Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

ME – SEMESTER III (NEW) – • EXAMINATION – SUMMER 2016

Subject Code: 2730806 **Date:03/05/2016**

Subject Name: Mechanics and Manufacturing of Composites

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.**

Q.1	**(a)**	What is composite material? Give the classification of composite materials.	**07**
	(b)	Write a note on ceramic matrix composites.	**07**
Q.2	**(a)**	Why composites are favored in engineering applications? Write a brief note on their uses in various engineering disciplines.	**07**
	(b)	Why fibers are preferred to other reinforcements? What are whiskers? Describe how fibers are fabricated using vapour deposition processes.	**07**
		OR	
	(b)	Derive expressions for Tsai-Hill and Tsai-Wu strength criteria.	**07**
Q.3	**(a)**	State the generalized Hooke's law for a three-dimensional elastic anisotropic material and show that there are twenty-one independent elastic constants for a triclinic material.	**07**
	(b)	Write down the application of silicon carbide and boron carbide fibers.	**07**
		OR	
Q.3	**(a)**	Write down the elastic constant matrix for three-dimensional orthtropic, square symmetric, hexagonal symmetric and isotropic materials.	**07**
	(b)	Which factors affect the material selection process?	**07**
Q.4	**(a)**	Explain the interlaminar stresses in cross-ply laminates.	**07**
	(b)	Explain the ribbon reinforced composites.	**07**
		OR	
Q.4	**(a)**	Explain the different types of the special laminates.	**07**
	(b)	Describe the fabrication processes for ceramic matrix composites.	**07**
Q.5	**(a)**	How do you determine the moisture diffusion coefficient d'_{22} of a polymer composite?	**07**
	(b)	Write notes on (i) filament winding and (ii) pultrusion	**07**
		OR	
Q.5	**(a)**	Determine the deflection equation for a simply supported square (axa) symmetric laminated plate subjected to a transverse load $q=q_0\ x_1/a$.	**07**
	(b)	Explain the bending and buckling of the laminated plates.	**07**

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