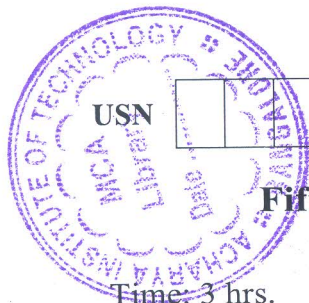


CBCS SCHEME



USN

--	--	--	--	--	--	--	--	--	--

18AE54

Fifth Semester B.E. Degree Examination, June/July 2023

Introduction to Composite Materials

Time: 3 hrs.

Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

- 1 a. Define composites and justify why the composites are better than conventional materials. (10 Marks)
b. Discuss various fibers used in the composite manufacturing. (10 Marks)

OR

- 2 a. Classify composites based on reinforcement, the type of matrix. (10 Marks)
b. Explain metal matrix composites from Al, Si, Mg, Ti with examples. (10 Marks)

Module-2

- 3 a. With neat sketch, explain the hand layup process in composite manufacturing. (10 Marks)
b. Explain Pultrusion forming of composite manufacturing with advantages over the other processes. (10 Marks)

OR

- 4 a. Describe vacuum bag molding of composite manufacturing. (10 Marks)
b. Explain filament winding used for aerospace applications. (10 Marks)

Module-3

- 5 a. Derive the equation for elastic modulus of a composite laminate. (10 Marks)
b. Calculate the modulus of elasticity of a composite materials consisting of 60% by volume of continuous E-glass fiber and 40% epoxy resin for the matrix. When stressed under iso-stress condition. The modulus of elasticity of E-glass is 72.4GPa and that of the epoxy resin is 3.1GPa. (10 Marks)

OR

- 6 a. Define volume and mass fractions for fibre and matrix and derive expressions for same. (10 Marks)
b. Using strength of material approach, derive expression for effective axial modulus, Poissons ratio. (10 Marks)

Module-4

- 7 a. Define composite failure and discuss the modes of failure in composites. (10 Marks)
b. Explain Tsai-hill failure theory with its merits. (10 Marks)

OR

- 8 Derive the expressions for [A], [B] and [D] matrices. (20 Marks)

Module-5

- 9 a. Suggest the experimental setup to test composites for tension and shear properties. (10 Marks)
b. Discuss various NDT used for the composites. (10 Marks)

OR

- 10 a. Explain ultrasonic testing of composites mentioning its merits. (10 Marks)
b. Discuss the applications of composites from day today requirements to the advanced applications in space with examples. (10 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg. 42+8 = 50, will be treated as malpractice.