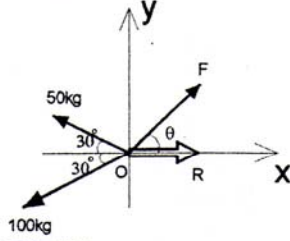


SINAV 5 SORULAR

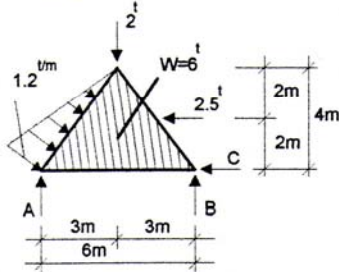
SORU 1:



Şekilde verilen bir noktada kesişen kuvvetler sisteminde $R=12 \text{ kg}$ olduğuna göre;

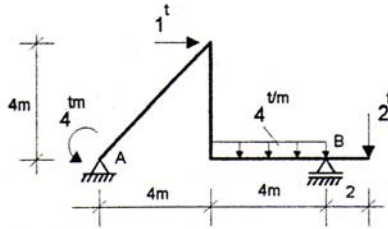
- F kuvvetini,
- θ açısını hesaplayınız.

SORU 2:



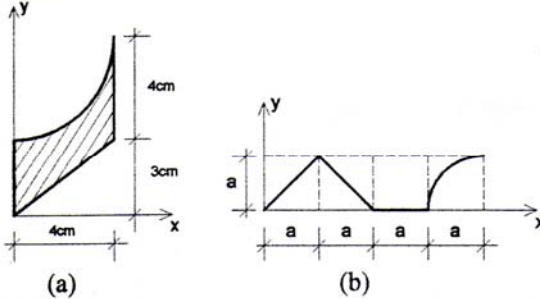
Şekilde ölçüleri ve yükleme durumu verilen levhanın ağırlığı 6 ton'dur. Sistemin dengede olabilmesi için A, B ve C kuvvetleri hangi değerleri almalıdır.

SORU 3:



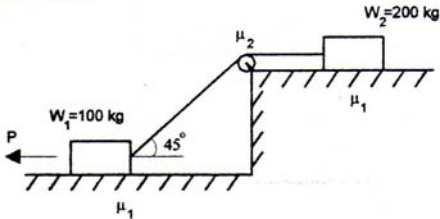
Şekilde ölçüleri ve yükleri verilen taşıyıcı sistemin mesnet tepkilerini hesaplayınız.

SORU 4:



- Şekilde ölçüleri verilen taralı alanın ağırlık merkezinin koordinatlarını hesaplayınız.
- Şekilde ölçüleri verilen telin x eksenine etrafında 360° döndürülmesiyle oluşacak yüzeyin alanını hesaplayınız.

SORU 5:



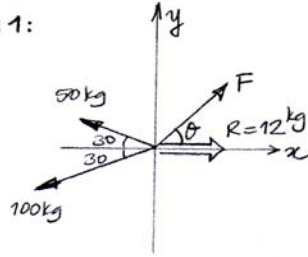
Şekilde verilen düzende,

- $\mu_1=0.25$, $\mu_2=0$,
- $\mu_1=0.25$, $\mu_2=0.637$,

olması durumunda sistemi sola doğru harekete geçirecek minimum P kuvvetini hesaplayınız.

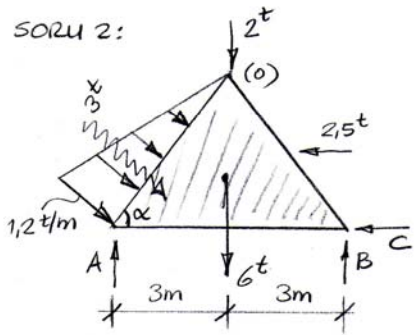
SINAV 5 CEVAPLAR

SORU 1:



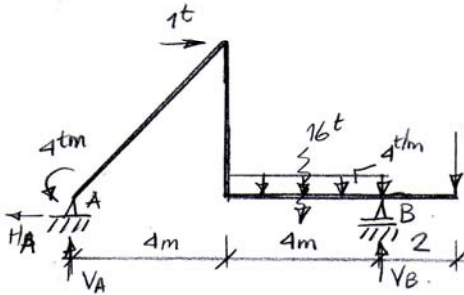
$$\begin{aligned} \sum F_y = 0 &\rightarrow F \sin \theta + 50 \sin 30 - 100 \sin 30 = 0 \\ F \sin \theta &= 25 \\ \sum F_x = R = 12 \text{ kg} \\ F \cos \theta - 50 \cos 30 - 100 \cos 30 &= 12 \\ F \cos \theta - 43,3 - 86,6 &= 12 \\ F \cos \theta - 129,9 &= 12 \rightarrow F \cos \theta = 141,9 \\ \frac{F \sin \theta}{F \cos \theta} = \frac{25}{141,9} &\rightarrow \tan \theta = 0,176 \\ \theta &= 9,99 \approx 10^\circ \\ F \sin 10^\circ = 25 &\rightarrow F = 143,97 \approx 144 \text{ kg} \end{aligned}$$

