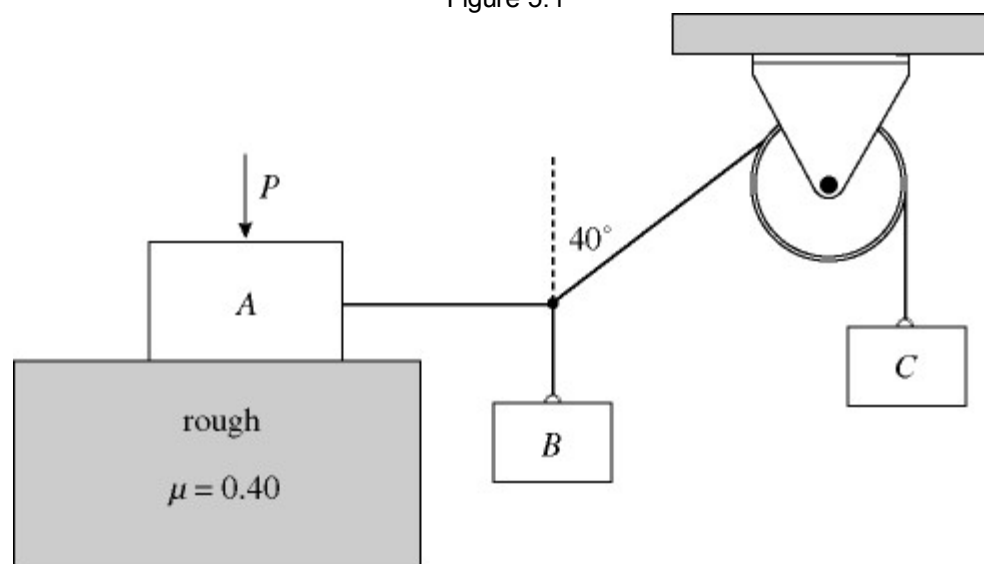Exam 2 Practice

Due: 11:00am on Wednesday, October 10, 2012

Note: To understand how points are awarded, read your instructor's Grading Policy.

Multiple Choice Question - 5.1

Part A

Figure 5.1

A system of blocks and a frictionless pulley is shown in Fig. 5.1. Block *A* has a mass of 5.0 kg and is on a rough surface (μ = 0.40). Block *C* has a mass of 4.0 kg. An external force *P* = 25.0 N, applied vertically to block *A*, maintains the system in static equilibrium as shown in Fig. 5.1. The mass of block *B* is closest to:

ANSWER:

○ 2.6 kg

○ 2.3 kg

○ 3.1 kg

○ 2.8 kg

○ 2.1 kg

Completed; correct answer withheld by instructor

Multiple Choice Question - 5.13

Part A

On a horizontal frictionless floor, a worker of weight 900 N pushes horizontally with a force of 200 N on a box weighing 1800 N. As a result of this push:

ANSWER:

○ The worker and box will both have an acceleration of 1.09 m/s^2, but in opposite directions.

○ The worker and box will both have an acceleration of 2.18 m/s^2, but in opposite directions.

○ The worker will accelerate at 1.09 m/s2 and the box will accelerate at 2.18 m/s^2, but in opposite directions.

○ The box will not move because the push is less than its weight.

○ The worker will accelerate at 2.18 m/s2 and the box will accelerate at 1.09 m/s^2, but in opposite directions.

Completed; correct answer withheld by instructor

Multiple Choice Question - 5.19

Part A

Figure 5.8
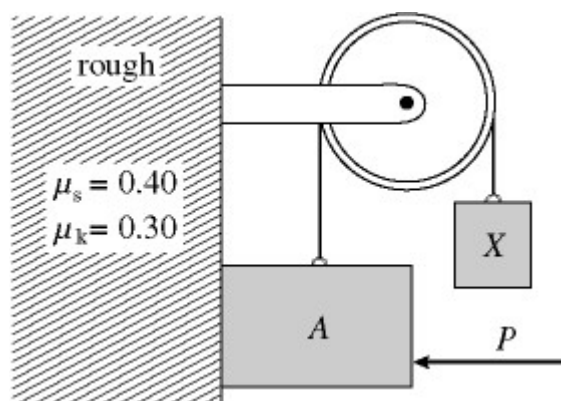
Block *A* of mass 8 kg and block *X* are attached to a rope which passes over a pulley. A 50-N force is applied horizontally to block A, keeping it in contact with a rough vertical face. The coefficients of static and kinetic friction are μ_s = 0.40 and μ_k = 0.30. The pulley is light and frictionless. In Fig. 5.8, the mass of block *X* is set so that block A descends at constant velocity when it is set into motion. The mass of block *X* is closest to:

