Cambridge International Examinations
Cambridge International General Certificate of Secondary Education

PHYSICS **0625/12**

Paper 1 Multiple Choice **February/March 2015**

45 minutes

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

* 1 7 4 3 6 3 5 0 0 4 *

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.

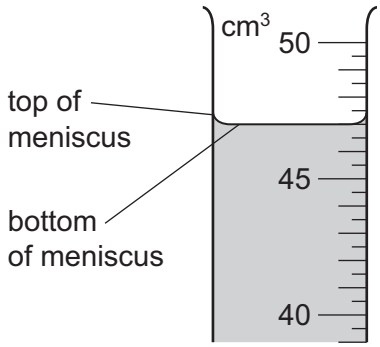
Each correct answer will score one mark. A mark will not be deducted for a wrong answer.
Any rough working should be done in this booklet.
Electronic calculators may be used.

The syllabus is approved for use in England, Wales and Northern Ireland as a Cambridge International Level1/Level 2 Certificate.

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

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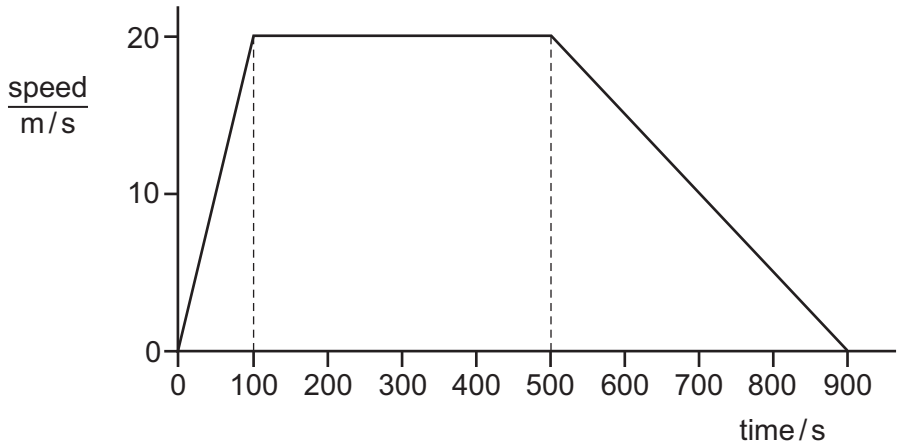
1 A student uses a measuring cylinder to measure the volume of some water. The diagram shows part of the measuring cylinder. The top and bottom of the meniscus are labelled.



What is the volume of the water?

A 47.0 cm^3 **B** 47.5 cm^3 **C** 49.0 cm^3 **D** 49.5 cm^3

2 The graph represents the motion of a train travelling between two stations.



Which statement about the train is correct?

A Its acceleration takes a longer time than its deceleration.

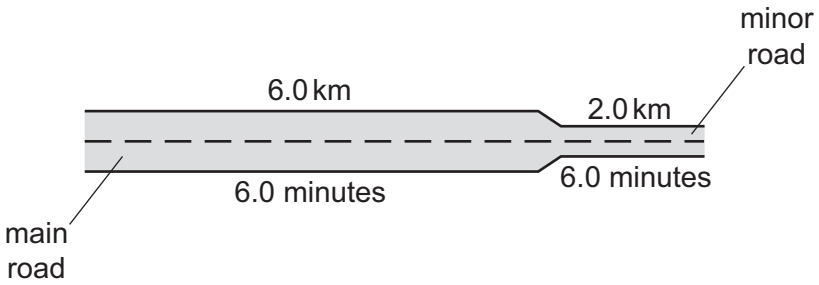
B It travels at constant speed for less than half of its journey time.

C It travels 2000 m in the first 100 s.

D It travels 10 000 m at constant speed.

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3 A car travels 6.0 km along a main road in 6.0 minutes. It then travels 2.0 km along a minor road in 6.0 minutes.



Which calculation of average speed for the whole journey is correct?

