



PRESIDENCY UNIVERSITY

BENGALURU

Roll No.												
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End - Term Examinations – May / June 2026

Date: 23- 05- 2026

Time:09:30am – 12:30pm

School: SOE	Program: B. Tech (Mechanical Engineering)	
Course Code: MEC2505	Course Name: Mechanics of Solids	
Semester: IV	Max Marks: 100	Weightage: 50%

CO - Levels	C01	C02	C03	C04	C05	C06
Marks	6	4	24	26	20	20

Instructions:

- (i) Read all questions carefully and answer accordingly.
- (ii) Do not write anything on the question paper other than roll number.

Part A

Answer ALL the Questions. Each question carries 2marks.

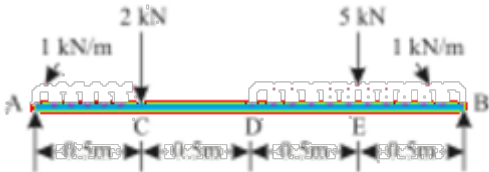
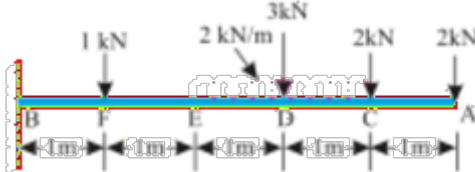
10Q x 2M=20M

1.	Define stress and strain.	2 Marks	L1	C01
2.	Define Statically Determinate Beams.	2 Marks	L1	C01
3.	What is angle of twist in context of torsion?	2 Marks	L1	C04
4.	Define principal stress and principal strain.	2 Marks	L1	C02
5.	Explain continuous beams.	2 Marks	L2	C03
6.	List two types of stresses developed when cylinders are subjected to internal fluid pressures.	2 Marks	L1	C02
7.	What will be the bending moment at the ends of simply supported beam?	2 Marks	L1	C03
8.	What is demarcation between thin and thick cylinders?	2 Marks	L1	C04
9.	What are assumptions made in Lamé's theory?	2 Marks	L1	C04
10.	Define Poisson's ratio.	2 Marks	L1	C01

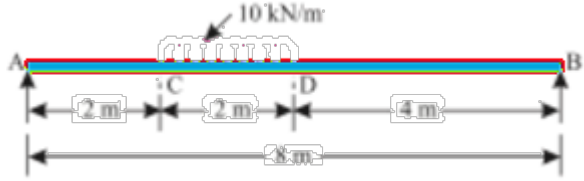
Part B

Answer the Questions.

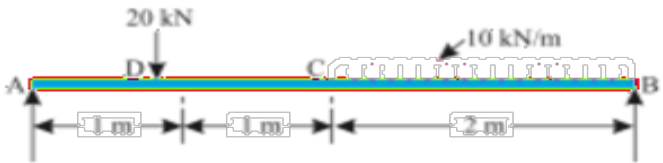
Total Marks 80M

11.	Draw the Bending moment and Shear Force diagrams for the beam shown in Figure	20 Marks	L3	C03	
					
Or					
12.	Draw the Bending moment and Shear Force diagrams for the beam shown in Figure	20 Marks	L3	C03	
					
13.	At a point in a stressed body the principal stresses are 100 MN/m ² (tensile) and 60 MN/m ² (compressive). Determine the normal stress and the shear stress on a plane inclined at 50° to the axis of major principal stress. Also calculate the maximum shear stress at the point. You can use either analytical method or Mohr's circle to solve.	20 Marks	L3	C06	
Or					
14.	An element in a stressed material has tensile stress of 500 MN/m ² and a compressive stress of 350 MN/m ² acting on two mutually perpendicular planes and equal shear stresses of 100 MN/m ² on these planes. Find principal stresses and position of the principal planes. Find also maximum shearing stress. You can use either analytical method or Mohr's circle to solve.	20 Marks	L3	C06	
15.	a.	A solid circular shaft of diameter 50 mm is subjected to a torque of 1600 N-m, G=80 GPa. Find maximum shear stress and angle of twist (in degrees) in a length of 1m.	10 Marks	L3	C04
	b.	A hollow circular shaft of outer diameter 60 mm and inner diameter 48 mm is subjected to a torque of 100 N-m, G=80 GPa. Find the maximum shear stress (MPa) and angle of twist (θ) in length of 2m.	10 Marks	L3	C04
Or					

16.	a.	Calculate the thickness of the metal required for a cast-iron main 800 mm in diameter for water at a pressure head of 100 m if the maximum permissible tensile stress is 20 MN/m ² and weight of water is 10 kN/m ³ .	10 Marks	L3	C04
	b.	A cylindrical air drum is 2.25 m in diameter with plates 1.2 cm thick. The efficiencies of the longitudinal and circumferential joints are respectively 75% and 40%. If the tensile stress in the plating is to be limited to 120 MN/m ² find the maximum safe air pressure.	10 Marks	L3	C04

17.	A beam AB of span 8m is simply supported at the ends A and B and is loaded as shown in Figure. If $E = 200 \times 10^6 \text{ kN/m}^2$ and $I = 120 \times 10^{-6} \text{ m}^4$ determine: (i) Deflection at the mid-span. (ii) Maximum deflection. (iii) Slope at the end A. 	20 Marks	L3	C05
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Or

18.	A beam AB of 4 metres span is simply supported at the ends and is loaded as shown in Figure. Determine: (i) Deflection at C, (ii) Maximum deflection, and (iii) Slope at the end A. Given : $E = 200 \times 10^6 \text{ kN/m}^2$, and $I = 20 \times 10^{-6} \text{ m}^4$ 	20 Marks	L3	C05
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