

Phys12 Dynamics : Worksheet - 10

1) An 850 kg elevator initially at rest, is accelerated upward by a force of 9.6×10^3 N.

a) Find the acceleration. b) Find the velocity at 2.0 s.

2) An ice puck of mass 0.40 kg slows down from 15m/s to 3.0m/s over a distance 50. m.

a) Find the frictional force. b) Find the coefficient of friction.

3) Three forces (in the horizontal plane) act on a mass of 6.0 kg. The forces are : 25 N [East], 30. N [55° N of W], and 15 N [$30.^\circ$ S of E].

Find the acceleration.

4) A student of mass 65 kg, is standing on a scale on an elevator to test Newton's laws. Find the scale reading when the elevator :

a) moves upward with an acceleration of 0.60 m/s^2 .

b) moves upward with a constant speed of 2.5 m/s.

c) moves upward but is decelerating at 1.5 m/s^2 .

5) A 50. kg boy pulls on a rope attached to a 25 kg sled with a horizontal force of 150. N. The force of friction between the sled and the snow is 80. N.

a) Find the acceleration of the system.

b) Find the driving force exerted by the ground on the boy's feet.

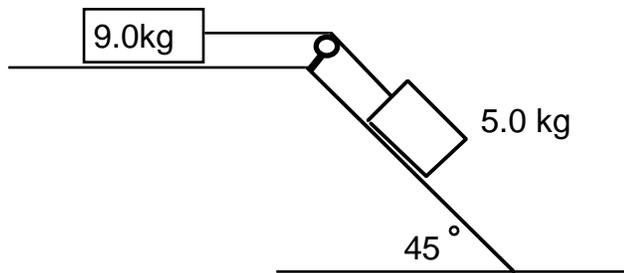
6) A wooden plank is raised at one end so until an angle of $40.^\circ$ is made with the horizontal. A 3.0 kg box is placed on the incline 2.0 m from the lower end. The coefficient of friction is 0.25. It starts to slide down the incline. Determine :

a) the acceleration

b) the speed at the bottom if the box is initially at rest.

7) An 18 kg box is pulled horizontally across the ground with a force of 30. N. The acceleration is 0.20 m/s^2 . Find the coefficient of kinetic friction.

8) A 9.0 kg box is attached as shown below to a 5.0 kg box by rope. The pulley is frictionless and friction between the boxes and the surfaces is negligible.



a) Find the magnitude of the acceleration of the system.

b) Find the tension in the rope.

Answers : 1)a) 1.5 m/s^2 [up], b) 3.0 m/s [up], 2) a) -0.86 N , b) 0.22 ,
3) [$3.5, 2.9$] m/s^2 or 4.5 m/s^2 [$40.^\circ \text{ N of E}$], 4)a) 680 N , b) 640 N ,
c) 540 N , 5) a) 2.8 m/s^2 , b) 290 N , 6)a) 4.4 m/s^2 [down incline], b) 4.2
 m/s , 7) 0.15 , 8)a) 2.5 m/s^2 , b) 22 N .