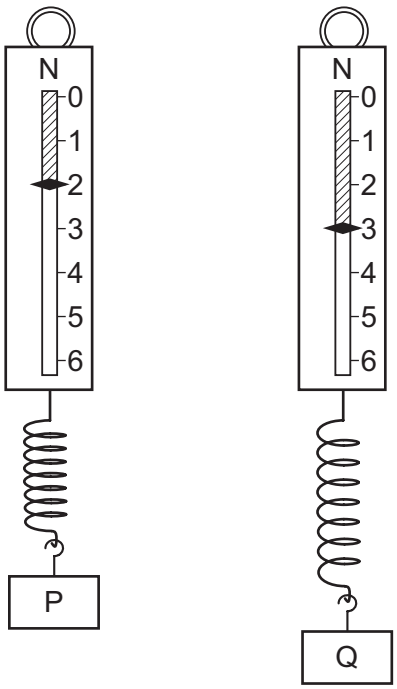
A 8.0 ÷ 12.0 = 0.67 km / minute

B 12.0 ÷ 8.0 = 1.5 km / minute

C 8.0 + 12.0 = 20 km / minute

D 8.0 × 12.0 = 96 km / minute

4 Two metal blocks P and Q have identical dimensions. They hang on identical spring balances.



What can be deduced about P and Q?

A They have different volumes and different weights.

B They have different volumes, but equal masses.

C They have equal volumes and equal weights.

D They have equal volumes, but different masses.

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5 A person measures the length, width, height and mass of a metal block with rectangular sides.

Which of these measurements must be used in order to calculate the density of the metal?

A mass only

B height and mass only

C length, width and height only

D length, width, height and mass

6 The diagram shows the only three forces acting on an object.



What is the resultant force on the object?

A 0 N

B 5.0 N towards the left

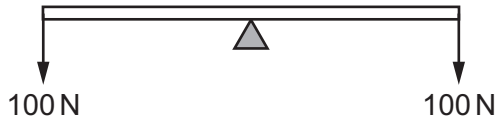
C 5.0 N towards the right

D 10.0 N towards the right

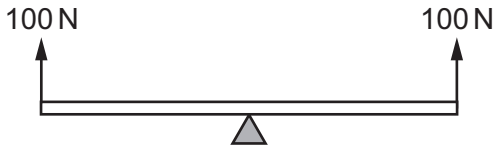
7 A uniform rod rests on a pivot at its centre. The rod is not attached to the pivot. Forces are then applied to the rod in four different ways, as shown. The weight of the rod can be ignored.

Which diagram shows the rod in equilibrium?

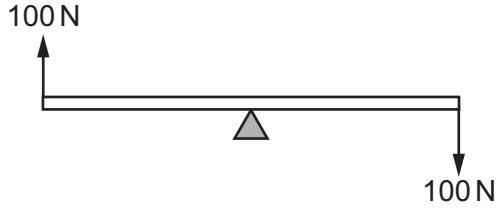
A



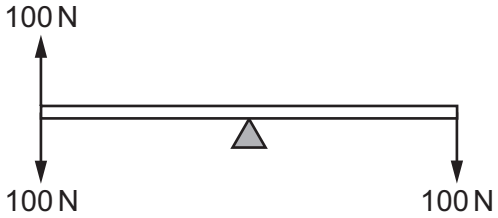
B



C



D



8 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?

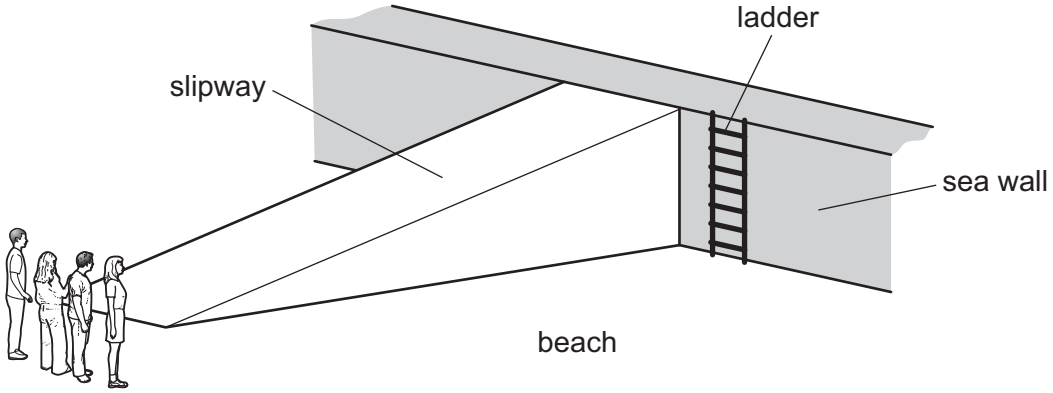
A chemical → gravitational potential → kinetic

B chemical → kinetic → gravitational potential

C gravitational potential → chemical → kinetic

D kinetic → chemical → gravitational potential

9 Four people of equal weight on a beach use different routes to get to the top of a sea wall.



Which person produces the greatest average power?

person	route	time taken / s
A	runs across the beach, then climbs the ladder	8
B	walks across the beach, then climbs the ladder	16
C	runs up the slipway	5
D	walks up the slipway	10

10 A vehicle sinks into soft ground.

The vehicle is changed so that it does not sink as far.

