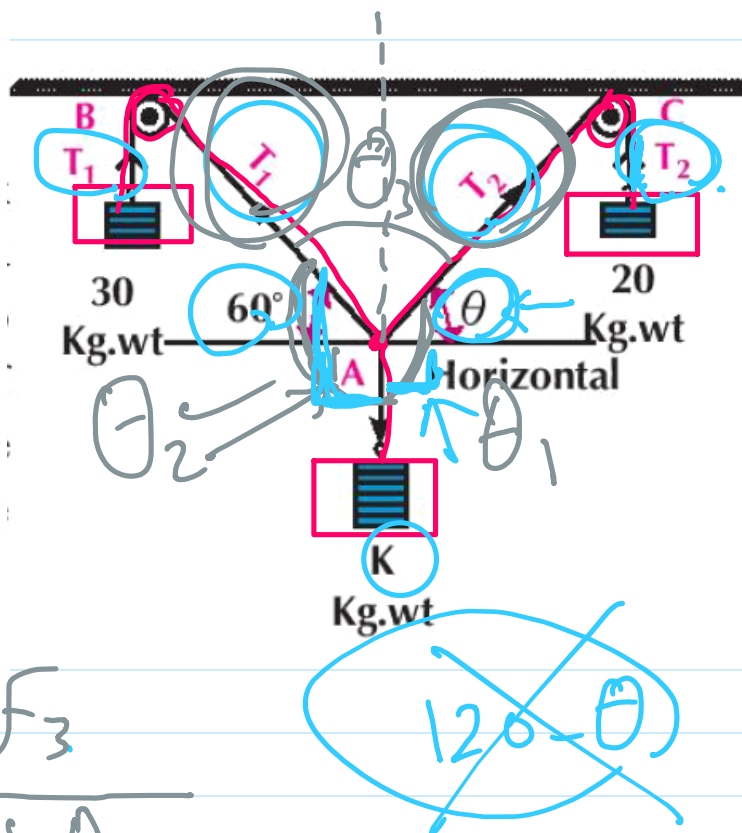


Equilibrium of a rigid body meeting at point_8

Saturday, October 25, 2025 4:36 PM

7 In the opposite figure: A weight of magnitude k is suspended by an end of a string, the other end is suspended by two strings passing over two smooth pulleys at B, C and carries two weights of magnitudes 30 kg.wt and 20 kg.wt. Find the value of the weight k and the measure of angle θ in state of equilibrium.



$$\frac{F_1}{\sin \theta_1} = \frac{F_2}{\sin \theta_2} = \frac{F_3}{\sin \theta_3}$$

Screen clipping taken: 10/27/2025 5:12 PM

Directed -

$$\sin(90 + \theta) = \cos \theta$$

$$\frac{T_1}{\sin(90 + \theta)} = \frac{T_2}{\sin(90 + 60)} = \frac{K}{\sin(180 - (60 + \theta))}$$

$$\frac{30}{\cos \theta} = \frac{20}{\cos 60} = \frac{K}{\sin(60 + \theta)}$$

$$\cos \theta = \frac{\cos 60 \times 30}{20} \Rightarrow \cos \theta = \frac{3}{4}$$

$$\theta = 41^\circ 24' 35''$$

$$\frac{20}{\cos 60} = \frac{K}{\sin(60 + 41^\circ 24' 35'')}$$

$$K = \frac{20 \times \sin(60 + 41^\circ 24' 35'')}{\cos 60} =$$

Equilibrium of a rigid body meeting at point_9

Sunday, October 26, 2025 10:02 AM

- 9 In the opposite figure: ABCD is a square, The forces of magnitudes: 16, 20, $12\sqrt{2}$, $4\sqrt{5}$ newton act, in the directions \overrightarrow{AB} , \overrightarrow{AD} , \overrightarrow{CA} , \overrightarrow{EA} respectively. where E is the midpoint of \overline{CD} . Prove that these forces are in equilibrium.

$$R_x = 16 \cos \theta + (-12\sqrt{2}) \cos 45^\circ + (4\sqrt{5})$$

$$+ 12\sqrt{2} \cos 22.5^\circ$$

$$(4\sqrt{5})^2 =$$

