Cambridge International Examinations
Cambridge International General Certificate of Secondary Education

PHYSICS **0625/12**

Paper 1 Multiple Choice **October/November 2015**

45 minutes

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

* 4 8 2 9 6 4 9 2 6 6 *

READ THESE INSTRUCTIONS FIRST

Write in soft pencil.
Do not use staples, paper clips, 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.
DO **NOT** WRITE IN ANY BARCODES.

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.

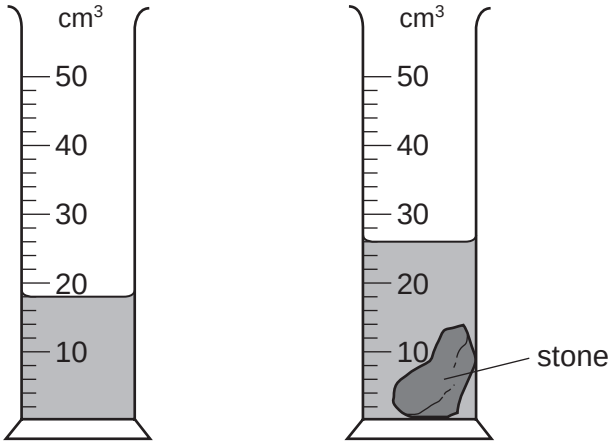
Each correct answer will score one mark. A mark will not be deducted for a wrong answer.
Any rough working should be done in this booklet.
Electronic calculators may be used.

The syllabus is approved for use in England, Wales and Northern Ireland as a Cambridge International Level 1/Level 2 Certificate.

This document consists of **18** printed pages and **2** blank pages.

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1 The diagram shows a measuring cylinder used to measure the volume of a small stone.



What is the volume of the stone?

A $8\,cm^3$ **B** $9\,cm^3$ **C** $14\,cm^3$ **D** $26\,cm^3$

2 The table shows the readings on a car speedometer at 5 second intervals.

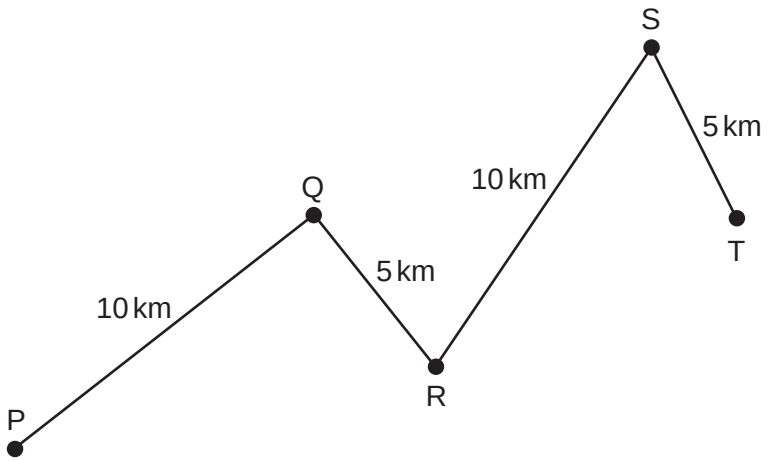
time / s	speed / km/h
0	0
5	30
10	50
15	60
20	65

Which row describes the speed and the acceleration of the car?

	speed	acceleration
A	decreasing	zero
B	decreasing	not zero
C	increasing	zero
D	increasing	not zero

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3 A car travels along the route PQRST in 30 minutes.



What is the average speed of the car?

A 10 km / hour **B** 20 km / hour **C** 30 km / hour **D** 60 km / hour

4 Which statement about mass or weight is correct?

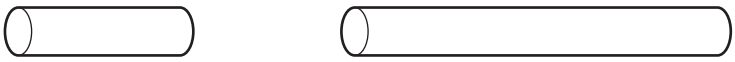
A Mass is a force.

B Mass is measured in newtons.

C Weight is a force.

D Weight is measured in kilograms.

5 Two cylinders are made of the same metal. Both cylinders have the same cross-sectional area but one is longer than the other.



cylinder 1 cylinder 2

Which quantity is the same for both cylinders?

