Cambridge International Examinations
Cambridge International General Certificate of Secondary Education

PHYSICS **0625/12**

Paper 1 Multiple Choice (Core) **February/March 2017**

45 minutes

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

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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.

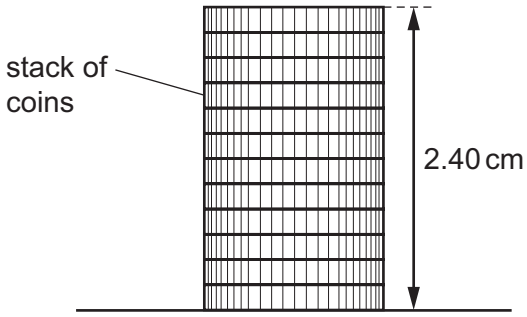
Each correct answer will score one mark. A mark will not be deducted for a wrong answer.
Any rough working should be done in this booklet.
Electronic calculators may be used.
Take the weight of 1.0 kg to be 10 N (acceleration of free fall = 10 m / s^2).

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 **19** printed pages and **1** blank page.

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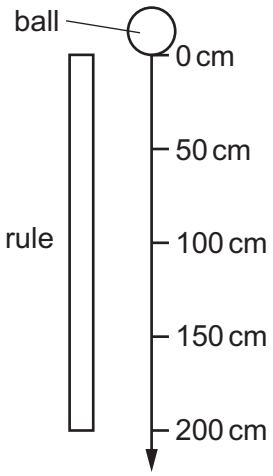
1 The diagram shows the height of a stack of identical coins.



What is the thickness of one coin?

A 0.20 mm **B** 2.0 mm **C** 0.24 cm **D** 2.0 cm

2 In a laboratory, a ball is dropped in a vacuum and falls 200 cm.



Which statement describes the acceleration of the ball?

A It is greater at 10 cm than at 200 cm.

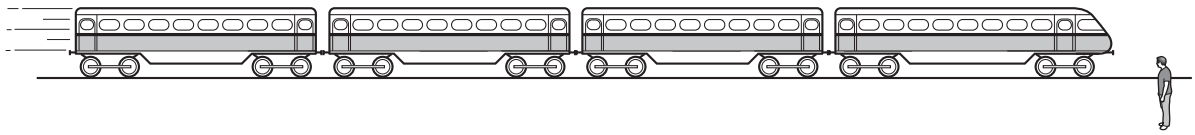
B It is greatest at 200 cm.

C It is smaller at 50 cm than at 100 cm.

D It is the same value at 50 cm as at 150 cm.

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3 A man stands by a railway track.



A train travelling at 40 m / s takes 2.0 s to pass the man.

What is the length of the train?

A 20 m **B** 38 m **C** 40 m **D** 80 m

4 Which statement about the masses and weights of objects on the Earth is correct?

A A balance can only be used to compare weights, not masses.

B Heavy objects always have more mass than light ones.

C Large objects always have more mass than small ones.

D Mass is a force but weight is not.

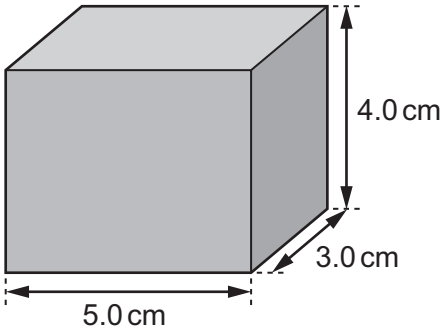
5 A stone has a weight of 5.7 N.

The gravitational field strength *g* is 10 N / kg.

What is the mass of the stone?

A 0.57 kg **B** 5.7 kg **C** 57 kg **D** 570 kg

6 The block of metal shown has a mass of 240 g.



What is the density of the metal?

