

Given:  $h_1 = 40 \text{ m}$ ,  $v_1 = 5 \frac{\text{m}}{\text{s}}$ ,  $h_2 = 15 \text{ m}$

Find:  $v_2$  - ?

**Solution:**

$$\begin{aligned} \text{Initial P.E.} + \text{K.E.} &= mgh_1 + \frac{mv_1^2}{2} = \\ &= 40mg + 0.5 \cdot 25m = 40mg + 12.5m \end{aligned}$$

$$\text{Final P.E.} + \text{K.E.} = 15mg + \frac{mv_2^2}{2}$$

$$\text{Initial P.E.} + \text{K.E.} = \text{Final P.E.} + \text{K.E.}$$

$$40mg + 12.5m = 15mg + \frac{mv_2^2}{2}$$

$$v_2 = 22.7 \text{ m/s}$$

**Answer:**

$$v_2 = 22.7 \text{ m/s}$$