Which change is made?

A a lower centre of mass

B a more powerful engine

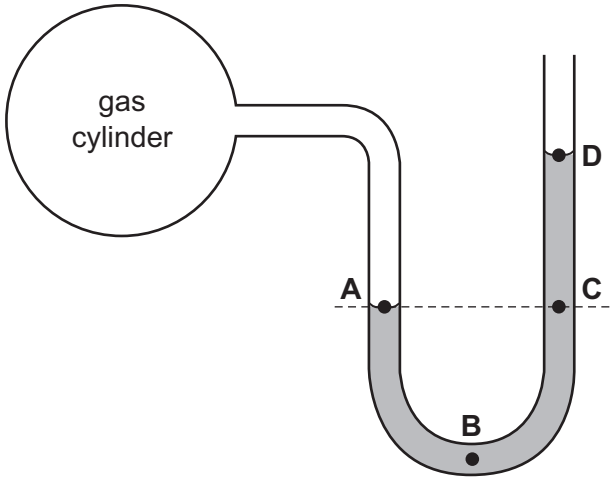
C wheels that are further apart

D wider tyres

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11 A manometer is used to measure the pressure of a gas trapped in a cylinder.

At which labelled point on the diagram is the pressure greatest?



12 Extremely small pollen grains in water are viewed through a microscope. The grains are seen to move continually and randomly.

What is the reason for this random movement?

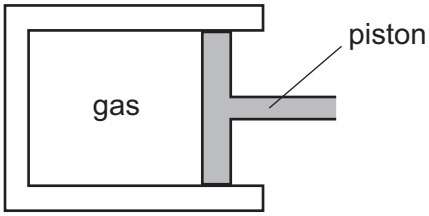
A The grains are moved by randomly moving water molecules.

B The grains are moved by random convection currents in the water.

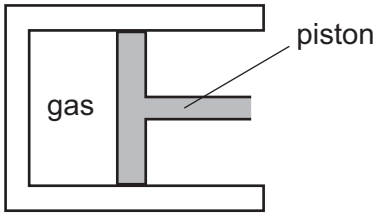
C The grains are moved by random rays of light reflecting off them.

D The grains are moved by the random motion of their own atoms.

13 A gas is compressed in a sealed cylinder by moving a piston.



initial position



after gas has been compressed

Which row in the table states what happens to the density of the gas and to the pressure of the gas when it is compressed?

	density	pressure
A	decreases	decreases
B	decreases	increases
C	increases	decreases
D	increases	increases

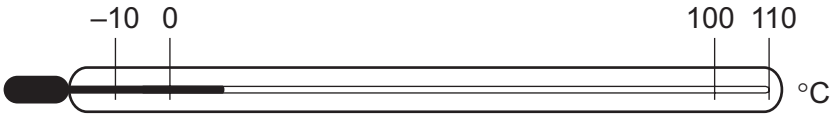
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14 When steam condenses it becomes liquid water. When liquid water solidifies it becomes ice.

What happens to the temperature of steam while it is condensing, and what happens to the temperature of water while it is solidifying?

	temperature of steam while it is condensing	temperature of water while it is solidifying
A	decreases	decreases
B	decreases	stays the same
C	stays the same	decreases
D	stays the same	stays the same

15 A thermometer has graduations which start at –10 °C and end at 110 °C.



What is the lower fixed point and what is the upper fixed point of the Celsius scale?

	lower fixed point / °C	upper fixed point / °C
A	–10	100
B	–10	110
C	0	100
D	0	110

