#13 Equilibrium, Dynamics Post-class

Due: 11:00am on Friday, September 21, 2012

Note: You will receive no credit for late submissions. To learn more, read your instructor's Grading Policy

Exercise 5.20

A 8.30-kg block of ice, released from rest at the top of a 1.41-m-long frictionless ramp, slides downhill, reaching a speed of 2.83m/s at the bottom.

Part A

What is the angle between the ramp and the horizontal?

ANSWER:

$\phi =$ 16.8 $^\circ$

Correct

Part B

What would be the speed of the ice at the bottom if the motion were opposed by a constant friction force of 11.0N parallel to the surface of the ramp?
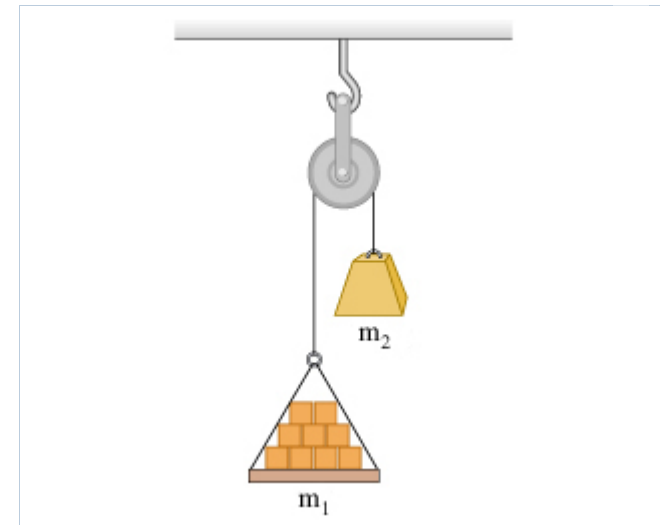
ANSWER:

$v =$ 2.07 m/s

Correct

Exercise 5.19: Atwood's Machine

A load of bricks with mass m_1 = 15.2 kg hangs from one end of a rope that passes over a small, frictionless pulley. A counterweight of mass m_2 = 29.0 kg

is suspended from the other end of the rope, as shown in the figure. The system is released from rest. Use g = 9.80 m/s² for the magnitude of the acceleration due to gravity.

Part A

What is the magnitude of the upward acceleration of the load of bricks?

ANSWER:

3.06   \rm{m/s^{2}}

Correct

Part B

What is the tension in the rope while the load is moving?
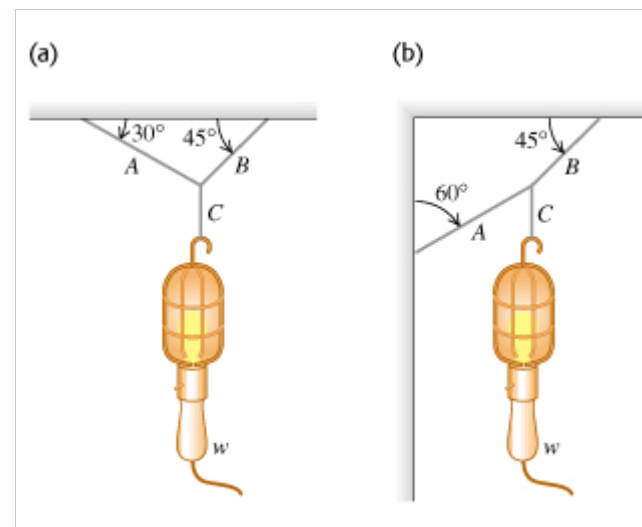
ANSWER:

195 N

Correct

Exercise 5.9

Find the tension in each cord in the figure if the weight of the suspended object is w.

Part A

Find the tension of the cord A in the figure (a).

Express your answer in terms of w.

ANSWER:

T_A = .732w

Correct

Part B

Find the tension of the cord B in the figure (a).

Express your answer in terms of w**.**

ANSWER:

T_B = .897w

Correct

Part C

Find the tension of the cord C in the figure (a).

Express your answer in terms of w**.**

ANSWER:

T_C = w

Correct

Part D

Find the tension of the cord A in the figure (b).

Express your answer in terms of w.

ANSWER:

T_A = 2.73w

Correct

Part E

Find the tension of the cord B in the figure (b).

Express your answer in terms of w.

ANSWER:

T_B = 3.35w

Correct

Part F

Find the tension of the cord C in the figure (b).

Express your answer in terms of w.

ANSWER:

T_C = w

Correct

Exercise 5.23

A 800-kg boulder is raised from a quarry 180m deep by a long uniform chain having a mass of 580$_{\rm kg}$. This chain is of uniform strength, but at any point it can support a maximum tension no greater than 2.60 times its weight without breaking.

Part A

What is the maximum acceleration the boulder can have and still get out of the quarry?

ANSWER:

a_{\rm max} = 0.909 m/s^2

Correct

Part B

How long does it take to be lifted out at maximum acceleration if it started from rest?

ANSWER:

$t =$ 19.9   s

Correct

Score Summary:

Your score on this assignment is 98.4%.
You received 39.35 out of a possible total of 40 points.