Roll No.												

PRESIDENCY UNIVERSITY

BENGALURU

Mid - Term Examinations – October 2025

Date: 09-10-2025 **Time:** 11.45am to 01.15pm

School: SOE	**Program:** B.Tech	
Course Code : CIV2500	**Course Name:** Strength Of Materials	
Semester: III	**Max Marks**: 50	**Weightage**: 25%

CO - Levels	**CO1**	**CO2**	**CO3**	**CO4**	**CO5**
Marks	**36**	**14**	**-**	**-**	**-**

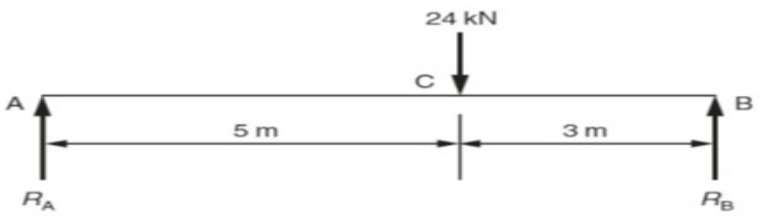
Instructions:

(i) Read all questions carefully and answer accordingly.

(ii) Do not write anything on the question paper other than roll number.

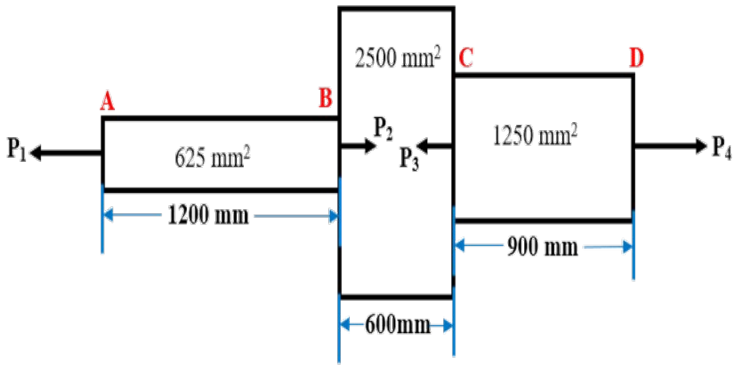
Part A

Answer ALL the Questions. Each question carries 2marks. **5Q x 2M=10M**

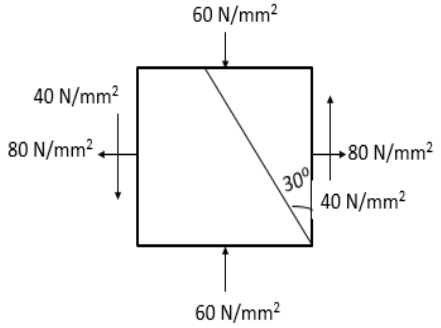
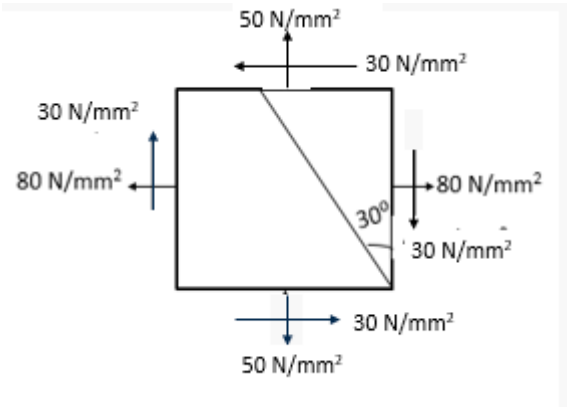
1	Define Volumetric strain and Poisson's ratio.	**2 Marks**	**L1**	**CO1**
2	Find the strain of a brass rod of 150mm which is subjected to a tensile load of 40kN when the extension of rod is equal to 0.5mm?	**2 Marks**	**L1**	**CO1**
3	Write the relation between elasticity moduli, E and C.	**2 Marks**	**L1**	**CO1**
4	Find the reaction at simple support B.  Fig. 4(a)	**2 Marks**	**L1**	**CO2**
5	List the different types of loads.	**2 Marks**	**L1**	**CO2**