A density

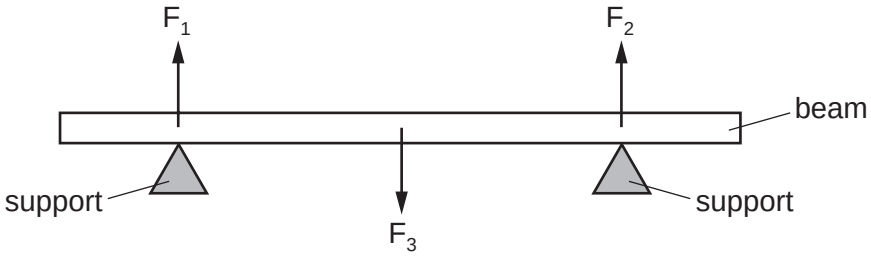
B mass

C resistance

D volume

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6 A heavy beam rests on two supports. The diagram shows the only three forces F_1, F_2 and F_3 acting on the beam.



The beam is in equilibrium.

Which statement is correct?

A All the forces are equal in size.

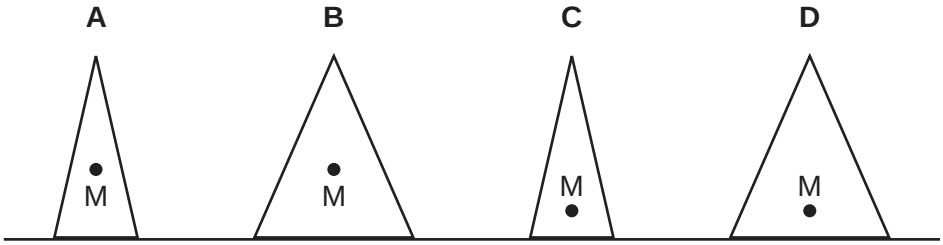
B The resultant force on the beam is in the opposite direction to the resultant turning effect.

C The resultant force on the beam is zero and the resultant turning effect on the beam is zero.

D The total upward force is twice the total downward force.

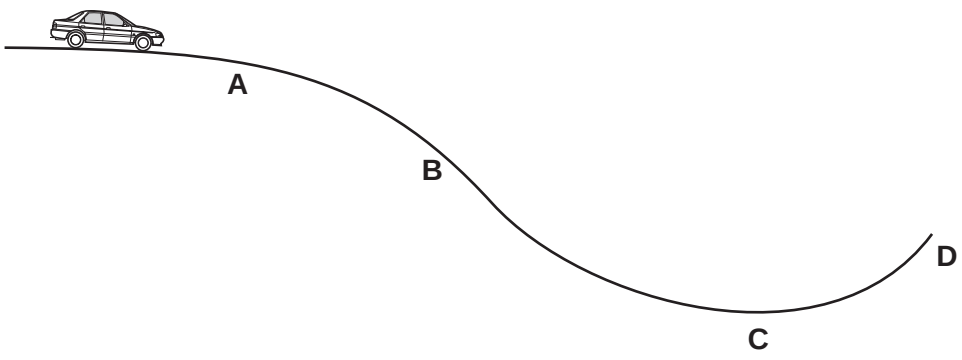
7 The diagrams show four solid cones. The centre of mass of each cone is marked by a point labelled M.

Which cone is the most stable?



8 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.



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9 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

10 The table gives four forces and the surface area on which each force acts.

Which row gives the largest pressure on the surface?

