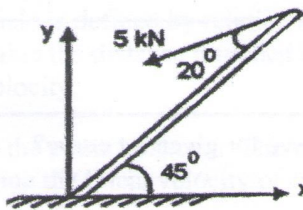
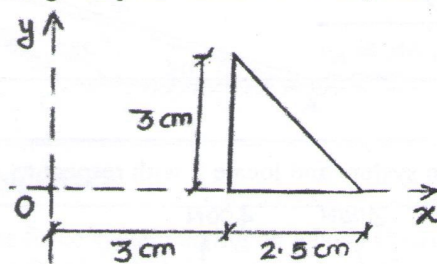
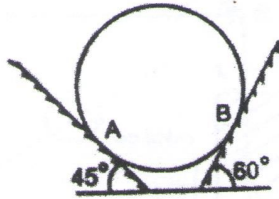
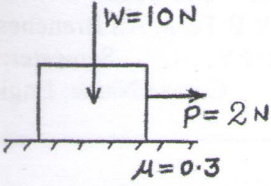
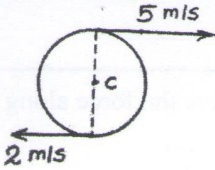
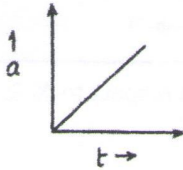
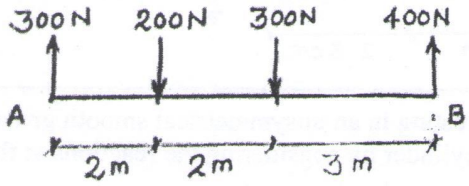
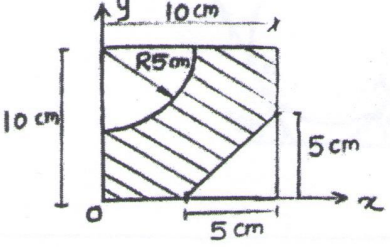
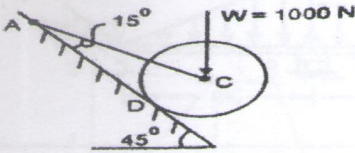
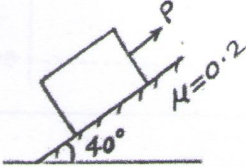
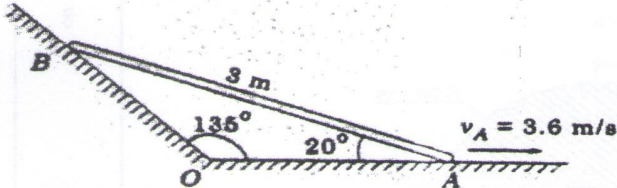
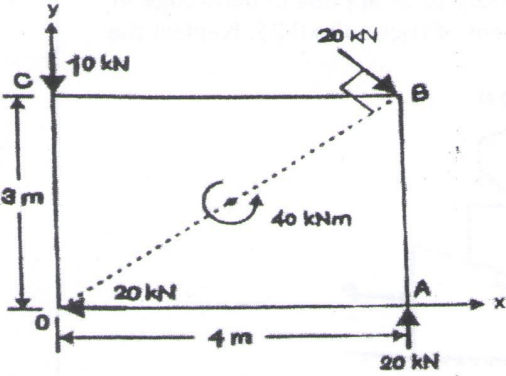


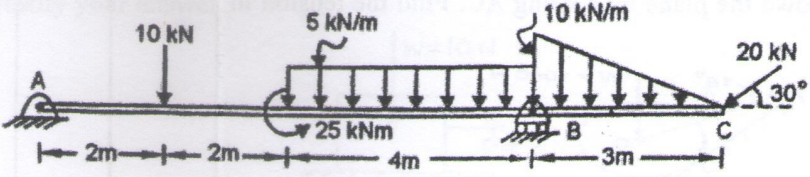
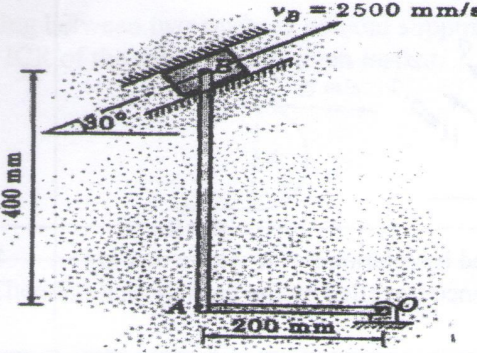
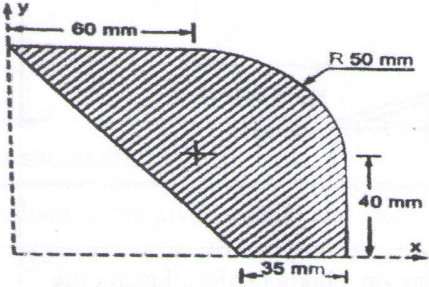
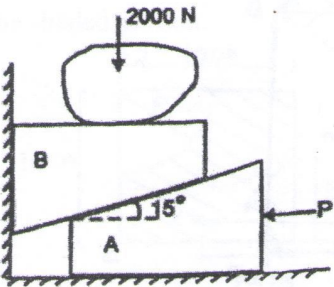
Nov – Dec 2022 Program: FY B.Tech. All Branches Examination: FY Semester: I Course Code: BSC104 and Course Name: Engineering Mechanics Duration: 2.5 Hours Max. Marks: 60				
Instructions: (1) All questions are compulsory. (2) Draw neat diagrams wherever applicable. (3) Assume suitable data, if necessary.				
		Max. Marks	CO	BT level
Q.1	<b>Attempt any six out of eight:-</b>	12		
i)	A 5 kN force acts on one end of a rod. Resolve the force along X & Y directions. 	2	1	U
ii)	Find Centroid for the given plane lamina with respect to X & Y axes. 	2	2	U
iii)	A cylinder of 1500 N weight is resting in an unsymmetrical smooth groove. Draw free body diagram of the cylinder by considering the reactions at the points of contact. 	2	1	A

