Instructor(s): *J. Ipser*

PHYSICS DEPARTMENT

PHY 2004   1st Exam   September 21, 2005

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 76–80 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 with scratch work most questions demand.
(4) **Blacken the circle of your intended answer completely, using a #2 pencil or <u>blue</u> or <u>black</u> ink**. Do not make any stray marks or some answers may be counted as incorrect.
(5) The answers are rounded off. Choose the closest to exact. There is no penalty for guessing.
(6) **Hand in the answer sheet separately.**

Suggestion: Try ***** problems first.
$g = 9.80$ m/s^2

---

1. ***** A hiker walks 200 m at angle $\theta = 45°$ measured counterclockwise with respect to the positive x direction. She then walks a straight-line path that is represented by the displacement $\vec{D}$. Following the second segment, she walks for 500 m at angle $\theta = 270°$ measured counterclockwise with respect to the positive x direction and ends up at her starting point. What is the magnitude of $\vec{D}$?

   (1) 385 m   (2) 200 m   (3) 500 m   (4) 780 m   (5) 960 m

2. ***** An auto goes from 0 to 30 m/s in 6 s and then immediately begins to decelerate at a uniform rate and comes to rest. The auto travels a total distance of 130 m. Assume 1-dimensional motion. What is the magnitude of the auto's decleeration in m/s^2?

   (1) 11.3   (2) 9.4   (3) 7.2   (4) 5.3   (5) 2.9

3. An auto passes a parked police cruiser at 40 m/s. The cruiser immediately takes off after the auto as the auto passes by. The police cruiser maintains constant acceleration of 5 m/s^2. The auto begins to decelerate (slow down) at a constant rate of 2 m/s^2 when it passes the cruiser. How much time is required for the police cruiser to catch up to the auto?

   (1) 11.4 s   (2) 22.5 s   (3) 18.1 s   (4) 15.3 s   (5) 43.8 s

4. Autos A and B are heading directly at each other. Auto A's initial speed is 50 m/s and at time $t = 0$ it begins to decelerate at a constant rate of 5 m/s^2. Auto B's initial speed is 40 m/s and at time $t = 0$ it begins to decelerate at a contant rate of 4 m/s^2. The autos collide after 4 s. What is the distance btween the autos at time $t = 0$?

   (1) 288 m   (2) 390 m   (3) 420 m   (4) 475 m   (5) 138 m

5. A ball is thrown straight up from the bottom of a hole that is 10 m <u>below</u> the ground. The ball is thrown up with an initial velocity of 20 m/s. How long is it in the air before it reaches ground level during its downward motion?
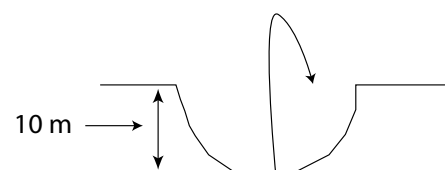
   (1) 3.5 s   (2) 1.3 s   (3) 2.4 s   (4) 4.6 s   (5) 5.7 s

6. A rock is thrown out horizontally from the top of a tower of height 20 m. When it reaches the ground, its velocity vector makes an angle of 60° with respect ot the ground. At what initial speed is the rock thrown out from the tower?
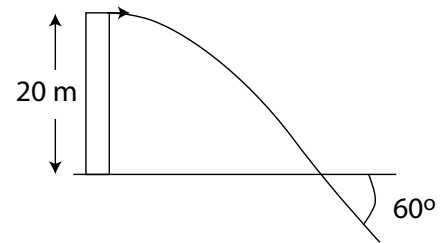
(1) 11 m/s   (2) 18 m/s   (3) 14 m/s   (4) 28 m/s   (5) 39 m/s

7. * A ball is thrown straight down from the top of a building of height 30 m. The ball takes 2 seconds to reach the ground. What is the ball's initial speed in m/s?

(1) 5.2   (2) 3.2   (3) 1.2   (4) 7.6   (5) 9.3

8. * On Earth a cannon shoots a cannonball a horizontal distance of 500 m when it is aimed 45° above the horizontal. On Planet X, the same cannon shoots a cannonball a horizontal distance of 400 m when it is aimed 15° above the horizontal. What is the acceleration of gravity on Planet X in m/s^2?

(1) 6.1   (2) 10.4   (3) 19.6   (4) 14.3   (5) 3.6