

Answer on Question 70236, Physics, Other

Question:

What is the kinetic energy of a car weighing 14300 N with a velocity of 82 km/h?

Solution:

Let's first find the mass of the car from the definition of the weight:

$$W = mg,$$

here, W is the weight of the car, m is the mass of the car and g is the acceleration due to gravity.

Then, we get:

$$m = \frac{W}{g} = \frac{14300 \text{ N}}{9.8 \frac{\text{m}}{\text{s}^2}} = 1459 \text{ kg}.$$

Secondly, let's convert km/h to m/s:

$$v = 82 \frac{\text{km}}{\text{h}} \cdot \frac{1000 \text{ m}}{1 \text{ km}} \cdot \frac{1 \text{ h}}{3600 \text{ s}} = 22.7 \frac{\text{m}}{\text{s}}.$$

Finally, from the definition of the kinetic energy, we can find the kinetic energy of a car:

$$KE = \frac{1}{2}mv^2 = \frac{1}{2} \cdot 1459 \text{ kg} \cdot \left(22.7 \frac{\text{m}}{\text{s}}\right)^2 = 375904 \text{ J} = 3.76 \cdot 10^5 \text{ J}.$$

Answer:

$$KE = 3.76 \cdot 10^5 \text{ J}.$$

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