

## Answer on Question 58483, Physics, Other

### Question:

Calculate the amount of work needed to stop a car of  $250 \text{ kg}$ , moving at a speed of  $18 \text{ km/hr}$  ( $18 \text{ km/hr} = 18 \cdot \frac{1000 \text{ m}}{3600 \text{ s}} = 5 \text{ ms}^{-1}$ ).

### Solution:

Let's apply the Work-Energy theorem. It states that the work done by the net force acting on a car (friction force) is equal to change in the kinetic energy of the car:

$$\begin{aligned} \text{Work} &= -F_{fr}d = KE_f - KE_i = \frac{1}{2} \cdot 250 \text{ kg} \cdot (0 \text{ ms}^{-1})^2 - \frac{1}{2} \cdot 250 \text{ kg} \cdot (5 \text{ ms}^{-1})^2 \\ &= -3125 \text{ J}. \end{aligned}$$

Sign minus indicates that the friction force is directed in the opposite direction to the motion of the car.

### Answer:

$$W = 3125 \text{ J}.$$