

## Answer on Question #69207, Physics / Mechanics | Relativity

**Question.** A car is stopped for a traffic signal. When the light turns green, the car accelerates, increasing its speed from zero to  $4,92 \text{ m/s}$  over a time interval of  $0,726 \text{ s}$ . What impulse and average force does a  $68 \text{ kg}$  passenger in the car experience?

**Given.**

Initial speed  $v_i = 0 \frac{\text{m}}{\text{s}}$ ;

Final speed  $v_f = 4,92 \frac{\text{m}}{\text{s}}$ ;

Time interval  $t = 0,726 \text{ s}$ ;

Mass of passenger  $m = 68 \text{ kg}$ ;

**Find.**

Impulse  $J$ ;

Average force  $F_{av}$ .

**Solution.**

Impulse

$$J = \Delta p = \Delta(mv) = m\Delta v = m(v_f - v_i) = 68 \cdot (4,92 - 0) \approx 334,6 \frac{\text{kg} \cdot \text{m}}{\text{s}}.$$

Average force

$$F_{av} = \frac{\Delta p}{\Delta t} = \frac{334,6}{0,726} \approx 461 \text{ N}.$$

**Answer:** Impulse  $J = 334,6 \frac{\text{kg} \cdot \text{m}}{\text{s}}$ ; Average force  $F_{av} = 461 \text{ N}$ .

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