ANSWER:

- ⚪ 9.5 kg
- ⚪ 8.0 kg
- ⚪ 6.5 kg
- ⚪ 8.8 kg
- ⚪ 7.2 kg

Completed; correct answer withheld by instructor

Multiple Choice Question - 5.35

Part A

Figure 5.12
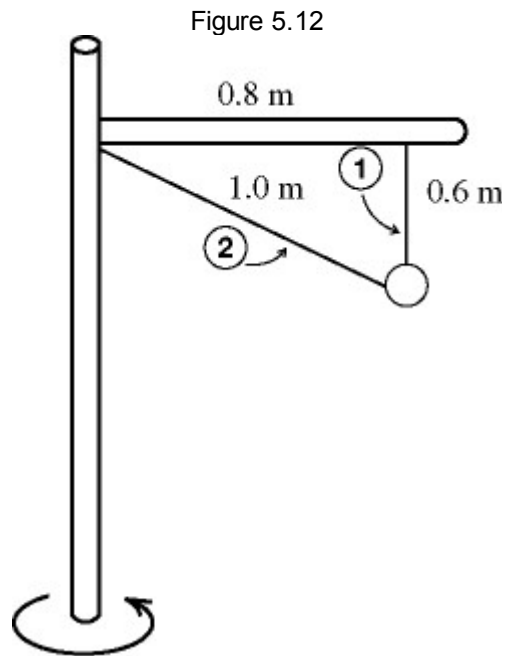
A ball of mass 3.0 kg is suspended by two wires from a horizontal arm, which is attached to a vertical shaft, as shown in Fig. 5.12. The shaft is in uniform rotation about its axis such that the linear speed of the ball equals 2.5 m/s. The tension in wire 2 is closest to:
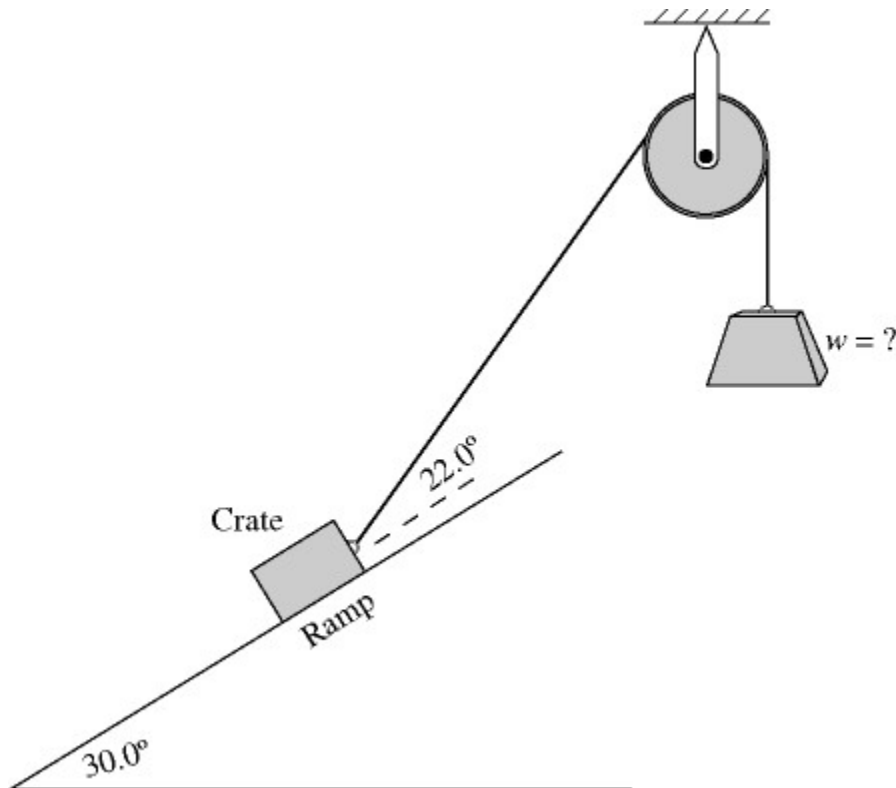
ANSWER:

