

Solutions

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

2.1

- $\text{KE} = \frac{1}{2}mv^2 = \frac{1}{2}(2)(36) = 36 \text{ J}$

2.2

- $W = Fd = 50 \times 4 = 200 \text{ J}$

3.1 C

- $\text{work} = \text{power} \times \text{time} = 1500 \times 10 = 15000 \text{ J}$

3.2

(a)

- $\Delta\text{KE} = \frac{1}{2}(1200)(20^2 - 10^2) = 600(400 - 100) = 600(300) = 180000 \text{ J}$

(b)

- $\text{work by engine} = \Delta\text{KE} + \text{work against resistance} = 180000 + 400(150); = 180000 + 60000 = 240000 \text{ J}$

3.3

(a)

- $\text{energy: } mgh - (\text{resistance work}) = \frac{1}{2}mv^2; 90(10)(20) - 9000 = \frac{1}{2}(90)v^2; 18000 - 9000 = 45v^2 \Rightarrow v^2 = 200; v = 14.1 \text{ m s}^{-1}$