

Instructor(s): *N. Sullivan*PHYSICS DEPARTMENT
Midterm Exam 1

September 19, 2011

Name (print, last first): _____ Signature: _____

*On my honor, I have neither given nor received unauthorized aid on this examination.***YOUR TEST NUMBER IS THE 5-DIGIT NUMBER AT THE TOP OF EACH PAGE.**

- (1) **Code your test number on your answer sheet (use lines 76–80 on the answer sheet for the 5-digit number).** Code your name on your answer sheet. **DARKEN CIRCLES COMPLETELY.** Code your UFID number on your answer sheet.
- (2) Print your name on this sheet and sign it also.
- (3) Do all scratch work anywhere on this exam that you like. **Circle your answers on the test form.** At the end of the test, this exam printout is to be turned in. No credit will be given without both answer sheet and printout.
- (4) **Blacken the circle of your intended answer completely, using a #2 pencil or blue or black ink.** Do not make any stray marks or some answers may be counted as incorrect.
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- (6) Hand in the answer sheet separately.

$$g = 9.80 \text{ m/s}^2$$

1. (4 points) A ball is thrown up vertically at 20 m/s. How high will the ball go?
 - (1) 20.4 m
 - (2) 2.04 m
 - (3) 5.10 m
 - (4) 40.8 m
 - (5) 7.10 m

2. (4 points) Jane sets out on a walk. She walks 8 km east and then 15 km north. How far is she from her starting point?
 - (1) 17 km
 - (2) 23 km
 - (3) 16 km
 - (4) 7 km
 - (5) 30 km

3. (4 points) A stone is dropped from a bridge. It hits the water 2 seconds after it is dropped. What is the height of the bridge above the water?
 - (1) 19.6 m
 - (2) 39.2 m
 - (3) 27.6 m
 - (4) 4.9 m
 - (5) 9.8 m

4. (4 points) A block of mass 10 kg sits on an inclined plane. The coefficient of static friction between the block and the surface is 0.60. At what angle (in degrees) must the block be raised before it begins to slide?
 - (1) 31°
 - (2) 75°
 - (3) 42°
 - (4) 25°
 - (5) 62°

5. (5 points) An automobile is initially backing up at a speed of 5 m/s. At time $t = 0$ the automobile begins accelerating in the forward direction at 4 m/s². What is its net displacement after 4 s of acceleration?
 - (1) 12 m
 - (2) 0 m
 - (3) 6 m
 - (4) 3 m
 - (5) 9 m

6. (5 points) A police cruiser is traveling at 20 m/s. A car traveling in the same direction at 30 m/s passes the cruiser. At this moment the car begins to accelerate in the forward direction at a rate of 2 m/s², and the cruiser begins to accelerate in the forward direction at 4 m/s². How far does the cruiser travel until it catches up to the car?
 - (1) 400 m
 - (2) 500 m
 - (3) 200 m
 - (4) 100 m
 - (5) 200 m

7. (4 points) An astronaut wants to measure the acceleration of gravity on planet X. On Earth his powerful dart gun will shoot a dart a maximum horizontal distance of 30 m before the dart returns to the same height from which it was shot. He performs the same experiment on planet X, and finds that the dart gun shoots the dart a maximum distance of 60 m. What is the value of the acceleration due to gravity on Planet X?
 - (1) 4.9 m/s²
 - (2) 7.6 m/s²
 - (3) 9.8 m/s²
 - (4) 14.8 m/s²
 - (5) 2.5 m/s²

Instructor(s): *N. Sullivan*PHYSICS DEPARTMENT
Midterm Exam 1

September 19, 2012

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$$g = 9.80 \text{ m/s}^2$$

1. (3 points) A cyclist travels 8 km east and then 15 km north. How far is she from her starting point?
 - (1) 17 km
 - (2) 23 km
 - (3) 15 km
 - (4) 5 km
 - (5) 0 km

