UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
International General Certificate of Secondary Education

PHYSICS **0625/13**

Paper 1 Multiple Choice **October/November 2012**

45 minutes

Additional Materials: Multiple Choice Answer Sheet
Soft clean eraser
Soft pencil (type B or HB recommended)

* 8 4 0 0 2 2 2 4 3 2 *

READ THESE INSTRUCTIONS FIRST

Write in soft pencil.
Do not use staples, paper clips, highlighters, glue or correction fluid.
Write your name, Centre number and candidate number on the Answer Sheet in the spaces provided unless this has been done for you.

There are **forty** questions on this paper. Answer **all** questions. For each question there are four possible answers **A**, **B**, **C** and **D**.
Choose the **one** you consider correct and record your choice in **soft pencil** on the separate Answer Sheet.

Read the instructions on the Answer Sheet very carefully.

Each correct answer will score one mark. A mark will not be deducted for a wrong answer.
Any rough working should be done in this booklet.

This document consists of **17** printed pages and **3** blank pages.

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1 A pendulum is set in motion and timed. The time measured for 20 complete swings is 30 s.

What is the time for one complete swing of the pendulum?

A 0.67 s **B** 0.75 s **C** 1.5 s **D** 3.0 s

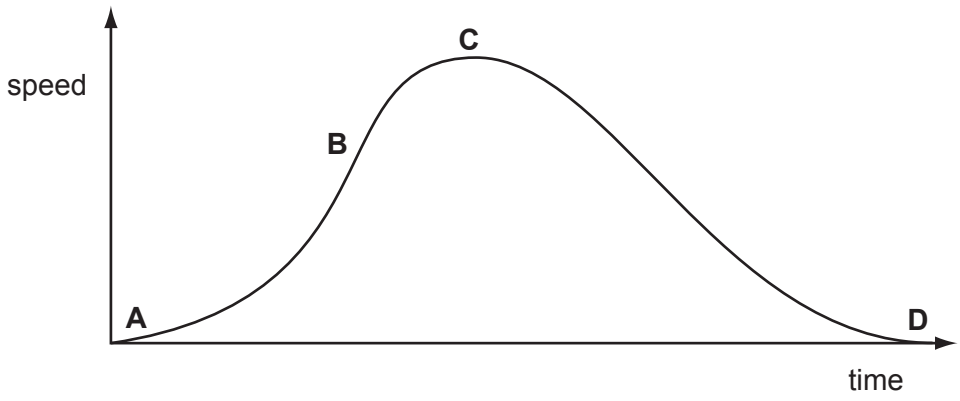
2 Two stones of different weight fall at the same time from a table. Air resistance may be ignored.

What will happen and why?

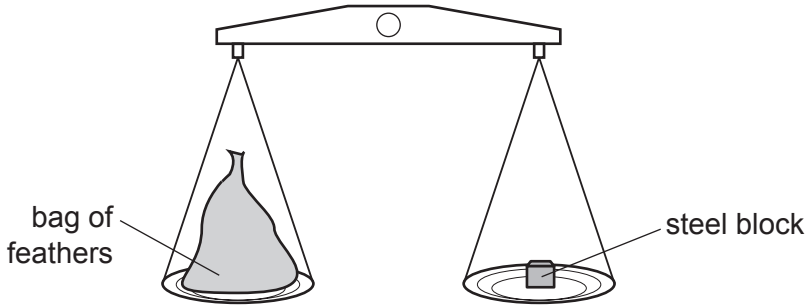
	what will happen	why
A	both stones hit the floor at the same time	acceleration of free fall is constant
B	both stones hit the floor at the same time	they fall at constant speed
C	the heavier stone hits the floor first	acceleration increases with weight
D	the heavier stone hits the floor first	speed increases with weight

3 The speed-time graph shown is for a bus travelling between stops.

Where on the graph is the acceleration of the bus greatest?



4 A large bag of feathers and a steel block balance each other on some scales.



What does this show about the masses and the weights of the bag of feathers and the steel block?

A It shows that the masses are equal and the weights are equal.

B It shows that the masses are equal, but the weights might be different.

C It shows that the masses might be different and the weights might be different.

D It shows that the weights are equal, but the masses might be different.

