

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

September 24, 2007

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.**

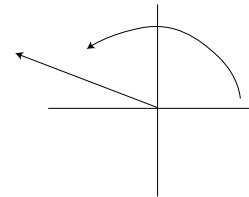
$$g = 9.80 \text{ m/s}^2$$

1. A trip consists of three legs. All angles are measured counterclockwise with respect to the positive x axis as shown. The following information is given:

Leg 1: 5 m at  $30^\circ$                       Leg 2: 5 m at  $150^\circ$

Net displacement: 10 m at  $270^\circ$

What is the angle associated with Leg 3?



- (1)  $270^\circ$                       (2)  $180^\circ$                       (3)  $90^\circ$                       (4)  $137^\circ$                       (5)  $55^\circ$
2. An automobile is initially traveling backwards at 3 m/s at  $t = 0$ . At this moment, the driver places the transmission into first gear and immediately establishes a constant acceleration of  $2 \text{ m/s}^2$  in the forward direction. What is the net displacement after 4 s?
- (1) 4 m                      (2) 8 m                      (3) 16 m                      (4) 24 m                      (5) 12 m
3. An auto passes a parked police cruiser at a constant velocity of 15 m/s. When the auto is 30 m past the cruiser's position, the cruiser takes off after the auto, maintaining a constant acceleration of  $4 \text{ m/s}^2$ . How much time is required for the cruiser to catch up to the auto?
- (1) 9 s                      (2) 4 s                      (3) 60 s                      (4) 15 s                      (5) 23 s
4. An auto starts from rest and maintains a constant acceleration of  $4 \text{ m/s}^2$  for 10 s. It then immediately begins to decelerate (brake) at a constant rate. It travels a total distance of 300 m (including both phases). What is the magnitude of the auto's acceleration while it is slowing down, in  $\text{m/s}^2$ ?
- (1) 8                      (2) 4                      (3) 2                      (4) 24                      (5) not enough information
5. Ball A is thrown up from the ground at time  $t = 0$  with initial speed 40 m/s. At the same moment, ball B is thrown up from a tower of height 40 m with a speed of 10 m/s. At what time are the balls at the same height?
- (1) 1.3 s                      (2) 2.2 s                      (3) 0.5 s                      (4) 3.6 s                      (5) 4.7 s
6. Ball A is thrown straight up from the ground with initial speed  $v^*$  and reaches height  $h$ . Ball B is thrown straight up from the ground and reaches a height of  $16h$ . What is the initial speed of ball B?
- (1)  $4v^*$                       (2)  $2v^*$                       (3)  $3v^*$                       (4)  $9v^*$                       (5)  $6v^*$

