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PRESIDENCY UNIVERSITY

BENGALURU

Mid - Term Examinations - March 2026

Date: 12-03-2026

Time: 09:30am - 11.00am

School: SOE	Program: B. Tech		
Course Code: MEC2505	Course Name: Mechanics of Solids		
Semester: IV	Max Marks: 50	Weightage: 25%	

CO - Levels	C01	C02	C03	C04	C05
Marks	26	24	-	-	-

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.

5Q x 2M=10M

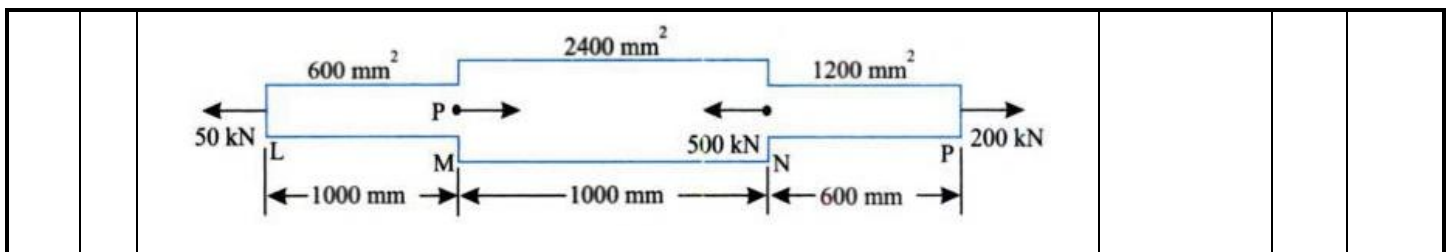
1	Define Stress	2 Marks	L1	C01
2	Explain modulus of Elasticity	2 Marks	L2	C01
3	Relate modulus of Elasticity to modulus of Rigidity	2 Marks	L2	C02
4	List the types of loads	2 Marks	L1	C02
5	Define poisons ratio.	2 Marks	L1	C01

Part B

Answer the Questions.

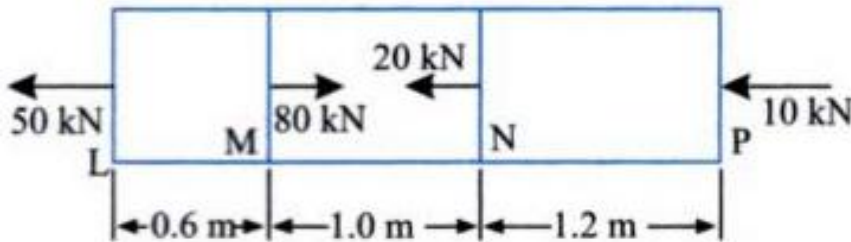
Total Marks 40M

6.	a.	A member LMNP is subjected to point loads as shown in figure. Calculate (i) Force P necessary for equilibrium (ii) Total Elongation of the bar Take $E = 210\text{GN/m}^2$	10 Marks	L3	C01
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b. A brass bar having cross sectional area of 1000 mm^2 is subjected to axial forces as shown in the figure. Find the total elongation of the bar. Modulus of elasticity of brass = 100 GN/m^2 .

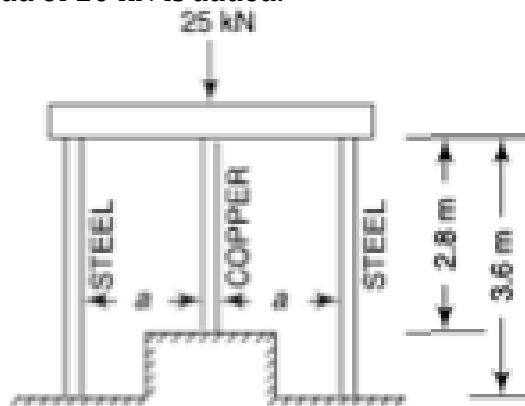
10 Marks L3 CO1



Or

7. Three equidistant vertical rods, each of 20 mm diameter support a load of 25 kN in the same plane as shown in the figure. Initially all the rods are adjusted to share the load equally. Neglecting any chance of buckling and taking $E_s = 205 \text{ GN/m}^2$ and $E_c = 100 \text{ GN/m}^2$. Determine the final stresses when further load of 20 kN is added.

20 Marks L3 CO1



8. At a point in a bracket the stresses on two mutually perpendicular planes are 35 MN/m^2 (tensile) and 15 MN/m^2 (tensile). The shear stress across these planes is 9 MN/m^2 . Find the magnitude and direction of the resultant stress on a plane making an angle of 40° with the plane of first stress. Find also the normal and tangential stresses on the planes.

20 Marks L3 CO2

Or

9. Direct stresses of 120 MN/m^2 in tension and 90 MN/m^2 in compression are applied to an elastic material at a certain point on planes at right angles to another. If the maximum principal stress is not to exceed 150 MN/m^2 in tension, to what shearing stress can the material be subjected? What is then the maximum resulting shearing stress in the material? Also find the magnitude of the other principal stress and its inclination to 120 MN/m^2 stress.

20 Marks L3 CO2