

Answer on Question #58248-Physics-Mechanics-Relativity

A stone is thrown upwards with a velocity of 40m/s. if the maximum height attained is 20m. What is the angle of projection?

Solution

The maximum height of projectile can be obtained by the formula:

$$h_{max} = \frac{v_0^2}{2g} \sin^2 \theta \rightarrow \sin^2 \theta = \frac{2gh_{max}}{v_0^2},$$

where θ is the angle of projection, v_0 is initial velocity of projectile, g is the acceleration due to the gravity.

Thus, the angle of projection is

$$\theta = \sin^{-1} \sqrt{\frac{2gh_{max}}{v_0^2}} = \sin^{-1} \sqrt{\frac{2 \cdot 10 \cdot 20}{40^2}} = 30^\circ$$

Answer: 30°.