QP Code: RJ23MTECH015 | Reg. No | | | | | | | | | | | AY 23

GIET UNIVERSITY, GUNUPUR – 765022

M. Tech (First Semester) Examinations, January– 2024

MPCMT1010 - Composite Materials

(Manufacturing Technology)

Time: 3Hrs | Maximum: 70 Marks

(The figures in the right hand margin indicate marks.)

PART – A **(2 x 10 = 20 Marks)**

Q.1. Answer all questions	CO#	Blooms Level
a. What do you mean by composites?	CO1	K1
b. What are the commercial forms of fibers?	CO1	K1
c. List down the reinforcement materials and resins used in composite materials.	CO2	K2
d. Explain the concept of fiber orientation.	CO3	K2
e. Describe the relevance of the plane stress condition in the behavior of laminae.	CO3	K3
f. Differentiate between a cross-ply laminate and an angle-ply laminate.	CO4	K2
g. Write structural strain relation for laminates.	CO4	K2
h. Define Roving.	CO5	K1
i. What is the function of caul plate?	CO5	K1
j. Distinguish between open mould and close mould processes.	CO6	K2

PART – B **(10 x 5=50 Marks)**

Answer ***ANY FIVE*** questions	Marks	CO#	Blooms Level
2. a. Write a brief note on engineering applications of composites.	5	CO1	K2
b. List out the reasons, why polymers are preferred in making laminated composites.	5	CO1	K2
3.a. Write a brief note on natural and manmade composites.	5	CO1	K2
b. Find the stiffness matrices [A], [B] for a three ply [0/30/-45] graphite epoxy laminate. Assume each lamina has a thickness of 5mm. The properties of graphite/epoxy El =181 GPa, Et =10.3 GPa, _lt = 0.28 and Glt =7.17 GPa	5	CO2	K3
4. a. Deduce a relation between on-axis and off-axis stress transformations for a unidirectional lamina.	5	CO2	K3
b. List the assumptions for plane stress condition.	5	CO3	K2
5.a. What are diluents? Explain reactive diluents for epoxy resin.	5	CO2	K2
b. Discuss the failure mechanisms in fibre reinforced polymer matrix composites and describe a failure theory which is widely used for testing of polymer	5	CO3	K2

composites.

6. a.	Derive the expressions to U_{12}, and G_{12} in terms of constituent properties using Micromechanics principles.	5	CO4	K3
b.	Derive the governing differential equations for a symmetric cross ply laminated plate.	5	CO4	K3
7.a.	A symmetric angle ply laminate has the following data: 4 Layers of each 0.5mm thick +45º/-45º/-45º/+45º . El =210 GPa, Et =21 GPa, _it = 0.3 and Git =7 GPa. Compute the in-plane stiffness matrix of the laminate.	5	CO4	K3
b.	Write the working principle of centrifugal casting.	5	CO5	K2
8. a.	Describe the injection molding process.	5	CO6	K2
b.	Write the difference between RTM and compression molding.	5	CO6	K2

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