Roll No.												

PRESIDENCY UNIVERSITY

BENGALURU

End - Term Examinations – MAY 2025

Date: 31-05-2025 **Time:** 01:00 pm – 04:00 pm

School: SOE	**Program:** B .Tech- Physics Cycle	
Course Code : CIV1003	**Course Name:** Elements of Engineering Mechanics	
Semester: II	**Max Marks**: 100	**Weightage**: 50%

CO - Levels	CO1	CO2	CO3	CO4	CO5
Marks	26	26	48	-	-

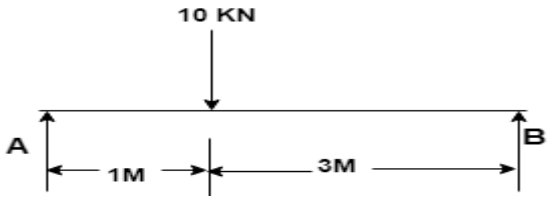
Instructions:

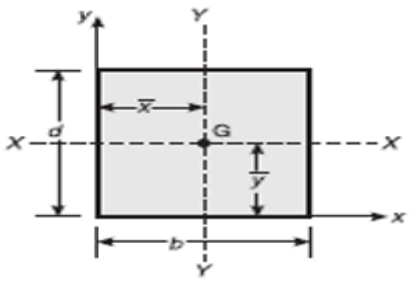
(i) Read all questions carefully and answer accordingly.

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

Part A

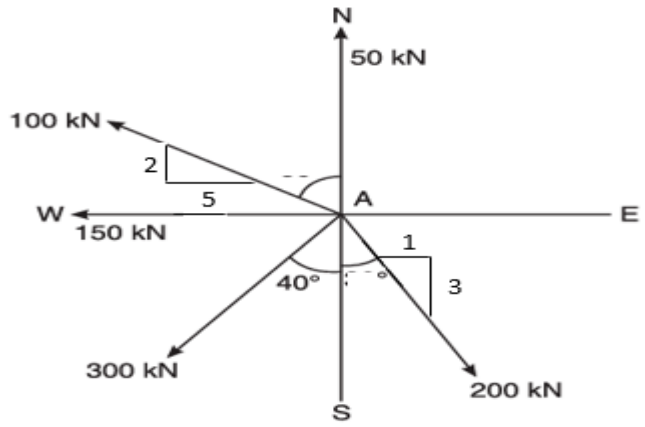
Answer ALL the Questions. Each question carries 2marks. **10Q x 2M=20M**

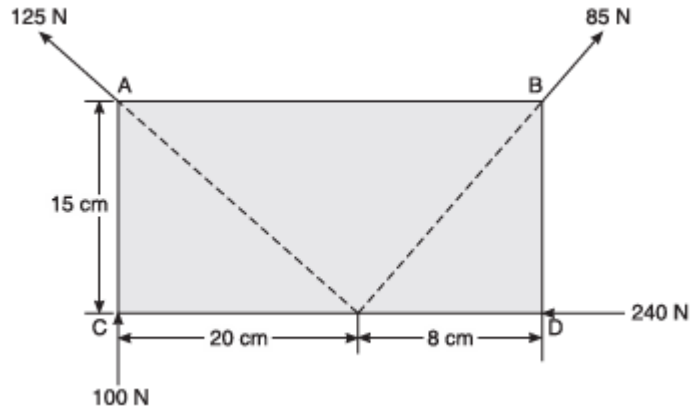
1.	State Newton's Second Law of motion.	**2 Marks**	**L1**	**CO1**
2.	Differentiate between a Coplanar and Non-Coplanar Force system.	**2 Marks**	**L1**	**CO1**
3.	Write the formulae for the Magnitude of the Resultant (R) and Direction of the resultant (α) where F1 and F2 are the two forces representing the adjacent side of the Parallelogram.	**2 Marks**	**L1**	**CO1**
4.	State Lami's Theorem.	**2 Marks**	**L1**	**CO2**
5.	List the different types of beams.	**2 Marks**	**L1**	**CO2**
6.	Find the reaction at the simple support A? 	**2 Marks**	**L1**	**CO2**
7.	Differentiate between Static and Dynamic Friction.	**2 Marks**	**L1**	**CO3**

