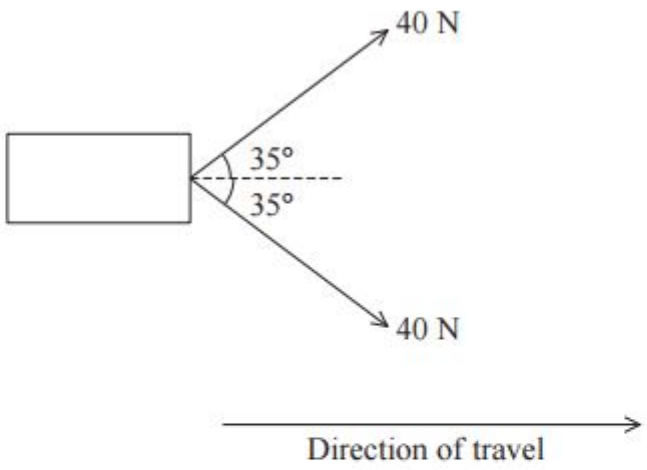
**1** Two ropes are attached to a box. Each rope is pulled with a force of 40 N at an angle of 35° to the direction of travel.




The box is moved 20 m in the direction shown.

The work done, in joules, is found using

☒ **A** $40 \times \cos 35 \times 20$

☒ **B** $2 \times 40 \times \cos 35 \times 20$

☒ **C** $40 \times \sin 35 \times 20$

☒ **D** $2 \times 40 \times \sin 35 \times 20$

**(Total for Question = 1 mark)**

**2** Which of these statements about work is **not** correct?

☒ **A** For work to be done a force must always be applied.

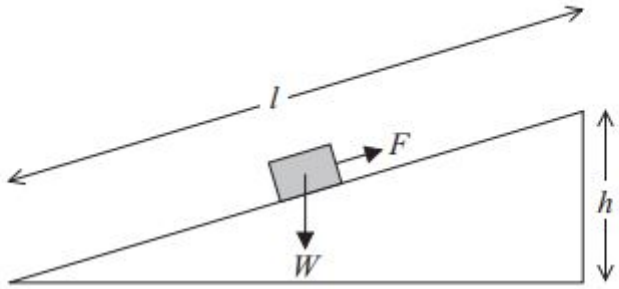
☒ **B** When work is done energy is transferred.

☒ **C** Work done is the product of force and distance moved perpendicular to the force.

☒ **D** Work done is a scalar quantity.

**(Total for Question = 1 mark)**

**3** A student uses a force $F$ to push a block of weight $W$ all the way up a frictionless ramp, at a constant speed.




The work done by the student can be calculated using

☐ **A** $Fh$

☐ **B** $(F–W)\,l$

☐ **C** $Wh$

☐ **D** $Wl$

**(Total for Question = 1 mark)**

**4** A mass of 0.05 kg is lifted at a slow steady speed by a 5 W electric motor.

The height the mass rises in 8 s is found using

☐ **A** $\dfrac{5}{0.05 \times 9.81 \times 8}$

☐ **B** $\dfrac{5 \times 8}{0.05 \times 9.81}$

☐ **C** $\dfrac{0.05 \times 9.81}{5 \times 8}$

☐ **D** $\dfrac{0.05 \times 9.81 \times 8}{5}$

**(Total for Question = 1 mark)**

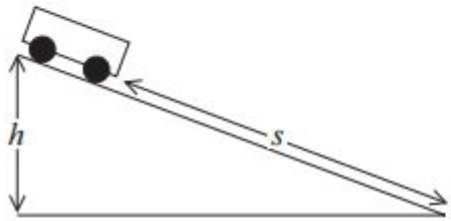
**5** A car of mass $m$ travelling with a velocity $v$ comes to rest over a distance $d$ in time $t$.

The constant frictional force acting on the car while it is braking is found using

- ☒ **A** $\frac{mv}{2t}$
- ☒ **B** $\frac{2mv}{t}$
- ☒ **C** $\frac{mv^2}{2d}$
- ☒ **D** $\frac{2mv^2}{d}$

**(Total for Question = 1 mark)**

**6** A trolley rolls down a slope from rest. The trolley moves through a vertical height $h$ while rolling a distance $s$ along the slope.