	force / N	area / m^2
A	20	2
B	40	2
C	20	4
D	40	4

11 What does a barometer measure?

A the current in a circuit

B the density of a liquid

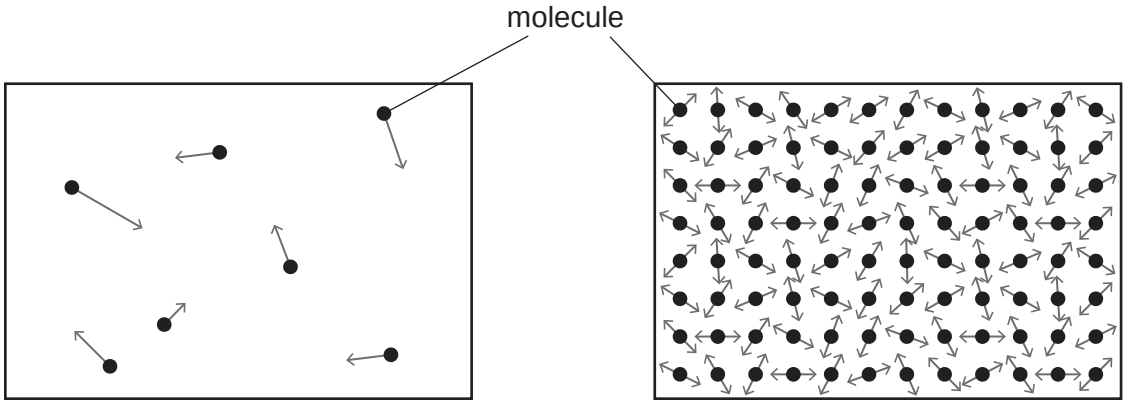
C the pressure of air

D the temperature of an object

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[Turn over

12 The diagrams represent the molecules in two different states of matter. The arrows show the motion of the molecules.



What is state 1, and what is state 2?

	state 1	state 2
A	gas	liquid
B	gas	solid
C	liquid	gas
D	liquid	solid

13 A swimmer feels cold after leaving warm water on a warm, windy day.

Why does she feel cold even though the air is warm?

A The less energetic water molecules on her skin escape quickly.

B The more energetic water molecules on her skin do not escape quickly.

C The water on her skin does not evaporate quickly enough to keep her warm.

D The water on her skin evaporates quickly and cools her skin.

14 A circular metal disc is heated.

Which quantity decreases?

A its density

B its diameter

C its thickness

D its volume

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15 A block of copper and a block of lead are heated. The internal energy of each block increases by the same amount.

The block of copper has a lower thermal capacity than the block of lead.

Which conclusion can be made from this information?

A The temperature increase of the copper is greater than the temperature increase of the lead.

B The temperature increase of the copper is the same as the temperature increase of the lead.

C The temperature increase of the copper is less than the temperature increase of the lead.

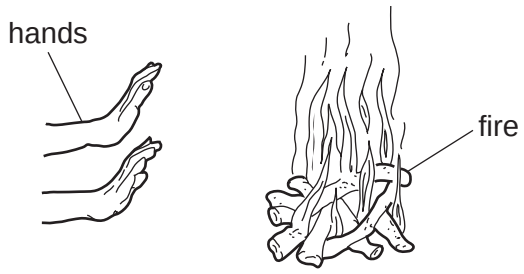
D The melting point of copper is lower than the melting point of lead.

16 In a refrigerator, the cooling unit can be fitted either at the top or at the bottom. In an oven, the heater can be fitted either at the top or at the bottom.

Which row shows the best position for the cooling unit and the best position for the heater?

	cooling unit	heater
A	bottom	bottom
B	bottom	top
C	top	bottom
D	top	top

17 A girl is outdoors. She warms her hands by holding them near a fire, as shown.



How does the heat from the fire reach her hands?

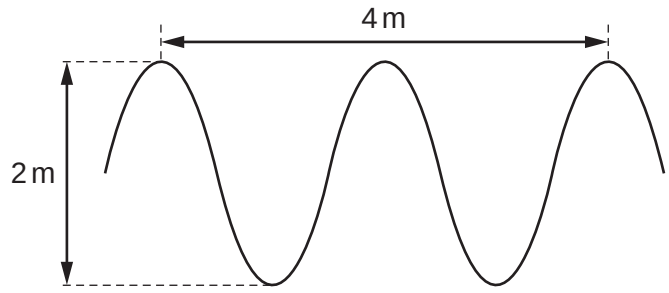
A conduction only

B convection and conduction

C convection and radiation

D radiation only

18 The diagram represents a water wave.

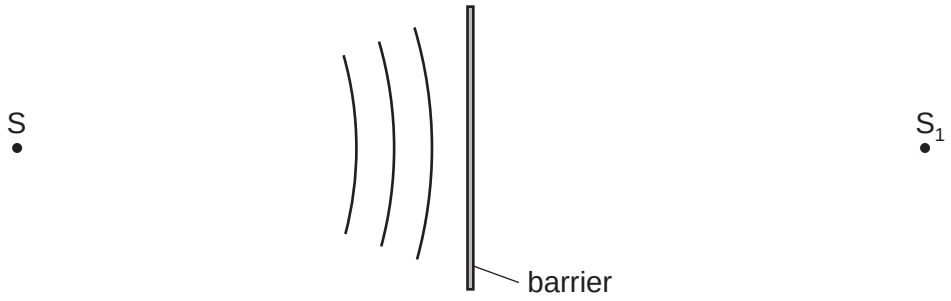


Which row shows the amplitude and the wavelength of the wave?