16 What is the name of the process of heat transfer using electromagnetic waves?

A conduction

B convection

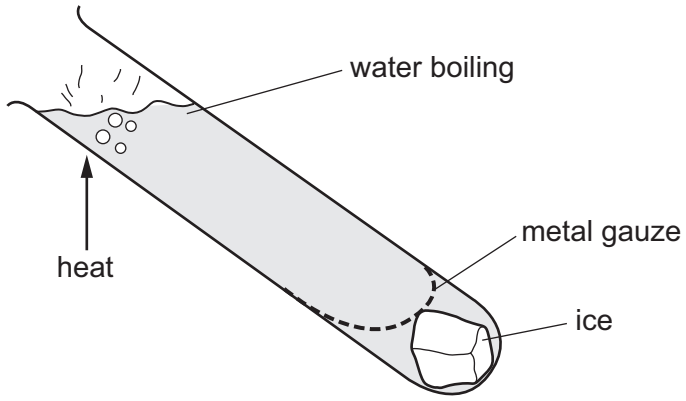
C evaporation

D radiation

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17 Ice is trapped by a metal gauze at the bottom of a tube containing water.

The water is heated strongly at the top, but the ice only melts very slowly.



Why does the ice melt so slowly?

A Heat energy always travels upwards.

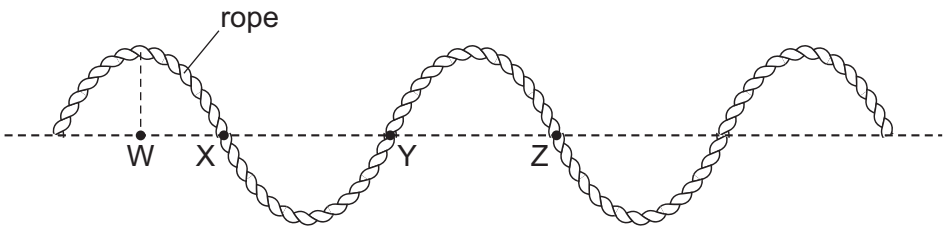
B Hot water is more dense than cold water.

C Metal gauze does not allow heat to pass through.

D Water is a poor conductor of heat.

18 A transverse wave moves along a rope.

The diagram shows the position of the rope at one particular time.

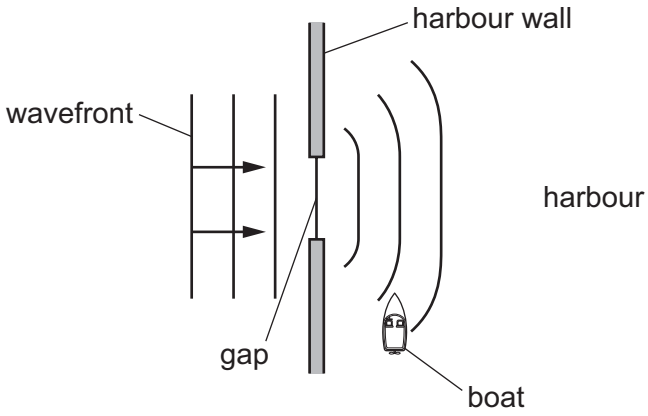


Which two labelled points are one wavelength apart?

