Cambridge
O Level

Cambridge International Examinations
Cambridge Ordinary Level

PHYSICS **5054/11**

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

1 hour

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

* 2 9 1 8 9 4 0 9 0 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.

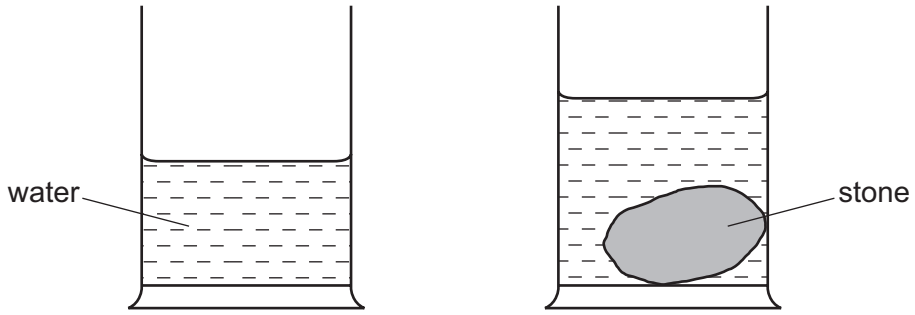
There are **forty** questions on this paper. Answer **all** questions. For each question there are four possible answers **A**, **B**, **C** and **D**.
Choose the **one** you consider correct and record your choice in **soft pencil** on the separate Answer Sheet.

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.

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1 During an experiment to find the density of a stone, the stone is lowered into a measuring cylinder partly filled with water.



Which statement is correct?

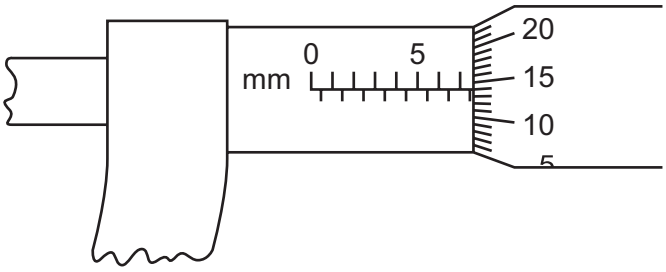
A The difference between the readings gives the density of the stone.

B The difference between the readings gives the volume of the stone.

C The final reading gives the density of the stone.

D The final reading gives the volume of the stone.

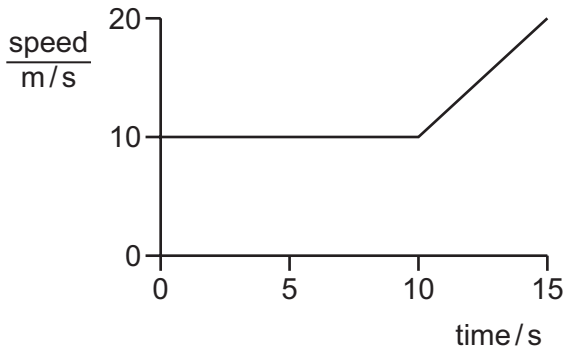
2 The diagram shows a micrometer scale.



Which reading is shown?

A 5.64 mm **B** 7.14 mm **C** 7.16 mm **D** 7.64 mm

3 An object travels at a constant speed of 10 m / s for 10 s. During the next 5 s, it accelerates uniformly to 20 m / s.

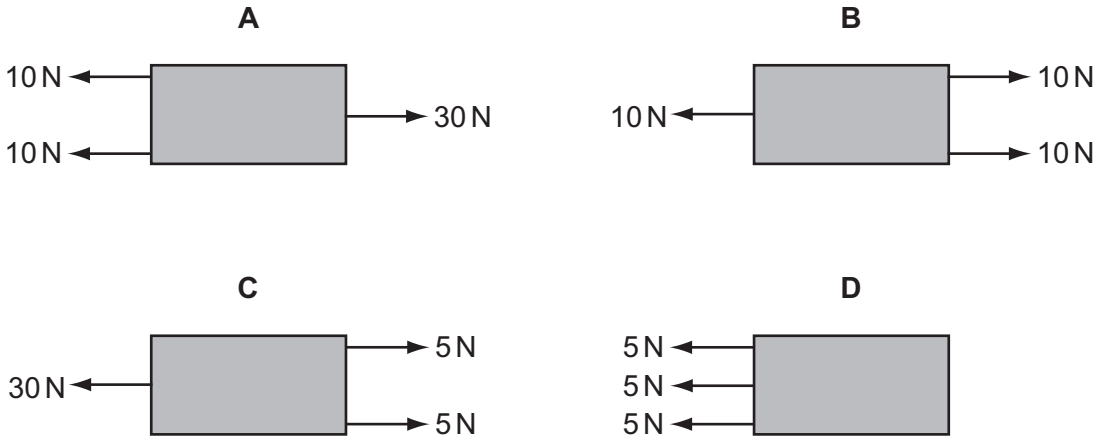


What is the total distance travelled by the object?

