

Instructor(s): *J. Ipser*PHYSICS DEPARTMENT
1st Exam

September 25, 2006

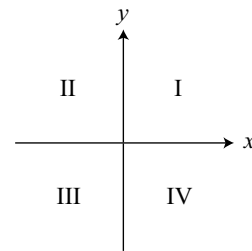
Name (print, last first): _____ Signature: _____

*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.**

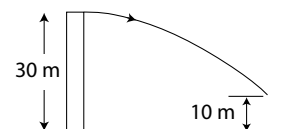
- (1) **Code your test number on your answer sheet (use lines 76–80 on the answer sheet for the 5-digit number).** Code your name on your answer sheet. **DARKEN CIRCLES COMPLETELY.** Code your UFID number on your answer sheet.
- (2) Print your name on this sheet and sign it also.
- (3) Do all scratch 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.
- (5) The answers are rounded off. Choose the closest to exact. There is no penalty for guessing. If you believe that no listed answer is correct, **leave the form blank.**
- (6) **Hand in the answer sheet separately.**

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

1. A vector A of magnitude 20 m lies in quadrant IV and makes an angle of 60° with the x -axis in that quadrant. Vector B , of magnitude 30 m, lies in quadrant III and makes an angle of 30° with respect to the x -axis in that quadrant. What is the magnitude of the vector $A-B$?



- (1) 36.1 m (2) 10.3 m (3) 5.6 m (4) 19.8 m (5) 26.3 m
2. An auto accelerates from rest at a constant rate for 10 s. The auto then immediately begins to brake with deceleration of 7 m/s^2 and comes to rest after braking for 5 s. What was the rate of acceleration of the auto from rest?
- (1) 3.5 m/s (2) 5 m/s (3) 6.5 m/s (4) 9.5 m/s (5) 12 m/s
3. An auto passes a parked police cruiser. The auto maintains a constant velocity of 40 m/s in the x -direction. The cruiser is traveling at 10 m/s in the x -direction when the auto passes, and the cruiser immediately begins to chase the auto with an acceleration of 3 m/s^2 . How much time passes before the cruiser catches up to the auto?
- (1) 20 s (2) 15 s (3) 10 s (4) 25 s (5) 30 s
4. A rock is thrown up from the ground with speed 30 m/s. When the rock is coming back down, what is the time interval between the moment the rock's downward speed is 10 m/s and the moment it reaches the ground?
- (1) 2 s (2) 1 s (3) 3 s (4) 6 s (5) not enough information
5. A rock is thrown out horizontally from a tower of height 30 m with a speed of 20 m/s. What is the rock's speed (magnitude of its velocity vector) when it is at a height of 10 m?

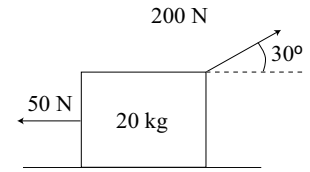


- (1) 28 m/s (2) 36 m/s (3) 23 m/s (4) 18 m/s (5) 13 m/s

6. A cannon shoots a cannonball a distance of 10^3 m on Earth when it is aimed 20° above the horizontal. How far does the same cannon shoot a cannonball on the Moon if it is aimed at 45° above the horizontal? The acceleration of gravity on the Moon is $\frac{1}{6}$ that on Earth.

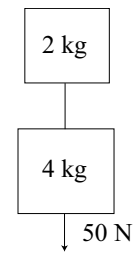
(1) 9300 m (2) 6500 m (3) 280 m (4) 4600 m (5) 1875 m

7. A block of mass 20 kg is pulled across a horizontal floor by an applied force of 200 N acting at an angle of 30° above the horizontal as shown. The floor exerts a retarding horizontal friction force of 50 N. If the block starts from rest, how much time is required for it to travel a horizontal distance of 5 m?



(1) 1.25 s (2) 2.5 s (3) 0.5 s (4) 4 s (5) 6.5 s

8. A 4 kg block is connected to a 2 kg block by a rope as shown. A 50 N downward vertical force is applied to the 4-kg block. What is the magnitude of the force with which the 2 kg block pulls on the rope?



(1) 16.6 N (2) 8.3 N (3) 4.2 N (4) 2.3 N (5) 34.7 N