## Answer on Question #57899 – Physics – Mechanics | Relativity

Condition: You hold a rock at a height 10 m above the ground and throw it downwards. Its total energy at the top is 200 J, but by the time it has reached the ground, friction and air resistance has removed 136 J. How much is its energy just before it hits the ground? What is the rock's speed just before it hits the ground? Assume its mass is 2.0 kg.

Solution:

H = 10 m;

m = 2.0 kg;

U – Potential energy;

T – Kinetic energy;

V – The rock's speed;

R – The energy spent on the force of air resistance and friction;

Potential energy turns into kinetic energy and spent on the force of air resistance and friction;

The energy value at a height of 10 m : $U_0 = 200\,J\,;\ T_0 = 0\,J$

Before the rock hits the ground: $U = 0\,J\,; T -$ desired value

We use the law of conservation of energy: $U_0 = T + R\ \rightarrow T =\ U_0 - R\ \rightarrow T = 200 - 136 = 64\,J\,;$

The kinetic energy is equal to 1/2 the product of the mass and the square of the speed: $T = \frac{m*V^2}{2}\ \rightarrow V = \sqrt{\frac{2*T}{m}} = \sqrt{\frac{2*64}{2}} = 8\ \frac{m}{s}.$

**Answer**: The rock's energy just before it hits the ground is T = 64 J;

The rock's speed just before it hits the ground is V= 8 m/s .