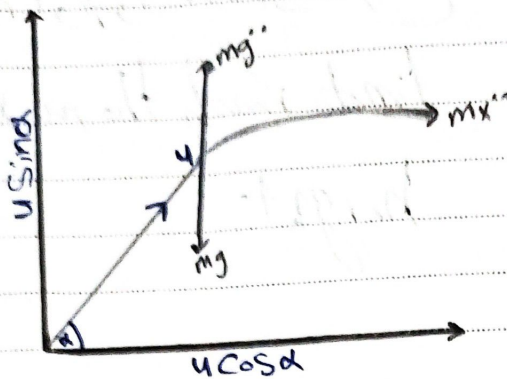


5 m/s
Suk

Date / / No



$$mx'' = 0$$

$$x'' = 0$$

$$x' = C = u \cos \alpha$$

$$my'' = -mg$$

$$y'' = -g$$

$$y' = -gt + C$$

$$\text{For } y' = u \sin \alpha$$

$$y' = u \sin \alpha - gt$$

$$x' = u \cos \alpha$$

$$x = ut \cos \alpha + C$$

$$t=0, x=0 \rightarrow C=0$$

$$x = ut \cos \alpha$$

$$y = ut \sin \alpha - \frac{1}{2}gt^2$$

$$t=0, y=0 \rightarrow C=0$$

$$y = ut \sin \alpha - \frac{1}{2}gt^2$$

$$t = \frac{2u \sin \alpha}{g}$$

Time of flight
Flight time

$$Rang \leftarrow R = \frac{v^2}{g} \sin 2\alpha$$

$$R_{\max} = \frac{v^2}{g}$$

وقت الوصول لأقصى ارتفاع
time to reach the maximum
height

$$t = \frac{v}{g} \sin \alpha$$

$$h_{\max} = \frac{v^2}{2g} \sin^2 \alpha$$

أسفل *

$$V_x = x = v \cos \alpha$$

$$V_y = y = v \sin \alpha - gt$$

$$v^2, v_x^2 + v_y^2 = (v \cos \alpha)^2 + (v \sin \alpha - gt)^2$$

$$v = \sqrt{v_x^2 + v_y^2}$$

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

ex From the top of a tower 208 feet above the surface of the earth, a rocket was launched with initial x -velocity 256 ft/sec and initial y -velocity 192 ft/sec. find flight time and how far the point where it collided with the ground at the base of the tower.

Solution

$$x' = 256$$

$$y' = -gt + C$$

$$t=0, y' = 192 \therefore C = 192$$

$$y' = 192 - gt$$

$$y = 192t - \frac{1}{2}gt^2 + C_2$$

$$\text{At } t=0, y=0 \therefore C_2 = 0$$

$$\text{At } t=0, y = 208$$

$$\therefore y = 192t - \frac{1}{2}gt^2, \therefore y = -208$$

$$16t^2 - 192t - 208 = 0$$

$$\therefore t = 13$$

