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**GANDHI INSTITUTE OF ENGINEERING AND TECHNOLOGY UNIVERSITY, ODISHA, GUNUPUR
(GIET UNIVERSITY)**



Ph.D. (Second Semester-Summer) Examinations, May - 2025

23SPPEME2011 - Manufacturing of Composite Materials

(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

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| 1.a. | Give the classifications of composite materials, classifications of fiber reinforced composites and also explain what is a reinforcement and Matrix in composites? | 8 |
| b. | Explain different types of composites in constructions and their uses | 6 |
| 2. | How do environmental factors, such as moisture, chemicals, and UV radiation, influence the properties and performance of composite materials and selection for composite applications? | 14 |
| 3.a. | What are the primary thermoset composite manufacturing processes, and how do they influence design decisions? | 7 |
| b. | What challenges are associated with joining thermoset composite components, and how can design mitigate these challenges? | 7 |
| 4. | Explain various types of Composite manufacturing processes and explain vacuum bag molding process. | 14 |
| 5.a. | Why do we need non-destructive testing for composites materials? List out various non-destructive testing methods used and also write the most commonly used NDT methods. | 7 |
| b. | What do you mean by NDT? List out various types of NDT for composite materials. | 7 |
| 6.a. | How do processing parameters such as temperature, pressure, and cooling rate influence the microstructure and properties of metal matrix composites? | 7 |
| b. | Write short notes on ceramic composites and their applications. | 7 |
| 7. | What are the key processing methods used in the fabrication of ceramic matrix composites (CMCs), and how do they differ from conventional ceramic processing techniques? Explain the steps involved in the fabrication of ceramic matrix composites (CMCs) via the chemical vapor infiltration (CVI) method | 14 |
| 8.a. | Explain polymer matrix and Nano composites. | 7 |
| b. | What do you mean PMC, MMC and CMC? Write the differences between them. | 7 |

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