The maximum possible speed is given by

- ☒ **A** $2gs$
- ☒ **B** $2gh$
- ☒ **C** $\sqrt{(2gs)}$
- ☒ **D** $\sqrt{(2gh)}$

**(Total for Question = 1 mark)**

7 A bowling ball of mass 7.0 kg is travelling at a speed of 4.0 m $s^{-1}$.

The kinetic energy of the ball is

☐ **A** 14 J

☐ **B** 28 J

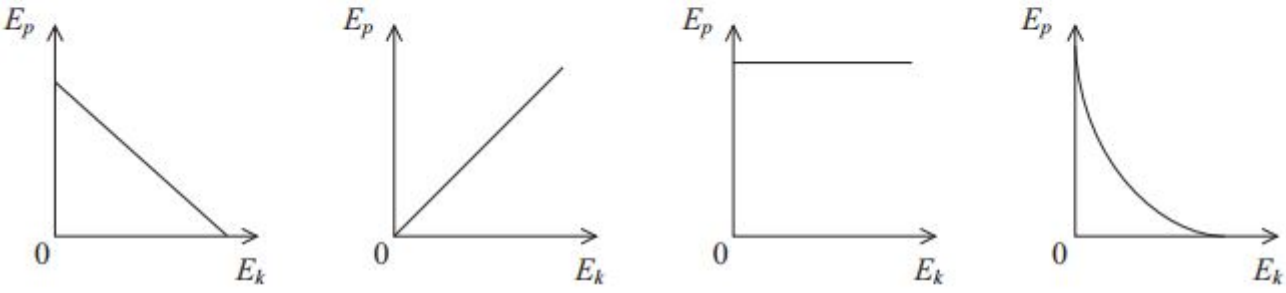
☐ **C** 56 J

☐ **D** 112 J

**(Total for Question = 1 mark)**

8 A stone is dropped from a bridge into a river.

Which graph correctly shows the variation of gravitational potential energy $E_p$ with kinetic energy $E_k$ for the falling stone?




**A** **B** **C** **D**

☐ **A**

☐ **B**

☐ **C**

☐ **D**

**(Total for Question = 1 mark)**

**9** A motor raises a mass $m$ through a height $\Delta h$ in time $t$.

The power of the motor is given by

☒ **A** $mgt\Delta h$

☒ **B** $\frac{mg}{t\Delta h}$

☒ **C** $\frac{mg\Delta h}{t}$

☒ **D** $\frac{mgt}{\Delta h}$

**(Total for Question = 1 mark)**

**10** A car pulls a trailer of weight 2500 N with a force of 20 N for a distance of 8 km along a horizontal road.

How much work is done by the car in pulling the trailer?

☒ **A** 160 J

☒ **B** 20 000 J

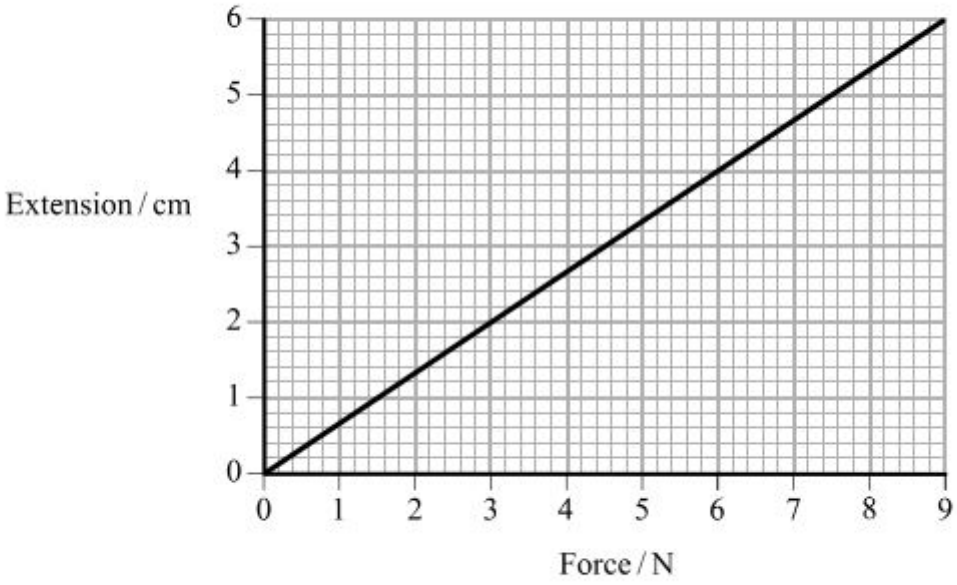
☒ **C** 160 000 J

☒ **D** 20 000 000 J

**(Total for Question = 1 mark)**

Use the following graph to answer Questions 11 and 12.

The graph shows how extension varies with applied force for a spring.