A W and X **B** W and Z **C** X and Z **D** Y and Z

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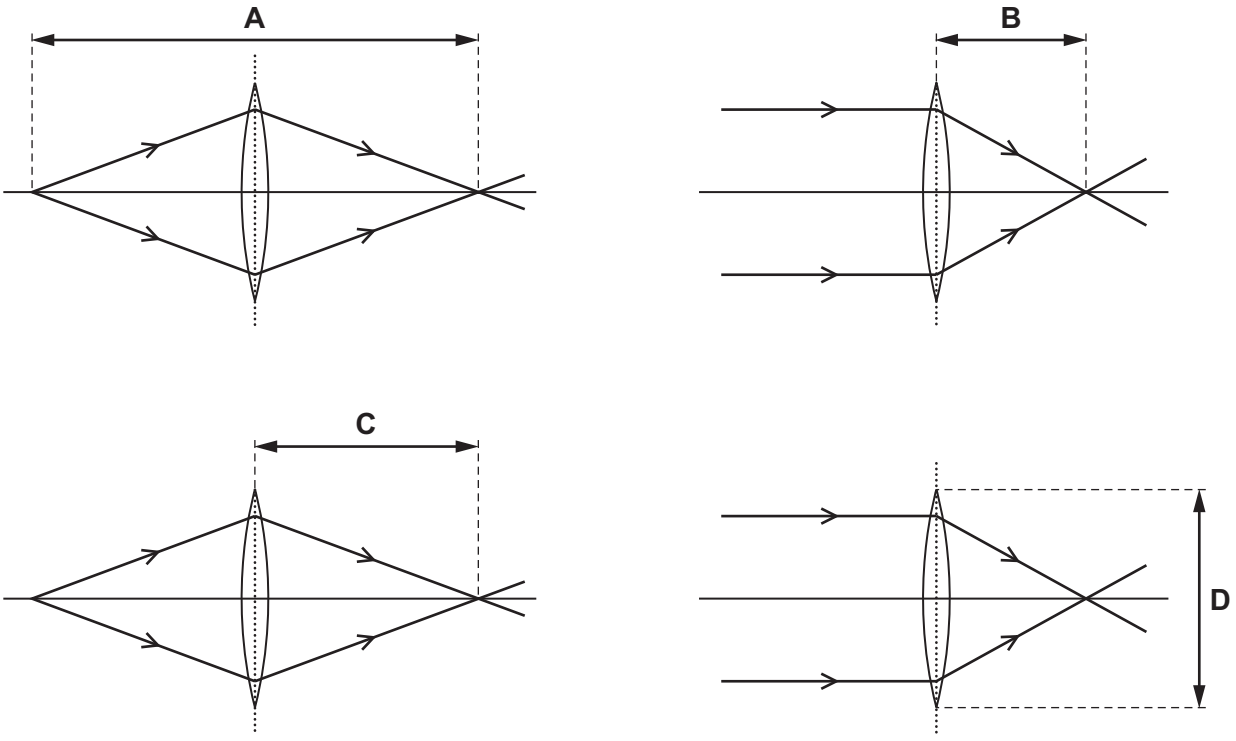
19 The diagram shows a water wave passing through a gap in a harbour wall. The wavefronts curve round the wall and reach a small boat in the harbour.



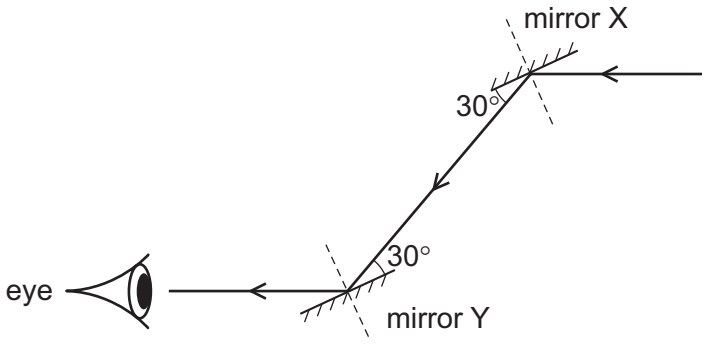
What is the name of this curving effect, and how can the gap be changed so that the wavefronts do not reach the boat?

	name of effect	change to the gap
A	diffraction	make the gap slightly bigger
B	diffraction	make the gap slightly smaller
C	refraction	make the gap slightly bigger
D	refraction	make the gap slightly smaller

20 Which labelled distance is the focal length of the lens?



21 A ray of light is reflected by two parallel plane mirrors X and Y.



Which statement is correct?

A The angle of incidence at mirror X is 30°.

B The angle of incidence at mirror Y is 60°.

C The angle of reflection at mirror X is 120°.

D The angle of reflection at mirror Y is 0°.

22 How do infra-red waves differ from ultraviolet waves?

A Infra-red waves are longitudinal.

B Infra-red waves have a lower speed *in vacuo* (in a vacuum).

C Infra-red waves have lower frequencies.

D Infra-red waves have smaller wavelengths.

23 What is the approximate range of audible sound frequencies for a human with good hearing?

A from 20 Hz to 2000 Hz

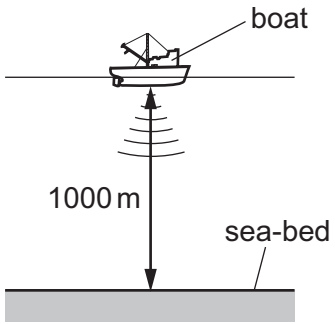
B from 20 Hz to 20 000 Hz

C from 200 Hz to 20 000 Hz

D from 200 Hz to 200 000 Hz

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24 A pulse of sound is produced at the bottom of a boat. The sound travels through the water and is reflected from the sea-bed. The sound reaches the boat again after 1.3 s. The sea-bed is 1000 m below the boat.



