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

CLASS: B. TECH **SEMESTER: IV**
BRANCH: MECHANICAL **SESSION : SP/2020**

SUBJECT: ME253 COMPOSITE MATERIALS

TIME: 2 HOURS **FULL MARKS: 25**

INSTRUCTIONS:
1. The total marks of the questions are 25.
2. Candidates may attempt for all 25 marks.
3. Before attempting the question paper, be sure that you have got the correct question paper.
4. The missing data, if any, may be assumed suitably.

				CO	BL
Q1	(a)	Classify various composite materials.	[2]	1	L
Q1	(b)	Explain the difference between thermosetting and thermoplastic matrix materials with relevant examples.	[3]	1	L
Q2	(a)	Discuss the role of a matrix material with the help of suitable examples.	[2]	1	L
Q2	(b)	Differentiate composite from metal. Discuss its application to different industries.	[3]	1	L
Q3		For a sheet molding compound composite designated as SMC-R65 E-Glass Fibre in thermosetting polyester matrix has the following data: Glass Fibre E = 68.9 GPa; Density =2.54 Kg/mm^2; Length of Fibre = 25 mm; Diameter = 2.5 mm; Polyester (matrix material) E = 3.45 GPa; Density = 1.1 Kg/mm^2. Determine the tensile modulus, shear modulus and Possion's ratio.	[5]	2	M
Q4	(a)	Develop the expression to determine the longitudinal modulus of the composite using law of mixtures.	[2]	2	M
Q4	(b)	Discuss the, failure mechanism of composite materials in the Following conditions; 1) Fatigue loading; 2) Tensile loading.	[3]	2	L
Q5		Determine the ultimate tensile strength of a Glass / Epoxy Laminate with a 70% fibre volume fraction. The properties of unidirectional glass / epoxy laminate are E_f = 85GPA, E_m = 3.4 , Poisson's ratio v_m = 0.3 and v_f = 0.25, $(\sigma_f)_{ult}$ = 1550 MPa and $(\sigma_m)_{ult}$ = 72 MPa.	[5]	2	M

:::::: 04/03/2020 ::::::E