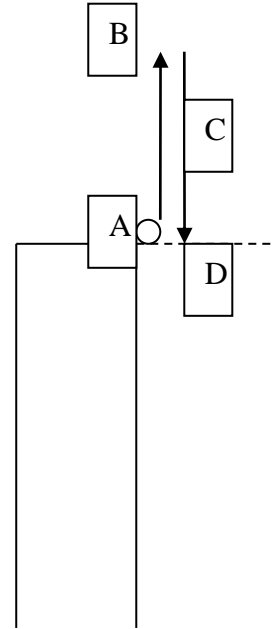


Given:

$$v_0 = 20 \text{ m/s} \quad t = 3 \text{ s} \quad \alpha = 90^\circ$$

Find: h

Solution:



Lets $t_{AC} = t = 3 \text{ s}$

$$t_{AD} = 2 \frac{v_0 \sin \alpha}{g} = 4.08 \text{ s}$$

$$h_{AB} = \frac{v_0^2 \sin^2 \alpha}{2g} = 20.4 \text{ m}$$

$$t_{BD} = \sqrt{\frac{2h_{AB}}{g}} = 2.02 \text{ s}$$

$$t_{AB} = t_{AD} - t_{BD} = 2.06 \text{ s}$$

$$t_{BC} = t_{AC} - t_{AB} = 0.94 \text{ s}$$

$$h_{BC} = \frac{gt_{BC}^2}{2} = \frac{9.8 \cdot 0.8836}{2} \text{ m} = 4.33 \text{ m}$$

$$h = h_{AB} - h_{BC} = 20.4 \text{ m} - 4.33 \text{ m} = 16.07 \text{ m} \approx 16 \text{ m}$$

Answer: $h = 16 \text{ m}$