SORU 2:



$$\begin{aligned} \sum M_A = 0 &\rightarrow 2 \cdot \frac{5}{3} + 2 \cdot 3 + 6 \cdot 3 - 2,5 \cdot 2 - 6B = 0 \\ 5 + 6 + 18 - 5 - 6B &= 0 \rightarrow B = 4 \text{ t} \\ \sum Y = 0 &\rightarrow A + B - 2 - 3 \cos \alpha - 6 = 0 \\ A + 4 - 2 - 1,8 - 6 &= 0 \rightarrow A = 5,8 \text{ t} \\ \sum X = 0 &\rightarrow 3 \sin \alpha - 2,5 - C = 0 \\ 4/5 = 0,8 & \\ 2,4 - 2,5 - C &= 0 \rightarrow C = -0,1 \text{ t} \end{aligned}$$

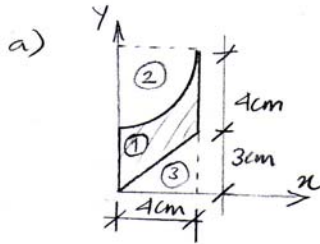
SORU 3:



$$\begin{aligned} \sum M_B = 0 &\rightarrow 8V_A - 1 \cdot 4 - 16 \cdot 2 + 2 \cdot 2 = 0 \\ 8V_A &= 28 \rightarrow V_A = 3,5 \text{ t} \\ \sum M_A = 0 &\rightarrow 4 - 1 \cdot 4 - 16 \cdot 6 + 8V_B - 2 \cdot 10 = 0 \\ 8V_B &= 116 \rightarrow V_B = 14,5 \text{ t} \\ \sum X = 0 &\rightarrow 1 - H_A = 0 \rightarrow H_A = 1 \text{ t} \end{aligned}$$

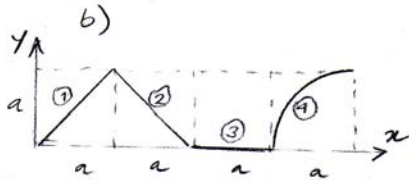
$$\begin{aligned} \text{KONTROL: } \sum Y = 0 &\rightarrow V_A + V_B = 16 + 2 = 18 \\ 3,5 + 14,5 &= 18 \\ 18 &= 18 \checkmark \end{aligned}$$

SORU 4:



i	A_i	x_i	y_i	$x_i A_i$	$y_i A_i$
1	28,00	2	3,5	56,00	98,00
2	12,56	1,70	5,3	-21,35	-66,57
3	-6,00	2,67	1	-16,02	-6,00
Σ	9,44			18,63	25,43

$$x_g = \frac{18,63}{9,44} = 1,97 \text{ cm}, \quad y_g = \frac{25,43}{9,44} = 2,69 \text{ cm}$$

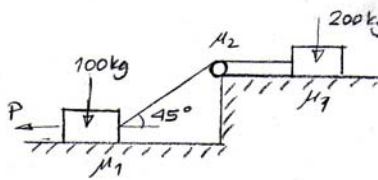


i	L_i	x_i	y_i	$x_i L_i$	$y_i L_i$
1	$1,41a$	$0,5a$	$0,5a$	$0,71a^2$	$0,71a^2$
2	$1,41a$	$1,5a$	$0,5a$	$2,12a^2$	$0,71a^2$
3	a	$2,5a$	0	$2,5a^2$	0
4	$1,57a$	$3,36a$	$0,64a$	$5,28a^2$	a^2

$$y_g = \frac{2,42a^2}{5,39a} = 0,45a$$

$$A = 2\pi (0,45a)(5,39a) = 15,23a^2$$

SORU 5:



b)

$$\frac{T_2}{T_1} = e^{\mu \beta}, \quad \beta = \frac{\pi}{4}$$

$$T_2 = 50 \cdot e^{0,637 \cdot \frac{\pi}{4}} = 50 \cdot e^{0,5} = 82,44 \text{ kg}$$

$$+\uparrow \Sigma \gamma = 0 \rightarrow N = 100 - T_2 \sin 45 = 100 - 82,44 \cdot 0,707$$

$$N = 41,71 \text{ kg}$$

$$P > T_2 \cos 45 + F_{s1} \rightarrow P_2 > 82,44 \cos 45 + 0,25 \cdot 41,71$$

$$P_2 > 68,72 \text{ kg} \quad P_{\min} = 68,72 \text{ kg}$$

a)

$$+\uparrow \Sigma \gamma = 0 \rightarrow N = 200 \text{ kg}$$

$$T > F_s \text{ olmalı}$$

$$F_s = 0,25 \cdot 200 = 50 \text{ kg}$$

$$+\uparrow \Sigma \gamma = 0$$

$$N = 100 - T \sin 45$$

$$N = 100 - 50 \cdot 0,707$$

$$N = 64,65 \text{ kg}$$

$$P > T \cos 45 + F_{s1} \text{ olmalı}$$

$$P > 50 \cos 45 + 0,25 \cdot 64,65$$

$$P > 51,5 \text{ kg} \quad P_{\min} = 51,5 \text{ kg}$$