Answer on Question #41030, Physics, Mechanics

An object of mass 10 kg is pulled across a rough floor at a constant speed of 4 m/s using a force of 40 N, then the coefficient of kinetic friction is (ignoring air resistance):
a) 0.4 b) 4 c) Zero d) 0.25 e) 2.5

Solution:

The equation of motion is

$$F - F_{fr} = ma,$$

where force is F = 40 N, force of friction is F_{fr} = μN (N = mg, μ is the coefficient of kinetic friction), the acceleration is a =0 (object is moved at a constant speed).

Thus,

$$F_{fr} = F$$
$$\mu mg = F$$
$$\mu = \frac{F}{mg} = \frac{40\ N}{10\ kg \cdot 10\ m/s^2} = 0.4$$

Answer. a) 0.4