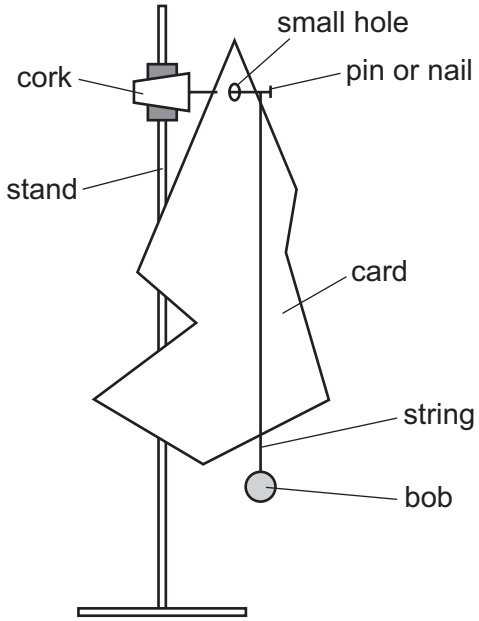
A 0.25 g / cm^3 **B** 4.0 g / cm^3 **C** 16 g / cm^3 **D** 14 400 g / cm^3

7 A car engine causes a forward force of 100 kN to act on the car. The total resistive force on the car is 20 kN.

What is the resultant force on the car?

A 5.0 kN **B** 60 kN **C** 80 kN **D** 120 kN

8 A student sets up the apparatus shown in the diagram to find the centre of mass of the card.



The student makes sure that the card, the string and the bob are all at rest.

What should the student do next?

A Mark a horizontal line on the card level with the middle of the string.

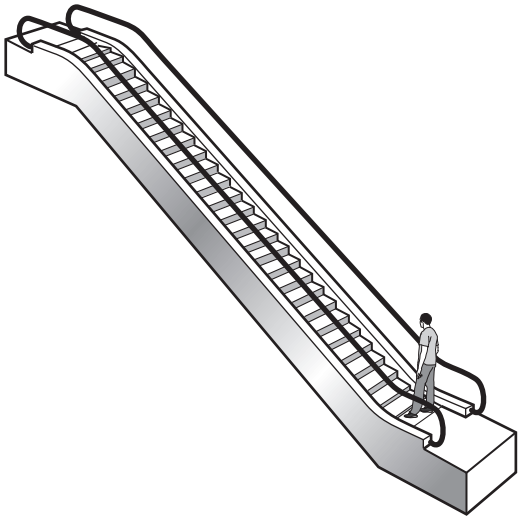
B Mark the line of the string on the card.

C Pull the bob on the string to one side and release it.

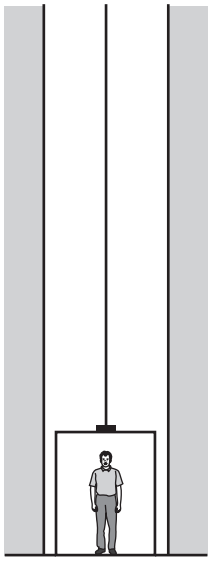
D Replace the bob with a heavier bob.

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9 A man can either take an escalator or a lift to travel up between two floors in a hotel.



escalator



lift

The escalator takes 20 seconds to carry the man between the two floors. The useful work done against gravity is *W.* The useful power developed is *P.*

The lift takes 30 seconds to carry the same man between the same two floors.

How much useful work against gravity is done by the lift, and how much useful power is developed by the lift?

	useful work done against gravity by lift	useful power developed by lift
A	more than *W*	less than *P*
B	more than *W*	*P*
C	*W*	less than *P*
D	*W*	*P*

10 The engine of a motor vehicle develops a large amount of power.

Which statement is correct?

A The driving force acting on the vehicle must be large.

B The engine must have a very large volume.

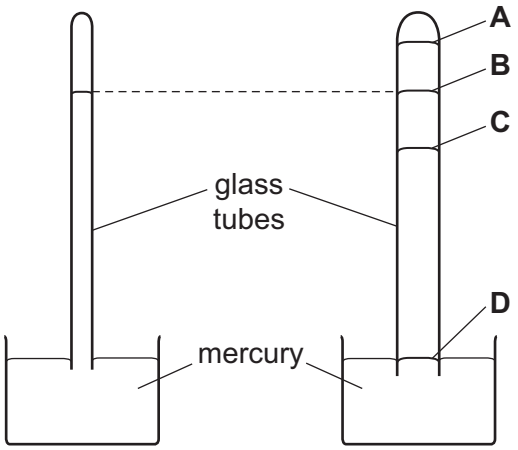
C The engine must transfer large amounts of energy each second.

D The vehicle must be very fast.