	amplitude / m	wavelength / m
A	1	2
B	1	4
C	2	2
D	2	4

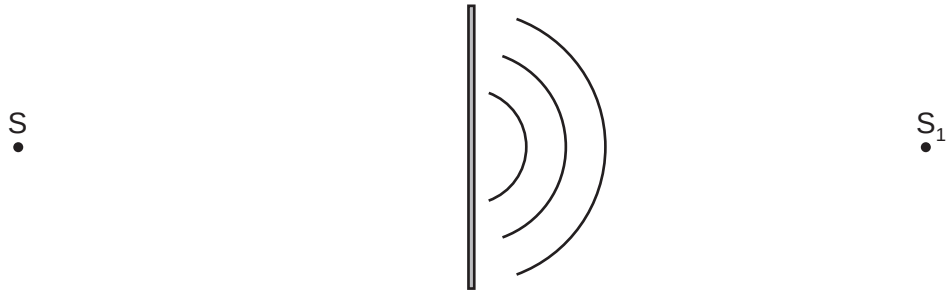
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19 The diagram represents circular wavefronts coming from point S. The wavefronts strike a barrier and are reflected so that they appear to come from point S_1.

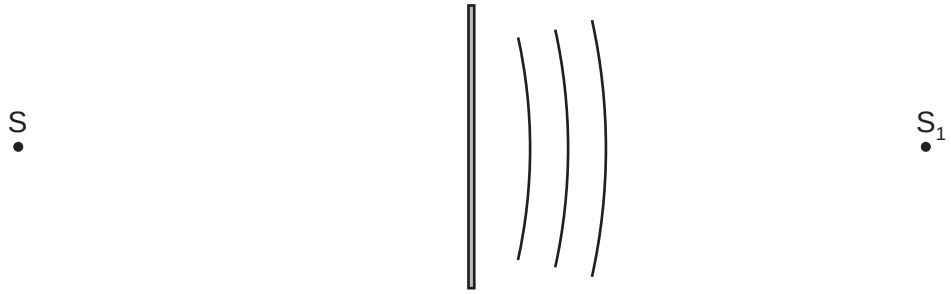


Which diagram shows the reflected wavefronts?

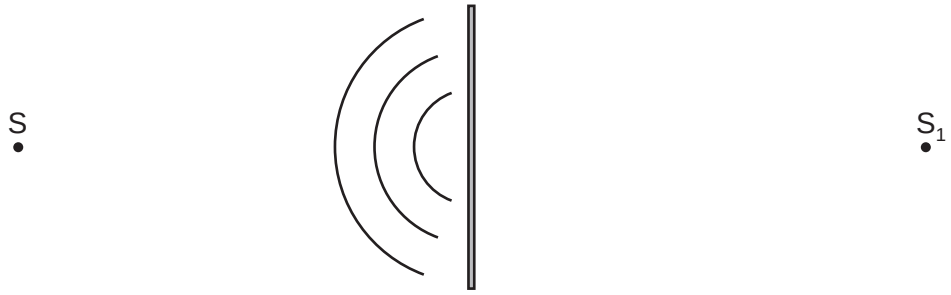
A



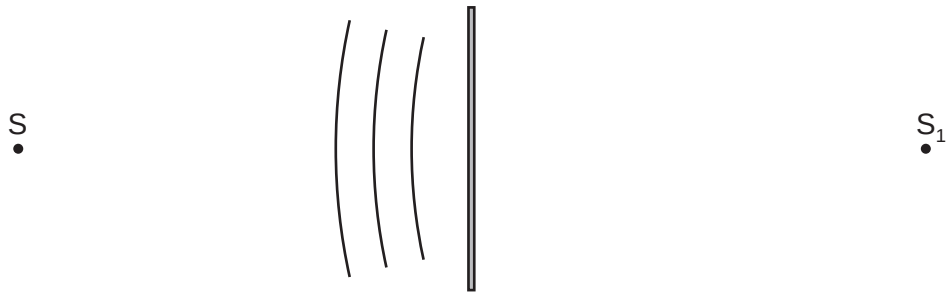
B



C



D



20 A plane mirror is fitted to a wall.

Which statement about the image formed by the mirror is correct?

