



CBCS SCHEME

18ME645

Sixth Semester B.E. Degree Examination, Jan./Feb. 2023 Composite Materials Technology

Time: 3 hrs.

Max. Marks: 100

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

Module-1

- 1 a. What are Composite Materials? Explain the role of matrix and reinforcement material. (10 Marks)
- b. Give the classification of composite material and explain them briefly. (10 Marks)

OR

- 2 a. List the advantages, disadvantages and application of composite material. (10 Marks)
- b. List and explain the commonly used matrix and reinforcement materials in composite. (10 Marks)

Module-2

- 3 a. Define Polymer Matrix Composites? List the processing of Thermoset Matrix composite and explain any one. (10 Marks)
- b. With a neat sketch, explain Injection Moulding process and also list the advantages and disadvantages. (10 Marks)

OR

- 4 a. With a neat sketch, explain squeeze casting technique. List its advantages and disadvantages. (10 Marks)
- b. With a neat sketch, explain Stir Casting technique. List its advantages and disadvantages. (10 Marks)

Module-3

- 5 a. What is Isostatic Pressing? Explain cold and hot isostatic pressing with a neat sketch. (10 Marks)
- b. With a neat sketch, explain Polymer Infiltration and Pyrolysis process. (10 Marks)

OR

- 6 a. What do you mean by Carbon / Carbon composites? List the properties and application of Carbon / Carbon composites. (10 Marks)
- b. What are Super Conductor? List the general properties of Super Conductor. Explain the factor to define a super conducting state. (10 Marks)

Module-4

- 7 a. What are nano composites? List and explain the properties of polymer / clay nano composites. (10 Marks)
- b. What are self-healing composites and explain the strategies of self healing materials. (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.

OR

- 8 a. List the unique characteristics of composites. Explain the tensile and compressive properties in detail. (10 Marks)
- b. Define Fatigue. List and explain the factor affecting fatigue life and also list its properties. (10 Marks)

Module-5

- 9 a. What are micromechanics of composites? Explain the approaches to micromechanics. (10 Marks)
- b. Write short notes on Halpin-Tsai equation and its importance in composites. (10 Marks)

OR

- 10 a. What are macromechanics of composites? Write the reduced stiffness and compliance matrix for an isotropic lamina. (10 Marks)
- b. The epoxy lamina is developed with 70% fiber volume fraction. Determine (i) Longitudinal Young's modulus (ii) Transverse Young's modulus (iii) In plane shear modulus, considering $E_{\text{glass}} = 85 \text{ GPa}$, $\mu_{\text{glass}} = 0.2$, $G_{\text{glass}} = 35.42 \text{ GPa}$ and $E_{\text{epoxy}} = 3.4 \text{ GPa}$, $\mu_{\text{epoxy}} = 0.3$, $G_{\text{epoxy}} = 1.3 \text{ GPa}$. (10 Marks)
