

4 Mechanics 1 – Part 2 — Answers

Answers

4.1 $a = F/m = 20/5 = 4 \text{ m s}^{-2}$.

4.2 momentum $= mv = 1500 \times 12 = 1.8 \times 10^4 \text{ kg m s}^{-1}$.

4.3 $3(4) = (3 + 1)v \Rightarrow v = 12/4 = 3 \text{ m s}^{-1}$.

4.4 KE $= \frac{1}{2}mv^2 = \frac{1}{2}(4)(5^2) = 50 \text{ J}$.

4.5 $P = Fv = 50 \times 8 = 400 \text{ W}$.

4.6 Momentum: $2(5) = (2 + 3)v$, so $v = 10/5 = 2 \text{ m s}^{-1}$. KE before $= \frac{1}{2}(2)(5^2) = 25 \text{ J}$;
KE after $= \frac{1}{2}(5)(2^2) = 10 \text{ J}$. Kinetic energy lost $= 25 - 10 = 15 \text{ J}$.