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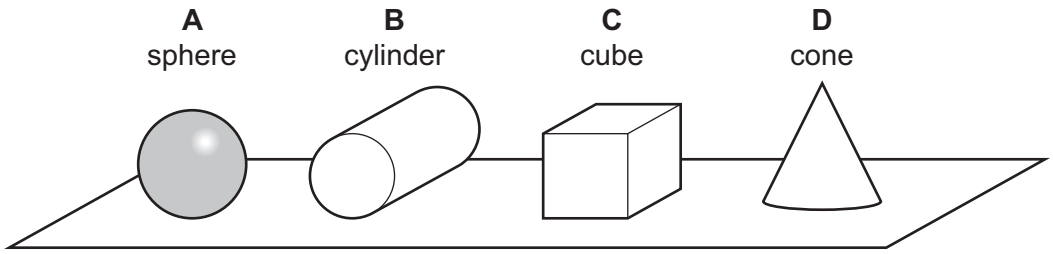
11 The diagrams show two mercury barometers. The right-hand diagram shows a tube of larger diameter. There is a vacuum above the mercury in both tubes.

Which labelled position on the right-hand tube shows the mercury level in the right-hand tube?



12 The diagram shows four solid objects resting on a horizontal surface. The objects all have the **same** weight, and are drawn to the same scale.

Which object exerts the least pressure on the surface?



13 On a hot day, the pressure of the air in a car tyre is greater than on a cold day.

Why is the pressure greater on a hot day?

A The air molecules strike each other more frequently.

B The air molecules strike each other with greater force.

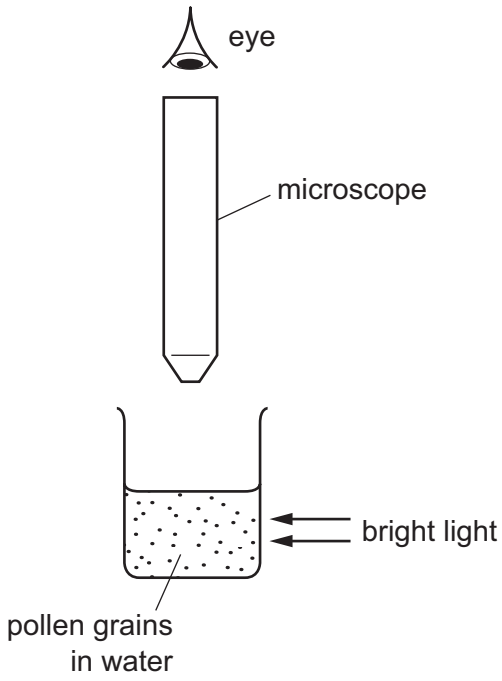
C The air molecules strike the tyre walls more frequently.

D The number of air molecules in the tyre increases.

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14 Very small pollen grains are suspended in water. A bright light shines from the side.

When looked at through a microscope, small specks of light are seen to be moving in a random, jerky manner.



What are the moving specks of light?

A pollen grains being hit by other pollen grains

B pollen grains being hit by water molecules

C water molecules being hit by other water molecules

D water molecules being hit by pollen grains

15 When a thermometer is calibrated, the fixed points are marked.

What are fixed points?

A all the marks on the temperature scale which cannot be removed

B all the marks of the temperature scale

C the lowest and highest temperatures shown on the thermometer

D two temperatures of known value which are easily reproduced

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16 Which statement defines the thermal capacity (heat capacity) of a solid body?

A the energy needed to melt the body without a change in temperature

B the energy needed to raise the temperature of the body by one degree Celsius

C the increase in the volume of the body when its temperature is raised by one degree Celsius

D the total amount of internal energy in the body

17 A substance can exist in three different states: solid, liquid or gas.

Each of the two statements below describes a change of state.

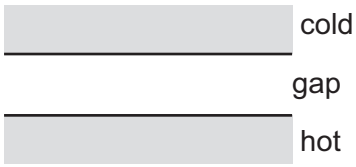
change 1 Molecules move closer together but continue to travel throughout the substance.

change 2 Molecules stop travelling throughout the substance and just vibrate about fixed positions.

Which changes of state do these statements describe?

	change 1	change 2
A	condensation	melting
B	condensation	solidification
C	solidification	condensation
D	solidification	melting

18 The diagram shows the gap between a hot surface and a cold surface. The gap can contain air, solid iron, a vacuum or liquid water.