A 150 m **B** 175 m **C** 200 m **D** 300 m

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4 Which object has the largest resultant force?



5 In which example does friction act in the direction of forward motion of the object on which it acts?

A on a suitcase accelerating on a conveyor belt

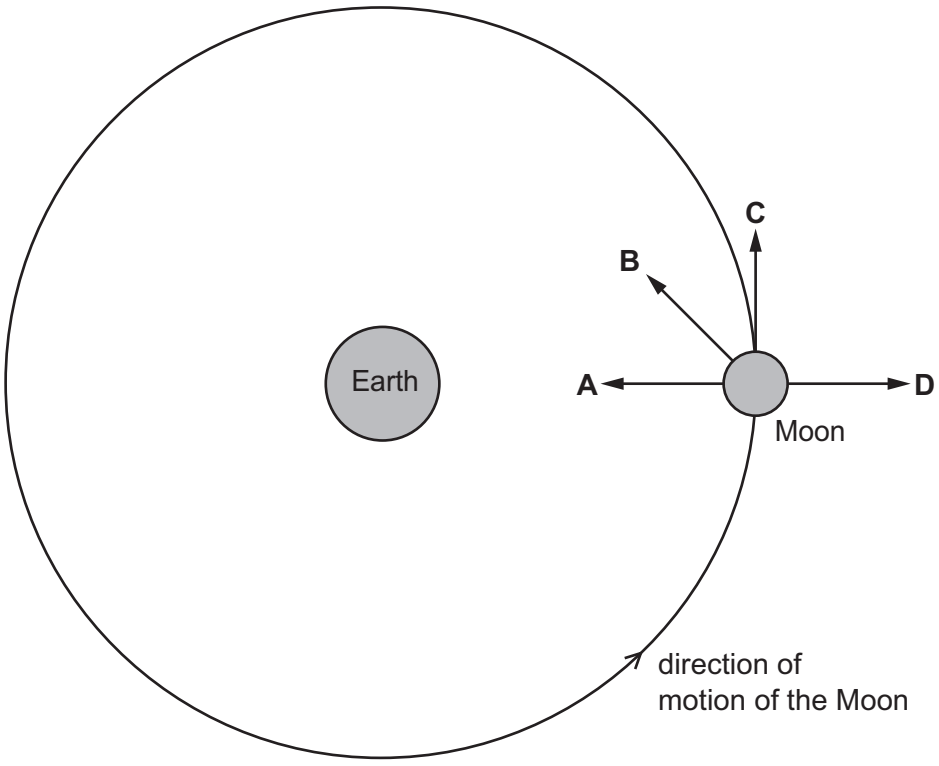
B on sandpaper rubbing a wooden block

C on the skis of a skier accelerating downhill on smooth snow

D on the tyres of a braking car

6 The diagram represents the Moon in its orbit around the Earth.

Which arrow represents the direction of the resultant force acting on the Moon at the instant shown?



7 Which statement about mass is correct?

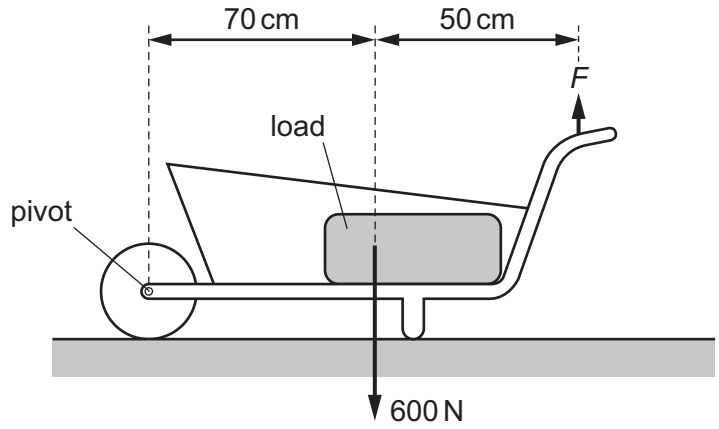
A Mass is density divided by volume.

