

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.