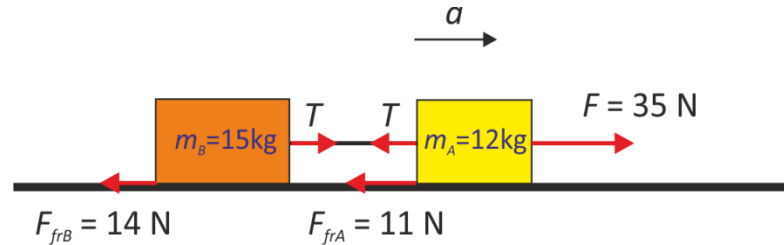


Answer on Question #43263, Physics, Mechanics | Kinematics | Dynamics

Box A, mass 12kg is tied to box B, mass 15kg, by a rope. Box A is pulled away from B with a force of 35N. Once moving, A experiences a force of frictions of 11N and B of 14N. What is the force of tension in the rope between the boxes?

Solution:



After drawing the free-body diagram, we apply the equation of motion in the x-direction to get

$$\sum F_x = ma$$

For box A: $m_A a = F - T - F_{frA}$

For box B: $m_B a = T - F_{frB}$

From given we have system of two equations

For box A: $12a = 35 - T - 11$

For box B: $15a = T - 14$

From second equation

$$T = 15a + 14$$

Substitute to first equation

$$12a = 35 - 15a - 14 - 11$$

$$27a = 10$$

$$a = \frac{10}{27}$$

Thus,

$$T = 15 \cdot \frac{10}{27} + 14 = 19.6\text{ N}$$

Answer: $T = 19.6\text{ N}$