B Mass is the amount of space occupied by a body.

C Mass is weight multiplied by the gravitational field strength.

D Mass resists a change in motion.

8 The total weight of the load and the wheelbarrow shown is 600 N.



What is the size of force *F* needed just to lift the loaded wheelbarrow?

A 350 N **B** 430 N **C** 600 N **D** 840 N

9 A force acts on a body.

Which properties of the body may all be changed by the force?

A mass, shape and size

B mass, shape and velocity

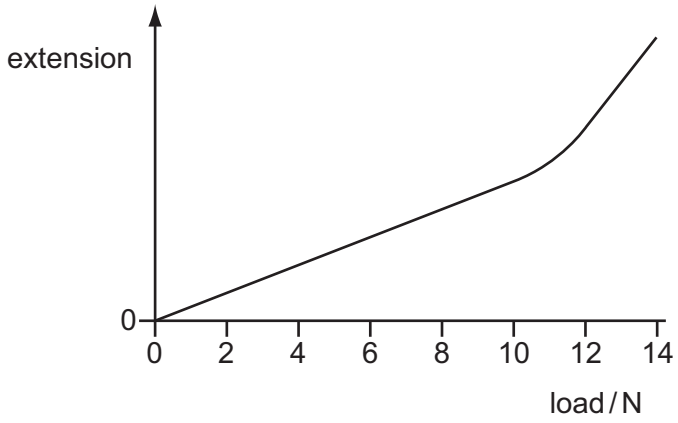
C mass, size and velocity

D shape, size and velocity

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10 Some students plan to use a spring to make a spring balance with a linear scale.

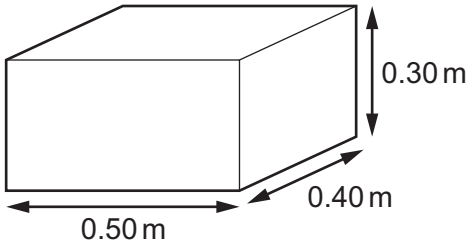
The graph shows how the extension of their spring changes with the load on it.



What is the total range of a balance with a linear scale using this spring?

A 0 N to 10 N **B** 0 N to 12 N **C** 10 N to 12 N **D** 10 N to 14 N

11 A block of weight 900 N has rectangular faces. The diagram shows the lengths of the sides.



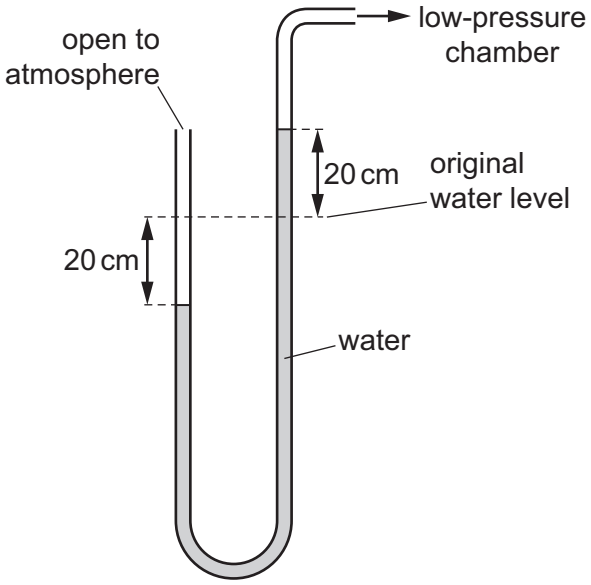
The block can rest on any of its faces.

What is the minimum pressure that the block can exert on the ground when resting on one of its faces?

A 900 Pa **B** 4500 Pa **C** 6000 Pa **D** 7500 Pa

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12 A U-tube containing water is used as a manometer.



