A Level · OCR · Physics

11 mins | 11 questions

Multiple Choice Questions

Work, Energy & Power

Work Done / Conservation of Energy / Energy & Work / Kinetic Energy / Gravitational Potential Energy / Power / Efficiency

Easy (1 question)	/1
Medium (5 questions)	/5
Hard (5 questions)	/5
Total Marks	**/11**

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Easy Questions

1 Which is **not** a unit of energy?

A. kW h

B. eV

C. J

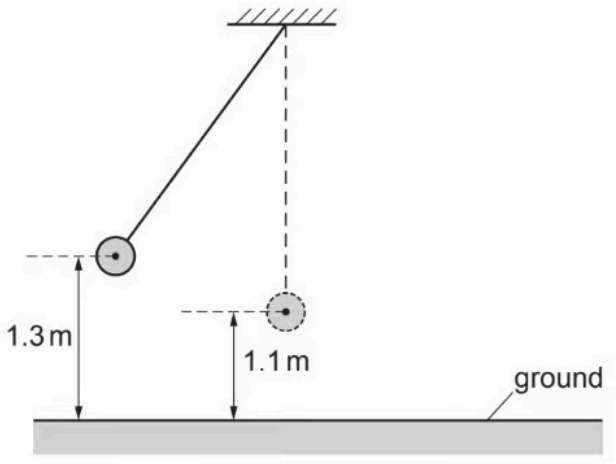
D. W

(1 mark)

Medium Questions

1 A pendulum bob is oscillating in a vacuum.

The maximum height of the bob from the ground is 1.3 m and its minimum height is 1.1 m.



What is the maximum speed of the pendulum bob?

A. 2.0 ms^{-1}

B. 3.9 ms^{-1}

C. 5.1 ms^{-1}

D. 26 ms^{-1}

(1 mark)

2 An object of mass 0.12 kg is lifted through a height of 0.60 m at a constant speed 3.0 m s^{-1}.

What is the minimum power needed to lift the object?

A. 0.36 W

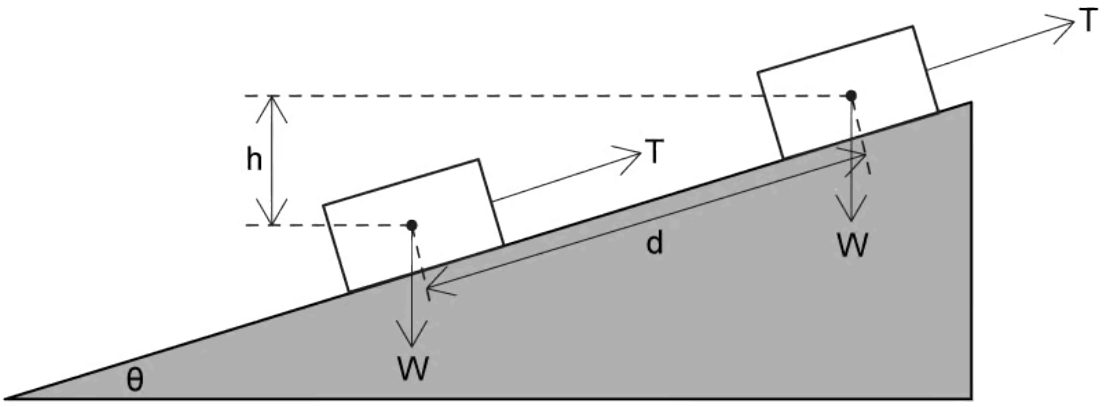
B. 0.54 W

C. 3.5 W

D. 4.1 W

(1 mark)

3 A block of weight *W* is pulled a distance *d* **at constant speed** up a slope inclined at an angle *θ* by a force *T* as shown.



The centre of mass of the block is raised by a distance *h*.

There are no frictional forces acting on the block.

Which expression is **not** equal to the gain in gravitational potential energy of the block?

A. $T \times d$

B. $T \times h \sin \theta$

C. $W \times h$

D. $W \times d \sin \theta$

(1 mark)

4 A 4.0 kg object is at rest on a horizontal surface.

A constant force of 5.0 N is applied to the object at an angle of 30° to the horizontal, causing the object to instantly accelerate horizontally.

The surface is frictionless and air resistance is negligible.

What is the kinetic energy of the object after it has moved 12 m?

