

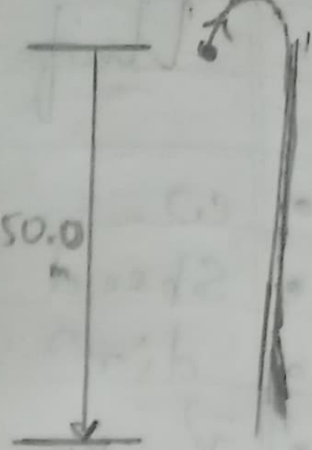
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1) A ball is thrown upward with an initial velocity of 10.0 m/s from the top of a $50.0 \text{ m}^{\text{tall}}$ building

a) With what velocity will the ball strike the ground?

b) How long does it take the ball to strike the ground.

$$\begin{aligned}
 \text{(a) } \{ \text{Ans} \} \quad v^2 &= v_0^2 - 2gy \\
 &= (10.0 \text{ m/s})^2 - 2(9.80 \text{ m/s}^2)(50.0 \text{ m}) \\
 &= 1.08 \times 10^3 \text{ m}^2/\text{s}^2
 \end{aligned}$$



so

$$v = \sqrt{1.08 \times 10^3 \text{ m}^2/\text{s}^2} = \pm 32.9 \text{ m/s}$$

The (ve) ans is discarded since the ball is falling when it lands.

$$v = -32.9 \text{ m/s.}$$

b) (Ans) From $v = v_0 - gt$ we have

$$t = \frac{v_0 - v}{g} = \frac{(10.0 \text{ m/s}) - (-32.9 \text{ m/s})}{9.80 \text{ m/s}^2}$$

$$= \frac{42.9 \text{ m/s}}{9.80 \text{ m/s}^2} = 4.38 \text{ s.}$$

2) A stone is dropped freely in the river from a bridge. It takes 5s to touch the water surface in the river.

i) the ~~the~~ height of the bridge from the water level.

Ans) $s = ut + \frac{1}{2}at^2$ where $a = g$ & $u = 0$.

$$\text{then } h = \frac{1}{2}g(5)^2 = \frac{1}{2} \times 9.8 \times 25$$

$$= \frac{1}{2} \times \frac{49}{10} \times 255 = 122.5 \text{ m.}$$

ii) The distance covered by stone in the last second ($g = 9.8 \text{ ms}^{-2}$)

Ans) Distance travelled in 4 sec

$$= \frac{1}{2} \times 9.8 \times 4^2 = 78.4 \text{ m.}$$

∴ Distance travelled in last sec :

$$= \text{Dis travelled in 5 sec} - \text{Distance travelled in 4 sec.}$$

$$= 122.5 - 78.4 = 44.1 \text{ m.}$$