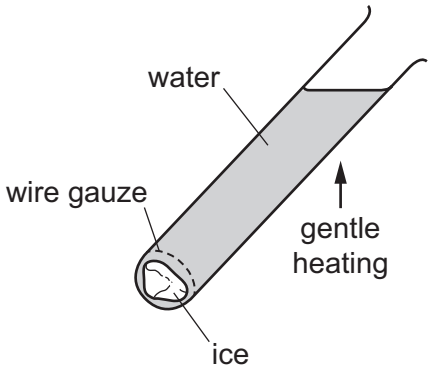


Which row shows whether heat can be transferred between the surfaces by conduction and convection?

		conduction	convection
A	air (gas)	yes	no
B	iron (solid)	yes	no
C	vacuum	no	yes
D	water (liquid)	yes	no

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19 Ice is trapped by a piece of wire gauze at the bottom of a tube containing water. The water at the top of the tube boils before the ice at the bottom of the tube melts.



Why does this happen?

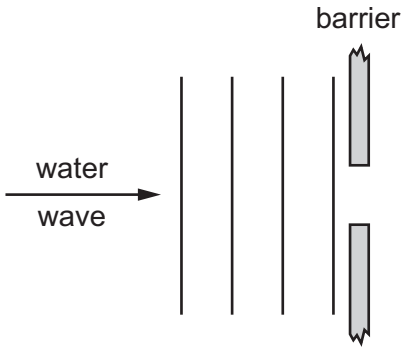
A Convection currents are circulating throughout the water.

B Ice is a poor emitter of thermal energy.

C Water is a poor conductor of thermal energy.

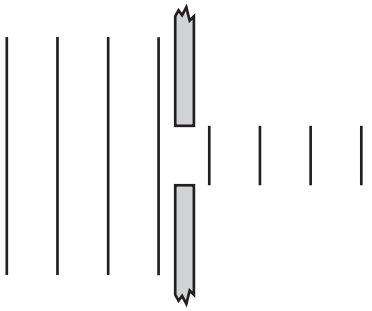
D Wire gauze is a good conductor of thermal energy.

20 In a shallow tank, a water wave moves towards a barrier with a narrow gap.

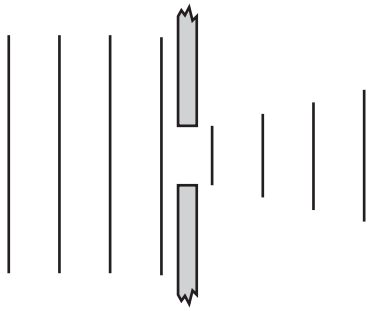


Which diagram shows the wave beyond the barrier?