5 Which row identifies quantities that are measured in newtons?

	electromotive force (e.m.f.)	mass	weight
A	no	no	yes
B	no	yes	yes
C	yes	no	no
D	yes	yes	no

6 A liquid has a density of $0.80\,g/cm^3$.

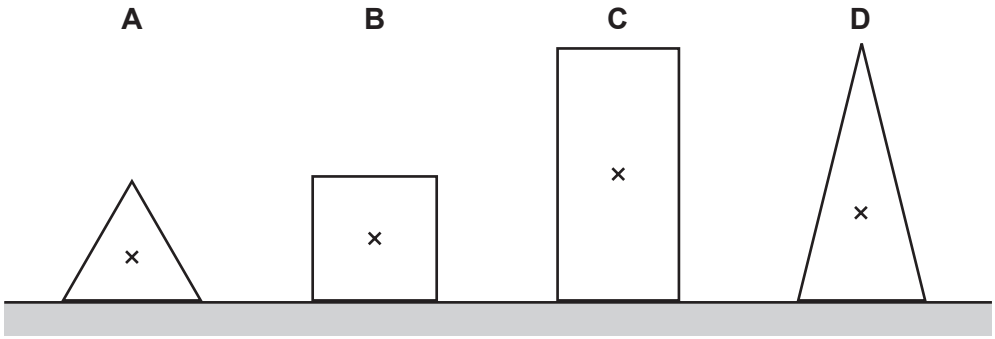
Which could be the volume and mass of this liquid?

	volume / cm^3	mass / g
A	2.0	16
B	8.0	10
C	10	8.0
D	16	2.0

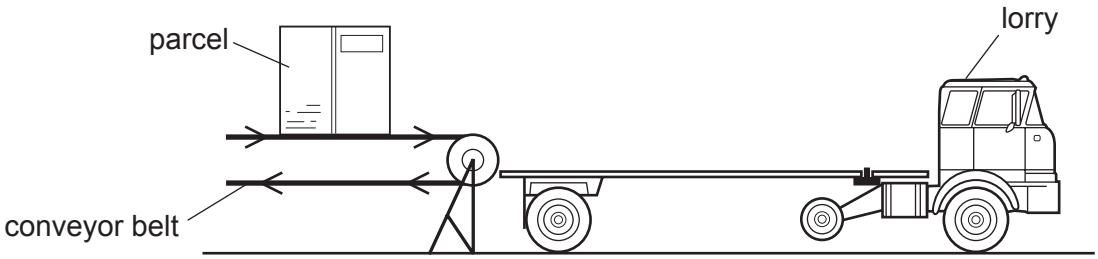
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7 The diagram shows sections of four objects of equal mass. The position of the centre of mass of each object has been marked with a cross.

Which object is the most stable?



8 A large parcel is on a horizontal conveyor belt. The conveyor belt moves the parcel towards a lorry.



The parcel travels towards the lorry at a constant speed. Only two horizontal forces act on the parcel: air resistance, and friction with the conveyor belt.

Which row correctly compares the directions and the sizes of these two forces?

	directions	sizes
A	opposite	different
B	opposite	the same
C	the same	different
D	the same	the same

9 A power station uses nuclear fission to obtain energy.

In this process, nuclear energy is **first** changed into

A chemical energy.

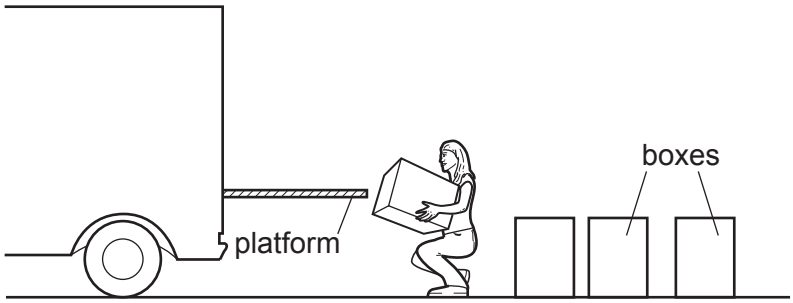
B electrical energy.

C gravitational energy.

D thermal (heat) energy.

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10 A person lifts boxes of equal weight on to a platform.



Which quantity will **not** affect the work done by the person?

