

Application of the Law of Conservation of Energy
 Physics 101

28 Oct 2021

Problem 1: A block of mass m is released from rest at the top of a smooth curved track of height h . Find the speed of the block at the bottom of the track.

Given: Initial velocity $u = 0$, height h , mass m .
 Find: Final velocity v at the bottom.

Using the principle of conservation of mechanical energy:

At the top: $E_{\text{total}} = E_{\text{potential}} + E_{\text{kinetic}} = mgh + \frac{1}{2}mu^2 = mgh$

At the bottom: $E_{\text{total}} = E_{\text{potential}} + E_{\text{kinetic}} = 0 + \frac{1}{2}mv^2$

Since energy is conserved, $mgh = \frac{1}{2}mv^2$

Solving for v : $v = \sqrt{2gh}$

Problem 2: A ball of mass m is thrown vertically upwards with an initial speed u . Find the maximum height h it reaches.
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Problem 3: A car of mass m starts from rest and accelerates to a speed v over a distance s . Find the work done by the engine.

Given: Initial velocity $u = 0$, final velocity v , distance s , mass m .
 Find: Work done W .

Using the work-energy theorem: $W = \Delta E_{\text{kinetic}} = \frac{1}{2}mv^2 - \frac{1}{2}mu^2 = \frac{1}{2}mv^2$

- 1) Kinetic Energy
- 2) Potential Energy
- 3) Mechanical Energy
- 4) Work Done
- 5) Power
- 6) Conservation of Energy
- 7) Conservation of Momentum
- 8) Conservation of Angular Momentum
- 9) Conservation of Mass
- 10) Conservation of Charge

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5. Indikator kemampuan kerjasama siswa

6. Indikator kemampuan berprestasi siswa

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