

[This question paper contains 3 printed pages.]

Your Roll No.

3176

J

M.E. Polymer Technology

Paper—CH.603

(Polymer Composites)

Time : 3 Hours

Maximum Marks : 100

*(Write your Roll No. on the top immediately
on receipt of this question paper.)*

Attempt any five questions.

All questions carry equal marks.

1. (a) What are composite materials ? How do polymer composites differ from polymer blends ? Give examples. 10
- (b) Explain the role of reinforcing phase and matrix phase in the formation of polymer composites. 10
2. (a) How do you classify polymer composites ? Explain with suitable examples. 10
- (b) What are polymer nano-composites ? How do they differ from other composites ? Write their advantages and disadvantages. 10
3. (a) Draw the stress-strain diagram and explain the following concepts w.r.t. polymer composites : 10
Yield Point, Proportional Limit, Modulus of Elasticity.

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- (b) Discuss the experimental method for the determination of impact strength of carbon-reinforced composites. 10
4. Explain the effect of following environmental pollutants on polymer composites : 20
- (a) Moisture
 - (b) Radiations
 - (c) Ozone gas
 - (d) Acids and Alkalis
5. Draw diagrams and explain *any two* of the following techniques for fabrication of polymer composites : 10 + 10
- (a) Extrusion
 - (b) Pultrusion
 - (c) Filament Winding
 - (d) Hand lay up.
6. (a) What are fibre-reinforced composites (FRP)? How do you predict the properties of FRP ? Give examples. 10
- (b) Derive the rule of mixtures for the modulus of elasticity of a fibre-reinforced composite when a stress is applied along the axis of the fibres. 10
7. (a) What are intelligent composites ? Give examples. What is the design approach for such intelligent composites ? 10

- (b) Write the applications of polymer composites in transport and medical industry. 10
8. Write short notes on *any three* of the following : 20
- (a) Fatigue Test;
 - (b) Sandwich Composites;
 - (c) Carbon-carbon Composites;
 - (d) Naturally Occurring Composites;
 - (e) Reinforcing Fibres.