A the height of the platform above the ground

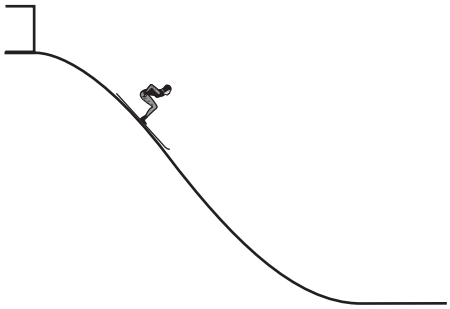
B the number of boxes lifted

C the time taken to lift the boxes

D the weight of the boxes

11 A skier walks from the bottom of a ski slope to the top and gains 10 000 J of gravitational potential energy.

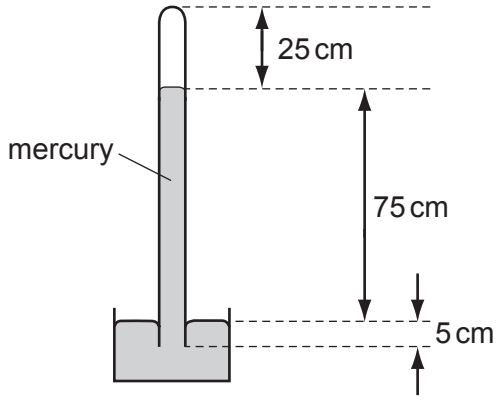
She skis down the slope. At the bottom of the slope, her kinetic energy is 2000 J.



How much energy was converted into thermal energy and sound energy as the skier moved down the slope?

A 2000 J **B** 8000 J **C** 10 000 J **D** 12 000 J

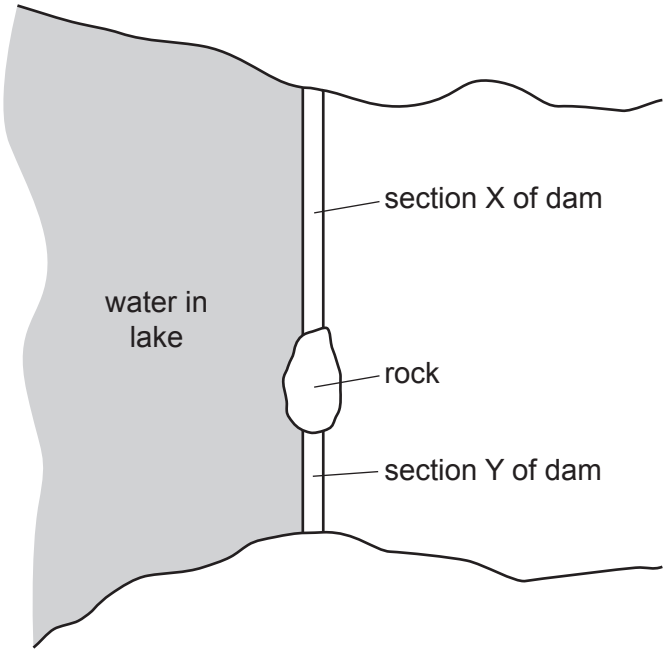
12 The diagram shows a mercury barometer.



Which distance is used to calculate the pressure of the atmosphere?

A 25 cm **B** 75 cm **C** 80 cm **D** 100 cm

13 A dam across a lake is divided into two sections by a rock. Section X is longer than section Y but the two sections are otherwise identical. The water in the lake by the dam is the same depth everywhere. The diagram shows a view from above of the lake and the dam.



The water creates a force on each section of the dam and a pressure on each section of the dam.

Which statement is correct?

A The force on X equals the force on Y.

B The force on X is less than the force on Y.

C The pressure on X equals the pressure on Y.

D The pressure on X is less than the pressure on Y.

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14 A car tyre contains a constant volume of air.

During use, the air gets hotter and the air pressure increases.

What explains this increase in pressure in terms of the motion of air molecules?

	number of air molecules in tyre	force between air molecules and tyre wall	number of collisions per second between air molecules and tyre wall
A	increased	increased	decreased
B	increased	unchanged	decreased
C	unchanged	increased	increased
D	unchanged	unchanged	increased

15 The table lists the melting points and the boiling points of four different substances.

Which substance is a liquid at 0 °C?

	melting point / °C	boiling point / °C
A	–219	–183
B	–7	58
C	98	890
D	1083	2582

16 A student wishes to calibrate a mercury-in-glass thermometer with a °C scale.

Which values should she use for the lower fixed point and for the upper fixed point?

