

سكيا

1-Each cord can sustain a maximum tension  $T$ . Determine the largest weight of the sack that can be supported. Also, determine  $\theta$  of cord DC for equilibrium. Given:

$T = 200 \text{ lb}, \theta_1 = 30^\circ, \theta_2 = 45^\circ, \theta_3 = 60^\circ, \quad (10 \text{ Marks})$

2-The curved rod lies in the x-y plane and has radius  $r$ . If a force  $F$  acts at its end as shown, determine the moment of this force about point B. Given:

$r = 3 \text{ m}, a = 1 \text{ m}, \theta = 45^\circ, F = 80 \text{ N}, \text{ and } b = 2 \text{ m} \quad (10 \text{ Marks})$

3-The building slab is subjected to four parallel column loadings. Determine the equivalent resultant force-couple system at the origin. Given:  $F_1 = 30 \text{ kN}, a = 3 \text{ m}, F_2 = 40 \text{ kN}, b = 8 \text{ m}, F_3 = 20 \text{ kN}, c = 2 \text{ m}, F_4 = 50 \text{ kN}, d = 6 \text{ m}, \text{ and } e = 4 \text{ m}. \quad (10 \text{ Marks})$

4-Determine the reactions at the roller A and pin B. Knowing that  $M = 800 \text{ lb ft}, c = 3 \text{ ft}, F = 390 \text{ lb}, d = 5, a = 8 \text{ ft}, e = 12, b = 4 \text{ ft}, \theta = 30^\circ. \quad (10 \text{ Marks})$

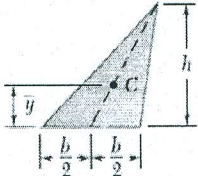

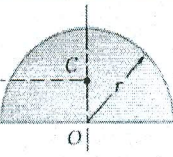
5- Determine the friction force on the crate of mass  $M$ , and the resultant normal force and its position  $x$ , measured from point A, if the force is  $P$ . Given:

$M = 40 \text{ kg}, \mu_s = 0.5, a = 400 \text{ mm}, \mu_k = 0.2, b = 800 \text{ mm}, d = 3, c = 200 \text{ mm}, e = 4, P = 300 \text{ N}. \quad (10 \text{ Marks})$

6-Locate the centroid  $(x_c, y_c)$  of the shaded area.

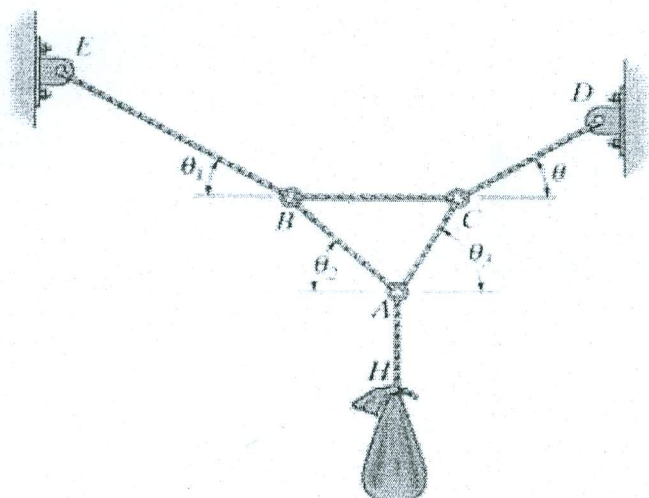
Given:  $a = 1 \text{ in}, b = 6 \text{ in}, c = 3 \text{ in}, d = 3 \text{ in} \quad (10 \text{ Marks})$

Hint:

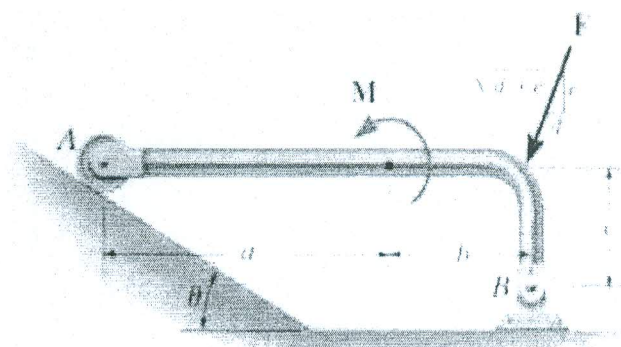
Shape		$\bar{x}$	$\bar{y}$	Area
Triangular area			$\frac{h}{3}$	$\frac{bh}{2}$
Quarter-circular area		$\frac{4r}{3\pi}$	$\frac{4r}{3\pi}$	$\frac{\pi r^2}{4}$
Semicircular area		0	$\frac{4r}{3\pi}$	$\frac{\pi r^2}{2}$

