Energy, Work & Power

Question Paper 1

Level	IGCSE
Subject	Physics (0625/0972)
Exam Board	Cambridge International Examinations (CIE)
Topic	General Physics
Sub-Topic	Energy, Work & Power
Booklet	Question Paper 1

Time allowed: **21 minutes**

Score: **/17**

Percentage: **/100**

Grade Boundaries:

9	8	7	6	5	4	3	2	1
>85%	75%	68%	60%	55%	50%	43%	35%	<30%

A lorry of mass 4000 kg is travelling at a speed of 4.0 m / s.

A car has a mass of 1000 kg. The kinetic energy of the car is equal to the kinetic energy of the lorry.

What is the speed of the car?

A 2.0 m/s B 4.0 m/s C 8.0 m/s D 16.0 m/s

A force acts on an object and causes the object to move a certain distance, in the same direction as the force.

Which row represents a situation in which the largest amount of work is done on the object by the force?

	force / N	distance moved / m
A	2.0	40.0
B	10.0	2.0
C	20.0	6.0
D	100.0	1.0

A stone of mass m is held at rest in water. The stone is released and falls vertically a distance h. The stone reaches a speed v.

Some of the original energy of the stone is transferred to the water. As it falls, resistive forces cause the temperature of the water and stone to increase.

Which expression gives the work done against the resistive forces?

A $\frac{1}{2}mv^2$

B $mgh - \frac{1}{2}mv^2$

C mgh

D $mgh + \frac{1}{2}mv^2$

Which energy resource does not derive its energy from the Sun?

A geothermal

B hydroelectric

C oil

D waves

Some processes are more efficient than others.

Which expression gives the efficiency of a process?

A $\frac{\text{total energy output}}{\text{total energy input}} \times 100\%$

B $\frac{\text{useful energy output}}{\text{total energy input}} \times 100\%$

C $\frac{\text{wasted energy output}}{\text{total energy input}} \times 100\%$

D $\frac{\text{wasted energy output}}{\text{useful energy output}} \times 100\%$

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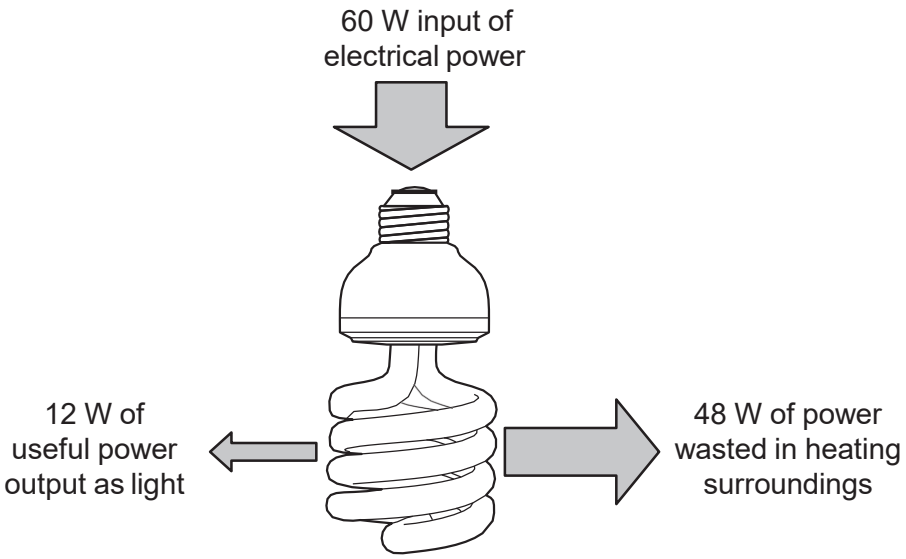
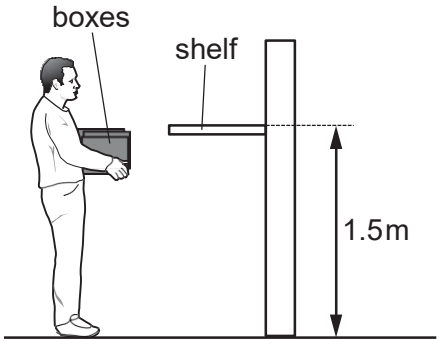
The diagram shows the energy used by a modern lamp.



Which expression gives the efficiency of the lamp?

A $\frac{12}{60} \times 100\%$ B $\frac{12}{48} \times 100\%$ C $\frac{48}{60} \times 100\%$ D $\frac{48}{12} \times 100\%$

Three boxes each weigh 100 N. A man lifts all the boxes together from the ground on to a shelf that is 1.5 m above the ground. The man takes 2.0 s to do this.