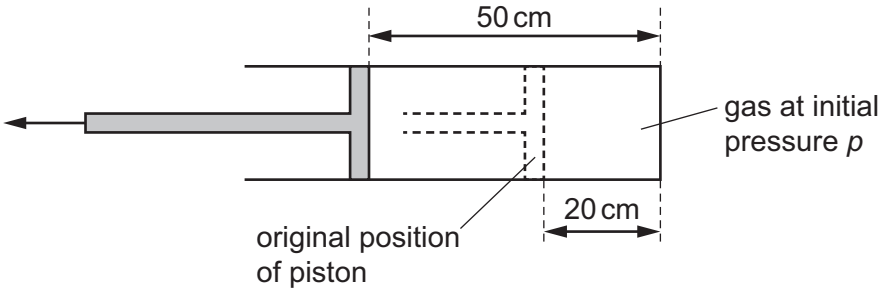
When one end of the manometer is connected to a low-pressure chamber, both water levels in the manometer change by 20 cm. The gravitational field strength g is 10 N / kg.

The density of water is 1000 kg / m^3.

How far below atmospheric pressure is the pressure in this chamber?

A 2000 Pa **B** 4000 Pa **C** 200 000 Pa **D** 400 000 Pa

13 A gas is trapped inside a cylinder by a movable piston. The length of the gas column is 20 cm and the pressure inside the cylinder is p.



The piston is pulled out a distance of 30 cm, so that the length of the gas column is now 50 cm. The temperature of the gas does not change.

What is the new pressure of the gas?

A 0.40 p **B** 0.60 p **C** 1.5 p **D** 2.5 p

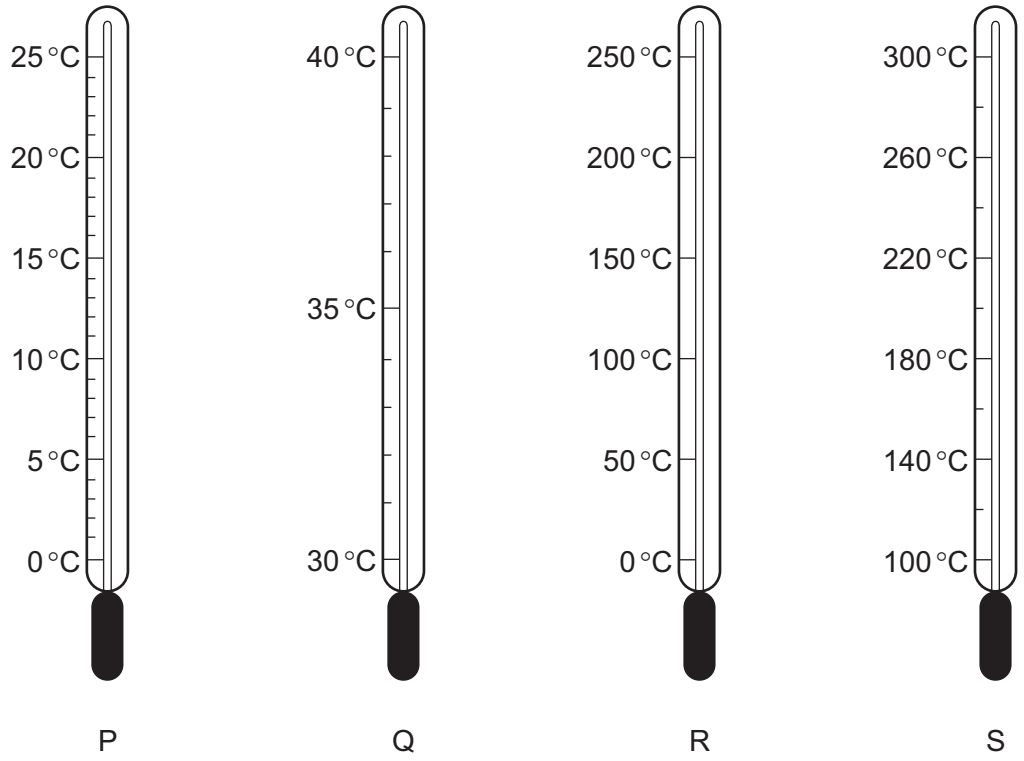
14 The input power to a lamp is 6.0 W. The lamp wastes 2.7 J of energy in 3.0 s.

What is the efficiency of the lamp?

A 0.15 **B** 0.45 **C** 0.55 **D** 0.85

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15 The diagrams represent four thermometers.