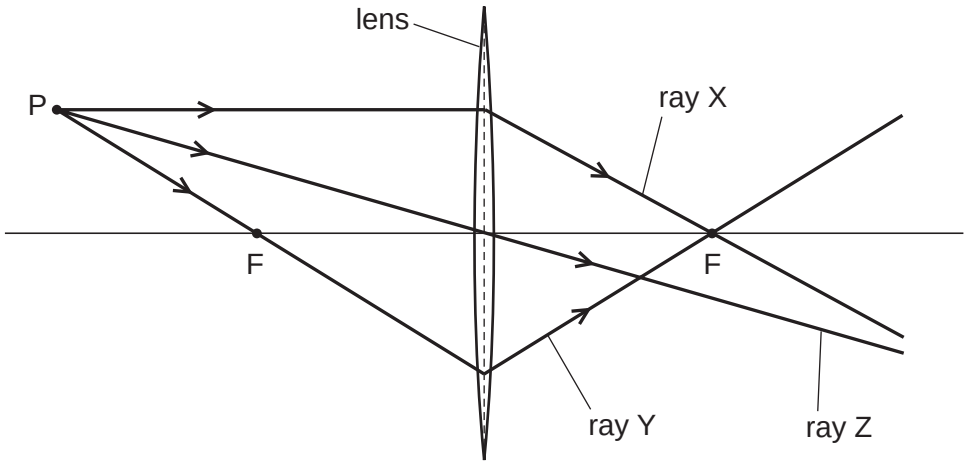
A The image is real.

B The image is left to right (laterally inverted).

C The image is smaller than the object.

D The image is upside down.

21 A student draws a diagram representing three rays of light from point P passing through a converging lens. Each point labelled F is a principal focus of the lens.



Which of the rays has the student drawn correctly?

A ray X and ray Y

B ray X and ray Z

C ray Y only

D ray Z only

22 Which group contains only electromagnetic waves?

A light waves, radio waves, γ-rays

B light waves, radio waves, sound waves

C light waves, sound waves, γ-rays

D radio waves, sound waves, γ-rays

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23 Two sounds X and Y are produced by loudspeakers.

The amplitude and frequency of each sound wave is given in the table.

	amplitude / mm	frequency / Hz
X	1.3	475
Y	2.0	235

How does sound Y compare with sound X?

A Y is louder and has a higher pitch.

B Y is louder and has a lower pitch.

C Y is quieter and has a higher pitch.

D Y is quieter and has a lower pitch.

24 Sounds are produced by vibrating objects. A certain object vibrates but a person nearby cannot hear any sound.

Which statement could explain why nothing is heard?

A The amplitude of the sound waves is too large.

B The frequency of the vibration is too high.

C The sound waves are transverse.

D The speed of the sound waves is too high.

25 Which statement about a permanent bar magnet is correct?

A It is made from a soft magnetic material.

B It repels a non-magnetic material.

C Its field lines cross each other where the magnetic field is strong.

D Its N-pole repels the N-pole of another magnet.

26 Which procedure may be used to demagnetise a steel bar?

A cooling it in a freezer for several hours

B earthing it with a copper wire for several seconds

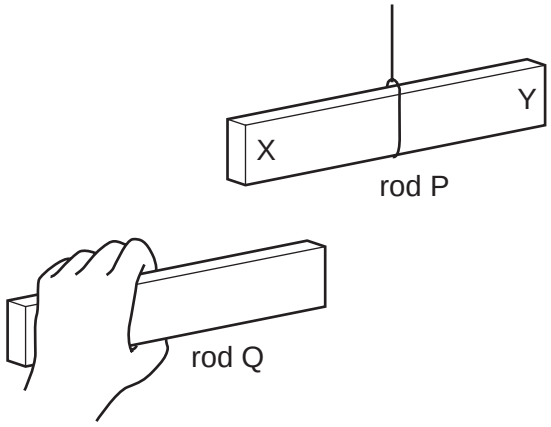
C removing it slowly from a coil carrying an alternating current (a.c.)

D rubbing it in one direction with a woollen cloth

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[Turn over

27 Two plastic rods P and Q are both negatively charged. Rod P hangs freely.



The end of rod Q is brought near to end X of rod P, and then near to end Y of rod P.