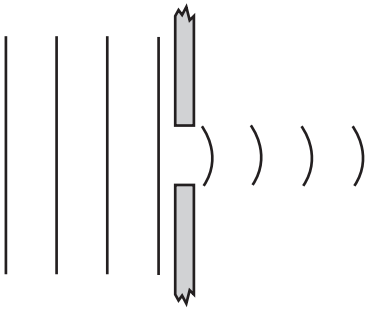
A



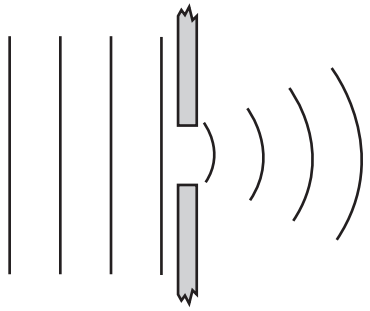
B



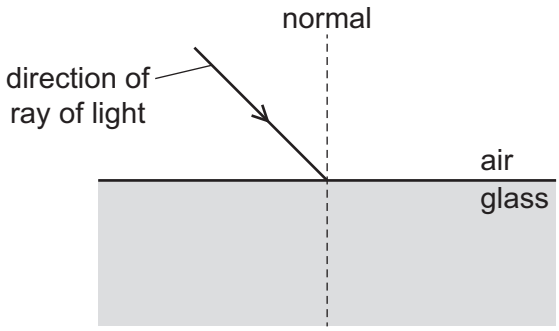
C



D



21 A ray of light is incident on the surface of a glass block.

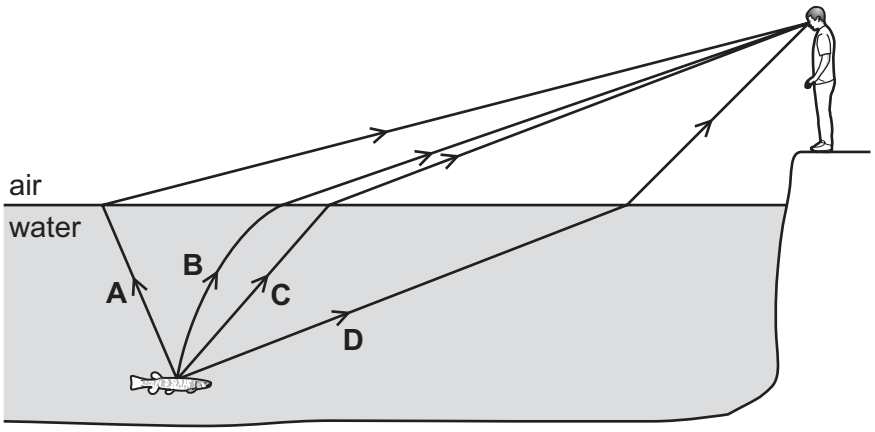


Which row describes how the speed and the direction of the ray of light change when it enters the glass?

	speed in glass	direction in glass
A	decreases	closer to the normal
B	decreases	further from the normal
C	increases	closer to the normal
D	increases	further from the normal

22 A boy sees a fish in a lake.

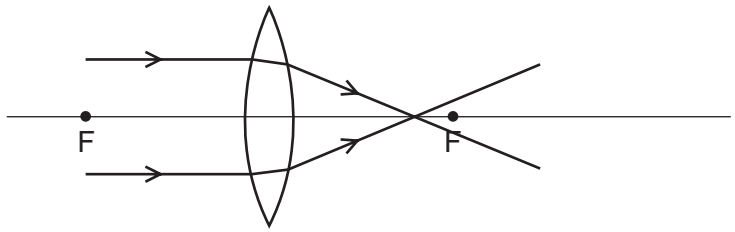
Which labelled path is taken by the light travelling from the fish to the boy's eye?



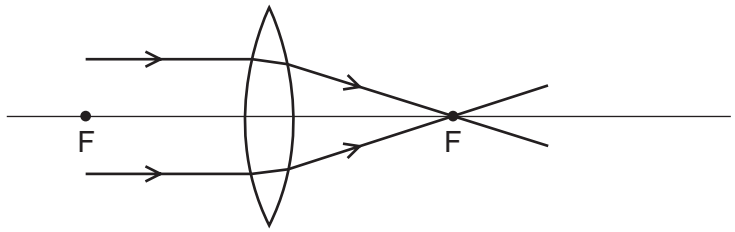
23 The points labelled F are the principal foci of a lens. A beam of parallel light is incident on the lens.

Which diagram shows the path of the light after it passes through the lens?

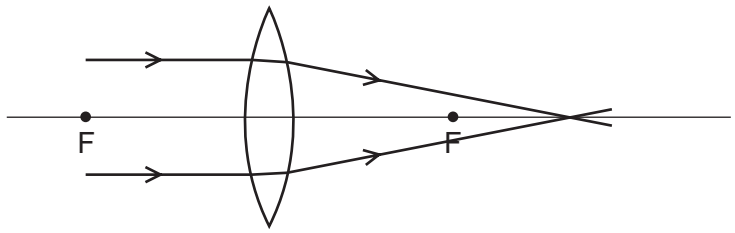
A



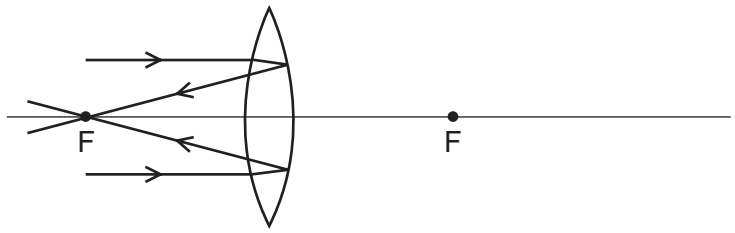
B



C



D



24 What is the main type of radiation given out by a campfire?

A infra-red

B microwave

C ultraviolet

D X-ray

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25 A student stands a few hundred metres away from a wall and shouts. He hears a faint echo.

Which statement is correct?

A The sound waves returning are quiet because they have a reduced frequency.