2. (4 points) A pebble is dropped from the top of a water well. If the pebble takes 2 seconds to hit the water, how deep is the well?
 - (1) 19.6 m
 - (2) 9.8 m
 - (3) 39.2 m
 - (4) 0 m
 - (5) 4.9 m

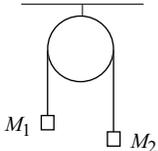
3. (5 points) Car A is traveling with a constant speed of 10 m/s. A drives by car B which is at rest. As soon as A passes B, B accelerates with a constant acceleration of 10 m/s². How long does it take B to catch up with A?
 - (1) 2.0 s
 - (2) 5.0 s
 - (3) 10.0 s
 - (4) 1.0 s
 - (5) 7.5 s

4. (6 points) An arrow is shot horizontally from the top of a 10 m tower. If the horizontal speed of the arrow is 12 m/s, how far from the foot of the tower does the arrow hit the ground?
 - (1) 17.1 m
 - (2) 12.3 m
 - (3) 10.0 m
 - (4) 8.5 m
 - (5) 2.5 m

5. (4 points) An astronaut equipped with full gear can jump a horizontal distance of 1 m on the surface of the earth. On the surface of the moon the acceleration due to gravity is 1/6 th of the value on earth. How far can the astronaut jump on the surface of the moon with the same equipment and same energy?
 - (1) 6.0 m
 - (2) 3.0 m
 - (3) 1.0 m
 - (4) 0.0 m
 - (5) 12.0 m

6. (4 points) A 100 kg car is traveling at 12 km/s. If the driver hits the brakes and the car skids to a stop in 10 m, what is the force of friction exerted by the tires as the car is braking?
 - (1) 720 N
 - (2) 360 N
 - (3) 120 N
 - (4) 1440 N
 - (5) 550 N

7. (4 points) In the Atwood's machine shown in the sketch, M_2 is 100 grams and M_1 is 50 grams. What is the magnitude of the acceleration of the masses when allowed to fall?



- (1) 3.27 m/s²
- (2) 6.54 m/s²
- (3) 13.1 m/s²
- (4) 0 m/s²
- (5) 1.63 m/s²

77777 Instructor(s): *N. Sullivan*

PHYSICS DEPARTMENT

PHY 2004

Exam 1

September 22, 2010

Name (print, last first): _____ Signature: _____

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$$g = 9.80 \text{ m/s}^2$$

The first answer given on this template are the correct answers.

1. A ball is thrown up vertically at 20 m/s. How high will the ball go?
(1) 20.4 m (2) 40.8 m (3) 5.1 m (4) 2 m (5) 7.1 m
2. Jane sets out on a walk. She walks 5 km east and then 12 km north. How far is she from her starting point?
(1) 13 km (2) 17 km (3) 7 km (4) 12 km (5) 5 km
3. A stone is dropped from a bridge. It hits the water 3 seconds after it is dropped. What is the height of the bridge above the water?
(1) 44.1 m (2) 22 m (3) 10.5 m (4) 66 m (5) 5.5 m
4. A block of mass 10 kg sits on an inclined plane. The coefficient of static friction between the block and the surface is 0.75. At what angle (in degrees) must the block be raised before it begins to slide?
(1) 37° (2) 53° (3) 89° (4) 5° (5) 45°
5. An automobile is initially backing up at a speed of 5 m/s. At time $t = 0$ the automobile begins accelerating in the forward direction at 4 m/s^2 . What is its net displacement after 4s of acceleration? (In other words, if $XI = 0$, what is the value of XF at $t = 4s$?)
(1) 12 m (2) 9 m (3) 6 m (4) 3 m (5) 0 m
6. A police cruiser is traveling at 20 m/s. A car traveling in the same direction at 30 m/s passes the cruiser. At this moment the car begins to accelerate in the forward direction at a rate of 2 m/s^2 , and the cruiser begins to accelerate in the forward direction at 4 m/s^2 . How far does the cruiser travel until it catches up to the car?
(1) 400 m (2) 300 m (3) 200 m (4) 100 m (5) 500 m

77777

7. An astronaut wants to measure the acceleration of gravity on planet X. On Earth her powerful dart gun will shoot a dart a maximum horizontal distance of 30 m before the dart returns to the same height from which it was shot. She performs the same experiment on planet X, and finds that the dart gun shoots the dart a maximum distance of 45 m.