○ 39 N

◉ 29 N

○ 34 N

○ 44 N

○ 24 N

Correct

Short Answer Question - 5.1

Part A

A 1520-N crate is to be held in place on a ramp that rises at 30.0° above the horizontal (see in the figure). The massless rope attached to the crate makes a 22.0° angle above the surface of the ramp. The coefficients of friction between the crate and the surface of the ramp are μ_k = 0.450 and μ_s = 0.650. The pulley has no appreciable mass or friction. What is the *maximum* weight w needed to hold this crate stationary on the ramp?
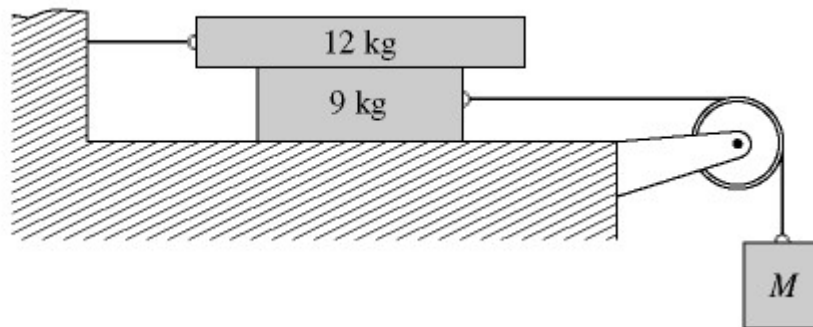
ANSWER:

1380 N

Correct

Multiple Choice Question - 5.15

Part A

Figure 5.7

A system comprising blocks, a light frictionless pulley, and connecting ropes is shown. The 9-kg block is on a smooth horizontal table (μ = 0). The surfaces of the 12-kg block are rough, with μ = 0.30.
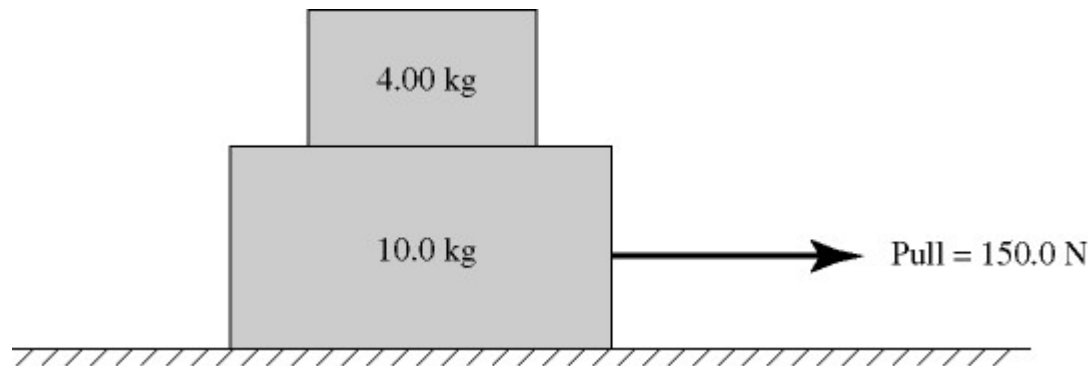
In Fig. 5.7, the mass M is set so that it descends at constant velocity when released. The mass M is closest to:

ANSWER:

○ 3.0 kg

○ 2.4 kg

○ 2.7 kg

◉ 3.6 kg

○ 3.3 kg

Correct

Multiple Choice Question - 5.40

Part A

Figure 5.15

A 4.00-kg box sits atop a 10.0-kg box on a horizontal table. The coefficient of kinetic friction between the two boxes *and* between the lower box and the table is 0.600, while the coefficient of static friction between these same surfaces is 0.800. A horizontal pull to the right is exerted on the lower box, as shown in Fig. 5.15, and the boxes move together. The friction force on the *upper* box is closest to:

ANSWER:

○ 31.4 N to the right

○ 23.5 N to the right

○ 19.3 N to the left

○ 31.4 N to the left

◉ 19.3 N to the right

Correct

Short Answer Question - 5.4

Part A

A Ferris wheel has radius 5.0 m and makes one revolution in 8.0 seconds. A person weighing 670 N is sitting on one of the benches attached at the rim of the wheel. What is the apparent weight (the the normal force exerted on her by the bench) of the person as she passes through the highest point of her motion?