B The sound waves returning are quiet because they have a reduced wavelength.

C The sound waves returning to the student are longitudinal.

D The sound waves returning to the student are transverse.

26 Which statement about ultrasound is correct?

A It is produced by a rapidly vibrating source.

B It is uncomfortable to human ears.

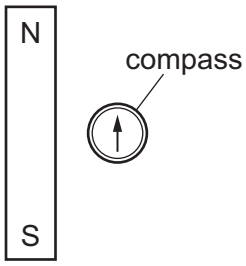
C Its frequency must be greater than 300 kHz.

D It travels the fastest in a vacuum.

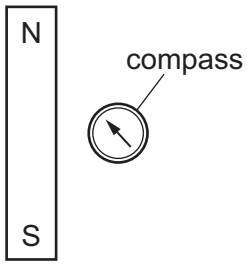
27 A small compass is placed close to a strong bar magnet, the same distance from each end.

Which diagram shows the direction in which the compass needle points?

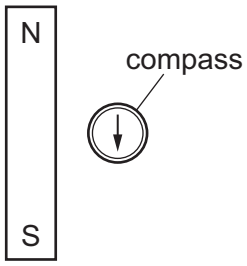
A



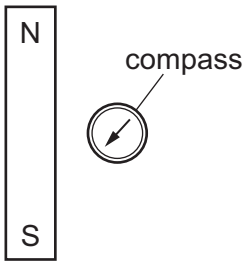
B



C



D



28 A student wishes to magnetise two steel bars X and Y.

She places bar X in a coil connected to a d.c. power supply.

She places bar Y parallel to a magnetic field and hammers it.

Which bars become magnetised?

A X and Y

B X only

C Y only

D neither X nor Y

29 Which particles move in a metal to cause an electric current?

A electrons

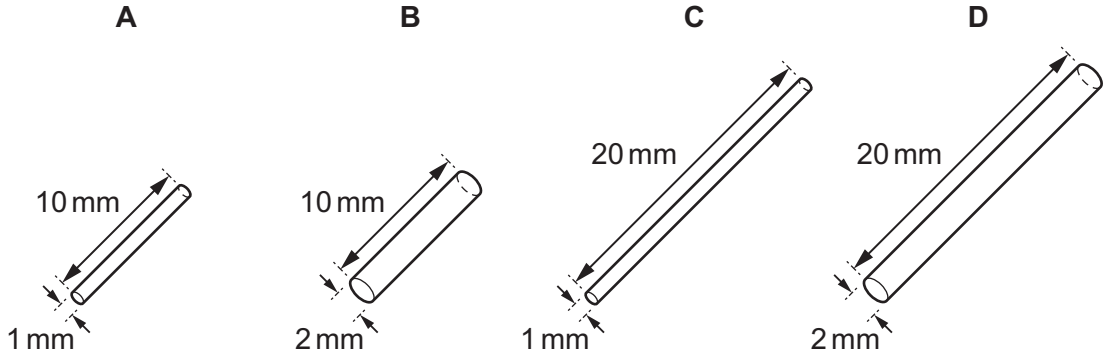
B neutrons

C nucleons

D protons

30 The diagrams represent four copper wires.

Which wire has the greatest resistance?



31 An air-conditioning unit, a lamp and an electric fire all receive electrical energy from the mains supply.

From which of these devices is all this energy eventually transferred to the surroundings?

	air-conditioning unit	lamp	electric fire
A	✓	✓	✓
B	✓	✗	✓
C	✗	✓	✓
D	✗	✗	✓

key

✓ = all energy transferred to surroundings

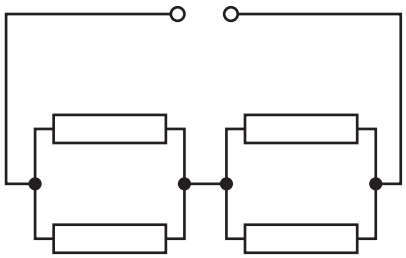
✗ = not all energy transferred to surroundings

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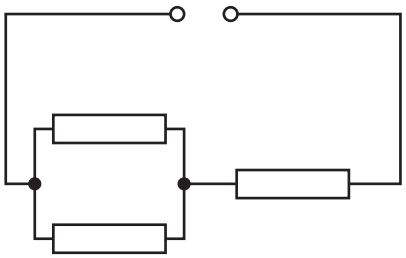
32 In the circuits shown, each of the resistors has a resistance of 1.0 Ω.

