QP Code: RA22BTECH613 | Reg. No | | | | | | | | | | | AR 21

Gandhi Institute of Engineering and Technology University, Odisha, Gunupur
(GIET University)

B. Tech. (Eighth Semester - Regular) Examinations, April – 2026

22BPEMPE48011 – Composite Materials

(Mechanical)

Time: 3 hrs | Maximum: 70 Marks

(The figures in the right hand margin indicate marks)

PART – A **(2 x 5 = 10 Marks)**

Q.1. Answer ***ALL*** questions	CO #	Blooms Level
a. What is the role of reinforcement in composites?	CO1	K1
b. List two advantages of polymer matrix composites.	CO2	K1
c. Describe the melt stirring technique used in MMC fabrication	CO2	K2
d. How does fiber orientation affect composite properties?	CO3	K4
e. Write the equation for transverse stiffness in a unidirectional composite.	CO4	K3

PART – B **(15 x 4=60 Marks)**

Answer ***ALL*** the questions	Marks	CO #	Blooms Level
2. a. Explain the factors affecting the properties of composite materials.	8	CO1	K2
b. Define composite materials and classify them based on matrix types.	7	CO1	K2
(OR)			
c. Discuss methods for measuring interfacial bond strength.	8	CO1	K3
d. Differentiate particulate, fiber, and whisker reinforcements.	7	CO1	K2
3.a. Discuss deposition techniques like CVD and PVD in MMCs.	8	CO2	K2
b. Analyze interface reactions in MMCs and their effect on properties.	7	CO2	K4
(OR)			
c. Evaluate the processing, properties, and applications of alumina matrix composites.	8	CO2	K5
d. illustrate the cold pressing and sintering process for ceramic matrix composites	7	CO2	K2
4.a. Examine how microstructural features influence the properties of composite materials	8	CO3	K4
b. Discuss structural effects on societal applications of composites.	7	CO3	K2
(OR)			
c. Explain the recycling challenges of polymer matrix composites.	8	CO3	K2
d. Discuss how composite materials contribute to lightweight and high-strength applications in the aerospace industry.	7	CO3	K4
5.a. Evaluate properties and applications of rubber matrix composites.	8	CO4	K5
b. A composite consists of fibers with a shear modulus of 30 GPa and a matrix with a shear modulus of 5 GPa. Using micromechanics principles, estimate the shear modulus of the composite (assuming fiber volume fraction = 0.6).	7	CO4	K3
(OR)			
c. Analyze micromechanics models for stiffness in unidirectional composites.	8	CO4	K4
d. A unidirectional fiber-reinforced composite consists of 60% fiber and 40% matrix by volume. Given:Elastic modulus of fiber = 200 GPa, Elastic modulus ofmatrix = 50 GPa. Use the rule of mixtures to calculate the longitudinal modulus of elasticity.	7	CO4	K3

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