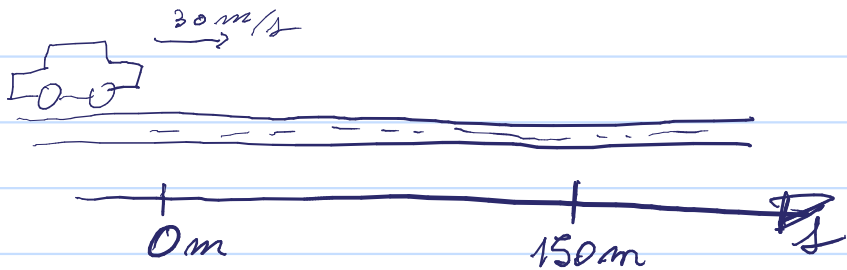


EXERCISE 14



$$v_0 = 30 \text{ m/s} \quad v = 0 \text{ m/s} \text{ (final speed)}$$

$$\Delta s = 150 \text{ m}$$

$$\begin{cases} v = v_0 + a \Delta t \rightarrow \\ \Delta s = v_0 \Delta t + \frac{1}{2} a \Delta t^2 \rightarrow \end{cases} \begin{cases} 0 = 30 + a \Delta t \\ 150 = 30 \Delta t + \frac{1}{2} a \Delta t^2 \end{cases}$$

$$-30 = a \Delta t \rightarrow \Delta t = \frac{-30}{a}$$

$$\rightarrow 150 = 30 \left(\frac{-30}{a} \right) + \frac{1}{2} a \left(\frac{-30}{a} \right)^2$$

$$150 = -\frac{900}{a} + \frac{1}{2} a \frac{900}{a^2}$$

$$150 = -\frac{900}{a} + \frac{1}{2} \frac{900}{a} \rightarrow 150 = -\frac{1800}{2a}$$

$$\rightarrow 150 = \frac{-450}{a} \rightarrow a = \frac{450}{150} = -3 \frac{\text{m}}{\text{s}^2}$$

$$a = -3 \frac{\text{m}}{\text{s}^2}$$

$$\Delta t = \frac{-30}{a} = \frac{-30}{-3} = 10 \text{ s}$$

$$\Delta t = 10 \text{ s}$$

So, the car breaks with an acceleration of 3 m/s^2 and takes 10 s to stop.