Which circuit has the greatest resistance?

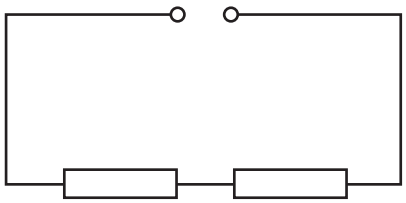
A



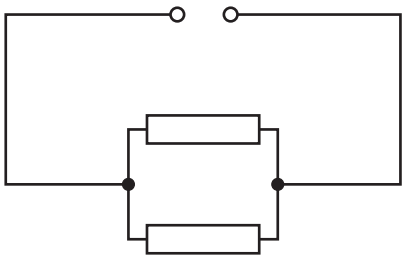
B



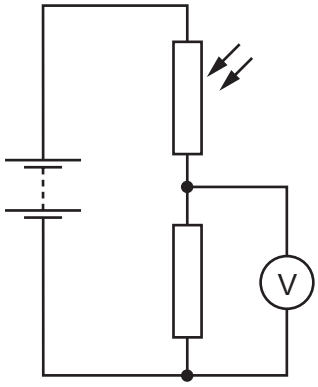
C



D



33 The diagram shows an electric circuit.



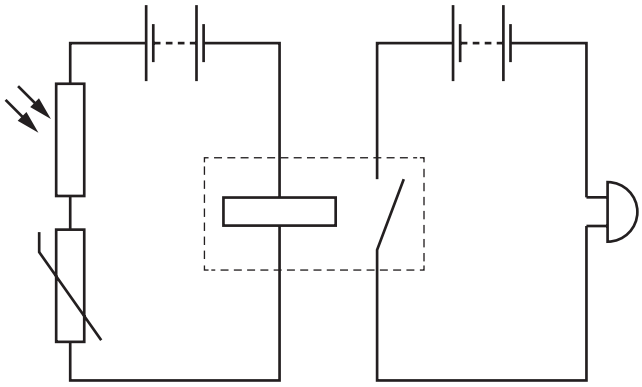
The light falling on the light-dependent resistor (LDR) increases in brightness.

What happens to the resistance of the LDR, the current in the fixed resistor and the reading on the voltmeter?

	resistance of LDR	current in fixed resistor	reading on voltmeter
A	decreases	increases	decreases
B	decreases	increases	increases
C	increases	decreases	decreases
D	increases	decreases	increases

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34 The diagram shows two linked circuits to control when a bell is switched on.



The conditions are altered and only one pair of conditions causes the bell to ring.

Which pair causes the bell to ring?

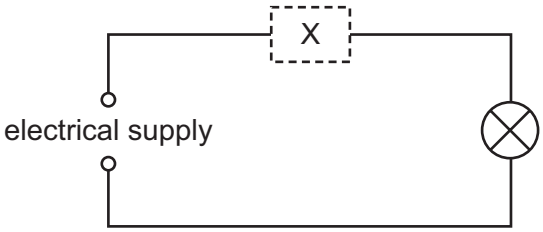
A bright light and high temperature

B bright light and low temperature

C dim light and high temperature

D dim light and low temperature

35 In this circuit, a component at X automatically protects the wiring from overheating if there is a fault.



Which row indicates components that are suitable?

	circuit breaker	fuse	switch
A	✓	✓	✓
B	✓	✓	✗
C	✓	✗	✓
D	✗	✓	✗

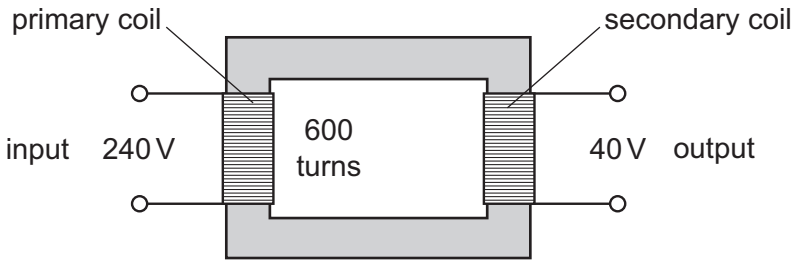
key

✓ = suitable

✗ = not suitable

36 The diagram shows a simple transformer with an input of 240 V and an output of 40 V.

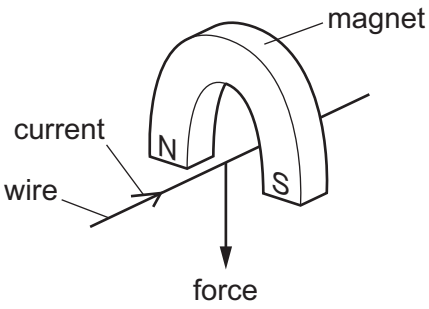
There are 600 turns on the primary coil.