Which thermometer has the greatest sensitivity and which thermometer has the greatest range?

	greatest sensitivity	greatest range
A	P	R
B	P	S
C	Q	R
D	Q	S

16 Which type of thermometer is used for measuring temperatures above 1000 °C and which type is used for measuring temperatures that change rapidly?

	measures temperatures above 1000 °C	measures temperatures that change rapidly
A	liquid-in-glass	liquid-in-glass
B	liquid-in-glass	thermocouple
C	thermocouple	liquid-in-glass
D	thermocouple	thermocouple

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[Turn over

17 An electric shower takes in cold water at 17 °C. The shower gives 6000 J of energy every second to the cold water and heats it to 37 °C. The specific heat capacity of water is 4200 J / (kg °C).

What is the mass of hot water supplied by the shower in one second?

A 0.035 kg **B** 0.039 kg **C** 0.071 kg **D** 0.084 kg

18 What is latent heat of vaporisation?

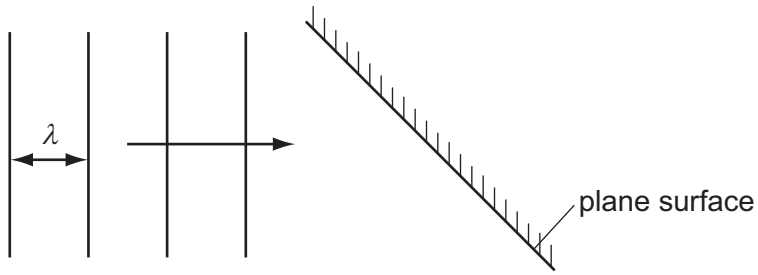
A the energy required to make molecules expand

B the energy required to make molecules expand and move apart

C the energy required to make molecules move apart

D the energy required to make molecules move faster

19 In an experiment using a ripple tank, plane wavefronts arrive at a plane surface.



Which row correctly describes the waves after they are reflected from the surface?

	speed of waves	wavelength λ
A	larger	shorter
B	smaller	shorter
C	the same	longer
D	the same	the same

20 Which statement about red light and blue light is correct?

A Red light has a higher frequency than blue light.

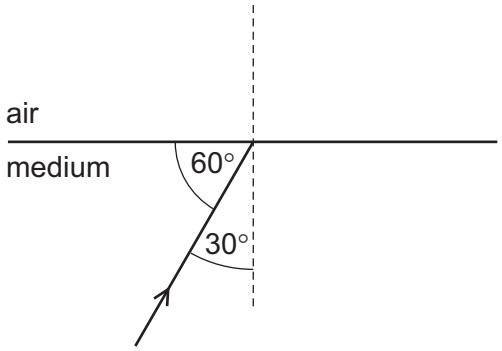
B Red light has a longer wavelength than blue light.

C Red light has the same speed in glass as blue light.

D Red light is refracted by a glass prism more than blue light.

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21 A ray of light in a transparent medium of refractive index 1.8 is incident on the surface as shown. The light enters air.



What is the angle between the refracted ray and the normal in air?

A 29° **B** 33° **C** 54° **D** 64°

22 A musical note is produced by two sources.

The traces produced by each source on the screen of a cathode-ray oscilloscope (c.r.o.) are shown below.



What is the difference between the sounds?

A the amplitude

B the frequency

C the pitch

D the quality

23 What is a suitable metal for the core of an electromagnet?

A aluminium

B copper

C iron

D steel

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24 A polythene rod becomes charged when rubbed with a dry woollen cloth.

The charge caused is a result of

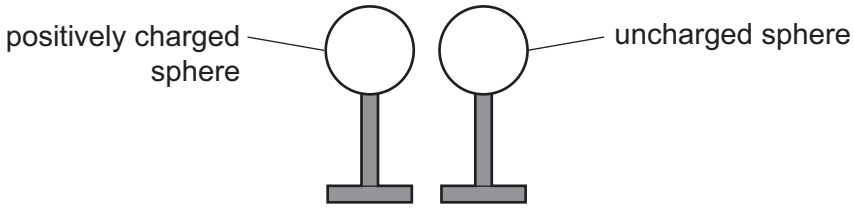
A friction producing a movement of electrons.

B friction producing a movement of protons.

C magnetism producing a movement of electrons.

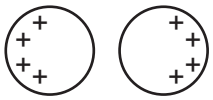
D magnetism producing a movement of protons.

25 A positively charged insulated metal sphere is brought close to an uncharged insulated metal sphere.

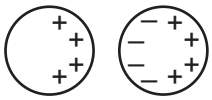


Which diagram shows the charge distribution on the spheres?

