

Code: MEMD1T3

I M.Tech - I Semester - Regular Examinations – March 2014

**MECHANICS OF COMPOSITE MATERIALS
(MACHINE DESIGN)**

Duration: 3 hours

Marks: 5x14=70

Answer any FIVE questions. All questions carry equal marks

1. a) Write about polymer matrix composites? Mention their advantageous and disadvantageous over other composites?

7 M

b) Make a list of products for which the use of composite materials could be advantageous because of their anisotropic properties? Explain in detail?

7 M

2. a) What are the main characteristics of a thermoplastic polymer? Explain?

7 M

b) Compare the relative advantages and limitations of metal-matrix composites, reinforced plastics, and ceramic-matrix composites.

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3. a) Explain the pultrusion process with neat diagram?

7 M

b) Explain the tape production process with neat diagram? 7M

4. a) For glass epoxy laminate $E_f = 85 \text{ GPa}$, $E_m = 3.4 \text{ GPa}$,
 $\nu_m = 0.3$ and $\nu_f = 0.25$, find the minor Poisson's ratio ν_{21}
and G_{12} for a fiber volume fraction of 70%. 7 M
- b) What weight of glass fibers must be added to 1kg of epoxy
to produce a composite with a density of 1700 kg/m^3 ,
 $\nu_f = 2500 \text{ kg/m}^3$ and $\nu_m = 1200 \text{ kg/m}^3$. 7 M
5. Explain monoclinic material with compliance and stiffness
matrices. 14 M
6. Derive the governing differential equation for a laminated
Unidirectional anisotropic plate. 14 M
7. a) What is Laminate code? Explain? 7 M
- b) Explain flexural modulus of a laminates. 7 M
8. What are the different failure modes of laminates? Explain
them in detail? 14 M