

3 Dynamics — Part 2 — Answers

Answers

3.1 impulse = $F \Delta t = 20 \times 3.0 = 60 \text{ N s}$ (i.e. 60 kg m s^{-1}).

3.2 Taking "up" as positive: $\Delta p = 0.15 (3.0 - (-4.0)) = 0.15 \times 7.0 = 1.05 \text{ kg m s}^{-1}$.

3.3 The resultant force is zero (drag now equals weight). With no resultant force there is no acceleration, so the speed stays constant.

3.4 (a) inelastic (they stick — kinetic energy is lost).

(b) elastic (kinetic energy is conserved).

3.5 $2.0(3.0) = (2.0 + 4.0) v \Rightarrow v = 6.0/6.0 = 1.0 \text{ m s}^{-1}$.

3.6 The change in momentum Δp (from moving to stopped) is fixed. Since $F = \Delta p / \Delta t$, spreading the same Δp over a *longer* time Δt makes the force F smaller — so the passengers feel a gentler force.