Solutions

Each answer shows the steps, then the **result**.

2.1

- $J = F\Delta t = 20 \times 3 = 60$ kg m s^{-1}

2.2

- The change in momentum, Δp

2.3

- $\Delta v = J/m = 16/4 = 4$ m s^{-1}

2.4

- For a fixed Δp, $F = \Delta p/\Delta t$; a larger Δt gives a smaller F

3.1 B

- impulse equals the change in momentum

3.2 B

- a longer time reduces the force

3.3

(a)

- Taking the incoming direction positive: $\Delta p = m(v_f - v_i) = 0.15(-8-10) = -2.7$ kg m s^{-1} (magnitude 2.7)

(b)

- $F = \Delta p/\Delta t = 2.7/0.02 = 135$ N

3.4

(a)

- $F = 300/0.1 = 3000$ N

(b)

- $F = 300/0.5 = 600$ N