Answer on Question 56917, Physics, Other

Question:

A bobsled zips down an ice track, starting from rest at the top of the hill, with vertical height of 170 meters. Disregarding friction, what is the velocity of the bobsled at the bottom of the hill?

Solution:

By the law of conservation of energy we have:

$$KE_{top} + PE_{top} = KE_{bottom} + PE_{bottom},$$

$$\frac{1}{2}mv_{top}^2 + mgh_{top} = \frac{1}{2}mv_{bottom}^2 + mgh_{bottom}.$$

Because $v_{top} = 0\frac{m}{s}$ (bobsled starting from rest) and $h_{bottom} = 0m$, we get:

$$mgh_{top} = \frac{1}{2}mv_{bottom}^2.$$

From this formula we can find the velocity of the bobsled at the bottom of the hill:

$$v_{bottom} = \sqrt{2gh_{top}} = \sqrt{2 \cdot 9.8\frac{m}{s^2} \cdot 170m} = 57.7\frac{m}{s}.$$

Answer:

The velocity of the bobsled at the bottom of the hill is $v_{bottom} = 57.7\frac{m}{s}$.