Question #37224

Suppose you roll a disk up a slope with an initial velocity v=17m/s at a 33 degree angle. When will it come to rest?

Answer

According to the equations of moving with the constant acceleration

$v = v_0 - at$ such as the final velocity is equal to zero $v_0 = at, t = \frac{v_0}{a}$

Where a is the acceleration

According to the second Newton's law

$\boldsymbol{a = \frac{F}{m}}$ where F is the vertical component of gravitational force (weight) m is the mass

$F = mgsin\alpha$ where α is the angle of the slope

$$\boldsymbol{a = gsin\alpha}$$

$$\boldsymbol{t = \frac{v_0}{gsin\alpha}}$$

$$\boldsymbol{S = \frac{17}{9.8sin33^\circ} = 3.2\ sec}$$

Answer: after 3.2 sec.