CBCS SCHEME

USN | | | | | | | | | | BAE601

Sixth Semester B.E./B.Tech. Degree Examination, Dec.2025/Jan.2026

Composite Materials and Structures

Time: 3 hrs. Max. Marks: 100

Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. M : Marks , L: Bloom's level , C: Course outcomes.

		Module – 1	M	L	C
Q.1	a.	Define Composite? Write the classification of Composites.	05	L1	CO1
	b.	Write the significance of fiber and matrix in a composite material.	05	L1	CO1
	c.	Draw and explain anyone of the MMC process.	10	L1	CO1
		OR			
Q.2	a.	Define the following : i) Isotropic ii) Orthotropic iii) Anisotropic iv) Homogeneous body and Non-homogeneous body v) Hooke's Law	10	L2	CO2
	b.	Derive the Elastic constants for Anisotropic Material.	10	L2	CO2
		Module – 2			
Q.3	a.	Define Micromechanics and Macromechanics.	04	L1	CO1
	b.	Explain about volume fraction, Mass fraction and Density with relevant equations.	08	L1	CO1
	c.	Find the major and minor Poisson's Ratio of glass and epoxy lamina with a 70% fiber volume fraction. Use the following properties of glass and Epoxy are $v_f = 0.2$, $v_m = 0.3$, $E_1 = 60.52$ Gpa, $E_2 = 10.37$ Gpa.	08	L2	CO2
		OR			
Q.4	a.	Determine the longitudinal young's modulus for the unidirectional lamina.	10	L2	CO2
	b.	Write the suitable assumptions and derive the Transverse young's modulus for the unidirectional lamina.	10	L2	CO2
		Module – 3			
Q.5	a.	Explain Tsai-Hill Failure Theory with suitable equations.	10	L2	CO2
	b.	Derive the Stress and Strain Failure Theory for unidirectional Lamina.	10	L2	CO2
		OR			
Q.6	a.	Write the basic assumptions in Classical Laminate Plate Theory.	06	L1	CO1
	b.	Derive the expression for [A] [B] for laminates.	14	L2	CO2
		Module – 4			
Q.7	a.	Define Sandwich Composite? What are the failure modes to be consider while designing the composites.	04	L1	CO1
	b.	Explain the material selection of sandwich composite.	06	L1	CO1
	c.	Explain the following : i) Tension ii) Compression iii) Hardness iv) Shear failure v) Matrix.	10	L1	CO1

		OR			
Q.8	**a.**	Write the types of Destruction Testing and explain about the Tensile Test and Hardness Test.	**10**	**L1**	**CO1**
	b.	What is NDT? Explain about the Liquid Penetration Test.	**10**	**L1**	**CO1**
		Module – 5			
Q.9	**a.**	Describe the fabrications of composites by hand-layup process with neat sketch.	**10**	**L1**	**CO1**
	b.	Draw a neat sketch and explain the Vacuum bagging process with advantages.	**10**	**L2**	**CO2**
		OR			
Q.10	**a.**	Briefly explain about the injection moulding process with neat sketch.	**10**	**L2**	**CO2**
	b.	Explain about the Pultrusion process with neat sketch.	**10**	**L2**	**CO2**

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