Answer on Question #62900-Physics -Other

A box is launched up a ramp of 40 degrees from the horizontal at 5.00 m/s. How far is the box able to travel when its speed it reduced to 2.00 m/s?

Solution

From the conservation of energy law:

$$\frac{mv_1^2}{2} + mgh_1 = \frac{mv_2^2}{2} + mgh_2$$

$$\Delta h = \frac{v_1^2 - v_2^2}{2g}$$

The distance will be

$$s = \frac{\Delta h}{\sin 40} = \frac{v_1^2 - v_2^2}{2g \sin 40} = \frac{5^2 - 2^2}{2(9.81)\sin 40} = 1.67\ m.$$

Answer: $1.67\ m$.