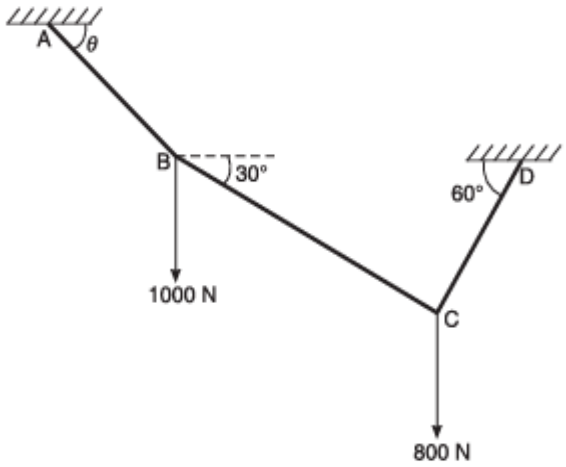
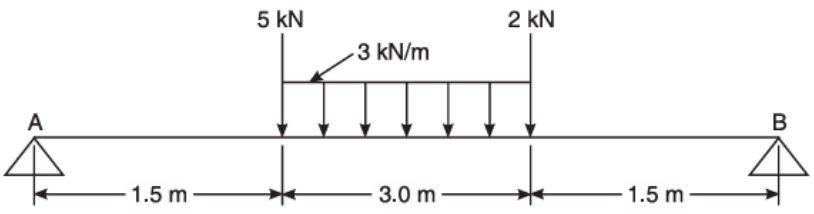
8.	Define Centre of Gravity of a body.	**2 Marks**	**L1**	**CO3**
9.	Write the Centroids of the below given figure with respect to X and Y axis:  	**2 Marks**	**L1**	**CO3**
10.	List any two laws of Friction.	**2 Marks**	**L1**	**CO3**

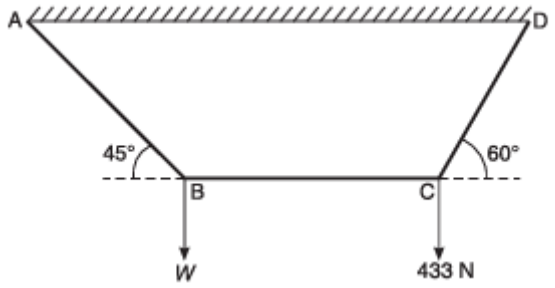
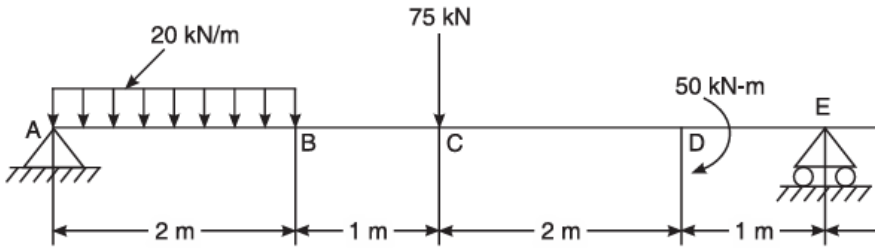
Part B

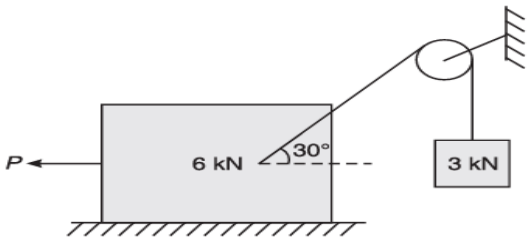
Answer the Questions. **Total Marks 80M**

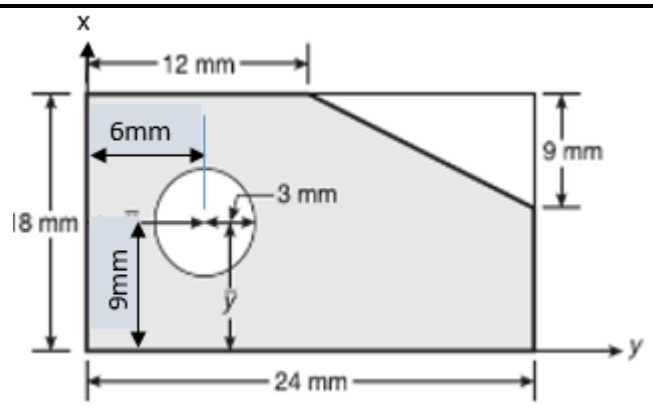
11.	**a.**	The following forces, as shown in Figure 11.1, are acting at point A. Locate the Resultant  Fig 11.1	**15 Marks**	**L2**	**CO1**
	b.	Also, compute the direction at which the resultant is applied in the figure.	**05 Marks**	**L2**	**CO1**
		Or			
12.	**a.**	Four forces are acting on 28 cm X 15 cm plate as shown in Figure 12.1. Find the resultant of these forces. Compute their moments with respect to the point C.	**20 Marks**	**L2**	**CO1**

