Instructor(s): *J. Ipser*

PHYSICS DEPARTMENT

PHY 2004 Section 3779, Exam 1 September 22, 2004

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 blue or black 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.**

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

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1. An auto slows down at a constant rate (contant acceleration) over a distance of 50 m and comes to rest in 5 s. What is the auto's initial speed in m/s?

(1) 20 (2) 10 (3) 15 (4) 25 (5) 30

2. An auto passes a parked police cruiser at 40 m/s. At the moment the auto begins to accelerate at a constant rate of 3 m/s and the police cruiser begins to chase the auto, maintaining a constant acceleration of 5 m/s^2. How much time passes before the police cruiser catches up with the auto?

(1) 40 s (2) 20 s (3) 7 s (4) 10 s (5) 15 s

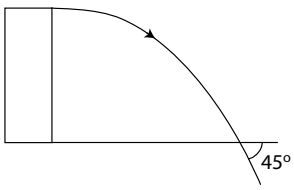
3. Ball A is thrown straight down from a height of 30 m above the ground. At the same time, ball B is thrown straight up from the ground with speed 10 m/s. After 2 s, the balls are at the same height. With what speed in m/s is A thrown down?

(1) 5 (2) 10 (3) 2.5 (4) 7.5 (5) 25

4. A particular cannon can shoot a cannonball a maximum distance of 500 m on Earth. The acceleration of gravity on planet X is 4 m/s^2. How far (maximum distance) can the cannon shoot the cannonball on planet X?

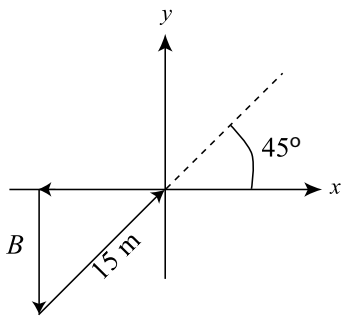
(1) 1225 m (2) 1605 m (3) 1825 m (4) 2135 m (5) 2955 m

5. A rock is projected out horizontally from a tower. When the rock reaches the ground, it makes an angle of 45° with respect to the horizontal as shown. The rock is in the air for 2 s. At what speed in m/s is the rock projected out from the tower?



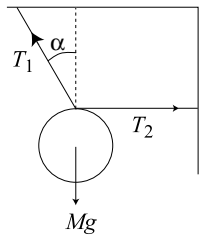
(1) 19.6 (2) 14.5 (3) 9.6 (4) 23.7 (5) 28.9

6. A lady walks west (negative x direction) for 10.6 s at 1 m/s. She then walks south (negative y direction) a distance B. Finally, she walks a distance of 15 m at an angle of 45° measured counterclockwise with respect to the east (the positive x direction). What is the value of B?



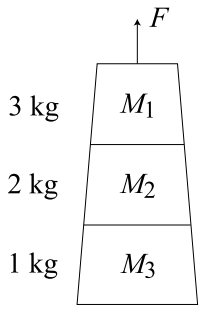
(1) 10.6 m (2) 12.8 m (3) 9.1 m (4) 7 m (5) 5.2 m

7. A mass $M = 2$ kg is supported in equilibrium by 2 wires. Wire 1 makes an angle $\alpha = 30°$ with respect to the vertical, and wire 2 is horizontal. What is the tension T_1 in wire 1?



(1) 22.6 N (2) 18.4 N (3) 14.3 N (4) 26.1 N (5) 98.6 N

8. Three masses of mass $M_1 = 3$kg, $M_2 = 2$kg, and $M_3 = 1$kg, move above Earth. An upward vertical force F is applied to M_1 as shown. The upward force of M_2 on M_3 is 20 N. What is the upward acceleration of the 3-mass system in m/s^2?



(1) 10.2 (2) 6.8 (3) 1.1 (4) 4.3 (5) 20.7