Physics 203– First Hourly Exam
October 5, 2006
Prof. George Horton

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 **RUID Number**..
4. Enter 203 under COURSE, and your section number under SEC.
5. Under **CODE** enter the exam code given above.
6. You may bring an 8 1/2" x 11" sheet of paper with notes of your choice and a standard hand calculator.
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. Always select the best answer to each question.
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. Answers and results will be posted on the 203 website on 10/6/2006.
10. A proctor will check your name sticker and your student ID sometime during the exam. Please have them ready.
11. Please hand in only the cover sheet.
12. If you have questions about the hourly or the grading contact Rafael Greenblatt.

1. A ball is thrown up and reaches a maximum height of 2.0 m. What is its speed in m/s when it reaches a height of 1.0 m?

   a) 4.5
   b) 6.0
   c) 8.5
   d) 10
   e) 2.5

2. A rock is thrown up by a boy and caught by him on its return after 4 seconds. How high has it risen (in meters) after 2 seconds of its flight?

   a) 4.9
   b) 9.8
   c) 23
   d) 19.6
   e) 26.1

3. An object is thrown up with a speed of 3 m/s from a ladder 4 m above the ground. Its acceleration is:

   a) 9.81 m/s^2 on the way up and -9.81 m/s^2 on its way down
   b) 9.81 m/s^2 while in motion
   c) -9.81 m/s^2 while in motion
   d) -9.81 m/s^2 on the way up and +9.81 m/s^2 on the way down
   e) the answer depends on the choice of coordinate system

4. The vector $\vec{C}$ satisfies the relations $C_x = -C_y \neq 0$. What are the possible directions of $\vec{C}$?

   a) $\vec{C}$ lies in the second quadrant and makes an angle of 45° with the y-axis.
   b) $\vec{C}$ lies in the fourth quadrant and makes an angle of 45° degrees with the x-axis.
   c) $\vec{C}$ lies in the third quadrant and makes an angle of 45° with the negative y-axis.
   d) No value of $\vec{C}$ satisfies these conditions.
   e) Two of these answers are correct.

5. You are riding in a boat whose speed relative to the water is 6.1 m/s. The boat points at an angle of 25° upstream on a river flowing at 1.4 m/s (see Fig. 1). What is your velocity in m/s relative to the ground?

   a) 5.6, 12° upstream
   b) 5.6, 12° downstream
   c) 1.8, 12° upstream
   d) 1.8, 12° downstream
   e) 2.6, 25° upstream

6. A projectile is launches with an initial speed v at an angle θ above the horizontal. It lands at the same horizontal level. What is the magnitude of its average velocity?

   a) v
   b) v/2
   c) v sin θ
   d) v tan θ
   e) v cos θ

7. A cork shoots out of a champaign bottle at an angle of 35.0° above the horizontal. If the cork travels a horizontal distance of 1.30 m in 1.25 s, what was its initial speed in m/s?

   a) 1.07
   b) 1.27
   c) 1.15
   d) 1.30
   e) 1.25

8. What is the launch angle for which the range and maximum height of a projectile are the same, on a horizontal plane?

   a) 45°
   b) 56°
   c) 66°
   d) 76°
   e) 82°

9. A bowling ball is hung by a string from the ceiling while an identical string hangs from the lowest part of the bowling ball and has a force F pulling down on the string. The lower string breaks first because

   a) because F is large
   b) because F is small
   c) because F is large and applied slowly
   d) because F is large and applied suddenly
   e) because F is small and applied slowly

10. A mass m is supported by two strings making angles of 60° and 30° with the horizontal (see Fig. 2). What is the tension in each string?

   a) $T_1 = \sqrt{3}mg; T_2 = mg$
   b) $T_1 = mg; T_2 = \frac{mg}{\sqrt{3}}$
   c) $T_1 = \sqrt{3}mg; T_2 = 3mg$
   d) none of these
   e) $T_1 = \frac{\sqrt{3}}{2}mg; T_2 = \frac{mg}{2}$

11. A skier speeds down a straight, frictionless trail which makes an angle θ with the horizontal. Does the net force exerted on the skier change with θ?

   a) increases as θ increases
   b) decreases as θ increases
   c) stays the same as θ increases
   d) increases as θ decreases
   e) stays the same as θ decreases

12. Two masses exert a force F on each other. Suddenly, one mass is doubled and the other tripled while their distance apart is halved. The new force between them equals

   a) F
   b) 6 F
   c) 36 F
   d) 24 F
   e) 3 F/2

13. A circus performer slides from rest down a straight 3 m long ramp, just above a pool, inclined at 23° to the horizontal. The coefficient of dynamic friction is $\mu_k = 0.26$. How long does it take for the performer to make a splash in the pool?

a) 1.0 s
b) 1.5 s
c) 2.0 s
d) 2.5 s
e) 3.0 s

14. Three masses of 1 kg, 2 kg, and 3 kg are coupled while on a smooth, horizontal plane. The 3 kg mass is pulled by a force of 6,000 N as shown in Fig. 3. What is the acceleration of the system in m/s^2 and the horizontal force on the 1 kg mass in N?

a) 20, 20
b) 10, 60
c) 20, 60
d) 10, 10
e) 10, 20

15. An automobile is accelerating on a country road. Which pair of forces represents a Newtonian action-reaction pair

a) the normal force of the road on the tires and the weight of the automobile.
b) the thrust of the road on the tires and the force of the air on the front of the automobile.
c) the upward force of the road on the tires and the upward force of the tires on the road.
d) the horizontal force of the tires on the road and the horizontal force of the road on the tires.
e) two of these.

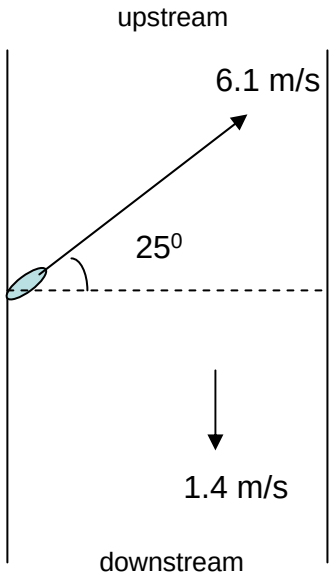

Fig. 1

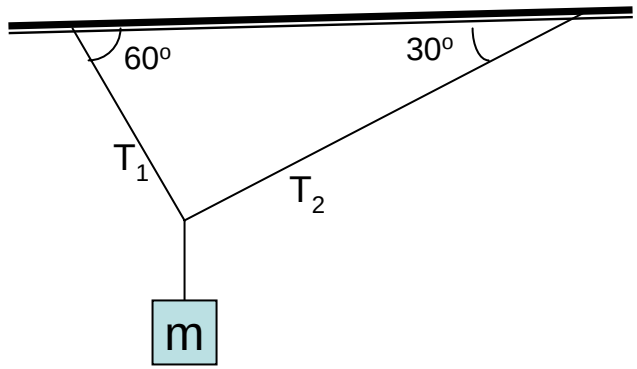

Fig. 2

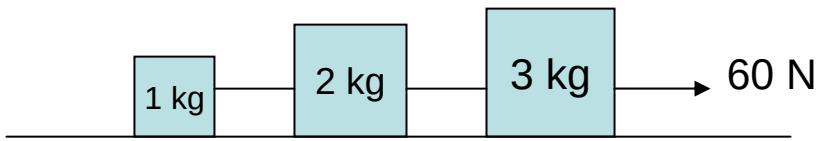

Fig. 3