B.M.S. College of Engineering, Bengaluru-560019

Autonomous Institute Affiliated to VTU

September / October 2024 Supplementary Examinations

Programme: B.E. **Semester: V**
Branch: Mechanical Engineering **Duration: 3 hrs.**
Course Code: 20ME5DECMT **Max Marks: 100**
Course: Composite Material Technology

Instructions: 1. Answer any FIVE full questions, choosing one full question from each unit.
2. Missing data, if any, may be suitably assumed.

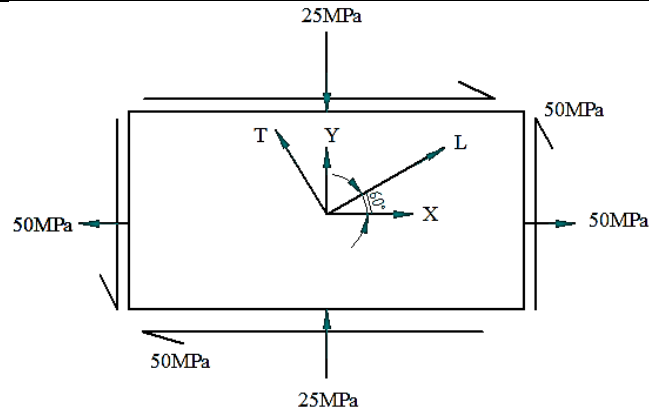|			**UNIT - I**	CO	PO	Marks
1	a)		Write the classification and characteristics of composite materials.	*CO1*	*PO5*	**10**
	b)		With a neat sketch explain the hand layup technique.	*CO1*	*PO6*	**10**
			OR			
2	a)		Write the difference between open and closed mould process.	*CO2*	*PO6*	**10**
	b)		With a neat sketch explain the injection molding process.	*CO2*	*PO8*	**10**
			UNIT - II			
3	a)		Derive the equation of the in-plane shear Modulus of a unidirectional lamina.	*CO3*	*PO5*	**10**
	b)		Derive the equation of the Major and minor Poisson's ratio of a unidirectional lamina.	*CO3*	*PO6*	**10**
			UNIT - III			
4	a)		State and explain Tsai-Hill theory of a lamina.	*CO3*	*PO8*	**10**
	b)		Predict the life of the Glass /epoxy lamina. By maximum strain theory. ($\Theta=60^0$). Given : E_1 = 38.6 GPa; E_2 = 8.27 GPa; G_{12} = 4.14 GPa; V_{12} = 0.26	*CO5*	*PO10*	**10**

SUPPLEMENTARY EXAMS 2024

Fig. 4(b): Applied stress in a lamina

(σ_1^T)ult = 1062 MPa
(σ_1^C)ult = 610 MPa
(σ_2^T)ult = 31 MPa
(σ_2^C)ult = 118 MPa
(τ_{12})ult = 72 MPa

OR

			CO	PO	Marks
5	a)	Explain in details on Non-Interactive failure criteria and its types.	*CO2*	*PO5*	**10**
	b)	State and explain Wu tensor theory of a lamina.	*CO4*	*PO6,8*	**10**
		UNIT - IV			

6	a)	Decode the types of laminates given below by drawing the stack up sequence diagram.
		    (i) [45|±45|-45|0]
		    (ii) [45|0|90]2s
		    (iii) [45|0|±60|30]
		    (iv) [0$_B$|±45$_{Gr}$|90$_{Gr}$]s
		    (iv) [45|0|45|90$_2$|30]
			CO3	*PO10*	**05**

	b)	Derive an expression for the three stiffness matrices [A], [B] and [D] for a 2D laminate composite.	*CO6*	*PO8*	**15**
		UNIT - V			
7	a)	List out the various reinforcement materials and explain any four briefly.	*CO1*	*PO8*	**10**
	b)	With a neat sketch explain liquid metallurgy technique.	*CO1*	*PO10*	**10**

******