Total No. of Questions – [4] Total No. of Printed Pages: 02

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G.R. No.	

OCTOBER 2018 / IN - SEM (T1)

F. Y. M. TECH. (DESIGN ENGINEERING) (SEMESTER - I)

COURSE NAME: MECHANICS OF COMPOSITE MATERIALS

COURSE CODE: MEPA11184B

(PATTERN 2018)

Time: [1 Hour] [Max. Marks: 20]

(*) Instructions to candidates:

1) **Answer Q.1 OR Q.2, Q.3 OR Q.4**
2) **Figures to the right indicate full marks.**
3) **Use of scientific calculator is allowed**
4) **Use suitable data where ever required**

Q.1) Explain the following terms [10 marks]
a) Lamina b) Laminate c) Micromechanics of lamina d)Macromechanics of lamina e) Volume Fraction

OR

Q.2) State various manufacturing methods for fiber reinforced polymer matrix composite materials. Explain any one with neat sketch and state its advantages and limitations. [10 marks]

Q.3) The acid digestion test left 2.595 g of fiber from a composite specimen weighing 3.697 g. The composite specimen weighs 1.636 g in water. If the specific gravity of the fiber and matrix is 2.5 and 1.2, respectively, find the
1. Theoretical volume fraction of fiber and matrix
2. Theoretical density of composite
3. Experimental density
4. Weight fraction of fiber and matrix
5. Void fraction [10 marks]

OR

Q.4) For a graphite/epoxy unidirectional lamina, find the following [10 marks]

1. Compliance matrix
2. Minor Poisson's ratio
3. Reduced stiffness matrix
4. Strains in the 1–2 coordinate system if the applied stresses are

$$\sigma_1 = 2 \text{ MPa}, \ \sigma_2 = -3 \text{ MPa}, \ \tau_{12} = 4 \ MPa$$

$$E_1 = 181 \ GPa, \ E_2 = 10.3 \ GPa, \ \nu_{12} = 0.28, \ G_{12} = 7.17 \ GPa.$$