

Answer on question #69248, Physics / Other

Question A 12.5 kg box has an initial velocity of 24.1 m/s on a horizontal board. If the coefficient of friction between the box and the board is 0.30, the total distance the box will move before coming to a halt is - meters.

Solution The force acting horizontally will be

$$F = \mu mg$$

The deceleration of box will be

$$a = \mu g = 0.3 \cdot 9.8 \approx 3.27 \text{ m/s}$$

Hence, time of decreasing velocity to 0 is

$$t = \frac{v}{a} = \frac{24.1}{3.27} \approx 7.37 \text{ s}$$

So, the distance travelled is

$$S = vt - at^2/2 = 24.1 \cdot 7.37 - 3.27 \cdot 7.37^2/2 \approx 88.8 \text{ m}$$