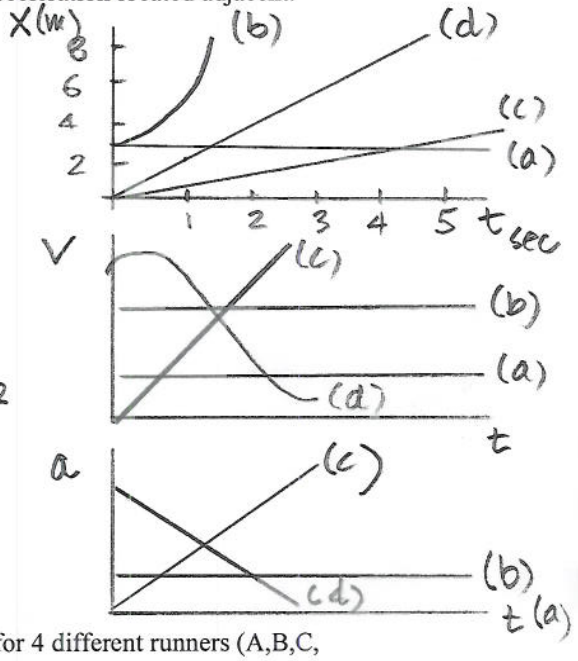
KEY

Physics 110 Midterm Exam

Answer the following questions by bubbling the scantron sheet. You are allowed to use a calculator and up to four cheat sheets. Good luck.

The following set of questions refer to the plots of position, velocity, and acceleration located adjacent.



C+D 1. Which trajectories are consistent with constant non-zero velocity?

C+D 2. Which velocities are accelerated?

B 3. Which trajectory contains the fastest velocity?

B 4. Which trajectory shows the largest acceleration?

D 5. Which velocity contains the largest acceleration?

C 6. Which trajectory belongs to the slowest but still moving object?

7. Which position and velocity is consistent with acceleration (a)?
   a. (a), (b)
   b. (b), (c)
   c. (a), (d)
   d. (c), (c)
   e. (d), (b)

$a = 0$
$v = \text{constant}$
$\times at$
$a = a_0 \; v \; at \; \times at^2$

B 8. Likewise for acceleration (b).

9. What is the velocity of trajectory (d)?
   a. 1m/s
   b. 2m/s/s
   c. 2m/s
   d. 4m/s

The following data sets of position vs. time are taken at 1 second intervals for 4 different runners (A,B,C, and D):

A. 1m, 2m, 3m, 4m, …
B. 3m, 12m, 27m, 48m, …
C. 1m, 3m, 5m, 7m, …
D. 5m, 20m, 45m, 80m, …

B+D 10. Which are constant acceleration?

A+C 11. Which are constant velocity?

12. What is the acceleration of runner D?
   a. 0 m/s/s
   b. 10 m/s/s
   c. 10 m/s
   d. 6 m/s/s
   e. 2 m/s/s

13. What is the acceleration of runner C?
   a. 0 m/s/s
   b. 10 m/s/s
   c. 10 m/s
   d. 6 m/s/s
   e. 2 m/s/s

14. Two balls are thrown with the same v_{x0} but different speeds. Ball 1 lands twice as far away as Ball 2. What is the relationship between the v_{y0} of each ball?
   a. They are the same
   b. 1 is twice that of 2
   c. 1 is $\sqrt{2}$ that of 2
   d. 1 is 4 times that of 2
   e. 1 is ½ that of 2

$R_1 = 2R_2$, same v_{x0} $\Rightarrow T_1 = 2T_2$

$v_{y0_1} = 2v_{y0}$