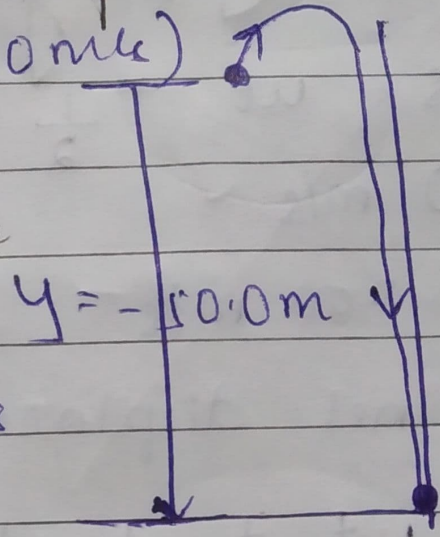


⇒ Homework :- ① A ball is thrown upward with an initial velocity of 10.0 m/s from the top of 50.0 m tall building. (take  $g = 10 \text{ m/s}^2$ )

(a) With what velocity will the ball strike the ground.



Ans: - initial velocity = 10 m/s

$$s = ut + \frac{1}{2}at^2$$

$$a = -g = -10 \text{ m/s}^2 \text{ (Approx.)}$$

$$v^2 - u^2 = 2gs$$

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$$v^2 = 10 \text{ m/s} = 2 \times (-10) \times 10$$

$$v^2 - 10 = 200$$

Ans:- (a)  $h = 50.0 \text{ m}$

1000  
1000

$$u = 10 \text{ m/s}$$

$$-g = -10 \text{ m/s}^2$$

$$v^2 = u^2 + 2gh$$

$$= v^2 = 10^2 + 2 \times -10 \times 50$$

$$v^2 = 100 + (-1000)$$

$$v^2 = -900$$

$$v = \sqrt{900}$$

$$v = -300 \text{ m/s}$$

(b) How long does it take the ball to strike the ground. ( $g = -10 \text{ m/s}^2$ )

Ans:-  $s = ut + \frac{1}{2} at^2$

$$u = 0 \text{ m/s}$$

$$v = -300 \text{ m/s}$$

$$s = \text{net displacement} = -h = -25 \text{ m}$$

$$s = ut + \frac{1}{2} at^2$$

$$-25 = 0 + \frac{1}{2} \times -10 \times t^2$$

$$-25 = -\frac{1}{2} \times 10 \times t^2$$

$$-25 = -5t^2$$

$$5 = t^2$$
$$\sqrt{5} = t$$



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

(i) The height of the bridge from the water level. ( $g = -10 \text{ m/s}^2$ )

Ans:  
m

$$t = 5 \text{ sec.}$$

$$u = 0 \text{ m/s}$$

$$s = h$$

$$s = ut + \frac{1}{2} at^2$$

$$s = ut - \frac{1}{2} g t^2$$

$$s = 0 \times 5 - \frac{1}{2} \times 10 \times 5^2$$

$$s = -\frac{1}{2} \times 10 \times 25$$

$$s = -125 \text{ m}$$

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

Ans:  
m

$$S_{nth} = u - \frac{g}{2} (2n-1)$$

$$S_{nth} = 0 - \frac{9.8}{2} (2 \times 5 - 1)$$

$$= -\frac{9.8}{2} \times 9$$

$$S_{nth} = -44.1 \text{ m} \quad \left. \begin{array}{l} \text{displacement} \\ = -44.1 \text{ m} \end{array} \right\}$$

3) A tennis ball is struck with a racket, firing it straight upward at 22 m per sec. After how much time will it be falling at 15 m/s?

Ans:-  $u = 10 \text{ m/s}$   
 $v = 15 \text{ m/s}$   
 $-g$   
 $t = ?$

initial velocity  
 $(u) = +22 \text{ m/s}$

final velocity  $(v) = -15 \text{ m/s}$

$-g = 9.8 \text{ m/s}^2$

$t = ?$

1

$$v_2 = u - gt$$

2

$$v - u = -gt$$

2

$$-15 - 22 = -9.8 \times t$$

2

$$\frac{-15 - 22}{-9.8} = t$$



$$\frac{37}{9.8} = t$$

$$\times 9.8$$

$$3.77 \text{ sec} = t$$

2