Part B

Answer the Questions. **Total Marks 40M**

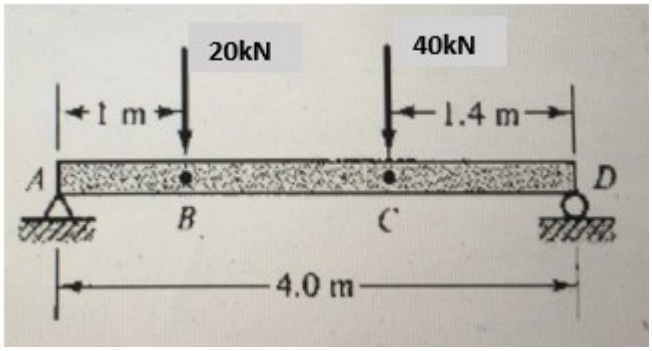
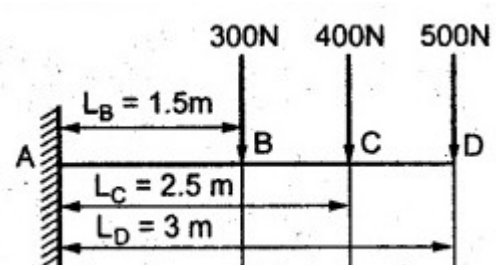
6.	**a.**	A stepped member ABCD made up of steel is subjected to point loads P_1, P_2, P_3 and P_4 as shown in Fig. 6(a). Calculate the force P_2 necessary for equilibrium, if P_1 = 50 kN, P_3 = 350 kN & P_4 = 100 kN. Also, Determine the total elongation of the member if the Young's modulus of steel is 2 x 10^5 N/mm^2. The area of each cross section and length of different segments are as indicated in the figure below.  Fig. 6(a)	**10 Marks**	**L3**	**CO1**
		Or			
7.	**a.**	A steel specimen had an original diameter of 40 mm and a gauge length of 1500 mm. Under a load of 300 kN, a tensile test was conducted on the specimen where the extension in length was measured as 0.650 mm, while the reduction in diameter was 0.0075 mm. Determine the Young's modulus, shear modulus, and bulk modulus for the tensile test carried out.	**10 Marks**	**L3**	**CO1**

8.	**a.**	At a point in an elastic material, the stresses on two perpendicular planes are 80 N/mm^2 (tensile) and 60 N/mm^2 (compressive). A shear stress of 40 N/mm^2 is also acting on the material as shown in Fig. 8(a) . Find the normal stress and shear stress on a plane making an angle of 30° with the plane on which the tensile stress acts. Also, find the values of principal stresses and the location of principal planes.	**10 Marks**	**L3**	**CO1**

		 Fig. 8(a)			
		Or			
9.	**a.**	At a point in a loaded elastic member, there are normal stresses of 80 N/mm^2 and 50 N/mm^2 both tensile respectively at right angles to each other as shown in Fig. 9(a). The positive shear stress of 30N/mm^2 are also acting. Draw the Mohr's Circle diagram and find (i) Principal stresses and their planes (ii) Maximum shear stress  Fig. 9(a)	**10 Marks**	**L3**	**CO1**

10.	**a.**	A compound bar consists of a circular rod of steel of diameter 20mm rigidly fitted into a copper tube of internal diameter 20mm and thickness 5mm. If the bar is subjected to a load of 100kN, find the stresses developed in the two materials. Take E of steel and copper as 2X10^5 N/mm^2 and 1.2X10^5 N/mm^2, respectively.	**10 Marks**	**L3**	**CO1**
		Or			
11.	**a.**	A tensile load of 150 kN applied gradually on a bar of 4cm diameter and 3 m long causes the material to deform. Compute the deformation in the length of the bar and the stress developed in the bar. The work done by the load to cause deformation is stored as strain energy in the bar. Compute the strain energy due to the deformation in the bar. Take E = 2x10^5	**10 Marks**	**L3**	**CO1**

		N/mm^2.			

12.	**a.**	Determine the Shear force and Bending moment of the beam shown in the Fig.12(a). Also, draw the SFD and BMD.  Fig.12(a)	**10 Marks**	**L3**	**CO2**
		Or			
13.	**a.**	A cantilever beam of length 3m carries the point loads as shown in Fig. 13(a). Draw the shear force and bending moment diagrams for the cantilever beam.  Fig.13(a)	**10 Marks**	**L3**	**CO2**