

Answer on Question #71636-Physics-Other

A ten-wheeler truck of mass 4500 kg and traveling at 10 m/s hits the back of a parked car. The car and its occupants have a total mass of 960 kg.

(a) What is the speed of the car and the truck immediately after impact assuming they are locked together?

(b) If the impact lasts for 0.4 s, what force is experienced by a 75 kg passenger?

Solution

a)

$$MV = (m + M)v$$

$$v = \frac{MV}{(m + M)}$$

$$v = \frac{4500}{(960 + 4500)} 10 = 8.24 \frac{m}{s}.$$

b)

$$F = \frac{mv}{t} = \frac{(75) \left(\frac{4500}{(960 + 4500)} 10 \right)}{0.4} = 1545 \text{ N}.$$

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