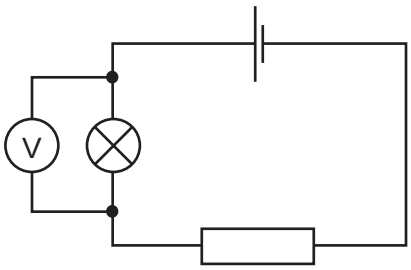
What happens to the rods in each position?

	near end X	near end Y
A	they attract	they attract
B	they attract	they repel
C	they repel	they attract
D	they repel	they repel

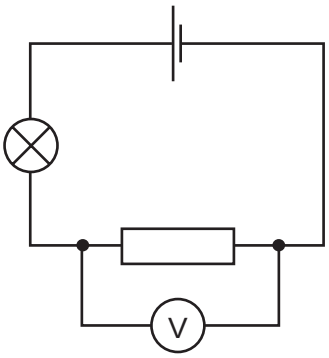
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28 Which circuit shows a voltmeter measuring the p.d. across a resistor?

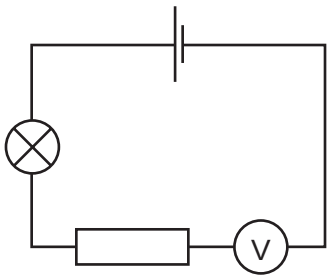
A



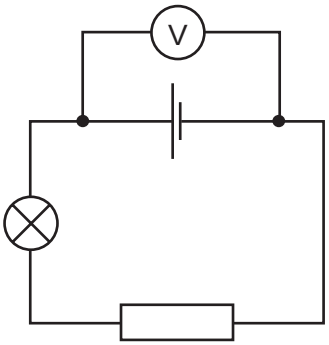
B



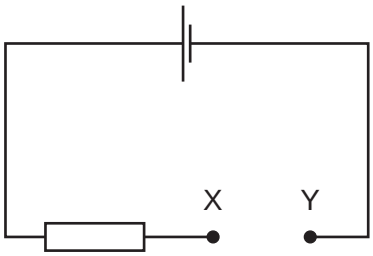
C



D



29 A student has four pieces of resistance wire made of the same material. Each piece is connected in turn between the terminals X and Y in the circuit.



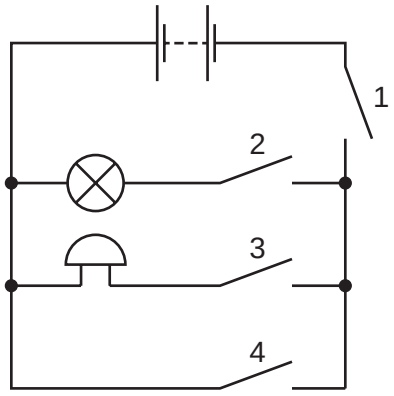
In which wire is the current the largest?

	length of wire / m	diameter of wire / mm
A	0.5	0.5
B	0.5	1.0
C	1.0	0.5
D	1.0	1.0

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[Turn over

30 A student connects the circuit shown.



Which switches must be closed for both the bell to ring and the lamp to light?

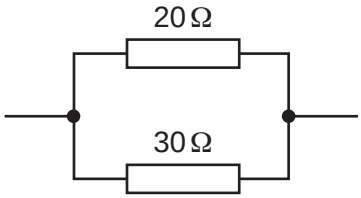
A 1 and 4 only

B 2 and 3 only

C 1, 2 and 3 only

D 1, 2, 3 and 4

31 Two resistors are connected in parallel.

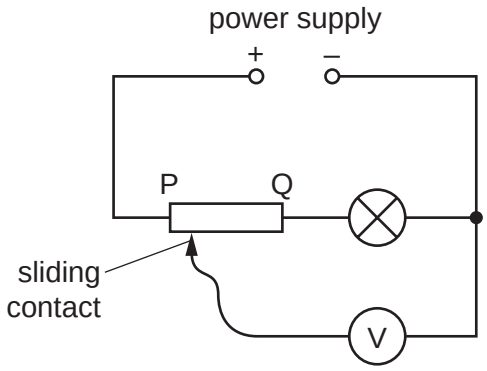


Which value could be the resistance of the combination?

A 12 Ω **B** 20 Ω **C** 25 Ω **D** 50 Ω

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32 The circuit contains a variable potential divider PQ, a lamp and a voltmeter.



The sliding contact of the potential divider is moved towards end Q.