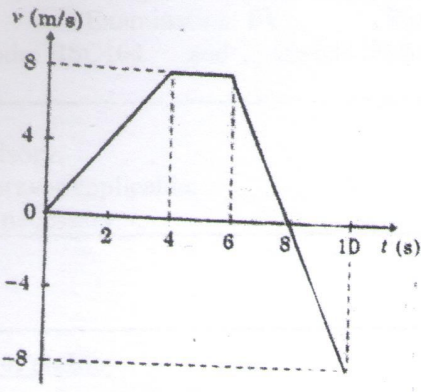
iv)	State whether block will move or stay at rest for the following case and justify your answer. <div style="text-align: center;">  </div>	2	3	A
v)	Define a) Time of Flight b) Range of Projection	2	4	R
vi)	A roller is rolling between two surfaces without slipping as shown in figure. Locate ICR of the roller for the given instant. <div style="text-align: center;">  </div>	2	5	An
vii)	State Lami's Theorem.	2	1	R
viii)	What is the nature of v-t curve and x-t curve for given a-t curve? <div style="text-align: center;">  </div>	2	4	An
Q.2	<b>Attempt any four out of six:-</b>	16		
i)	Determine the resultant of the given system and locate it with respect to A. <div style="text-align: center;">  </div>	4	1	U
ii)	Find the centroid of the shaded portion. <div style="text-align: center;">  </div>	4	2	U



iii)	<p>A roller of weight <math>W = 1000 \text{ N}</math> rest on a smooth inclined plane. It is prevented from rolling down the plane by a string AC. Find the tension in the string.</p> 	4	1	A
iv)	<p>A block of weight <math>1200 \text{ N}</math> is kept on a rough inclined surface. Find the minimum value of force <math>P</math> which is applied parallel to plane to keep the block in equilibrium.</p> 	4	3	A
v)	<p>The acceleration of the particle is defined by relation <math>a = -v</math> where <math>a</math> is in <math>\text{m/s}^2</math> and <math>v</math> is in <math>\text{m/s}</math>. Determine the distance travelled by the particle as it comes to rest from initial velocity.</p>	4	4	An
vi)	<p>A bar <math>3 \text{ m}</math> long slides down the plane as shown. The velocity of end A is <math>3.6 \text{ m/s}</math> to the right. Determine the linear velocity of end B.</p> 	4	5	An
Q.3 <u>Attempt any two out of three:-</u>		16		
i)	<p>Find the resultant of the force system acting on a body OABC. Locate the resultant with respect to O. Also find the points where the resultant will cut the X and Y axis.</p> 	8	1	A



ii)	<p>Determine the support reactions for the beam.</p> 	8	1	A
iii)	<p>For the link and slider mechanism shown, locate the instantaneous center of rotation of the link AB. Find also the angular velocity of the link OA. Take velocity of slider at B = 2500 mm/sec.</p> 	8	5	An
Q.4 <u>Attempt any two out of three:-</u>		16		
i)	<p>Find the centroid of the shaded area.</p> 	8	2	A
ii)	<p>To raise a heavy stone block weighing 2000 N, the arrangement shown is used. What horizontal force P is necessary to be applied to the wedge in order to raise the block? Take coefficient of friction as 0.25. Neglect the weight of the wedges.</p> 	8	3	A

iii)	<p>For a particle performing rectilinear motion v-t diagram is shown. Draw a-t diagram and x-t diagram for the motion if at <math>t = 0</math> s, <math>x = 16</math> m.</p> 	8	4	An
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