

**Answer on** Question #63560, Physics / Quantum Mechanics

a freight train moving at an initial speed of 40 m/sec puts on its brakes, producing a deceleration of 0.50 m/sec. a. how long will it take thw train to travel next 100 m ? b. at what speed will it be traveling at the end of this 100 m ?

**Find:** t - ? v- ?

**Given:**

$$v_0=40.00 \text{ m/s}$$

$$a=0.50 \text{ m/s}^2$$

$$s=100 \text{ m}$$

**Solution:**

Movement is delayed.

Distance:

$$-2as = v^2 - v_0^2 \quad (1)$$

$$\text{Of (1)} \Rightarrow v^2 = v_0^2 - 2as \quad (2)$$

$$\text{Of (2)} \Rightarrow v = \sqrt{v_0^2 - 2as} \quad (3)$$

$$\text{Of (3)} \Rightarrow v=37.73 \text{ m/s}$$

Acceleration:

$$-a = \frac{v-v_0}{t} \quad (4)$$

$$\text{Of (4)} \Rightarrow t = \frac{v-v_0}{-a} \quad (5)$$

$$\text{Of (5)} \Rightarrow t=2.54 \text{ s}$$

**Answer:**

a.  $t=2.54 \text{ s}$

b.  $v=37.73 \text{ m/s}$