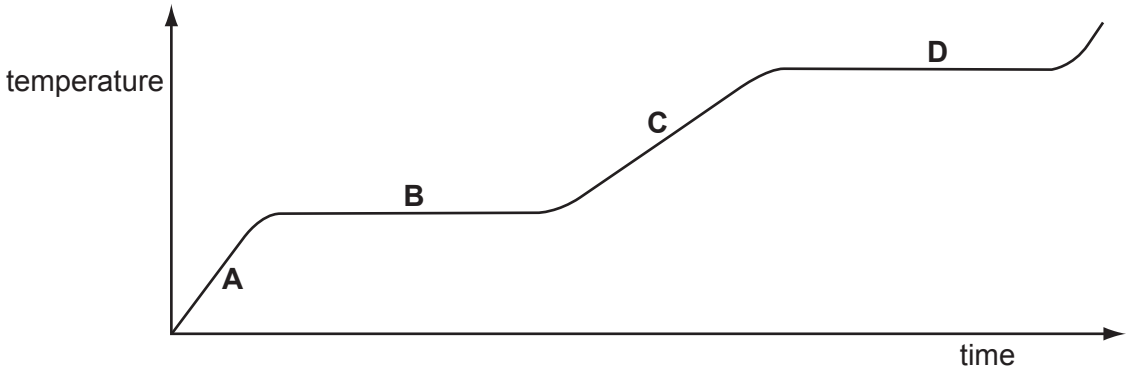
	lower fixed point	upper fixed point
A	freezing point of mercury	boiling point of mercury
B	freezing point of mercury	boiling point of water
C	freezing point of water	boiling point of mercury
D	freezing point of water	boiling point of water

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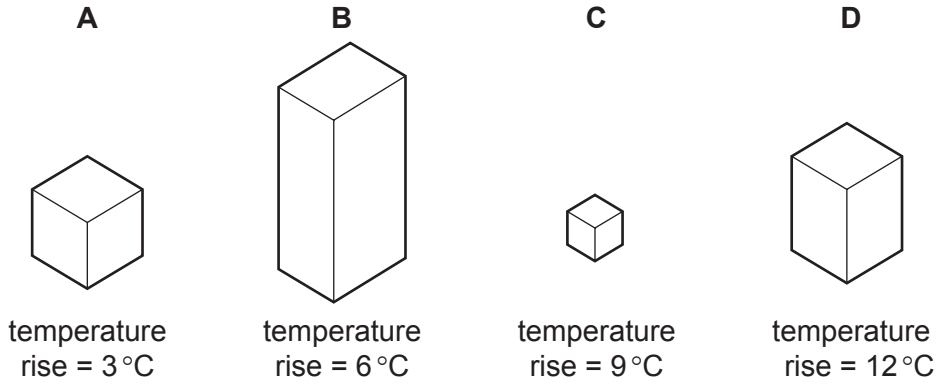
17 The graph shows the temperature of a substance as it is heated steadily.

In which part of the graph is the substance boiling?



18 Four blocks, made from different materials, are each heated so that they have the same increase in internal energy.

Which block has the smallest thermal capacity?

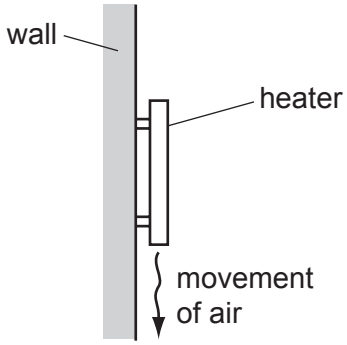


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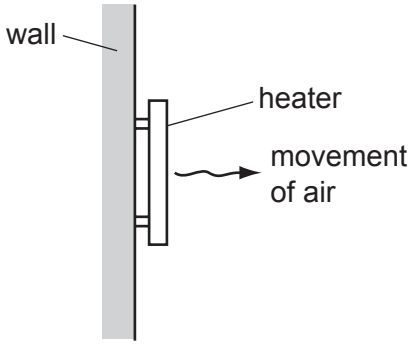
19 A convector heater is fixed to a wall.

Which diagram shows how warm air near the heater moves because of convection in the air?

