5 Work, energy and power – Part 1 — Answers

Answers

5.1 $W = Fs = 30 \times 6.0 = 180$ J.

5.2 $W = Fs\cos\theta = 40 \times 10 \times \cos 60° = 40 \times 10 \times 0.5 = 200$ J.

5.3 $E_k = \frac{1}{2}mv^2 = \frac{1}{2}(1200)(15^2) = 1.35 \times 10^5$ J.

5.4 $v = \sqrt{2gh} = \sqrt{2(9.8)(5.0)} = \sqrt{98} = 9.9$ m s^{-1}.

5.5 $P = W/t = 4500/30 = 150$ W.

5.6 efficiency $= \dfrac{9}{60} = 0.15$ (15%).

5.7 The braking force does work Fd to remove the kinetic energy $\frac{1}{2}mv^2$. Since the energy depends on v^2, doubling the speed gives *four times* the kinetic energy, so the braking distance becomes about *four times* as long.