

Answer on Question #83084, Physics / Mechanics | Relativity

Question:

A block slides with constant velocity down an inclined plane that has slope with angle $\theta = 30^\circ$. If the block is projected up the same plane with initial speed of 2.5 m/s, how far up the plane will it move before coming to rest?

Solution:

The constant velocity means the friction force $F = mg \sin \theta = 0.5mg$. According to the law of energy conservation $0.5mv^2 = 0.5mgl + mgh = mg(0.5 \cdot 2h + h)$, respectively

$$h = \frac{v^2}{4g} = \frac{6.25}{40} = 0.16 \text{ (m)}.$$

The answer:

$$h = \frac{v^2}{4g} = \frac{6.25}{40} = 0.16 \text{ m}.$$

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