

Physics 101Rec  
Quiz#1  
Chapter 2a

Instructor: Dr. A. Mekki

Name: Key Id: \_\_\_\_\_ Sect: \_\_\_\_\_

A car traveling at 55 km/h slows down at a constant acceleration of  $0.50 \text{ m/s}^2$ . Calculate

(a) The distance the car moves before it stops.

This is a decelerated motion. Suppose that the car is moving in the positive  $x$ -direction  $\Rightarrow a = -0.50 \text{ m/s}^2$

$$v^2 - v_0^2 = 2a(x - x_0)$$

$$v_0 = 55 \text{ km/h} = 15.3 \text{ m/s}$$

$$x - x_0 = \frac{v^2 - v_0^2}{2a} = - \frac{(15.3)^2}{-2 \times 0.5} = \boxed{234 \text{ m}}$$

(b) The time it takes to stop.

$$v = v_0 + at \Rightarrow t = - \frac{v_0}{a} = - \frac{15.3}{-0.5}$$

$$\boxed{t = 30.6 \text{ s}}$$

(c) The distance it travels during the first and the fifth second.

$$x - x_0 = \frac{1}{2}at^2 + v_0t$$

$$t = 1 \text{ s} \quad x - x_0 = \frac{1}{2}(-0.5)(1)^2 + (15.3)(1) = \boxed{15 \text{ m}}$$

$$t = 5 \text{ s} \quad x - x_0 = \frac{1}{2}(-0.5)(5)^2 + (15.3)(5) = \boxed{70.3 \text{ m}}$$