

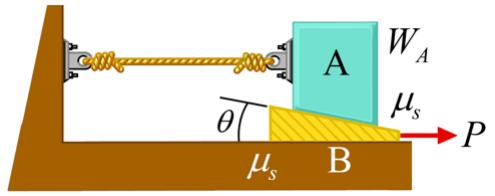
# STATICS

## Friction

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**Question :** Determine the minimum force  $P$  that will make the wedge move in the rightwards direction. There is an object A on the wedge that has a weight  $W_A = 1\text{kN}$  and it is connected to the wall by a cable. The coefficient of friction is  $\mu_s = 0.2$ .

The angle of the inclined surface of wedge with respect to the horizontal is  $\theta = 18.69^\circ$ .



### Solution:

The angle of friction on all surfaces is  $\phi_s = \tan^{-1} \mu_s = \tan^{-1}(0.2) \cong 11.31^\circ$ .

The sinusoidal theorem is used with respect to the free body diagram of the object A as,

$$R_A = \frac{T}{\sin 30^\circ} = \frac{1}{\sin 60^\circ}$$

$$R_A \cong 1.16\text{kN}$$

$$T_A \cong 0.58\text{kN}$$

The sinusoidal theorem is used with respect to the free body diagram of the wedge as,

$$\frac{P}{\sin 41.3^\circ} = \frac{R_B}{\sin 60^\circ} = \frac{1.16}{\sin 78.7^\circ}$$

$$R_B = 1.02\text{kN}$$

$$P = 0.78\text{kN}$$

