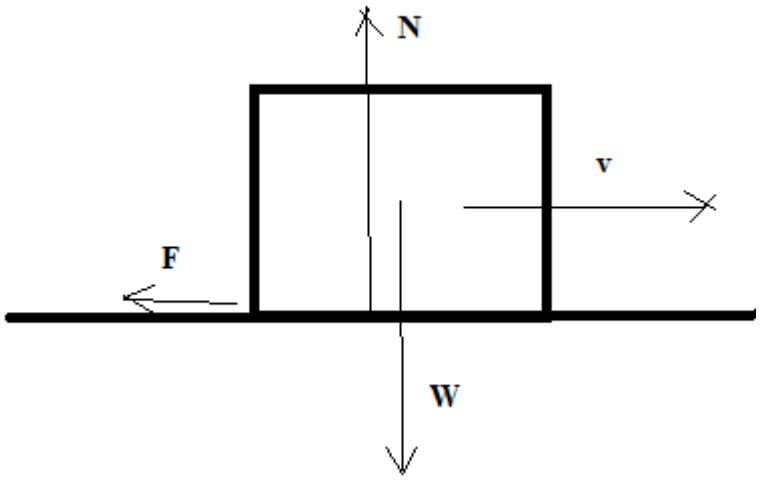
Question #77338, Physics / Other

A box of 20kg is pushed across a surface and then released with an initial speed of 10m/s. What will the object's speed be after 1 second if the coefficient of friction is 0.5?

Solution

Diagram:



$$N - W = 0 \to N = W$$

$$F = \mu N = \mu W = \mu mg.$$

$$a = \frac{F}{m} = \mu g.$$

The object's speed be after 1 second is

$$v_f = v_i - at = 10 - 0.5(10)(1) = 5\frac{m}{s}.$$

Answer: $\mathbf{5\frac{m}{s}}$.