

**Question #84855, Physics / Mechanics | Relativity**

(1) A 1,500 kg car is moving along a level road of 60 km/h. What work is required to stop the car?

**Solution**

$$W = K = \frac{1}{2}mv^2 = \frac{1}{2}mv^2$$
$$W = \frac{1}{2}(1500)\left(\frac{60}{3.6}\right)^2 = 208000 \text{ J} = 208 \text{ kJ}.$$

(2) At room temperature, an oxygen molecule, with mass  $5.31 \times 10^{-26}$  kg, typically has a kinetic energy of  $6.21 \times 10^{-21}$  J. How fast is the molecule moving?

**Solution**

$$v = \sqrt{\frac{2K}{m}} = \sqrt{\frac{2(6.21 \cdot 10^{-21})}{5.31 \cdot 10^{-26}}} = 484 \frac{\text{m}}{\text{s}}$$

(3) A 7.0-kg monkey swings from one branch to another 1.2 m higher. What is the change in potential energy? (acceleration due to gravity  $g = 9.80 \text{ m/s}^2$ )

**Solution**

$$E = mgh = (7)(9.8)(1.2) = 82 \text{ J}.$$

Answer provided by <https://www.AssignmentExpert.com>