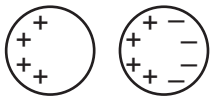
A



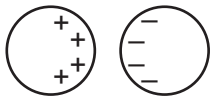
B



C



D



26 The flash on a camera operates when a capacitor discharges through a flash-tube.
In 3.2 ms, a charge of 6.0 C passes through the flash-tube.

What is the average current in the flash-tube?

A 0.019 A

B 1.9 A

C 19 A

D 1900 A

27 Which physical quantity is produced by a calculation where a charge is multiplied by a potential difference (p.d.)?

A current

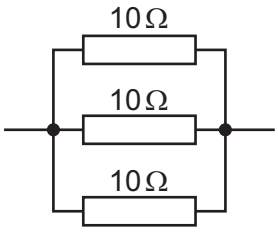
B electromotive force (e.m.f.)

C energy

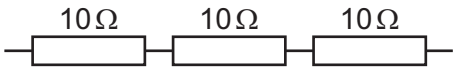
D power

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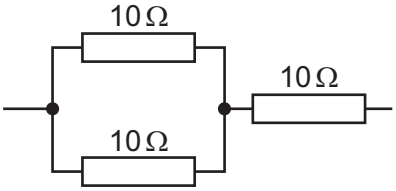
28 Three 10 Ω resistors are connected together to form networks X, Y and Z.



network X



network Y



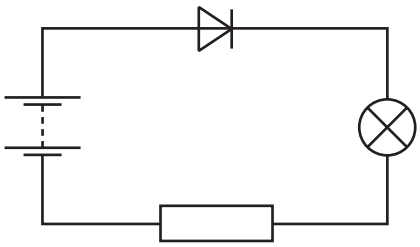
network Z

What is the order of resistance of the networks going from the smallest total resistance to the largest total resistance?

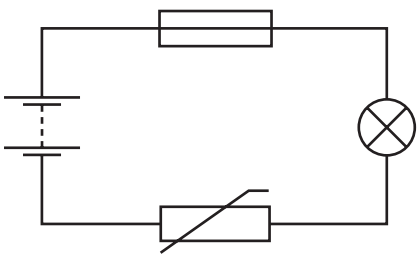
A X → Y → Z **B** X → Z → Y **C** Z → X → Y **D** Z → Y → X

29 Which circuit contains a fuse and a diode?

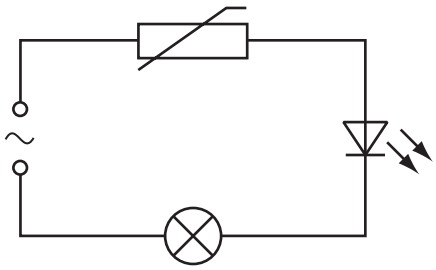
A



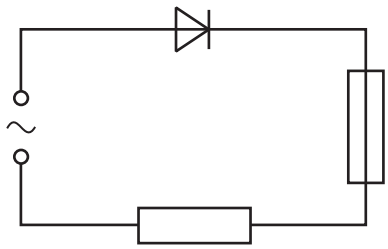
B



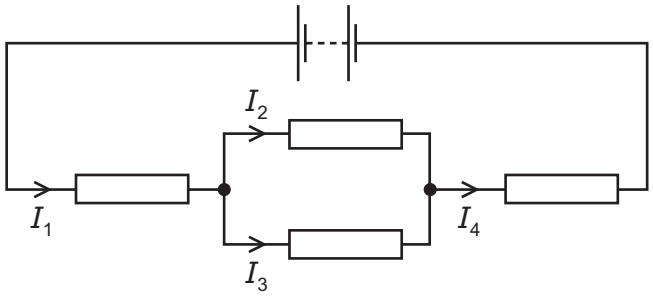
C



D



30 Four resistors of unequal resistances are connected to a power supply as shown.



The currents in the four resistors are I_1, I_2, I_3 and I_4.

Which equation is correct?