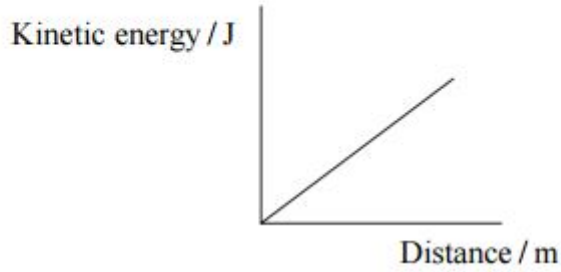



**11** The energy stored in the spring when it is extended by 6.0 cm is

- ☐ **A** 0.27 J
- ☐ **B** 0.54 J
- ☐ **C** 54 J
- ☐ **D** 108 J

**(Total for Question = 1 mark)**

**12** The graph shows how kinetic energy varies with distance for a train accelerating from a station.




The quantity represented by the gradient of the graph is

☒ **A** acceleration

☒ **B** force

☒ **C** power

☒ **D** velocity

**(Total for Question = 1 mark)**

**13** A spring of length 5.0 cm is suspended from a retort stand. When a mass of 0.030 kg is added the length of the spring doubles.

0.030 kg

The energy stored in the stretched spring can be calculated using

☒ **A** $\frac{1}{2} \times 0.030 \times 9.81 \times 0.10^2$

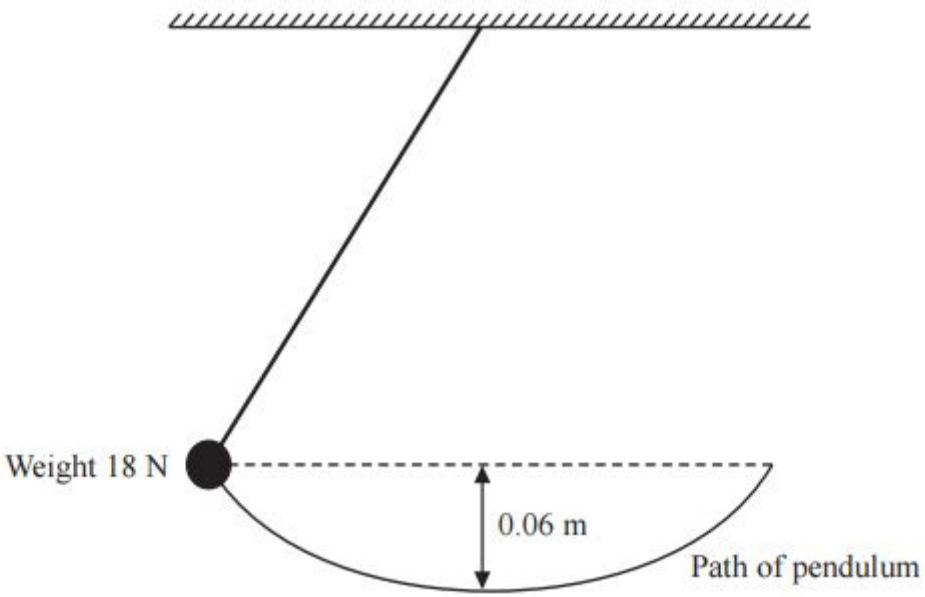
☒ **B** $\frac{1}{2} \times 0.030 \times 9.81 \times 0.10$

☒ **C** $\frac{1}{2} \times 0.030 \times 9.81 \times 0.050^2$

☒ **D** $\frac{1}{2} \times 0.030 \times 9.81 \times 0.050$

**(Total for Question = 1 mark)**

**14**




A pendulum consists of an 18 N weight attached to a piece of string. The weight is released from the position shown in the diagram. The speed in m $s^{-1}$ at the bottom of the swing is given by

☐ **A** $\sqrt{\frac{2 \times 9.81 \times 0.06}{18}}$

☐ **B** $\sqrt{9.81 \times 0.06}$

☐ **C** $\sqrt{2 \times 9.81 \times 0.06}$

☐ **D** $\sqrt{2 \times 9.81 \times 18 \times 0.06}$

**(Total for Question = 1 mark)**

**15** A pump is positioned at the bottom of a well and it pumps 15 kg of water 25 m to the surface each minute.

The power of the pump is

☐ **A** 6.3 W

☐ **B** 61 W

☐ **C** 3700 W

☐ **D** 22 000 W

**(Total for Question = 1 mark)**

**16** A student is asked to determine the output of a motor as it lifts an object. He measures the height through which the object is raised, the time taken and the weight of the object.

To find the power he must calculate

☒ **A** height × weight × time

☒ **B** $\frac{\text{height} \times \text{weight}}{\text{time}}$

☒ **C** $\frac{\text{time} \times \text{weight}}{\text{height}}$

☒ **D** $\frac{\text{weight}}{\text{height} \times \text{time}}$

**(Total for Question = 1 mark)**

**17** A pigeon of mass 0.45 kg is flying with kinetic energy 58 J.
Its speed is

☒ **A** 8.0 m $s^{-1}$

☒ **B** 11 m $s^{-1}$

☒ **C** 16 m $s^{-1}$

☒ **D** 22 m $s^{-1}$

**(Total for Question = 1 mark)**