A. 13 J

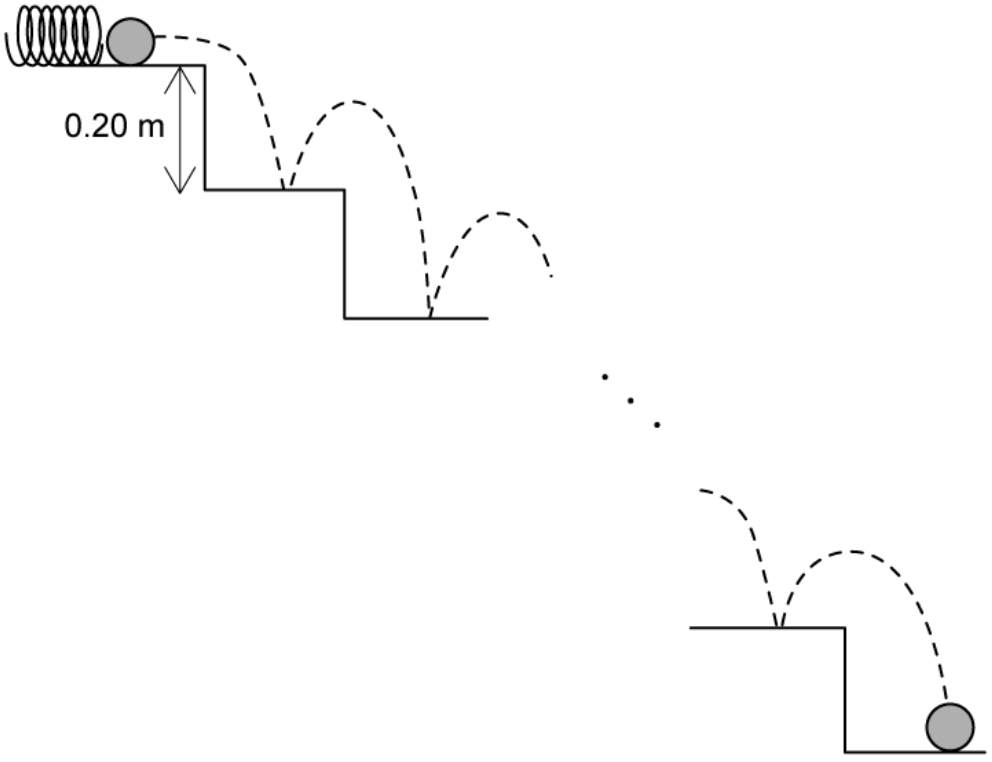
B. 30 J

C. 52 J

D. 100 J

(1 mark)

5 A spring mechanism storing 0.12 J of elastic potential energy is released, projecting a ball of mass 0.050 kg forwards. The ball then bounces down a set of steps.



The ball bounces on every step on its journey down. The vertical distance between each step is 0.20 m.

The bounces can be assumed to be elastic, and no air resistance acts on the ball in between bounces.

The ball lands at the bottom with a speed of 6.0 ms^{-1}.

How many steps did the ball descend?

A. 8

B. 10

C. 12

D. 14

(1 mark)

Hard Questions

1 A pin is dropped from a height of h and hits the floor with velocity v.

Air resistance is negligible.

What is the relationship between v and h when the height increases by a factor of four?

A. $v \propto 2h$

B. $v \propto 4h^2$

C. $v \propto 4\sqrt{h}$

D. $v \propto 2\sqrt{h}$

(1 mark)

2 An electric motor has an efficiency of 33% and raises a 233 N weight. It takes 15 s to raise the weight to a height of 8.5 m at a constant speed.

What is the power of the motor?

A. 400 W

B. 130 W

C. 44 W

D. 47 W

(1 mark)

3 A box of mass 4.0 kg is dropped from a height and hits the floor in 1.8 s.

What was the work done on the box?

A. 350 J

B. 64 J

C. 620 J

D. 71 J

(1 mark)

4 Which one of the following equations is **correct** for the work done on a moving object?

A. $KE = ma \times s$

B. $KE = m \times \frac{v^2}{2a}$

C. $KE = m \times \frac{gt^2}{2}$

D. $KE = mv \times \frac{s}{t}$

(1 mark)

5 A box is being pulled along by a rope by a force, *F*, at an angle, θ, to the direction of motion. The box experiences a resistive force, *R*, from the surface, as it travels a distance of *x*.

What is the total work done on the box?

A. $F\cos\theta - R$

B. $Fx\cos\theta - Rx$

C. $(F + R)x\cos\theta$

D. $Fx\sin\theta - Rx$

(1 mark)