A $I_1 = I_2 - I_3$

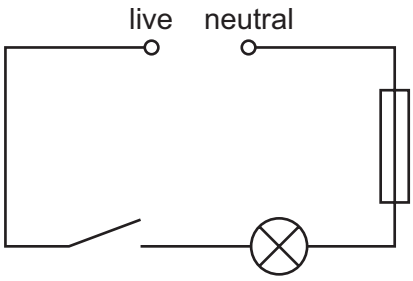
B $I_2 = I_1 + I_4$

C $I_3 = I_4 - I_1$

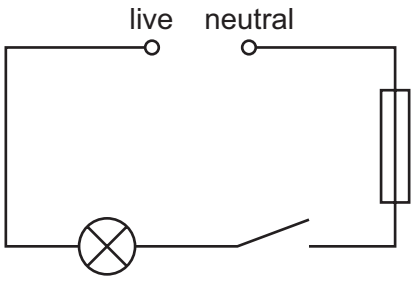
D $I_4 = I_2 + I_3$

31 Which diagram shows a lamp wired correctly to the mains supply in a house?

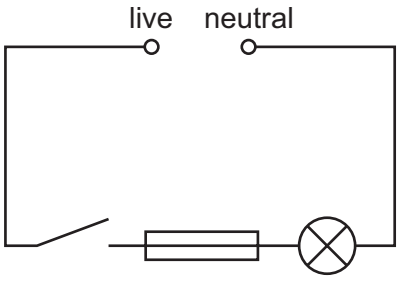
A



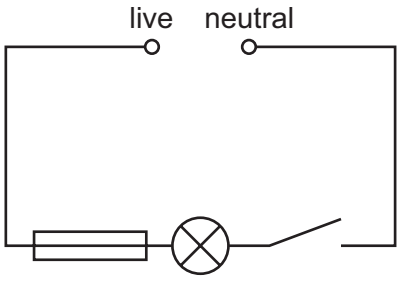
B



C



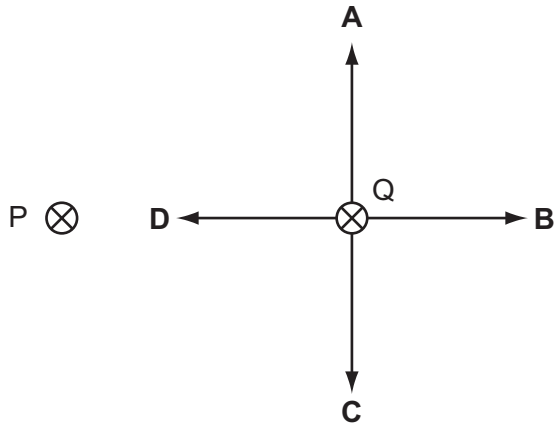
D



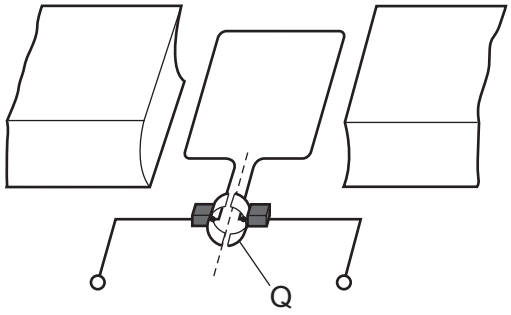
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32 P and Q represent two, parallel, straight wires carrying currents into the plane of the paper. P and Q exert a force on each other.

Which arrow shows the force on Q?



33 The diagram shows a simple d.c. motor.



What is the part labelled Q?

A a coil

B a commutator

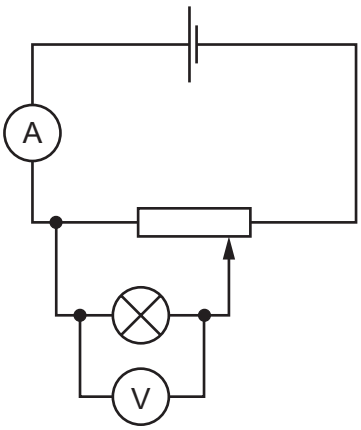
C a magnet

D a slip ring

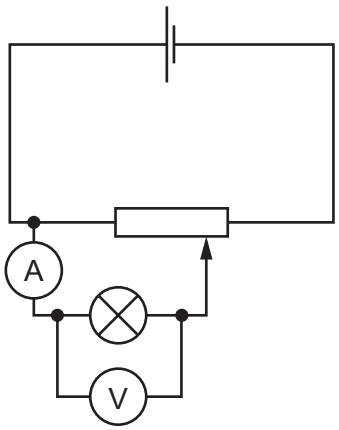
34 An experiment is set up to investigate how the current in a filament lamp changes with the potential difference across it.

Which circuit is correct?