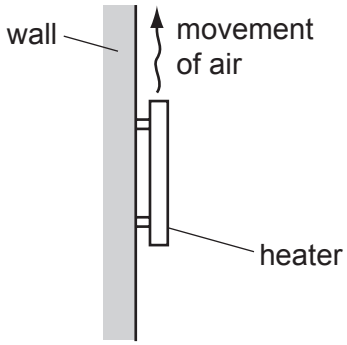
A



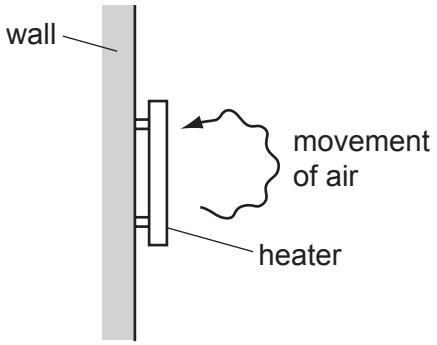
B



C

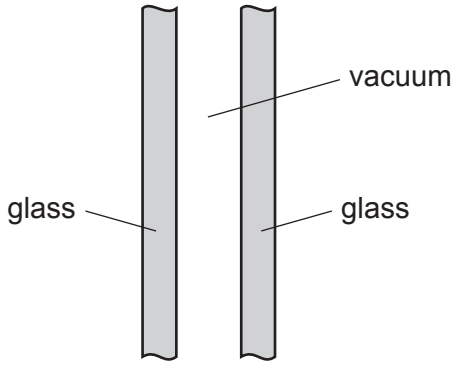


D



20 A double-glazed window consists of two panes of glass with a vacuum between them.

The vacuum reduces the amount of thermal energy transferred through the window.

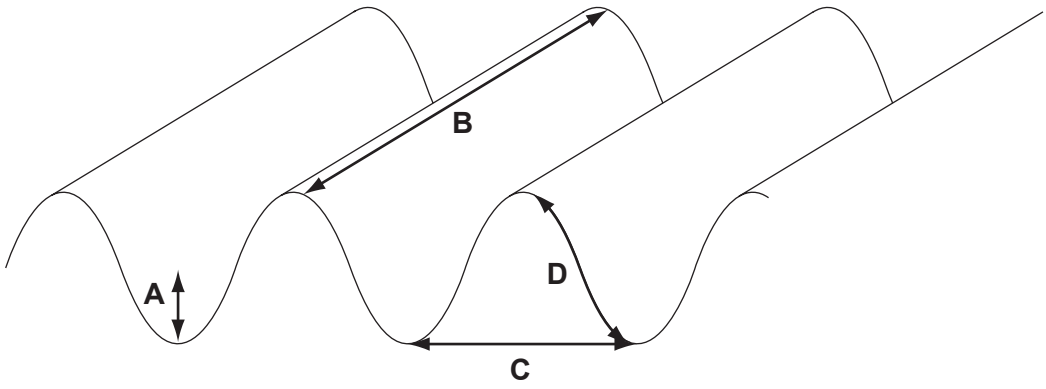


Which row shows how much thermal energy is transferred through the vacuum by conduction, by convection and by radiation?

	conduction	convection	radiation
A	none	none	some
B	none	some	some
C	some	none	none
D	some	some	none

21 The diagram shows a water wave in a ripple tank.

Which line represents a wavefront?



22 Which statement about radio waves is correct?

A They travel as longitudinal waves.

B They travel at the same speed as sound waves.

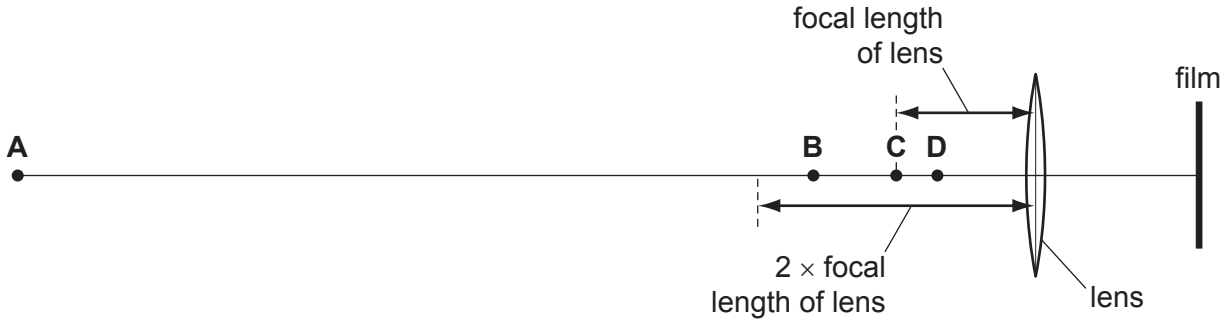
C They travel by means of molecular vibration.

