

- 15** An electric car travels at a constant speed of  $70 \text{ km h}^{-1}$  for 80 km on a straight horizontal road and uses energy  $E$  from its battery.

The total resistive force acting on the car is proportional to  $(\text{speed})^2$ . Assume that the electric motor is 100% efficient.

How much energy is used from the battery when the car travels at a constant speed of  $60 \text{ km h}^{-1}$  for 80 km on the straight horizontal road?

- A**  $0.73E$                       **B**  $0.86E$                       **C**  $1.2E$                       **D**  $1.4E$

- 16** What is meant by the efficiency of a system?

- A** the total energy input to the system divided by the useful energy output by the system  
**B** the useful energy output from the system divided by the energy wasted by the system  
**C** the useful energy output from the system divided by the total energy input to the system  
**D** the energy wasted by the system divided by the total energy input to the system

- 17** When an object of mass  $m$  is raised through a vertical height  $\Delta h$ , the gain of its gravitational potential energy is  $\Delta E_p$ .

$\Delta E_p$  and  $\Delta h$  are related by the equation

$$\Delta E_p = mg\Delta h,$$

where  $g$  is the acceleration of free fall.

The definition of which physical quantity is needed to derive this equation?

- A** acceleration  
**B** momentum  
**C** power  
**D** work done