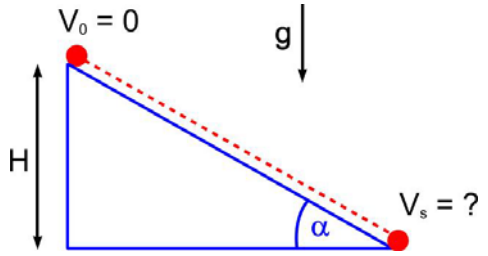
SOLUCIÓN EJERCICIO 4

i)

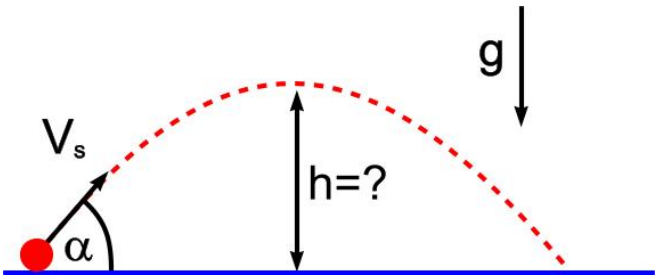


$$v_s^2 - \cancel{v_0^2}^{\,0} = 2a\Delta x$$

$$v_s^2 = 2g \cancel{\operatorname{sen}\alpha}\, \frac{H}{\cancel{\operatorname{sen}\alpha}}$$

$$\Rightarrow \quad v_{SUELO} = \sqrt{2gH}$$

LANZAMIENTO PROYECTIL



$$x = v_s \cos\alpha\, t$$

$$y = v_s \operatorname{sen}\alpha\, t - \frac{g}{2} t^2 \qquad \text{CON } v_s = \sqrt{2gH}$$

$$v_y = v_s \operatorname{sen}\alpha - g t$$

ALTURA MÁXIMA

$$v_y = 0 \quad \Rightarrow \quad \tilde{t} = \frac{v_s \operatorname{sen}\alpha}{g}$$

$$h = \frac{v_s^2 \operatorname{sen}^2\alpha}{g} - \frac{g}{2}\left(\frac{v_s \operatorname{sen}\alpha}{g}\right)^2$$

$$h = \frac{1}{2}\,\frac{v_s^2 \operatorname{sen}^2\alpha}{g}$$

$$\boxed{h = H \operatorname{sen}^2\alpha}$$

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ii) CAIDA POR LA CUÑA

$$X = \frac{1}{2} g \operatorname{sen}\alpha \, t^2$$

$$\Rightarrow \quad \frac{H}{\operatorname{sen}\alpha} = \frac{1}{2} g \operatorname{sen}\alpha \, t_1^2$$

$$t_1 = \sqrt{\frac{2H}{g}} \frac{1}{\operatorname{sen}\alpha}$$

PROYECTIL

$$y = v_s \operatorname{sen}\alpha \, t - \frac{1}{2} g t^2$$

$$y = 0 \quad \Rightarrow \quad 0 = t \left(v_s \operatorname{sen}\alpha - \frac{1}{2} g t \right)$$

$$t_2 = \frac{2 v_s \operatorname{sen}\alpha}{g} = 2 \sqrt{\frac{2H}{g}} \operatorname{sen}\alpha$$

POR LO TANTO

$$T_{VUELO} = t_1 + t_2$$

$$\boxed{T_{VUELO} = \sqrt{\frac{2H}{g}} \left(\frac{1}{\operatorname{sen}\alpha} + 2 \operatorname{sen}\alpha \right)}$$