D They can travel through a vacuum.

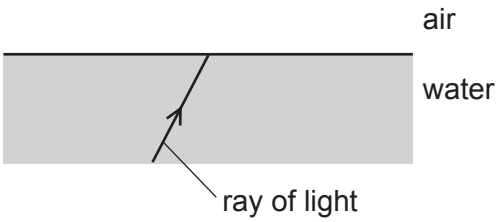
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23 The converging lens in a camera is used to make an image on a film.

At which labelled point could a large object be placed so that it makes a smaller image?



24 A ray of light in water is incident on the surface. The angle of incidence is much smaller than the critical angle.



What happens to this ray?

A It is completely reflected.

B It is completely refracted.

C It is partially reflected and partially refracted.

D It is refracted at an angle of refraction of 90°.

25 Sound waves may cause an echo.

What happens to sound waves to cause an echo and what is the nature of sound waves?

	what an echo is caused by	nature of sound waves
A	reflection	longitudinal
B	reflection	transverse
C	refraction	longitudinal
D	refraction	transverse

26 In a test, a car horn is found to be too loud and the pitch of the note is too high.

What information does this give about the amplitude and the frequency of the sound wave produced?

	amplitude	frequency
A	too large	too large
B	too large	too small
C	too small	too large
D	too small	too small

27 Which row shows whether iron and steel are ferrous or non-ferrous?

	iron	steel
A	ferrous	ferrous
B	ferrous	non-ferrous
C	non-ferrous	ferrous
D	non-ferrous	non-ferrous

28 The N pole of a magnet repels one end of bar X.



What happens when the **other** end of bar X is placed near to the poles of the magnet?

	other end near N pole	other end near S pole
A	attracts	attracts
B	attracts	repels
C	repels	attracts
D	repels	repels

29 Which is the worst electrical conductor?

A aluminium

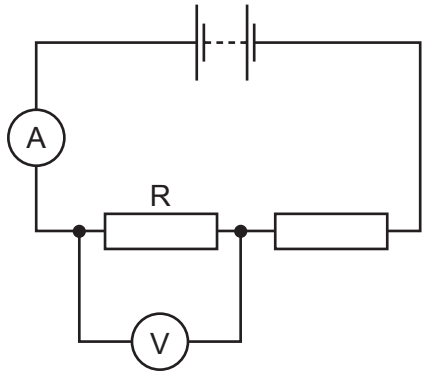
B carbon (graphite)

C iron

D sulfur

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30 The circuit shows a 24 V battery connected to two resistors in series.



The reading on the ammeter is 2.0 A and the reading on the voltmeter is 8.0 V.

What is the resistance of resistor R?

A 0.25 Ω **B** 4.0 Ω **C** 10 Ω **D** 16 Ω

31 A relay allows a small current in one circuit to control a different circuit.

Which type of force is produced by the small current to activate the relay?

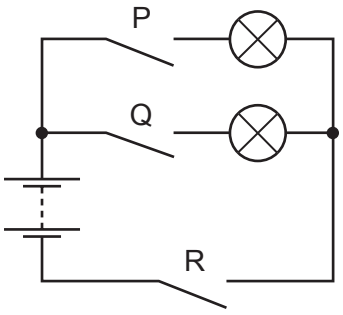
A electrical

B frictional

C gravitational

D magnetic

32 The diagram shows a circuit containing two identical lamps.



Which switches must be closed to light both of the lamps?

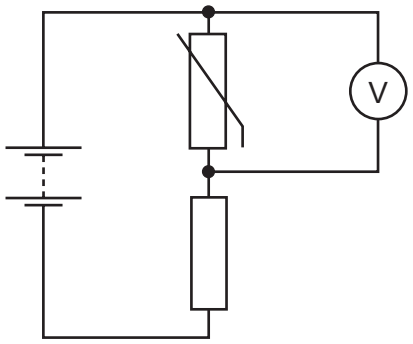
A P and Q only

B P and R only

C Q and R only

D P, Q and R

33 The diagram shows a potential divider circuit.



The temperature of the thermistor increases.

