The kinetic energy of a car is 8 × 106 J as it travels along a horizontal road. How much power is required to stop the car in 10 s?

Solution:

Power is the rate at which energy is transferred. You need to transfer 8 million joules of kinetic energy into 8 million joules of heat in the car's brakes in 10 seconds.

$$\text{Power} = \frac{\text{Change in Energy}}{\text{Time}}:$$

$$\mathrm{P} = \frac{\mathrm{E}}{\mathrm{t}} = \frac{8 \times 10^{6}\mathrm{J}}{10\mathrm{s}} = 8 \times 10^{5}\mathrm{W}$$

Answer: required power to stop the car is $8 \times 10^{5}\mathrm{W}$.