

BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(MID SEMESTER EXAMINATION SP/2025)

CLASS: BTECH
BRANCH: MECHANICAL

SEMESTER: IV
SESSION: SP/2025

SUBJECT: ME215 COMPOSITE MATERIALS

TIME: 02 Hours

FULL MARKS: 25

INSTRUCTIONS:

1. The question paper contains 5 questions each of 5 marks and total 25 marks.
2. Attempt all questions.
3. The missing data, if any, may be assumed suitably.
4. Tables/Data handbook/Graph paper etc., if applicable, will be supplied to the candidates

Q.1	Explain the classification of composite materials based on the type of reinforcement and matrix.	[5]	CO 1	BL L
Q.2	What are the major challenges in designing and using composite materials in structural applications? Discuss with examples.	[5]	1	M
Q.3	A unidirectional continuous fibre-reinforced composite consists of 65% carbon fibres (Modulus of Elasticity $E_f=230$ GPa) in an epoxy matrix (Modulus of Elasticity $E_m = 3.5$ GPa). Find: a) The Longitudinal Modulus of Elasticity b) The Transverse Modulus of Elasticity	[5]	2	H
Q.4	Discuss the different failure mechanisms in fibre-reinforced composite materials. Explain how these failure modes affect the mechanical performance of composites and how they can be predicted or mitigated.	[5]	2	H
Q.5	Compare different manufacturing techniques used for composite materials, highlighting their advantages and limitations.	[5]	3	M

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