

Answer on Question#34597 – Physics – Mechanics | Relativity

A truck covers 40.0 m in 8.20 s while uniformly slowing down to a final velocity of 3.50 m/s.

- (a) Find the truck's original speed.
- (b) Find its acceleration.

Solution

The law of motion is

$$s(t) = v_0 t + \frac{at^2}{2}$$

$$v(t) = v_0 + at$$

If $t = 8.2s$

$$s(t) = 40.0m$$

$$v(t) = 3.50m/s$$

$$\begin{cases} 40.0m = v_0 \cdot 8.2 + \frac{a \cdot (8.2s)^2}{2} \\ 3.5m/s = v_0 + a \cdot 8.2s \end{cases} \Rightarrow$$

$$(40.0 - 28.7) = -a \cdot 33.62s^2 \Rightarrow$$

$$a \approx -0.336m/s^2$$

$$v_0 \approx 6.256m/s$$

Answer:

Acceleration and initial speed are

$$a \approx -0.336m/s^2$$

$$v_0 \approx 6.256m/s$$