Phys101 Assignment Cover Sheet

First Name:_____ Last Name:_____ Mark: _____

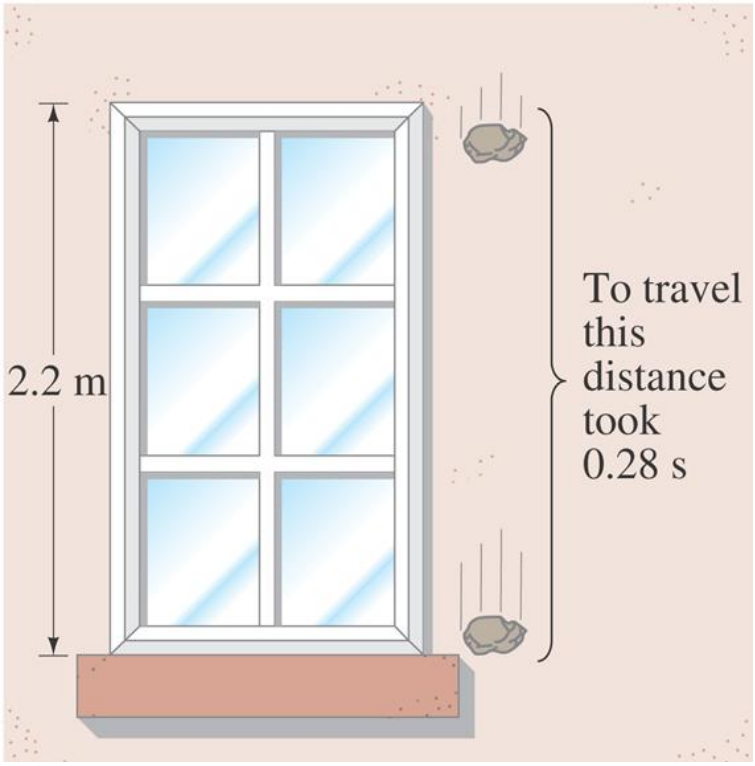
Student ID:_____ Date: _____

Phys101 Written Assignment #1

Due Wed/Thur Jan 12/13, 2011, at the end of your tutorial

Textbook (Giancoli, 6th edition) page 41 question #44.

44. (III) A falling stone takes 0.28 s to travel past a window 2.2 m tall. From what height above the top of the window did the stone fall?



P101 WRITTEN ASSIGNMENT #1

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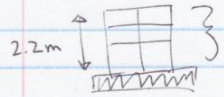
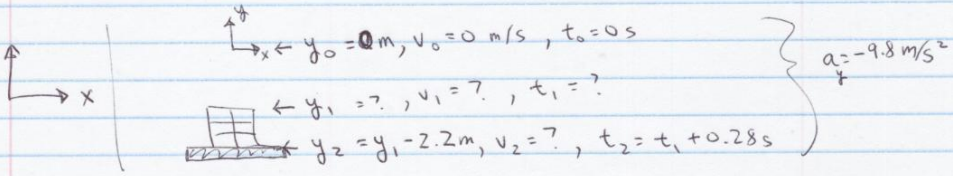


use:



① find v_1:

$$y = y_0 + v_0 t + \frac{1}{2} a_y t^2$$

from $y_1 \to y_2$: $y_2 = y_1 + v_1 t_{1\to 2} + \frac{1}{2} a_y (t_{1\to 2})^2$

$$y_1 - 2.2 = y_1 + v_1 (t_1 + 0.28 - t_1) + \frac{1}{2}(-9.8)(t_1 + 0.28 - t_1)^2$$

$$-2.2 = v_1 (0.28) + \underbrace{\frac{1}{2}(-9.8)(0.28)^2}_{-0.384}$$

$$v_1 = -6.49 \text{ m/s}$$

② find t_1:

$$\bar{a} = \frac{\Delta v}{\Delta t}$$

from $y_0 \to y_1$: $-9.8 = \frac{v_1 - v_0}{\Delta t} = \frac{-6.49 - 0}{\Delta t}$

$$\Delta t = t_1 - t_0 = t_1 = 0.662 \text{ s}$$

③ find y_0:

$$y = y_0 + v_0 t + \frac{1}{2} a_y t^2$$

from $y_0 \to y_1$: $y_1 = y_0 + v_0 t_{0\to 1} + \frac{1}{2} a_y (t_{0\to 1})^2$

$$y_1 = 0 + 0(0.662) + \frac{1}{2}(-9.8)(0.662)^2$$

$y_1 = -2.1$ m $\therefore$ y_0 is 2.1 m above the window