

**B. MECHANICAL ENGINEERING (PART TIME) 4TH YR 2ND SEM.
EXAMINATION, 2017 (OLD)**

Elective-II: Plastics & Fibre Reinforced Composites

Time:3hrs

(Answer any ten from the following)

Full marks: 100

Missing data if any are to be reasonably assumed.

1. Classify composite materials on the basis of (i) matrix & (ii) reinforcement.
2. Compare critically the properties of various fibres.
3. Explain the three classes of polymer matrices.
4. What are disadvantages of hand methods and advantages of moulding methods.
5. What is the fibre reinforced plastic (FRP)? What are the advantages and disadvantages of FRP?
6. Calculate v_f and ρ_c for a composite laminate containing 40 Wt% of E glass fibres in a Polyester Resin. Assume $\rho_f=2.8 \text{ gm/cm}^3$, $\rho_m= 1.2 \text{ gm/cm}^3$.
7. What are the difference between Naturel and Synthetic Rubbers? Why Carbon reinforced plastic is superior than Glass reinforced plastics?
8. What are the difference between Lamina and Laminate? Determine the longitudinal tensile loading and elastic properties of a unidirectional continuous fibre lamina.
9. Determine the critical volume fraction and minium volume fraction of fibre in a fibre reinforced composite.
10. Explain the stress strain transformation in a thin lamina under plane stress.
11. What are the differences among Isotropic, Anisotropic, and Orthotropic materials? Explain also elastic stress strain characteristic among them.

12. A normal Stress σ_{xx} and σ_{yy} are 20 MPa and 10 MPa respectively is applied on a unidirectional angle ply lamina containing fibre at 45° to the X axis right hand direction. Determine the stress in the principal materials directions.
13. Determine the Elastic Constant of the polymer matrix composite in case of Isostress and Isostrain conditions.
14. With the help of neat sketch, explain the Vacuum Bag Molding Process and compression molding process for manufacturing of the composite.
15. Explain the following terms: Texin, Teflon, Polyamide, and Polythene.