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GANDHI INSTITUTE OF ENGINEERING AND TECHNOLOGY UNIVERSITY, ODISHA, GUNUPUR

(GIET UNIVERSITY)

Ph.D. (First Semester-Winter) Examinations, June – 2025

23WPPEME1014 – Engineering Materials and Composites

(Mechanical Engineering)

Time: 3 hrs Maximum: 70 Marks

The figures in the right hand margin indicate marks.

Answer *ANY FIVE* Questions. (14 x 5 = 70 Marks) **Marks**

1.a.	What is the relation between fibre volume fraction and diameter of the fibre and prove the same?	8
b.	Discuss the various manufacturing process of polymer matrix composite and its advantages.	6
2.	The E-glass fibers in a polyesterresin is 35% by weight. Given ρf = 2.50gm/ml andρm=1gm/ml. Calculate Vf and ρc for the lamina.	14
3.a.	The development of different theories and the difference between the FSDT and CLPT.	7
b.	Difference between thermoset and thermo-plastic.	7
4.	What is nano-composites and write its application in automotive, aerospace and biocomposite with different examples.	14
5.a.	Write short notes on- SEM, EDX, TEM, DSC.	7
b.	Discuss the preparation and characterization of aparticulate filled fiber reinforced hybrid metal matrix composite.	7
6.a.	Distinguish between symmetric cross ply laminate and symmetric angle ply laminate.	7
b.	Derive the relation for in-plane shear modulus by mechanics of material approach.	7
7.	What are the various steps in mechanical recycling of short-fiber reinforced composite? Discuss the application of mechanical recycled short fibre.	14
8.a.	What is the relation between fibre volume fraction and diameter of the fibre and prove the same?	7
b.	Discuss any manufacturing process and the applications of metal matrix composites.	7

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