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GIET UNIVERSITY, GUNUPUR – 765022

M. Tech (First Semester – Regular) Examinations, June – 2021

MPCMT 1010 – COMPOSITE MATERIALS

(Manufacturing Technology)

Time: 2 hrs

Maximum: 50 Marks

The figures in the right hand margin indicate marks.

PART – A

(2 x 10 = 20 Marks)

Q1. Answer **ALL** questions

- a. Give some examples of products that can be manufactured using filament winding process.
- b. What is failure envelopes?
- c. Discuss the advantages of spray-up technique.
- d. List any two aerospace applications of composites.
- e. What do you mean by void in a composite? How to calculate the volume fraction of voids in FRP composites?
- f. Distinguish between micro and macro mechanics approaches for FRP composites.
- g. Name the various types of glass fibers.
- h. What do you mean by delamination in FRP composites?
- i. What is representative volume element?
- j. What are the properties of carbon fiber.

PART – B

(6 x 5 = 30 Marks)

Answer **ANY FIVE** questions

Marks

2. Discuss the detail fabrication process of FRP composites using resin transfer moulding with suitable diagram. Explain its merits and demerits. **(6)**
3. What is rule of mixtures? Derive an expression in terms of volume fraction to determine the density of FRP composites. **(6)**
4. Calculate the transverse Young’s modulus for a unidirectional glass fiber/epoxy lamina with 70% fiber volume fraction. Use Halphin-Tsai equations for a circular fiber in a square array packing geometry. Young’s modulus of the glass fiber and epoxy is 85GPa and 3.4GPa, respectively. **(6)**
5. What are the different failure theories used in composites? Discuss at least two of them? **(6)**
6. What is polymer matrix composites? Give a comparison between thermosetting and thermoplastic polymers. Give typical applications of polymer composites. **(6)**
7. Explain filament winding process with a neat diagram. Explain the effect of different parameters affecting the performance of filament wound products. **(6)**
8. Define laminate. How laminate is different from lamina? Name the different laminate types. Discuss any two of them. **(6)**

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