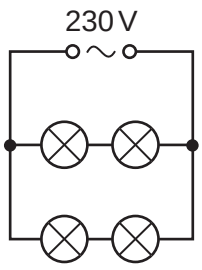
What happens to the brightness of the lamp and what happens to the voltmeter reading?

	brightness of lamp	voltmeter reading
A	becomes brighter	decreases
B	becomes brighter	increases
C	does not change	decreases
D	does not change	increases

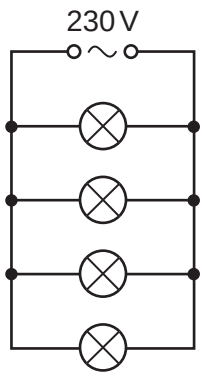
33 Four lamps are each labelled '60 W 230 V'.

In which circuit are the lamps connected so that they operate at normal brightness?

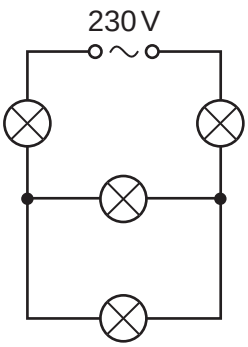
A



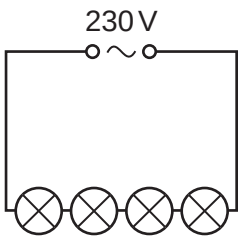
B



C



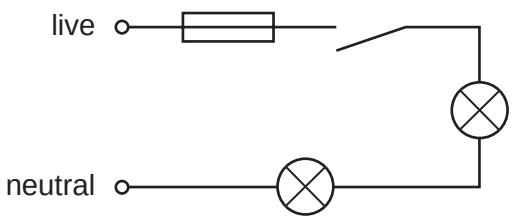
D



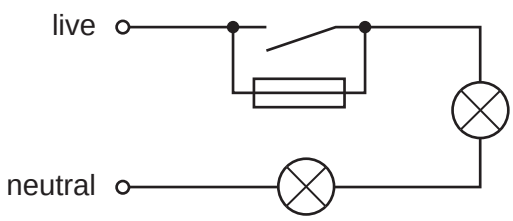
34 A fuse is used to protect an electric circuit.

Which diagram shows where the fuse should be connected?

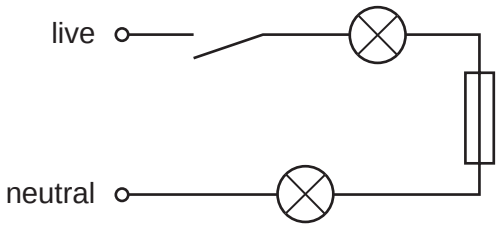
A



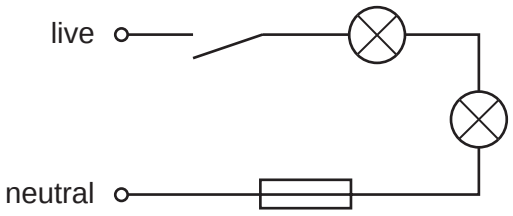
B



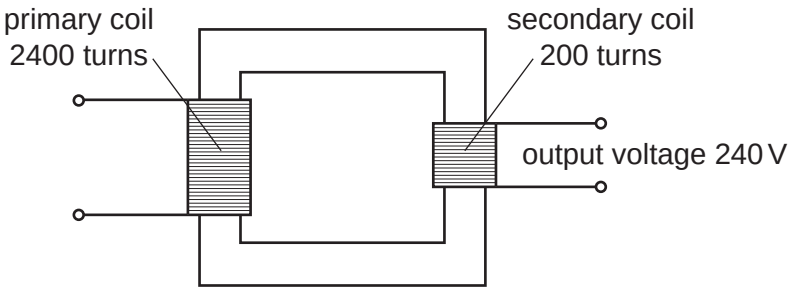
C



D



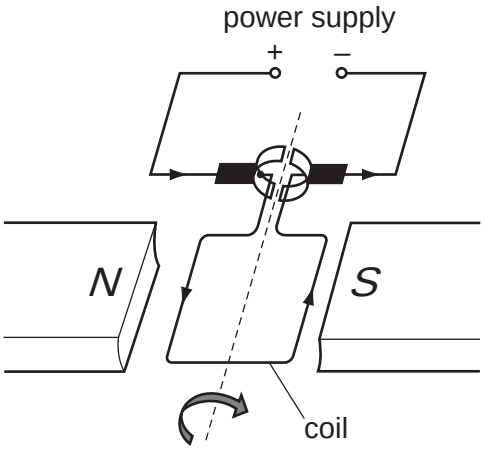
35 A transformer has 2400 turns on its primary coil and 200 turns on its secondary coil.