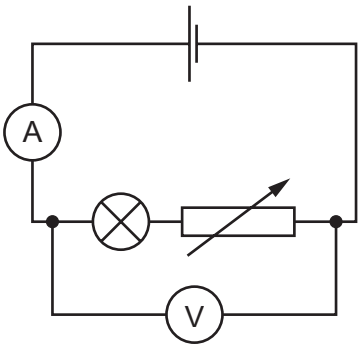
A



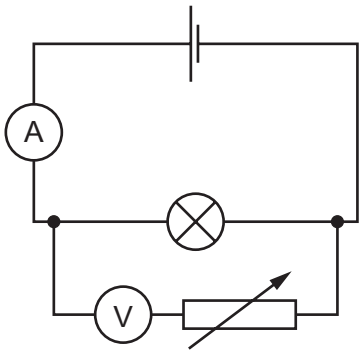
B



C



D



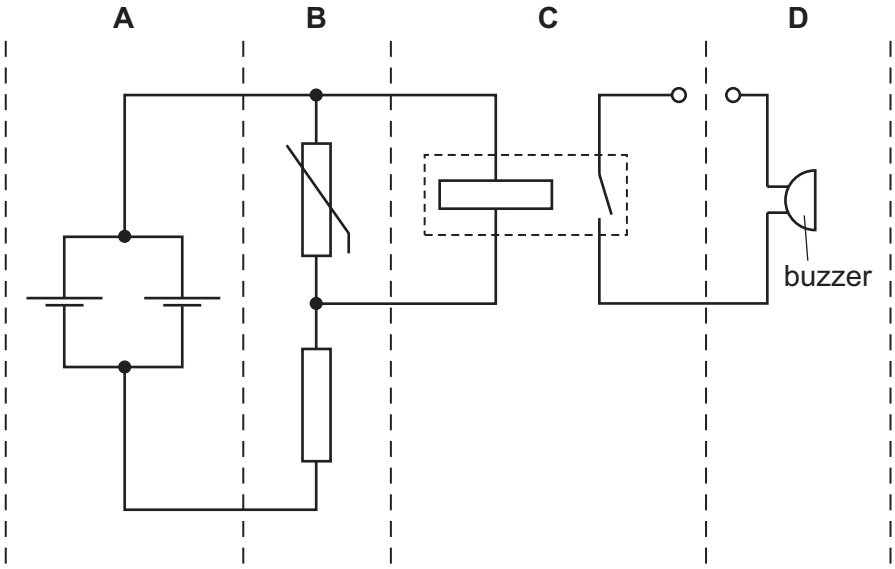
35 Electric power cables transmit electrical energy over large distances using high-voltage, alternating current.

What are the advantages of using a high voltage and of using an alternating current?

	advantage of using a high voltage	advantage of using an alternating current
A	high current is produced in the cable	the resistance of the cable is reduced
B	high current is produced in the cable	the voltage can be changed using a transformer
C	less energy is wasted in the cable	the resistance of the cable is reduced
D	less energy is wasted in the cable	the voltage can be changed using a transformer

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36 Which section of the circuit contains a potential divider?



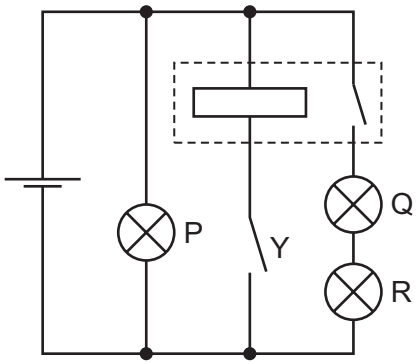
37 Which particles are emitted by the hot filament of a cathode-ray oscilloscope (c.r.o.) and which type of field is used to accelerate them?

	particles	type of field
A	electrons	electric
B	electrons	magnetic
C	protons	electric
D	protons	magnetic

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[Turn over

38 In the circuit shown, all lamps are identical. Lamp P lights with normal brightness.



Switch Y is closed and lamps come on.

Which row indicates the brightness of the lamps?

	P	Q	R
A	dim	dim	dim
B	normal	dim	dim
C	normal	off	off
D	off	normal	normal

39 Which type of electromagnetic radiation is produced during radioactive decay?

A alpha-particles

B beta-particles

C gamma-rays

D X-rays

40 Which row states where nuclear fusion occurs and what nuclear fusion is?

	nuclear fusion occurs in	nuclear fusion is
A	a power station	the joining of small nuclei
B	a power station	the splitting of large nuclei
C	a star	the joining of small nuclei
D	a star	the splitting of large nuclei

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