

Question

We will have the horizontal forces (resultant force equals to the zero because the box is pulling at a constant rate $\Rightarrow a = 0$):

$$N = m \cdot g$$

$$F_{friction} = \mu \cdot N = \mu \cdot m \cdot g = 0.7 \cdot 45 \cdot 9.8 = 308.7 \text{ N}$$

$$T_{horizontal} = T \cdot \cos 30^\circ$$

$$T_{horizontal} - F_{friction} = m \cdot a = 0 \Rightarrow T_{horizontal} = F_{friction} \Rightarrow$$

$$\Rightarrow T \cdot \cos 30^\circ = F_{friction} \Rightarrow T = \frac{F_{friction}}{\cos 30^\circ} = \frac{308.7}{\cos 30^\circ} \approx 356.5 \text{ N}$$

Answer: 356.5 N .