

Answer on Question #74640, Physics Mechanics Relativity

A 2500-kg truck traveling at 40 km/h strikes a brick wall and comes to a stop in 0.2 s.

(a) What is the change in momentum?

Solution.

$$J = F \cdot \Delta t = mV - mV_0$$

$$J = 2500 \cdot (0 - 40) = -100000 \text{ kg} \cdot \text{m/s (N} \cdot \text{s)}$$

Answer: $J = -100000 \text{ kg} \cdot \text{m/s (N} \cdot \text{s)}$

(b) What is the impulse?

Answer: Impulse is a term that quantifies the overall effect of a force acting over time. It is conventionally given the symbol J and expressed in Newton-seconds.

For a constant force, $J = F \cdot \Delta t$

(c) What is the average force on the wall during the crash?

Solution.

$$F_{av} = \frac{(mV - mV_0)}{\Delta t}$$

$$F_{av} = \frac{(2500 \cdot 0 - 2500 \cdot 40)}{0,2} = -500000 \text{ N} \cdot \text{s}$$

Answer: $F_{av} = -500000 \text{ N} \cdot \text{s}$

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