Answer on Question 79271, Physics, Other

Question:

A car acquired a velocity of $36\ km/h$ in 10 seconds just after the start. It takes 20 seconds to stop. Calculate the acceleration in both cases.

Solution:

a) We can find acceleration of the car in the first case from the kinematic equation:

$$v = v_0 + at,$$

$$a = \frac{v - v_0}{t} = \frac{36\ \frac{km}{h} \cdot \frac{1000\ m}{1\ km} \cdot \frac{1\ h}{3600\ s}}{10\ s} = 1.0\ \frac{m}{s^2}.$$

b) We can find acceleration of the car in the second case from the same kinematic equation:

$$v = v_0 + at,$$

$$a = \frac{v - v_0}{t} = \frac{0 - 36\ \frac{km}{h} \cdot \frac{1000\ m}{1\ km} \cdot \frac{1\ h}{3600\ s}}{20\ s} = -0.5\ \frac{m}{s^2}.$$

The sign minus indicates that the car decelerates.

Answer:

a) $a = 1.0\ \frac{m}{s^2}.$

b) $a = -0.5\ \frac{m}{s^2}.$