?	**03**
	(b)	Explain particulate and fiber reinforced composite materials.	**04**
	(c)	Write short notes. 1. Types of fiber 2. Types of matrix	**07**
Q.2	**(a)**	What is a composite material?	**03**
	(b)	Discuss the various applications of composite materials.	**04**
	(c)	Derive transverse modulus for unidirectional lamina.	**07**
		OR	
	(c)	Derive Volume and Weight fraction for composite.	**07**
Q.3	**(a)**	What is transformation of stress and strain?	**03**
	(b)	What are advantages of carbon fiber in Aerospace?	**04**
	(c)	The E-glass fibers in polyester is 35% by weight. Given Density of fiber ṕf=2.50gm/ml and density of matrix ṕm=1 gm/ml Calculate fiber volume fraction Vf and density of composite ṕc for the lamina.	**07**
		OR	
Q.3	**(a)**	What do you mean by failure in materials? Explain the use of failure criteria.	**03**
	(b)	What is FRP? Write characteristics and advantages of FRPs.	**04**
	(c)	Describe the stress-strain relations for plane stress in an orthotropic material.	**07**
Q.4	**(a)**	Define Lamina and laminate.	**03**
	(b)	What is Prepeg? Explain.	**04**
	(c)	Explain different types of thermoset polymers.	**07**
		OR	
Q.4	**(a)**	What are the characteristics of super alloys?	**03**
	(b)	Discuss in detail symmetric laminates.	**04**
	(c)	Write a note on Poisson's ratio with reference of composite material.	**07**
Q.5	**(a)**	Write down the significance of fillers and additives in composite materials in detail.	**03**
	(b)	Compare Polyester resins with Epoxy resins.	**04**
	(c)	Derive an expression for density of a unidirectional composite lamina in terms of densities of its constituents.	**07**

OR

Q.5	**(a)**	Define Isotropic and Anisotropic body.	**03**
	(b)	What are the basic assumptions for analysis of laminated composites?	**04**
	(c)	Derive Inplane Shear modulus with neat sketch.	**07**

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