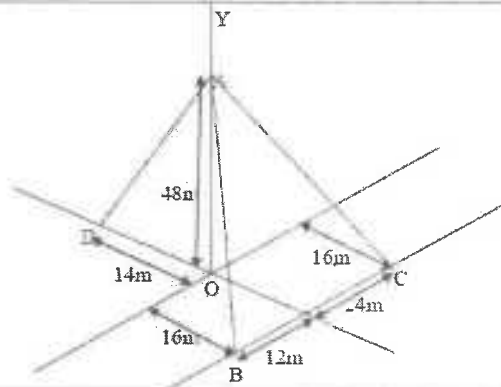
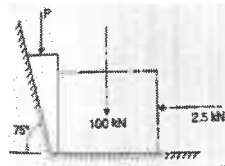


OR

- 12 A post is held vertical in position by three cables AB, AC, AD as shown in below Fig. If tension in cable AB is 40N, calculate the required tension in AC and AD so that the resultant of three forces applied at A is vertical. [10M]



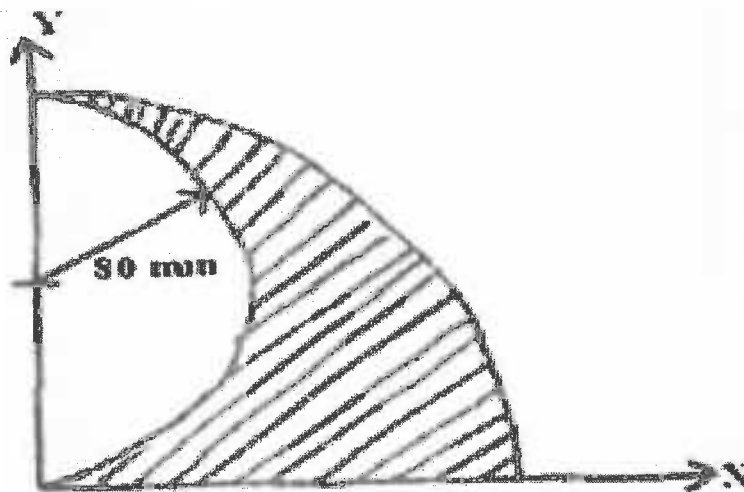
- 13 Determine the force P required to start the wedge as shown in Fig. The angle of friction for all surfaces of contact is 15° . [10M]



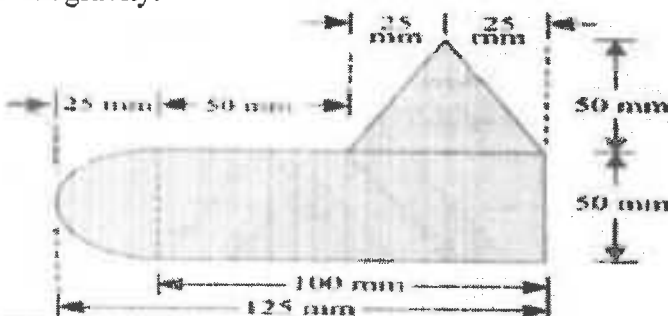
OR

- 14 An aircraft, moving horizontally at 108 km/hr at an altitude of 1000 m towards a target on the ground, releases a bomb which hits it. Estimate the horizontal distance of the aircraft from the target, when it released the bomb. Calculate also the direction and velocity with which the bomb hits the target. [10M]

- 15 (a) State and prove the equation for polar moment of inertia. [5M]
 (b) Determine the product of inertia of shaded area as shown in figure about the x-y axis. [5M]



OR

16	<p>Uniform lamina shown in the following figure consists of rectangle, a semi-circle and a triangle. Find the center of gravity. [10M]</p> 
17	<p>State and prove Pappu's theorems of area and volume. [10M]</p>
OR	
18	<p>State parallel axis theorem as applied to mass moment of inertia. [10M]</p>
19	<p>Find the mass moment of inertia of a solid cylinder of radius r, height h and mass m about centroidal x and y axes. [10M]</p>
OR	
20	<p>a) A body of mass 10 Kg is suspended by a string of length 1 m. It is struck by a bullet travelling horizontally with a velocity of 450 m/sec. The bullet weights 30 gms and gets embedded into the body after striking it. Determine the maximum angle through which the body swings. [5M]</p> <p>b) A body moving with simple harmonic motion has amplitude of 1 m and a period of oscillation of 2 seconds. What will be its velocity and acceleration 0.4 seconds after passing an extreme position? [5M]</p>