What is the value of the acceleration due to gravity on Planet X?

- (1) 6.5 m/s^2 (2) 3.8 m/s^2 (3) 9.8 m/s^2 (4) 12.4 m/s^2 (5) 15.9 m/s^2
8. A 0.02 kg bullet initially traveling at 500 m/s imbeds itself in a 2 kg block. What is the kinetic energy of the block immediately after the collision?
- (1) 2500 J (2) 2000 J (3) 4500 J (4) 3500 J (5) 6500 J

Instructor(s): *N. Sullivan*PHYSICS DEPARTMENT
Midterm Exam 1

February 1, 2012

Name (print, last first): _____ Signature: _____

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$$g = 9.80 \text{ m/s}^2$$

1. (3 points) A ball is thrown up vertically at 25 m/s. How high will the ball go?
 - (1) 31.9 m
 - (2) 3.20 m
 - (3) 0.51 m
 - (4) 40.8 m
 - (5) 7.10 m

2. (3 points) Jane sets out on a walk. She walks 8 km east and then 3 km north. How far is she from her starting point?
 - (1) 8.5 km
 - (2) 23 km
 - (3) 17.1 km
 - (4) 3 km
 - (5) 30 km

3. (3 points) A stone is dropped from a bridge. It hits the water 1.5 seconds after it is dropped. What is the height of the bridge above the water?
 - (1) 11.0 m
 - (2) 39.2 m
 - (3) 19.6 m
 - (4) 5.5 m
 - (5) 1.10 m

4. (3 points) A block of mass 10 kg sits on an inclined plane. The coefficient of static friction between the block and the surface is 0.51. At what angle (in degrees) must the block be raised before it begins to slide?
 - (1) 27°
 - (2) 75°
 - (3) 47°
 - (4) 15°
 - (5) 67°

5. (4 points) An automobile is initially backing up at a speed of 5 m/s. At time $t = 0$ the automobile begins accelerating in the forward direction at 4 m/s². What is its net displacement after 4 s of acceleration?
 - (1) 12 m
 - (2) 0 m
 - (3) 6 m
 - (4) 3 m
 - (5) 9 m

6. (5 points) A police cruiser is traveling at 20 m/s. A car traveling in the same direction at 30 m/s passes the cruiser. At this moment the car begins to accelerate in the forward direction at a rate of 2 m/s², and the cruiser begins to accelerate in the forward direction at 4 m/s². How far does the cruiser travel until it catches up to the car?
 - (1) 400 m
 - (2) 200 m
 - (3) 100 m
 - (4) 300 m
 - (5) 75 m

7. (4 points) An astronaut wants to measure the acceleration of gravity on planet X. On Earth his powerful dart gun will shoot a dart a maximum horizontal distance of 30 m before the dart returns to the same height from which it was shot. She performs the same experiment on planet X, and finds that the dart gun shoots the dart a maximum distance of 45 m. What is the value of the acceleration due to gravity on Planet X?
 - (1) 6.5 m/s²
 - (2) 7.6 m/s²
 - (3) 9.8 m/s²
 - (4) 14.8 m/s²
 - (5) 2.5 m/s²

8. (5 points) A 5 kg mass is held in equilibrium by 2 ropes as shown. What is the value of T_2 , the tension in rope 2?

- (1) 36 N
- (2) 13 N
- (3) 47 N
- (4) 61 N
- (5) 72 N

