

Quiz 5 Work and Energy

1. Work done by a force on a moving object is -50J. It was traveling at a speed of 10 m/s. Find the new speed of the object if the mass of the object is 2 kg.

Answer:

$$W = \frac{1}{2}m(v^2-u^2)$$

Given: W = -50J

Work done by the force is equal to the change in kinetic energy.

$$\Rightarrow -50 = \frac{1}{2}(2)(v^2-10^2)$$
 $W = \frac{1}{2}m(v^2-u^2)$

Given, u = 10m/s and v = ?. m = 2kg.

Plugging the values in the given equation,

$$\Rightarrow -50 = v^2 - 10^2$$
$$= 50 = v^2$$
$$= v = \sqrt{50}$$

$$W = \frac{1}{2}m(v^2-u^2)$$

$$=v=5\sqrt{2}$$
 m/s

- 2. A 300-Watt electric wheelchair has a mass of 50kg, and carries its 50 kg occupant at constant velocity up a long ramp. About how much time does it take the wheelchair to reach the top of the 10-meter high ramp?
- 3. The correct answer is e. The wheelchair carries a total mass of 100kg up to a height of 10m, with 300J of Work being done by the wheelchair each second. The time for the total Work does is calculated as follows:

$$P = \frac{Work}{time}$$

$$time = \frac{Work}{Power} = \frac{mgh}{P}$$

$$time = \frac{(100kg)(10m/s^2)(10m)}{300J/s} = \frac{10000}{300} = 33s$$