What input voltage is needed to give an output voltage of 240 V?

A 12 V **B** 20 V **C** 240 V **D** 2880 V

36 A current-carrying coil in a magnetic field experiences a turning effect.



How can the turning effect be increased?

A Increase the number of turns on the coil.

B Reduce the size of the current.

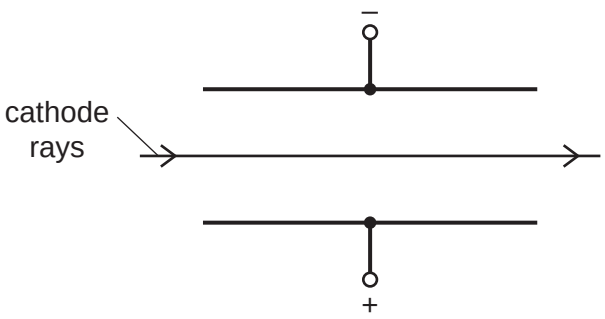
C Reverse the direction of the magnetic field.

D Use thinner wire for the coil.

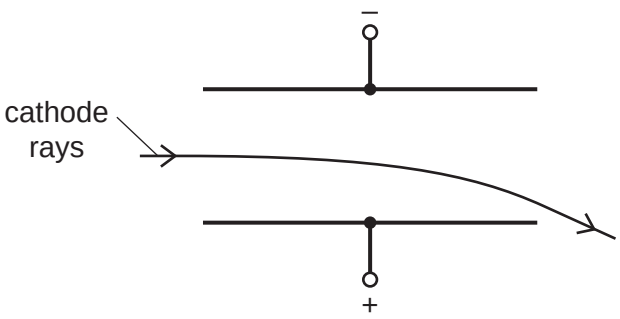
37 A beam of cathode rays enters an electric field between two charged plates.

Which diagram shows a path that the rays could take?

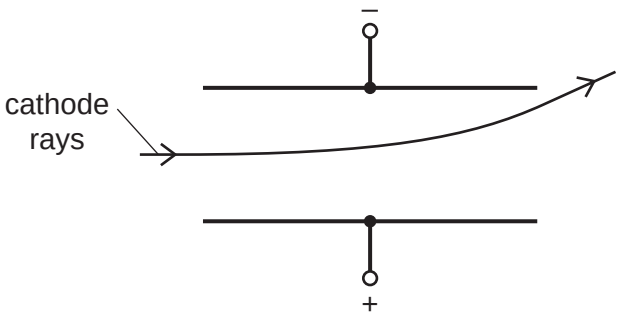
A



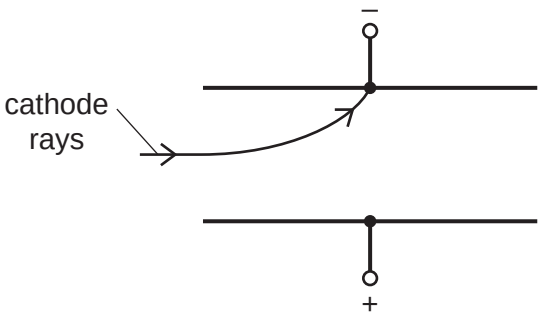
B



C



D



38 Radioactive carbon-14 decays into nitrogen by emitting a β-particle. The equation below represents the decay.

$$^{14}_{P}C \rightarrow {}^{14}_{7}N + {}^{0}_{Q}\beta$$

What are the values of P and Q?

	P	Q
A	6	1
B	6	–1
C	8	1
D	8	–1

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

The table shows the results from the detector used by the student.

time / minutes	count rate / counts per minute
0	340
2.0	180
4.0	100
6.0	60
8.0	40

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

The half-life of the source is known to be exactly 2.0 minutes.

Why is the measured count rate **always greater** 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.

40 The nuclide notation for radium-226 is $^{226}_{88}Ra$.

How many electrons orbit the nucleus of a neutral atom of radium-226?

A 0 **B** 88 **C** 138 **D** 226

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