Using this information, what is the speed of sound in the water?

A 769 m / s **B** 1300 m / s **C** 1538 m / s **D** 2600 m / s

25 Which metal is suitable to use to make a permanent magnet?

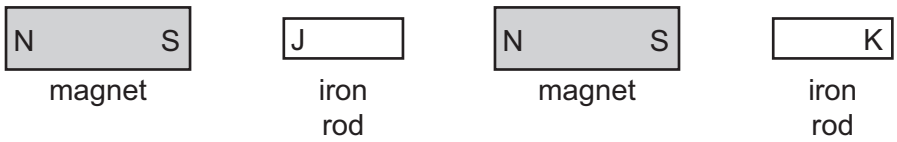
A aluminium

B brass

C iron

D steel

26 The diagram shows two magnets and two iron rods placed in a line.



Which magnetic poles are induced at the ends J and K of the iron rods?

	pole induced at end J	pole induced at end K
A	N	N
B	N	S
C	S	N
D	S	S

27 A teacher wishes to show the production of electrostatic charges.

She holds a rod and rubs it with a cotton cloth. A copper rod, a glass rod, a plastic rod and a steel rod are available.

Which two rods would both be suitable to use?

A a copper rod and a glass rod

B a glass rod and a plastic rod

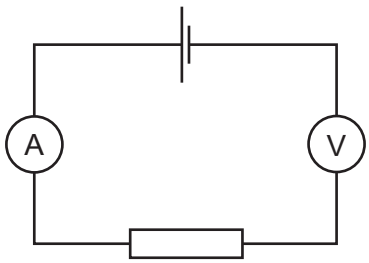
C a plastic rod and a copper rod

D a plastic rod and a steel rod

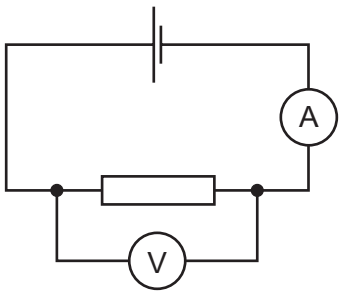
28 A student wishes to determine the resistance of a resistor. She uses an ammeter and a voltmeter in a circuit.

In which circuit are the ammeter and voltmeter connected correctly?

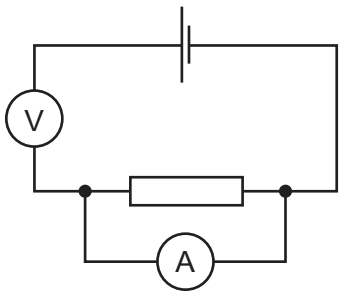
A



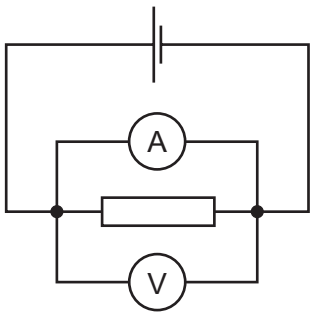
B



C



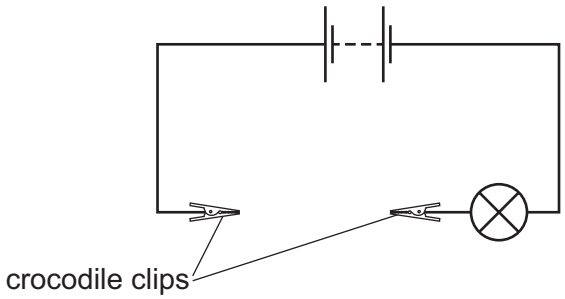
D



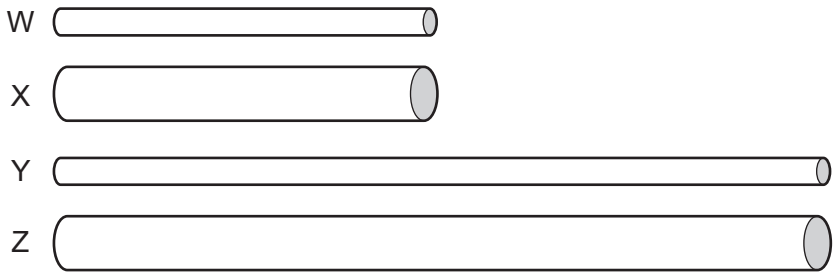
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29 A battery is connected to two crocodile clips and a lamp.