مع أطيب التمنيات بالتوفيق والنجاح

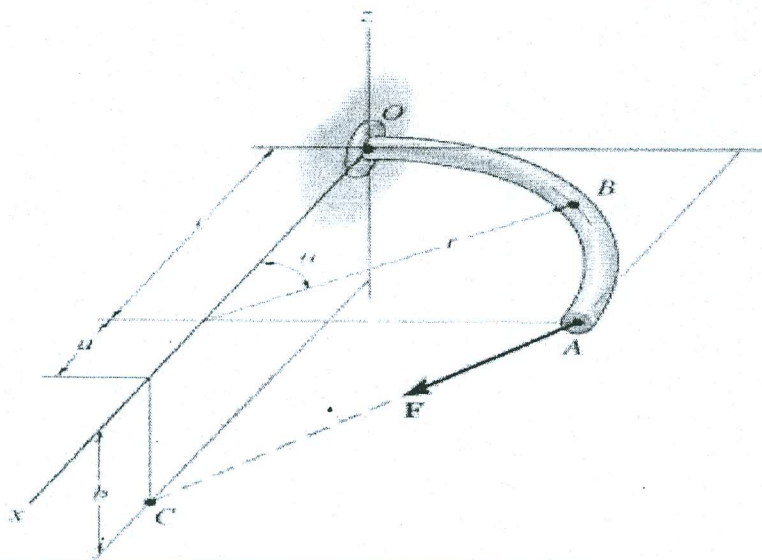
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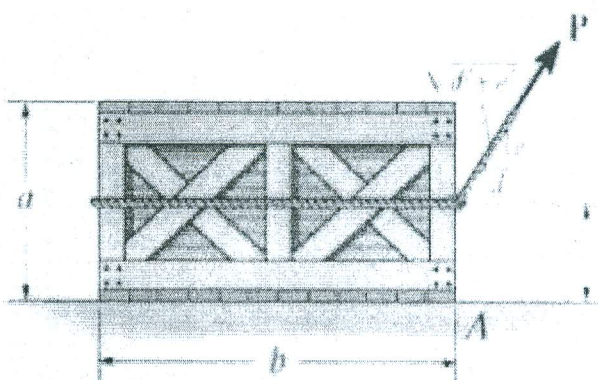
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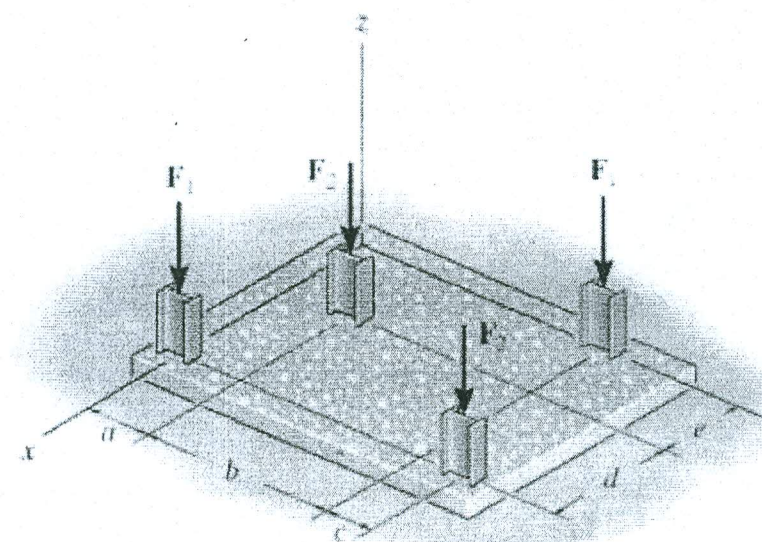
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p-3



p-6

