PRN:		Course Code :	UAE551

000104

Third Year **B. Tech** End Semester Examination Winter 2024

Composite Materials and Structure

Day and Date: Tue 26 NOV 2024 Max Marks: **100**

Time : 10.30AM To 01.30PM Duration: **03** hrs

Instructions: All questions are compulsory.

		Marks	Bloom's Level	CO
Q.1	**Attempt the following**			
a)	Calculate the longitudinal modulus and tensile strength of a unidirectional composite containing 55 percent by volume of Sisal fibers in epoxy matrix. The modulus and strength of fiber is 30 GPa and 600 MPa respectively and the same for matrix is 3.5 GPa and 100 MPa respectively. Find the fraction of load taken by fibers in the composite.	08	3	1
b)	Explain the following (i) Fiber volume ratio (ii) Mass fraction (iii) Density of composites (iv) Effect of voids in composites	08	2	1
	OR			
b)	The following data is obtained from the burn-out test conducted in a glass-epoxy composite. Weight of empty crucible is 46.5 g. Weight of crucible and composite is 66.3 g. Weight of crucible and glass fiber is 58.6 g. Find the volume fraction of fiber and actual density of composite. Take density of glass fiber as 2.49 g/cm3 and that of matrix as 1.1 g/cm3 .	08	3	1
Q.2	**Attempt the following**			
a)	Determine the in plane strengths of a lamina.	08	3	2
b)	Stress-strain relations with respect to natural axis and arbitrary axis.	08	3	2
	OR			
b)	Explain the following Failure theories of a lamina (i) Maximum stress theory	08	3	2

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(ii) Maximum strain theory

Q.3	**Attempt any two from the following**				
a)	Explain in detail about Different types of laminates.	08	1	3
b)	Derive flexural constants of a laminate	08	3	3
c)	Explain the Stress – strain Graph for a laminate.	08	2	3
Q.4	**Attempt any two from the following**				
a)	Explain Netting analysis.	08	2	4
b)	Explain laminate failures in detail.	08	2	4
c)	Write about Impact resistance and inter laminar stresses.	08	2	4
Q.5	**Attempt any Two of the following**				
a)	Explain Relation between stresses in coating and specimen.	09	2	5
b)	Explain any two failure theories of brittle coating.	09	2	5
c)	Explain the following (i) Maximum principles stress theory, (ii) Maximum shear stress theory.	09	3	5
Q.6	**Attempt any Two of the following**				
a)	Explain bending stress and shear flow in composite beams.	09	2	6
b)	Write about materials used for sandwich construction	09	2	6
c)	Explain types of failures in sandwich panel.	09	2	6

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