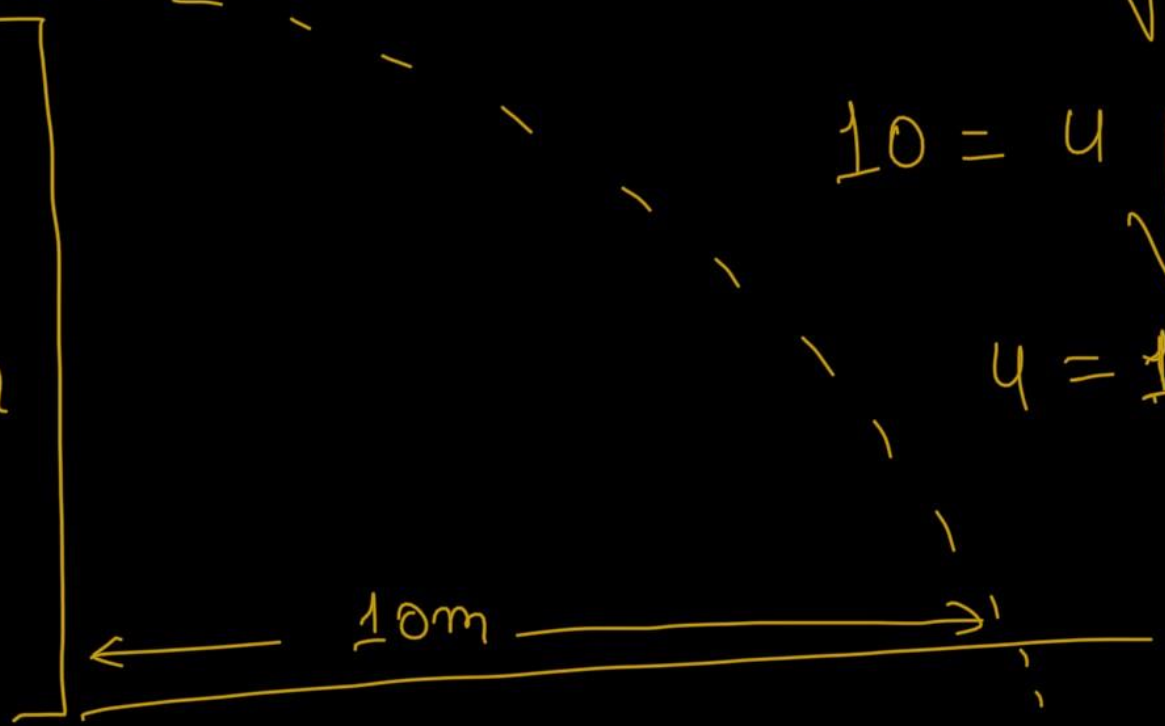
ARJUNA NEET BATCH

MOTION IN PLANE

(DPP-03 Discussion)

(1) Both have zero initial velocity in Vertical direction.

(2)

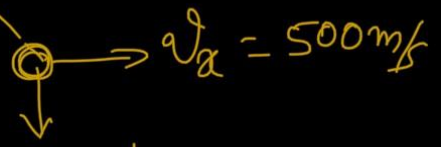


$$\text{Range} = u\sqrt{\frac{2h}{g}}$$

$$10 = u\sqrt{\frac{2\times 5}{10}}$$

$$u = 10\ m/s$$

(3)



$V_y = gt$

$= 10 \times 10 = 100 m/s.$

$$\tan\theta = \frac{V_y}{v_x}$$

$$\theta = \tan^{-1}\left(\frac{100}{500}\right) = \tan^{-1}\left(\frac{1}{5}\right)$$

(4) → (c) Range will be same for θ and $90-\theta$

(5.) $\tan 45^\circ = \frac{v_y}{v_x}$

$\therefore v_y = v_x = 18 \text{ m/s}.$

(6.) $T = \sqrt{\frac{2h}{g}} = \sqrt{\frac{2 \times 1960}{9.8}} = 20 \text{ sec}.$

(7.) As $\theta \uparrow\uparrow$: $\sin 2\theta$: first Increases then decreases

$\sin\theta$: Increases.

(8.) $R = 4H$

$$\frac{u^2 \sin 2\theta}{g} = 4\,\frac{u^2 \sin^2\theta}{2g}$$

$$2\sin\theta\cos\theta = \frac{4\sin^2\theta}{2}$$

$$\tan\theta = 1$$

$$\theta = 45^\circ$$

(9.) Acceleration of particle is constant and equal to g

(10.) Horizontal direction

$$F_x = 0$$

$$\therefore a_x = 0$$

Vertical direction

$$F_y = mg$$

$$a_y = g = 10\ m/s^2$$