There is a gap between the crocodile clips.



Four cylinders W, X, Y and Z are made of the same metal but have different dimensions. The cylinders are connected in turn, by their ends, between the crocodile clips. The diagrams of the cylinders are all drawn to the same scale.

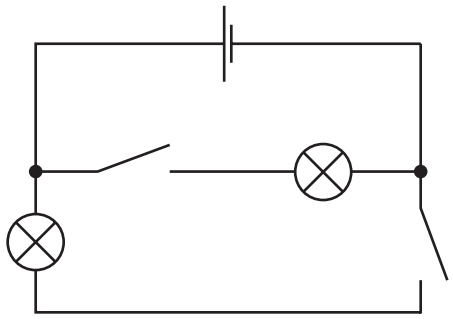


Which cylinder makes the lamp glow most brightly and which cylinder makes the lamp glow least brightly?

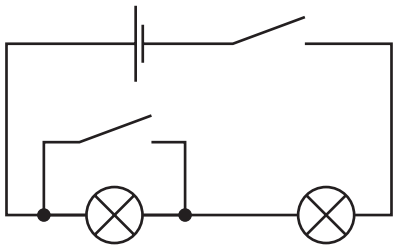
	most brightly	least brightly
A	W	Y
B	W	Z
C	X	Y
D	X	Z

30 In which circuit can the lamps be switched on and off independently?

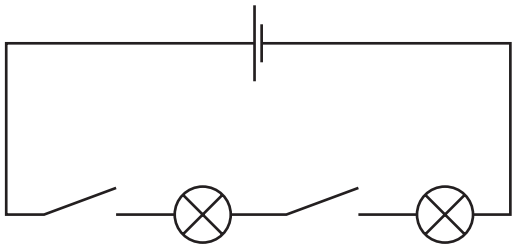
A



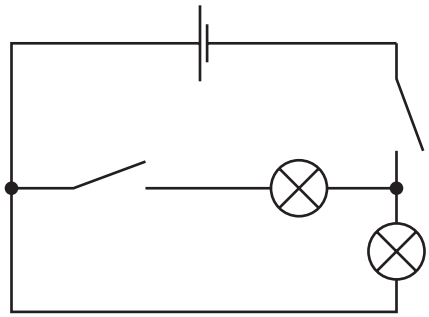
B



C

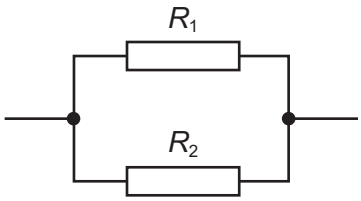


D



31 Two resistors, with resistances R_1 and R_2, are connected in parallel.

The resistance R_1 is greater than the resistance R_2.



What is the resistance of the parallel combination?

A less than either R_1 or R_2

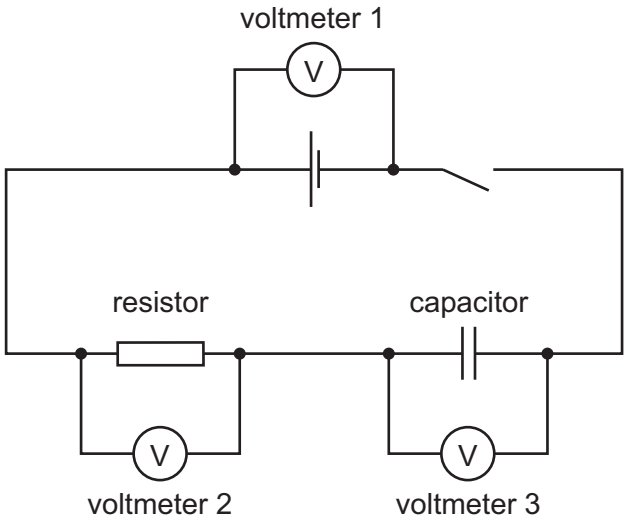
B equal to R_1

C equal to R_2

D the average of R_1 and R_2

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32 In the circuit shown, the switch is closed for a long time, then opened.



Immediately after the switch is opened, which of the voltmeters reads zero?

