Answer on Question 48122, Physics, Other

Question:

The speed of train is reduced from 60 km/hr at the same time as it travels a distance of 450 m. If the retardation is uniform, find how much further it will travel (approx) before coming to rest?

Solution:

We have velocity at the initial moment of time v_0, then train begin its retardation on distance $x = 450m$ to speed v_1. We need to determine the time t_{rest} needed to stop after train travels distance x. Because from the conditions of question we don't know the velocity v_1, we find t_{rest} in symbolic form. First we find acceleration:

$$a = \frac{({v_0}^2 - {v_1}^2)}{2 \cdot x}$$

Then we can determine time from retardadion begins to stop train:

$$t_{stop} = \frac{v_0}{a}$$

Also we find time that needs train to travel distance x:

$$t_x = \frac{v_0 - v_1}{a}$$

Therefore we can obtain the time t_{rest}:

$$t_{rest} = t_{stop} - t_x = \frac{v_1}{a} = \frac{2 \cdot x \cdot v_1}{({v_0}^2 - {v_1}^2)}$$

Answer:

$$t_{rest} = \frac{2 \cdot x \cdot v_1}{({v_0}^2 - {v_1}^2)}$$