

MECH 310 – Mechanics III (Dynamics)
TEST NUMBER 1
May 8, 2003
Dr Richard Stanley
1:15 – 2:45 PM
2-226C AB

INSTRUCTIONS:

Open Book and Open Notes.

Blue Book is required.

1 ½ Hour Test Time

Show All Work. Partial Credit will be awarded only for CLEAR work.

1) Superman flies in a straight line with the following relationship:

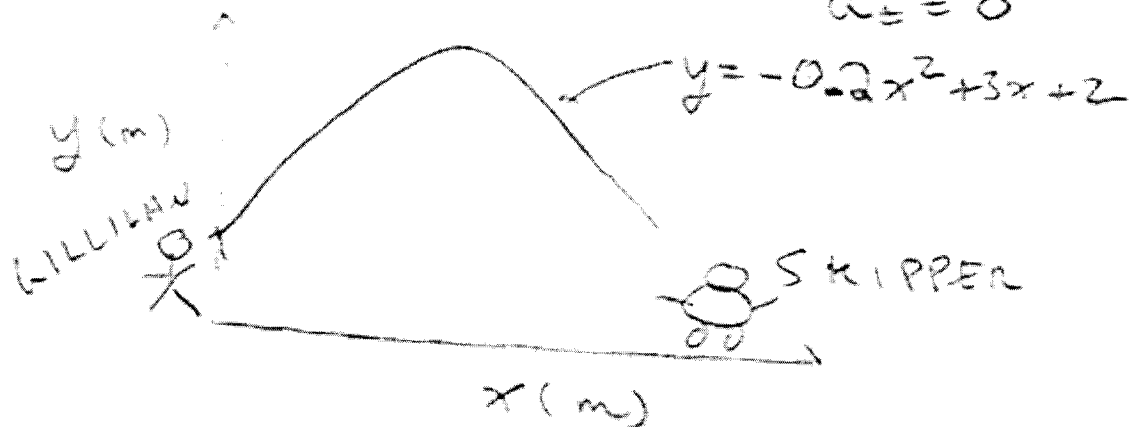
20 PTS

$$a = \frac{1}{20}t^2 + 5t \text{ (m/s}^2\text{)}$$

If he starts from rest, how far has he travelled when $t = 100$ sec?
How fast is he going at this time?

2) Gilligan throws a pop air plane to the Skipper. The professor calculates the path as shown below. ($v = 3 \text{ m/s}$)
 $a = 0$

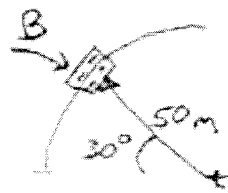
20 PTS



What is the acceleration of the pop air plane at $x = 4 \text{ m}$ W X-Y COORDINATES?

3) WHAT IS A's velocity + acceleration relative to B?

10 PTS



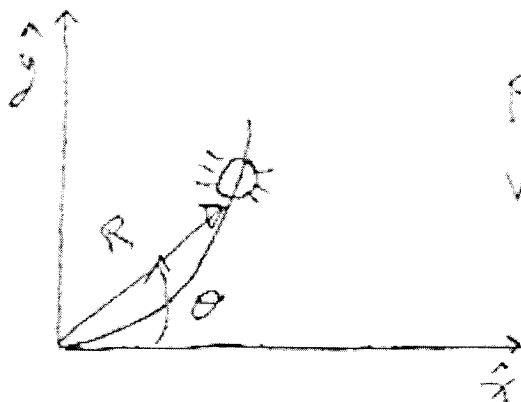
$$v_B = 20 \text{ m/s}$$

$$a_{B,t} = 1 \text{ m/s}^2$$

$$\begin{array}{|c|} \hline \text{A} \\ \hline \end{array} \rightarrow \begin{array}{l} a_A = 10 \text{ m/s}^2 \\ v_A = 2 \text{ m/s} \end{array}$$

4

20 pts



$$R(\theta) = 25 \sin \theta$$

$$V = 5 \text{ m/s}$$

(constant)

A BUG SCURRIES ABOUT AS SHOWN ABOVE.
 AT $\theta = 45^\circ$, what is the bug's velocity
 in $R-\theta$ coordinates?

5

Eddie Haskell throws a baseball
 to the beaver. What is the baseball's
 initial velocity?

20 pts