ANSWER:

460 N

Correct

Multiple Choice Question - 7.6

Part A

Two objects, one of mass m and the other of mass $2m$, are dropped from the top of a building. When they hit the ground:

ANSWER:

○ The heavier one will have half the kinetic energy of the lighter one.

◉ The heavier one will have twice the kinetic energy of the lighter one.

○ Both will have the same kinetic energy.

○ The heavier one will have four times the kinetic energy of the lighter one.

○ The heavier one will have one-fourth the kinetic energy of the lighter one.

Correct

Multiple Choice Question - 7.13

Part A

Figure 7.4
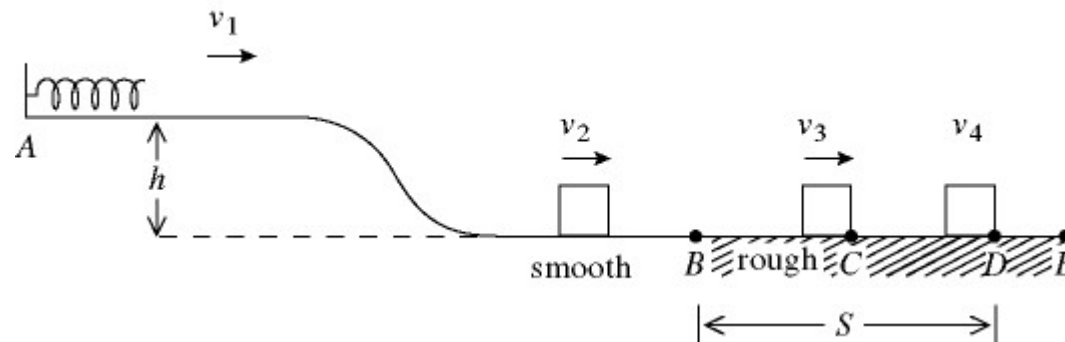
A 0.54-kg block is held in place against the spring by a 65-N horizontal external force. The external force is removed, and the block is projected with a velocity v_1 = 1.2 m/s upon separation from the spring. The block descends a ramp and has a velocity v_2 = 1.4 m/s at the bottom. The track is frictionless between points A and B. The block enters a rough section at B, extending to E. The coefficient of kinetic friction is 0.36. The velocity of the block is v_3 = 1.4 m/s at C. The block moves on to D, where it stops. In Fig. 7.4, the initial compression of the spring, in cm, is closest to:

ANSWER:

- ○ 0.64
- ○ 2.4
- ○ 0.43
- ◉ 1.2
- ○ 1.6

Correct

Multiple Choice Question - 7.24

Part A

A 225-g arrow is shot vertically into the air from an initial height of 1.40 m above the ground with an initial speed of 18.6 m/s. When it reaches a height of 4.60 m above the ground, its velocity is measured to be 9.74 m/s upward. Air resistance is *not* negligible. During the time interval between shooting the arrow and measuring its velocity at 4.60 m, the amount of mechanical energy dissipated by air friction is closest to:
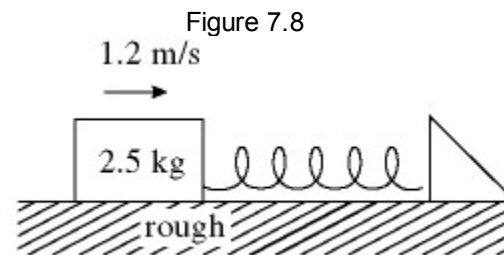
ANSWER:

- ○ 31.9 J
- ○ 28.8 J
- ○ 18.1 J
- ○ 35.3 J
- ◉ 21.2 J

Correct

Multiple Choice Question - 7.29

Part A

Figure 7.8

1.2 m/s

2.5 kg $\lll$

rough

A 2.5 kg, sliding on a rough surface, has a speed of 1.2 m/s when it makes contact with a spring. The block comes to a momentary halt when the compression of the spring is 5.0 cm. The work done by the friction, from the instant the block makes contact with the spring until is comes to a momentary halt, is -0.50 J.