How much useful power does the man produce to lift the boxes?

A 75 W B 225 W C 300 W D 900 W

A car has a mass of 1000 kg and a momentum of 12000 kg m/s.

What is its kinetic energy?

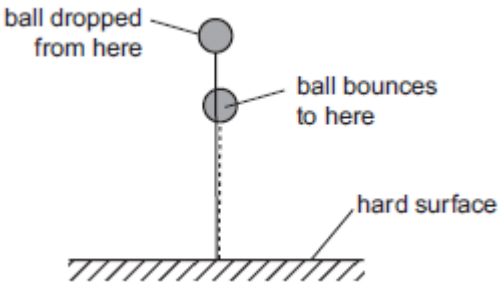
A. 6 kJ

B. 12 kJ

C. 72 kJ

D. 144 kJ

A ball is dropped on to a hard surface and bounces. It does not bounce all the way back to where it started, and so has not regained all of its original gravitational potential energy.



Which statement accounts for the loss of gravitational potential energy?

A. Energy was destroyed as the ball hit the ground.

B. Energy was destroyed as the ball travelled through the air.

C. The chemical energy and elastic energy of the ball have increased.

D. The internal (heat) energy of the ball and its surroundings has increased.

Which energy resource is used to generate electricity without using any moving parts?

A geothermal

B hydroelectric

C nuclear

D solar

A cyclist travels down a hill from rest at point X, without pedalling.

The cyclist applies his brakes and the cycle stops at point Y.

Which energy changes have taken place between X and Y?

A gravitational potential → kinetic → thermal (heat)

B gravitational potential → thermal (heat) → kinetic

C kinetic → gravitational potential → thermal (heat)

D kinetic → thermal (heat) → gravitational potential

Which source of energy involves the splitting of heavy atoms?

A. chemical energy

B. geothermal energy

C. hydroelectric energy

D. nuclear energy

To calculate the power produced by a force, the size of the force must be known.

What else needs to be known to calculate the power?

	the distance the force moves the object	the time for which the force acts on the object
A	✓	✓
B	✓	X
C	X	✓
D	X	X

key

✓ = needed

X = not needed

Electrical energy may be obtained from nuclear fission.

In which order is the energy transferred in this process?

A nuclear fuel → generator → reactor and boiler → turbines

B nuclear fuel → generator → turbines → reactor and boiler

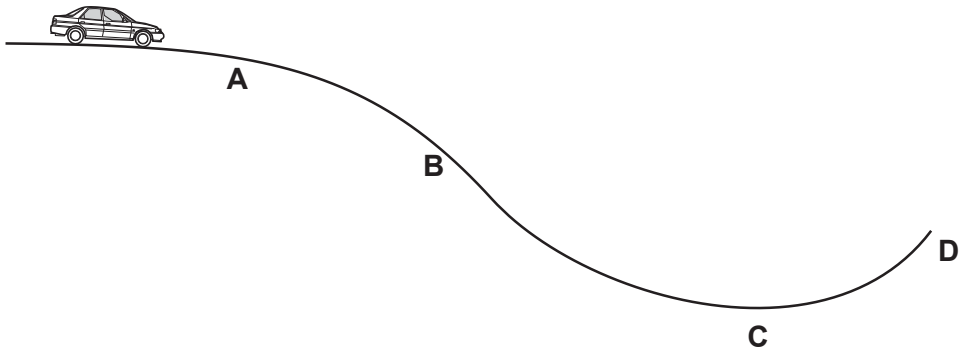
C nuclear fuel → reactor and boiler → generator → turbines

D nuclear fuel → reactor and boiler → turbines → generator

Question 15

A car is stationary at the top of a hill with the engine switched off. The brakes are released and the car rolls down the hill.

At which labelled point does the car have the greatest kinetic energy? Ignore friction.



Which row gives the energy change in a battery and the energy change in a solar cell?

	battery	solar cell
A	chemical to electrical	electrical to light
B	chemical to electrical	light to electrical
C	electrical to chemical	electrical to light
D	electrical to chemical	light to electrical

5

A helicopter takes off from the ground and rises vertically. It then hovers at a constant height above the ground.

Which sequence of energy changes takes place during the gain in height?

A chemical → gravitational potential → kinetic

B chemical → kinetic → gravitational potential

C gravitational potential → chemical → kinetic

D kinetic → chemical → gravitational potential