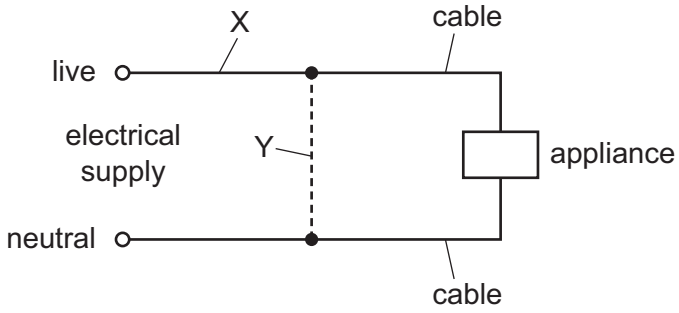
A voltmeter 1 only

B voltmeter 2 only

C voltmeter 3 only

D voltmeter 1, voltmeter 2 and voltmeter 3

33 Either a fuse or a circuit-breaker can be used to protect electrical cables from large currents that could cause overheating.



When a fuse is used, where should it be connected, and when a circuit-breaker is used, where should it be connected?

	position of fuse	position of circuit-breaker
A	X	X
B	X	Y
C	Y	X
D	Y	Y

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[Turn over

34 Which device uses slip rings?

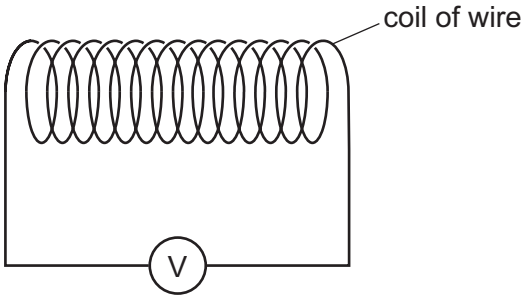
A a d.c. electric motor

B a relay

C a transformer

D an a.c. generator

35 The diagram shows a coil of wire connected to a voltmeter.



A student has a magnet and an unmagnetised iron rod.

How can an e.m.f. be induced across the coil?

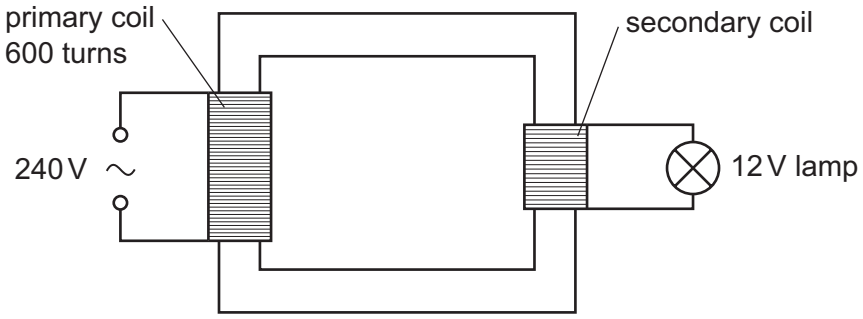
A holding the magnet inside the coil

B holding the iron rod inside the coil

C pushing the magnet into the coil

D pushing the iron rod into the coil

36 A step-down transformer is used to light a 12 V lamp from a 240 V mains supply. The lamp lights at normal brightness. The primary coil has 600 turns.



How many turns are in the secondary coil?

A 12 **B** 20 **C** 30 **D** 50

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37 What happens in the process of thermionic emission?

A Complete molecules are emitted from the surface of a hot liquid.

B Single atoms are emitted from the surface of a hot liquid.

C Electrons are emitted from the surface of a hot metal.

D Protons are emitted from the surface of a hot metal.

38 Which row shows the relative ionising effects and penetrating abilities of α-particles and β-particles?

	ionising effect	penetrating ability
A	α greater than β	α greater than β
B	α greater than β	α less than β
C	α less than β	α greater than β
D	α less than β	α less than β

39 A radioactive substance has a half-life of 2 weeks. At the beginning of an investigation, a sample of the substance emits 3000 β-particles per minute.

How many β-particles will it emit per minute after 6 weeks?

A 0 **B** 375 **C** 500 **D** 1500

40 A nuclide has the symbol ${}^{14}_{6}\mathrm{C}$.

How many protons are there in one nucleus of this nuclide?

A 6 **B** 8 **C** 14 **D** 20

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