

Physics 203– Hourly Exam 1

October 4, 2007

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Your name sticker

with exam code



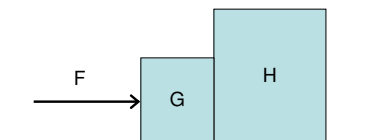
1. The exam will last from 9:40 to 11:00 p.m. Use a #2 pencil to make entries on the answer sheet. Enter the following id information now, before the exam starts.
2. In the section labelled NAME (Last, First, M.I.) enter your last name, then fill in the empty circle for a blank, then enter your first name, another blank, and finally your middle initial.
3. Under STUDENT # enter your 9-digit Rutgers ID number.
4. Enter 203 under COURSE, and your section number under SEC.
5. Under CODE enter the exam code given above.
6. During the exam, you may use a calculator and are allowed one handwritten 8.5" by 11" sheet of paper with whatever information you want (both sides OK). You may not use cell phones, text messaging, Blackberry, email, or any other electronic communication devices. **Please make sure your phone is turned off.**
7. The exam consists of 15 multiple choice questions. For each multiple choice question mark only one answer on the answer sheet. There is no deduction of points for an incorrect answer, so even if you cannot work out the answer to a question, you should make an educated guess.
8. Before starting the exam, make sure that your copy contains all 15 questions. Raise your hand if this is not the case, and a proctor

will help you. Also raise your hand during the exam if you have a question.

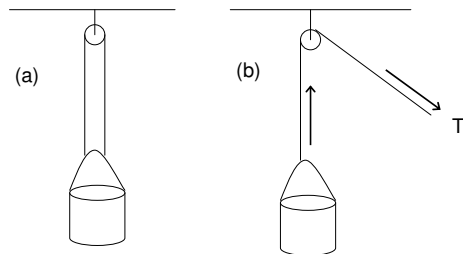
9. A proctor will check your name sticker and your student ID sometime during the exam. Please have them ready.
10. You are not allowed to give, solicit, or receive help on the exam, except help from a proctor. You may not change your seat without permission from a proctor.
11. Please sign below to indicate that you have read and understood these instructions.
12. When you are done, please tear of and hand in this cover sheet, and hand in your answer sheet. You may keep the exam questions.

SIGNATURE: _____

- A girl throws a rock horizontally, with a velocity of 10 m/s, from a bridge. It falls 20 m to the water below. How far does the rock travel horizontally before striking the water? (take $g = 10 \text{ m/s}^2$)
 - 14 m
 - 16 m
 - 20 m
 - 24 m
 - 26 m
- An arrow is shot from a bow, at an original speed of v_0 . Neglect air resistance. When it returns to the same original level its speed will be
 - $v_0/2$
 - v_0
 - $2v_0$
 - $9.8v_0$
 - $4.9v_0$
- A car travelling at 30 miles/hour is able to stop in a distance d . Assuming the same braking force, what distance does this car require to stop when it is travelling twice as fast?
 - d
 - $\sqrt{2}d$
 - $2d$
 - $4d$
 - none of the other answers
- A stone is thrown vertically upwards from the ground. What statement is true during its flight?
 - its velocity is always positive
 - its acceleration is always downwards
 - its acceleration is zero at the highest point reached
 - its velocity is never zero
 - its acceleration is different on its upward and downward flight
- A car decelerates uniformly and comes to a stop after 10 s. The car's average velocity during deceleration is 50 km/h. What is the car's deceleration while slowing down? (hs = hour second)
 - 12 km/hs
 - 10 km/hs
 - 8 km/hs
 - 5 km/hs
 - 4 km/hs
- A child's toy is suspended from the ceiling by means of a string. The earth pulls downward on the toy with its weight force of 8 N. If this is the action force, what is the reaction force?
 - the string pulling upward on the toy with an 8 N force
 - the ceiling pulling upward on the string with an 8 N force
 - the string pulling downwards on the ceiling with an 8 N force
 - the toy pulling upward on the earth with an 8 N force
 - none of the other answers
- Two cardboard boxes full of books are in contact with each other on a frictionless surface. Box H has twice the mass of box G. If you push on box G with horizontal F , causing the boxes to slide across the surface with acceleration a , then box H will experience a net force of
 - $(2/3) F$
 - F
 - $(3/2) F$
 - $2 F$
 - insufficient information



8. During the investigation of a traffic accident, the police find skid marks 90 m long. They determine the coefficient of friction between the car's tires and the roadway to be 0.5 for the prevailing conditions. Estimate the speed of the car when the brakes were applied. ($g = 9.8 \text{ m/s}^2$)
- 19.6 m/s
 - 24.1 m/s
 - 26.2 m/s
 - 29.7 m/s
 - 33.1 m/s
9. Trudie, whose mass is 60 kg, stands on a bathroom scale in an elevator at rest. What will the scale read when the elevator is accelerating upward at 4.0 m/s^2 ? ($g = 10 \text{ m/s}^2$)
- 240 N
 - 600 N
 - 940 N
 - 360 N
 - none of the other answers
10. Part a) of the drawing shows a bucket of water suspended from the pulley of a well. The tension in the rope is 100N. Part b) shows the same bucket of water being pulled up from the well at constant velocity. What is the tension T in the rope in part b.



- $< 100 \text{ N}$
- 100 N
- $100 \text{ N} < T < 200 \text{ N}$
- 200 N
- insufficient information

11. If you blow up a balloon, and then release it, the balloon will fly away as the air rushes out. This is an illustration of
- Newton's First Law
 - Newton's Second Law
 - Newton's Third Law
 - Galileo's Law of Inertia
 - Newto's Law of Universal Gravitation
12. A block is hung by a string from the inside roof of a van. When the van goes straight ahead at a speed of 28 m/s, the block hangs vertically down. But when the van maintains this same speed around an unbanked curve (radius = 150 m), the string makes an angle θ with the vertical. Find θ . ($g = 9.8 \text{ m/s}^2$)
- 30°
 - 22°
 - 32°
 - 24°
 - 28°
13. A car travels at a constant speed around a circular track whose radius is 2.6 km. The car goes once around the track in 360s. What is the magnitude of the centripetal acceleration of the car?
- 1.84
 - 0.79
 - 0.50
 - 0.25
 - 0.98
14. The displacement vector \vec{r} in the x - y plane has a magnitude of $r = 175 \text{ m}$ and points at an angle of 50° relative to the x -axis. What are the x and y components of this vector, respectively?
- 117m, 152m
 - 134m, 112m
 - 112m, 134m
 - 152m, 117m
 - insufficient information

15. The engine of a boat drives it across a river that is 1800 m wide. The velocity \vec{v}_{BW} of the boat relative to the water is 4 m/s directed perpendicular to the current. The velocity \vec{v}_{WS} of the water relative to the shore is 2 m/s. The time t for the boat to cross the river, and the speed v_{BS} of the boat relative to the shore are
- a) 510 s, 4 m/s
 - b) 450 s, 4.5 m/s
 - c) 510 s, 6 m/s
 - d) none of the other answers
 - e) 450 s, 4.5 m/s