In Fig. 7.8, the force constant of the spring is closest to:

ANSWER:

- ○ 890 N/m
- ○ 990 N/m
- ○ 840 N/m
- ○ 940 N/m
- ◉ 1040 N/m

Correct

Multiple Choice Question - 7.8

Part A

Two identical balls are thrown directly upward, ball A at speed v and ball B at speed $2v$, and they feel no air resistance. Which statement about these balls is correct?

ANSWER:

- ⦿ Ball B will go four times as high as ball A because it had four times the initial kinetic energy.
- ○ At their highest point, the acceleration of each ball is instantaneously equal to zero because they stop for an instant.
- ○ Ball B will go twice as high as ball A because it had twice the initial speed.
- ○ The balls will reach the same height because they have the same mass and the same acceleration.
- ○ At its highest point, ball B will have twice as much gravitational potential energy as ball A because it started out moving twice as fast.

Correct

Multiple Choice Question - 7.14

Part A

Figure 7.4
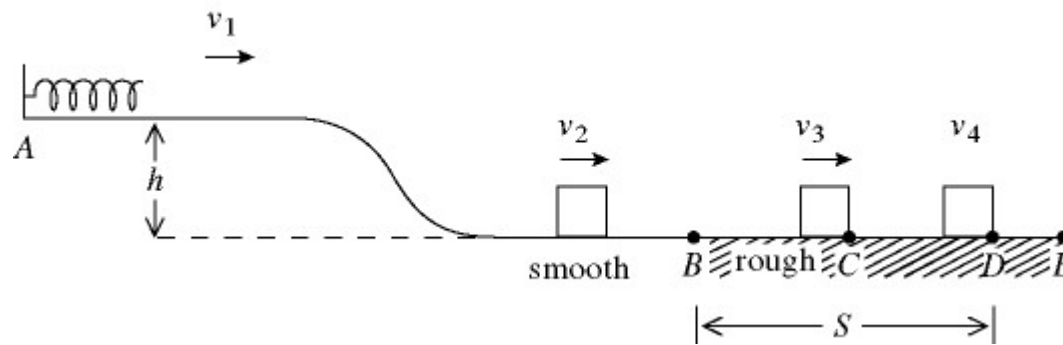
A 1.52-kg block is held in place against the spring by a 70-N horizontal external force. The external force is removed, and the block is projected with a velocity v_1 = 1.2 m/s upon separation from the spring. The block descends a ramp and has a velocity v_2 = 1.9 m/s at the bottom. The track is

frictionless between points A and B. The block enters a rough section at B, extending to E. The coefficient of kinetic friction is 0.34. The velocity of the block is v_3 = 1.4 m/s at C. The block moves on to D, where it stops. In Fig. 7.4, the height of the ramp h, in cm, is closest to:
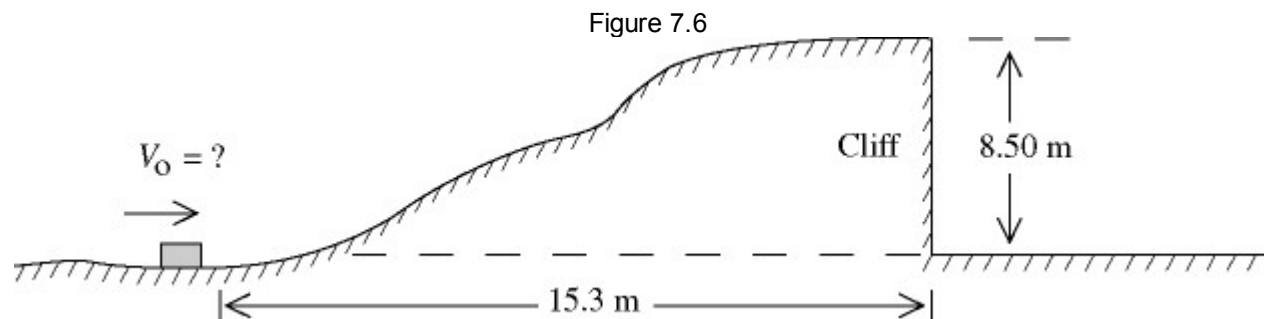
ANSWER:

