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GANDHI INSTITUTE OF ENGINEERING AND TECHNOLOGY UNIVERSITY, ODISHA, GUNUPUR

(GIET UNIVERSITY)

Ph.D. (First Semester) Examinations, December – 2024

23SPPEME1011 - Composite Materials

(Branch: 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.	Define composite materials and explain the significance of their reinforcement and matrix components.	8
b.	Describe the various types of composites and their applications in modern industries.	6
2.	Describe the advantages and disadvantages of polymer matrix composites over metal matrix composites. Differentiate between metal matrix composites (MMCs) and ceramic matrix composites (CMCs).	8+6
3.a.	Explain the spray lay-up method in composite manufacturing.	7
b.	Describe the centrifugal casting method used for manufacturing composite materials	7
4.	Define stiffness and strength in the context of composite materials. How do these properties influence the performance of composites?	14
5.a.	Explain the advantages and limitations of short fiber systems in terms of their mechanical properties .	7
b.	Discuss the factors that affect the tensile strength of composite materials.	7
6.a.	Explain the concept of plate stiffness in laminated composite structures.	7
b.	Discuss the assumptions made in classical laminate theory for the analysis of stresses and strains in laminates.	7
7.	Discuss the advantages and disadvantages of adhesive bonding in composite materials. When is adhesive bonding preferred over mechanical fastening?	14
8.a.	Compare adhesive bonding and mechanical fastening in terms of stress distribution and joint performance under different loading conditions.	7
b.	Discuss the types of mechanical fasteners used in composite materials and the factors that influence their selection.	7

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