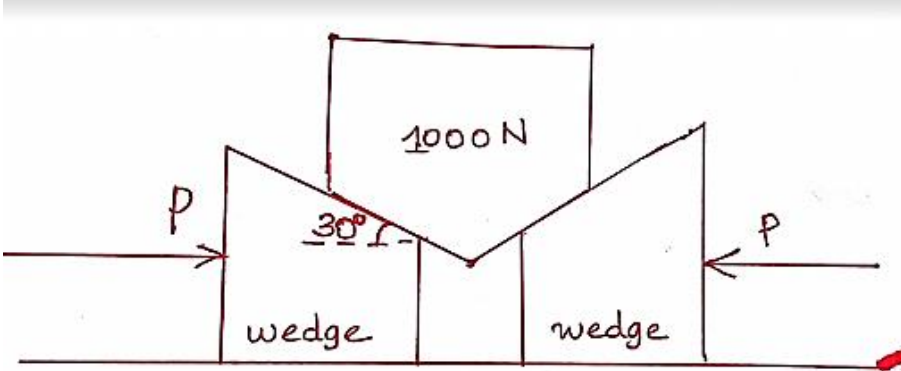
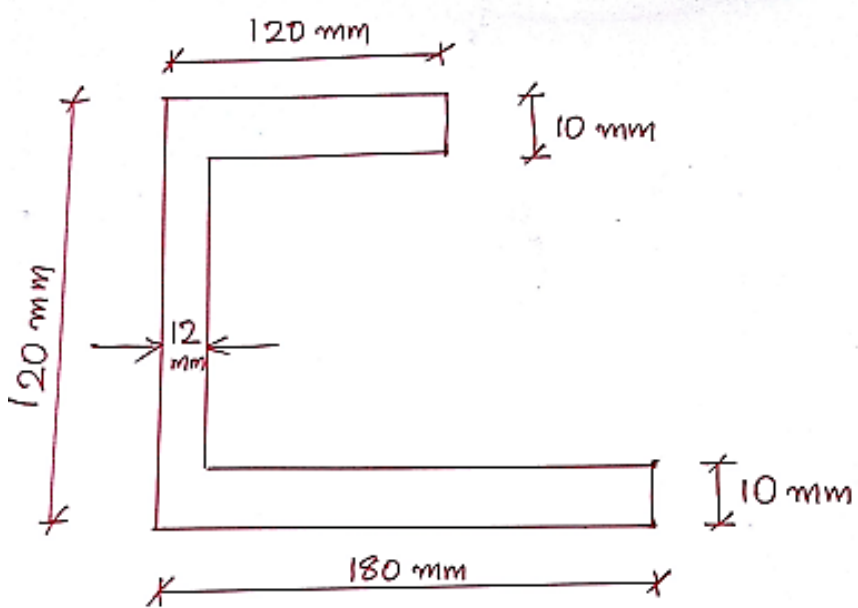


Internal Assessment Test 3 – May 2019

Sub:	Elements of Civil Engineering and Mechanics	Sub Code:	18CIV24	Branch:	
Date:	21/12/2019	Duration:	90 mins	Max Marks:	50
Sem / Sec:	ALL				OBE
Answer any FIVE FULL Questions					
		MARKS		CO	RBT
1	A block of weight 1000 N is to be raised by means of force P each acting on wedge as shown. If angle of friction at all rubbing surfaces is 15° . Determine P. Ignore the weight of the wedge. The angle of the wedge is shown as 30° .	[10]		CO4	L4
					
2 (a)	Derive the Moment of inertia of a semi-circle by principle of integration.	[07]		CO5	L3
	(b) State parallel axis theorem.	[03]		CO5	L1
3.	Find moment of inertia of the following section about its centroidal axes.	[10]		CO5	L3
					
4 (a)	The driver of a car moving at a constant speed of 18 kmph realizes that if he moves at this speed, he will reach the office late by 10s. Hence he accelerates at a constant rate of 2m/s^2 so that he reaches the office on time. Determine the time taken to reach the office and the distance covered during the time.	[5]		CO6	L3

4 (b)	A stone is dropped into a well and the splash is heard after 4s. If the speed of sound in air is 340 m/s. Determine the depth of well. Take $g = 9.81\text{m/s}^2$.	[5]	CO6	L3
5 (a)	Prove that the trajectory of a projectile is a parabola.	[4]	CO6	L3
(b)	The acceleration of a particle in rectilinear motion is defined as $a = k\sqrt{v}$, where a is acceleration in m/s^2 , v is in m/s and k is a constant. Given that at time $t = 2\text{s}$ and $t = 3\text{s}$ the velocities are 4 m/s and 9 m/s respectively. The displacement at $t = 3\text{s}$ is 20 m. Write the equations of motion and find the velocity, acceleration and displacement at $t = 4\text{s}$.	[6]	CO6	L3
6. (a)	A bomber is flying horizontally at a speed of 300 kmph at an altitude of 150 m releases a bomb targeting a ship moving in the same direction as the ship at a constant speed of 20 m/s . How far from the ship should it release the bomb to hit the ship? Take $g = 9.81\text{m/s}^2$.	[6]	CO6	L3
(b)	Write the equations for the following for a ball projected at an angle from the ground: (i) Time of flight (ii) Maximum height reached (iii) Range (iv) Resultant velocity at any instant	[4]	CO6	L1
7.	Explain with a neat figure the various cross-sectional elements of a road.	[10]	CO1	L4

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