What happens to the resistance of the thermistor, and what happens to the reading on the voltmeter?

	resistance of thermistor	voltmeter reading
A	decreases	decreases
B	decreases	increases
C	increases	decreases
D	increases	increases

34 An electric oven is connected to the mains supply using insulated copper wires. The wires become very warm.

What can be done to prevent so much heat being produced in the connecting wires?

A Use thicker copper wires.

B Use thinner copper wires.

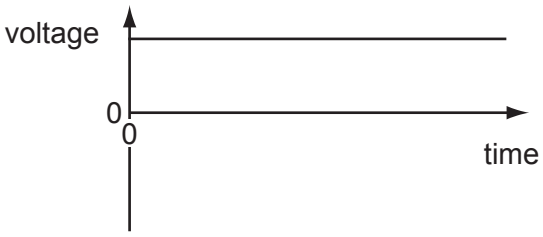
C Use thicker insulation.

D Use thinner insulation.

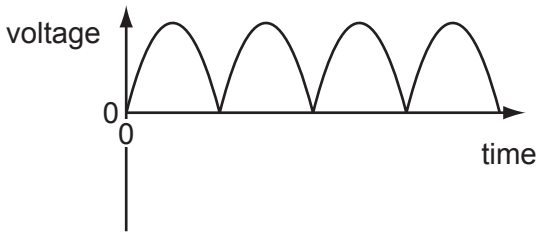
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35 Which graph shows how the voltage of a simple a.c. generator varies with time?

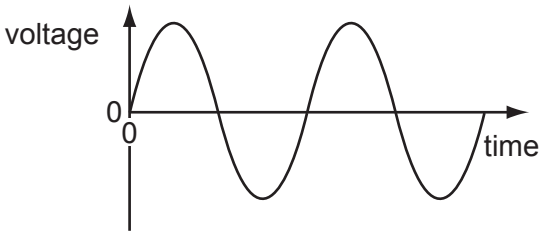
A



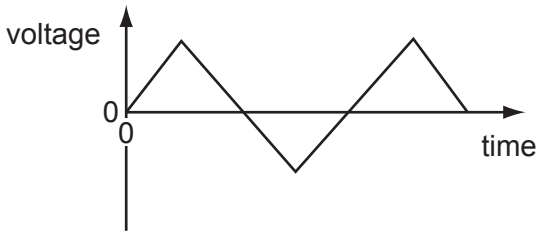
B



C



D



36 In the construction of a transformer, which items must be included?

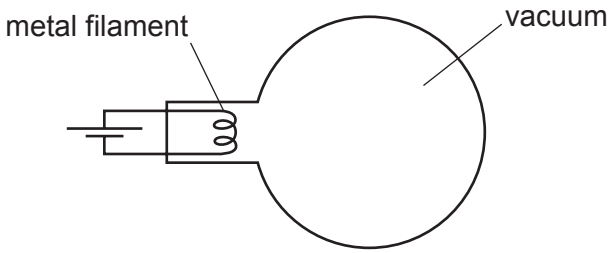
A an iron core and a permanent magnet

B an iron core and two coils of wire

C a steel core and a permanent magnet

D a steel core and two coils of wire

37 The metal filament shown is heated by passing a current through it. This makes it hot and it releases electrons.



What is the name of this process of releasing electrons?

A convection

B evaporation

C radioactive emission

D thermionic emission

38 How do the ionising effect and the penetrating ability of α-particles compare with those of β-particles and γ-rays?

	ionising effect	penetrating ability
A	higher	higher
B	higher	lower
C	lower	higher
D	lower	lower

39 A student is investigating how the radiation from a radioactive source changes with time.

The table shows the results from the detector.

time / min	count-rate / counts per min
0	340
2	180
4	100
6	60
8	40

The experiment is repeated by other students, who also measure the count-rate every two minutes.

The half-life of the source is known to be exactly two minutes.

Why is the measured count-rate **always** higher than half the previous value?

A Radioactive emissions occur randomly with time.

B The detector used is very close to the source.

C There is background radiation present.

D The radioactive source is decaying.

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40 Which of the following is **not** a charged particle?

A α-particle

B β-particle

C neutron

D proton

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