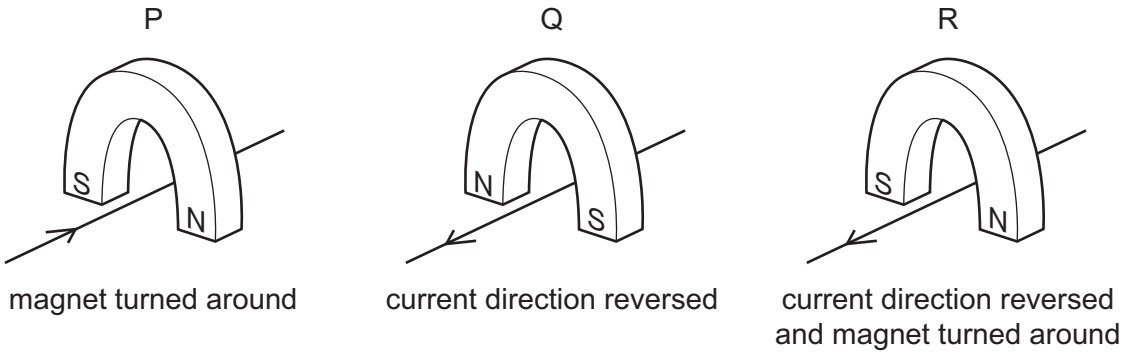
How many turns are there on the secondary coil?

A 100 **B** 320 **C** 400 **D** 3600

37 A wire is placed between the poles of a horseshoe magnet. There is a current in the wire in the direction shown, and this causes a force to act on the wire.



Three other arrangements P, Q and R of the wire and magnet are set up as shown.



Which arrangements cause a force in the same direction as the original arrangement?

A P, Q and R **B** P and Q only **C** P only **D** R only

38 The nuclide notation for an isotope of silver is $^{109}_{47}\text{Ag}$.

How many nucleons are in a nucleus of this isotope?

A 47 **B** 62 **C** 109 **D** 156

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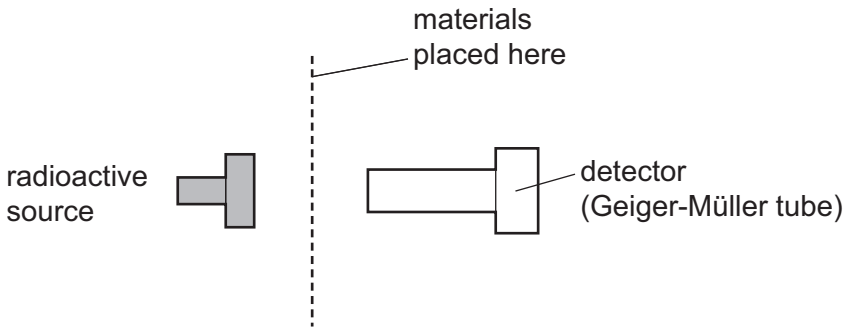
39 A radioactive substance emits radiation at a rate of 600 emissions per second. Four hours later, it emits radiation at a rate of 300 emissions per second.

What is the half-life of the substance and what is the rate of emission after a further four hours?

	half-life / hours	rate of emission after a further four hours / emissions per second
A	2	0
B	2	150
C	4	0
D	4	150

40 A radioactive source is placed near a detector.

The radiation arriving at the detector from the source is measured for 10 minutes with different materials placed between the source and the detector.



material between source and detector	radiation detected / counts
none	5626
sheet of paper	5629
thick sheet of aluminium	2226
thick sheet of lead	255

Which types of radiation are emitted by the source?

A α-particles and γ-rays

B α-particles only

C β-particles and γ-rays

D β-particles only

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