

QUES 03:- A man standing on a hill top projects a stone horizontally with speed v_0 as shown in figure. Taking the co-ordinate system as given in the figure. Find the co-ordinates of the point where the stone will hit the hill surface.

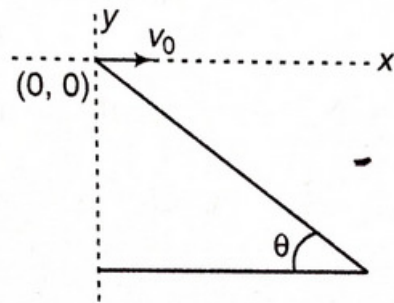


Fig. 7.18

Solution Range of the projectile on an inclined plane (down the plane) is,

$$R = \frac{u^2}{g \cos^2 \beta} [\sin (2\alpha + \beta) + \sin \beta]$$

Here,

$$u = v_0, \quad \alpha = 0 \quad \text{and} \quad \beta = \theta$$

\therefore

$$R = \frac{2v_0^2 \sin \theta}{g \cos^2 \theta}$$

Now,

$$x = R \cos \theta = \frac{2v_0^2 \tan \theta}{g}$$

and

$$y = -R \sin \theta = -\frac{2v_0^2 \tan^2 \theta}{g}$$

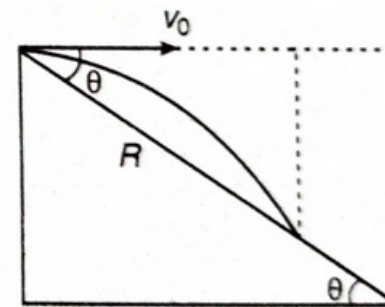


Fig. 7.19