- ⚪ 7.3
- ⦿ 11
- ⚪ 18
- ⚪ 15
- ⚪ 17

Correct

Multiple Choice Question - 7.18

Part A

Figure 7.6

A small hockey puck slides without friction over the icy hill shown in Fig. 7.6 and lands 6.20 m from the foot of the cliff with no air resistance. Its speed v_0 at the bottom of the hill is closest to:
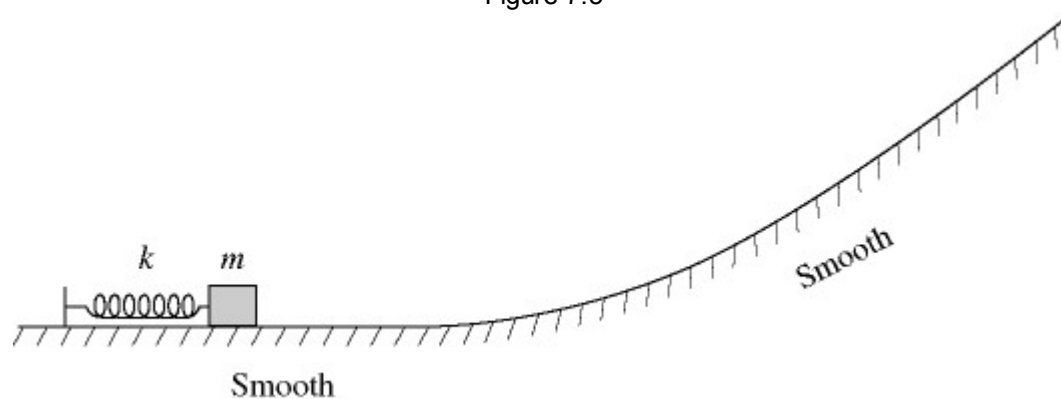
ANSWER:

- ◉ 13.7 m/s
- ○ 4.71 m/s
- ○ 14.4 m/s
- ○ 17.4 m/s
- ○ 20.8 m/s

Correct

Multiple Choice Question - 7.15

Part A

Figure 7.5

A box of mass m is pressed against (but is not attached to) an ideal spring of force constant k, compressing the spring a distance x. After it is released, the box slides up a frictionless incline as shown in Fig. 7.5 and eventually stops. If we repeat this experiment with a box of mass $2m$:

ANSWER:

- ○ Just as it moves free of the spring, the heavier box will have twice as much kinetic energy as the lighter box.
- ○ Box boxes will reach the same maximum height on the incline.
- ◉ The lighter box will go twice as high up the incline as the heavier box.
- ○ Just as it moves free of the spring, the lighter box will be moving twice as fast as the heavier box.
- ○ Both boxes will have the same speed just as they move free of the spring.

Correct

Multiple Choice Question - 7.30

Part A
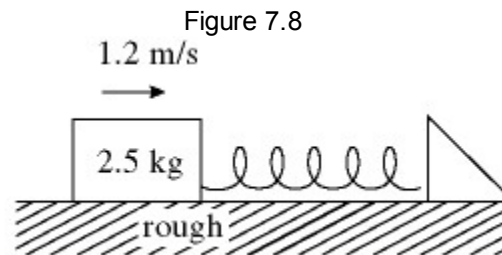
Figure 7.8

1.2 m/s

2.5 kg

rough

A 2.5 kg, sliding on a rough surface, has a speed of 1.2 m/s when it makes contact with a spring. The block comes to a momentary halt when the compression of the spring is 5.0 cm. The work done by the friction, from the instant the block makes contact with the spring until is comes to a momentary halt, is -0.50 J.

In Fig. 7.8, the coefficient of friction is closest to:

ANSWER:

- 0.37
- 0.33
- 0.35
- 0.39
- ● 0.41

Correct

Score Summary:

Your score on this assignment is 82.4%.
You received 70 out of a possible total of 85 points.