Physics 1303(001),1403(801) **Professor Scalise**
Spring 1996 **Midterm #1**

Name: ________________ ID number:________________

This exam is worth 100 points. It consists of 15 multiple-choice questions worth 5 points each and a partial credit section worth a maximum of 25 points.

Don't get hung up on the questions. They should only take a few minutes each. If you find yourself spending more than a few minutes on a question you are probably looking at it the wrong way. You should skip it temporarily and return to it later.

NOTE - The equation sheets are on the last page. If you think that it makes referring to them easier, you can remove them from the rest of the exam.

GOOD LUCK

1. Three vectors sum to zero. Their magnitudes **cannot** be
   - (a) 2,4,5
   - (b) 3,7,9
   - (c) 2,6,9
   - (d) 3,6,6
   - (e) 3,3,3

2. The speed of a particle in kilometers/hour is given by $v(t) = 17t^3 + 4t$, with t measured in hours. What are the (hidden) units of the coefficient 17?
   - (a) km/(hr^4)
   - (b) km/(hr^2)
   - (c) 1/(hr^3)
   - (d) km/hr
   - (e) 1

3. What is the polar angle of the sum of the two vectors (4 m, 60°) and (2 m, 180°)?

   (a) 36°
   (b) 240°
   (c) 90°
   (d) 210°
   (e) 0°

4. Vector $\vec{B}$, when added to the vector $\vec{C} = 3\hat{\boldsymbol{\imath}} + 4\hat{\boldsymbol{\jmath}}$, yields a resultant vector which is in the positive y direction and has a magnitude equal to that of $\vec{C}$. What is the vector $\vec{B}$?

   (a) (-1,-3)
   (b) (3,1)
   (c) (3,-1)
   (d) (-3,1)
   (e) (-1,3)

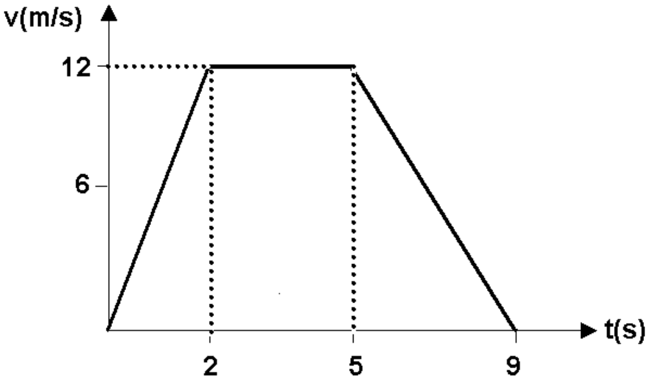
5. A stone is tossed straight up into the air. At its highest point, the stone has
   - (a) downward velocity and downward acceleration
   - (b) zero velocity and zero acceleration
   - (c) zero velocity and downward acceleration
   - (d) upward velocity and downward acceleration
   - (e) upward velocity and zero acceleration

6. Of the following situations, which one is impossible?
   - (a) a body having zero instantaneous velocity and non-zero instantaneous acceleration
   - (b) a body having constant velocity and variable acceleration
   - (c) a body having instantaneous velocity east and constant acceleration west
   - (d) a body having constant acceleration and variable velocity
   - (e) a body having instantaneous velocity east and constant acceleration north

7. A track star in the broad jump goes into the jump at 12 m/s and launches himself at 20° above the horizontal. How long is he in the air before returning to Earth? (Be sure that you solve for the **whole** time.)

   (a) 1.2 s
   (b) 1.0 s
   (c) 0.42 s
   (d) 2.3 s
   (e) 0.84 s

8. The graph below represents the one-dimensional motion of a car. What is the average acceleration between 2 s and 9 s?



   (a) -1.3 m/s^2
   (b) -3.0 m/s^2
   (c) -1.7 m/s^2
   (d) 1.3 m/s^2
   (e) 60 m/s^2

9. What is the change in velocity from $t = 0$ s to $t = 5$ s?