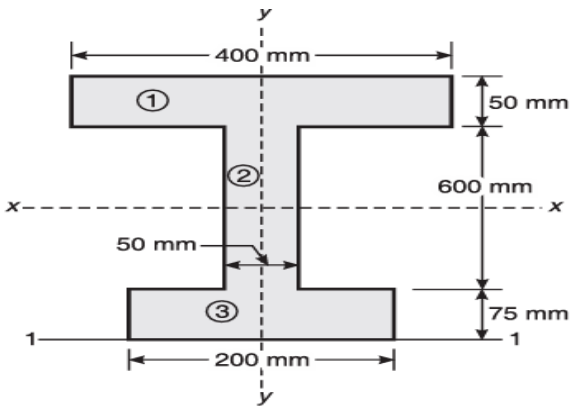
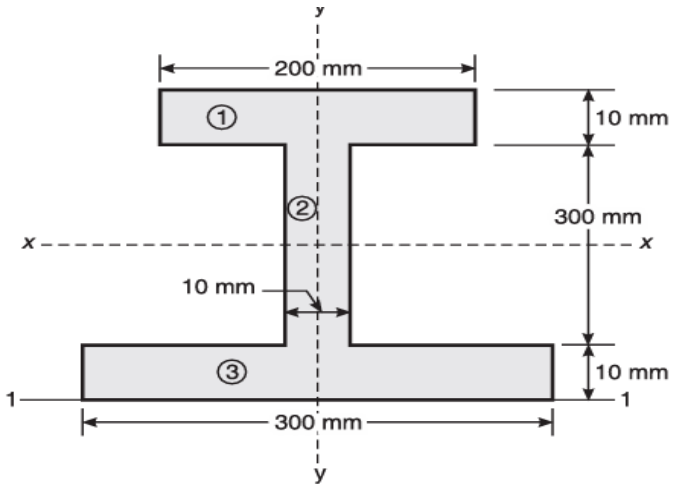
		 **Fig 12.1**			

13.	**a.**	Compute the tensions in the strings AB, BC and CD as shown in Figure 13.1 below:  **Fig 13.1**	**10 Marks**	**L2**	**CO2**
	b.	A simply supported beam of span 6 m is subjected to loading as shown in Figure 13.2. Determine the reactions at A and B. 	**10 Marks**	**L2**	**CO2**
		Or			
14.	**a.**	A string ABCD is tied at A and D to hooks as shown in Figure 14.1. At C, weight of 433 N is a suspended. And at B, an unknown weight W is suspended such that BC is horizontal and AB and CD are inclined at 45° and 60°, respectively, to the horizontal. Determine the tensions in AB, BC and CD and find the magnitude W.	**10 Marks**	**L2**	**CO2**

		 **Fig 14.1**			
	b.	Determine the support reactions for a beam loaded as shown in Figure 14.2  **Fig 14.2**	**10 Marks**	**L2**	**CO2**

15.	**a.**	A block weighing 6 kN is attached to a string, which passes over a frictionless pulley and supports a weight of 3 kN, when the coefficient of friction between the block and the floor is 0.35 (Figure 15.1). Determine the value of force P when the (i) motion is impending towards right. (ii) motion is impending towards left.  **Fig 15.1**	**20 Marks**	**L2**	**CO3**
		Or			
16.	**a.**	The corner of a plate is cut off and a hole of diameter 6mm is punched as shown in the figure 16.1. The center of the circle is at a distance of 6mm from the left and 9mm from the bottom edge of the plate. Calculate the position of the centroid for the remaining portion.	**20 Marks**	**L2**	**CO3**

		 **Fig 16.1**			

17.	**a.**	Compute the moment of inertia along the horizontal axis and vertical axis passing through the centroid of a section shown in the Fig 17.1  **Fig 17.1**	**20 Marks**	**L2**	**CO3**
		Or			
18.	**a.**	Determine the moment of inertia of the unequal I-section about its centroidal axes as shown in the Figure 18.1  **Fig 18.1**	**20 Marks**	**L2**	**CO3**