**Cambridge Assessment International Education**
Cambridge International General Certificate of Secondary Education

**PHYSICS** **0625/12**

Paper 1 Multiple Choice (Core) **February/March 2019**

**45 minutes**

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

*2318147385*

**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 / $s^2$).

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

This document consists of **16** printed pages.


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**1** Water drips from a tap into a measuring cylinder.

The table shows the volume of water in the cylinder every minute for four minutes.

| time / minutes | volume of water / $cm^3$ |
|---|---|
| 0 | 0 |
| 1.0 | 27 |
| 2.0 | 57 |
| 3.0 | 83 |
| 4.0 | 112 |

What is the average volume of water collected in the cylinder each minute?

**A** 22 $cm^3$ **B** 28 $cm^3$ **C** 56 $cm^3$ **D** 57 $cm^3$

**2** An object is moving with uniform deceleration.

Which statement describes its motion?

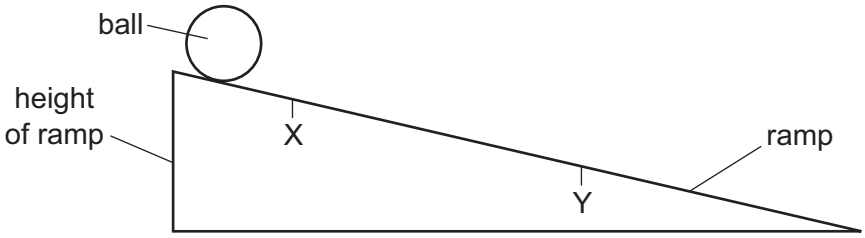
**A** Its rate of change of speed is decreasing.

**B** Its speed is constant.

**C** Its speed is decreasing.

**D** Its speed is increasing.

**3** A ball rolls down a ramp. The time it takes to move from X to Y is measured.




Which other quantity must be measured in order to calculate the average speed of the ball between point X and point Y?

**A** angle of slope

**B** diameter of ball

**C** distance between X and Y

**D** height of ramp

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**4** An astronaut in a space station orbits above the Earth.

In the space station, the acceleration due to gravity is $7.5\,m/s^2$.

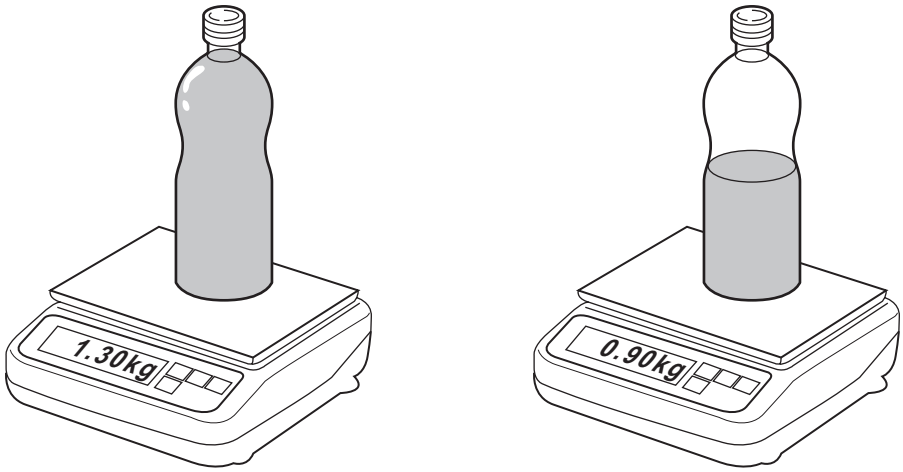
On Earth, the acceleration due to gravity is $10\,m/s^2$.

Which statement about the astronaut's mass and weight in the space station is correct?

| | mass of astronaut | weight of astronaut |
|---|---|---|
| **A** | same as on the Earth | less than on the Earth |
| **B** | same as on the Earth | greater than on the Earth |
| **C** | lower than on the Earth | less than on the Earth |
| **D** | lower than on the Earth | greater than on the Earth |

**5** The mass of a full bottle of cooking oil is 1.30 kg.

When exactly half of the oil has been used, the mass of the bottle plus the remaining oil is 0.90 kg.




What is the mass of the empty bottle?

**A** 0.40 kg **B** 0.50 kg **C** 0.65 kg **D** 0.80 kg

**6** A solid ball has a volume of $4.0\,cm^3$. The density of the ball is $1.6\,g/cm^3$.

What is the mass of the ball?

**A** 0.4 g **B** 2.5 g **C** 4.0 g **D** 6.4 g

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**7** Which property of an object **cannot** be changed by applying forces?

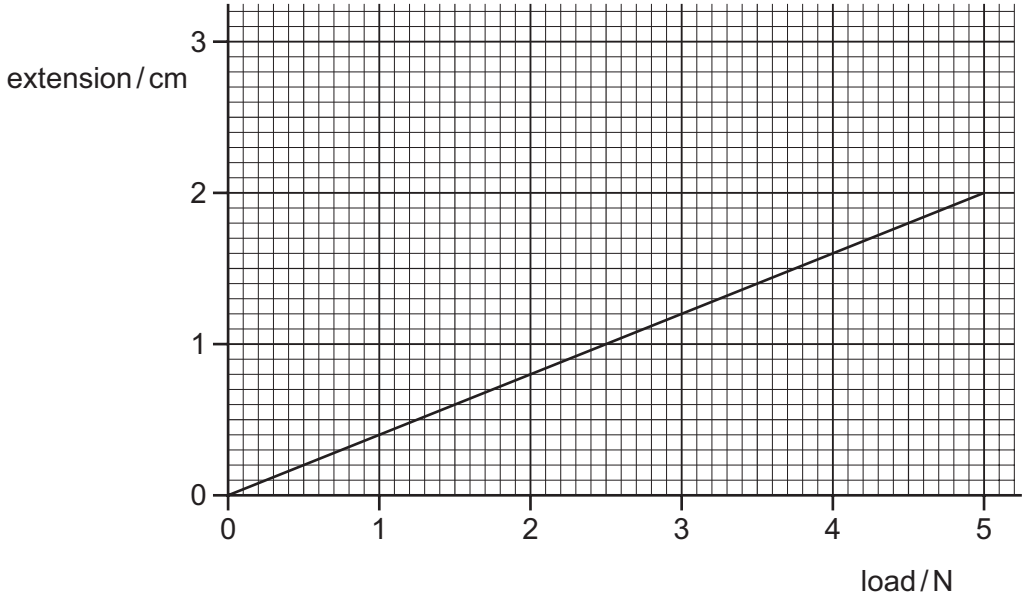
**A** mass

**B** shape

**C** speed

**D** volume

**8** The extension / load graph for a spring is shown. The unstretched length of the spring is 15.0 cm.

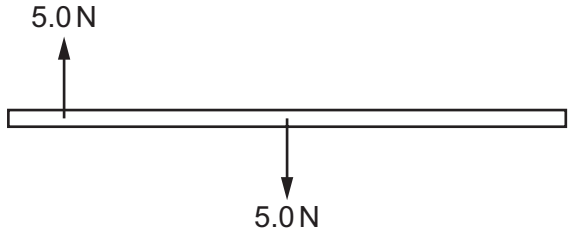



When an object of unknown weight is suspended on the spring, the length of the spring is 16.4 cm.

What is the weight of the object?

**A** 0.55 N **B** 0.67 N **C** 3.5 N **D** 4.1 N

**9** The diagram shows a wooden beam with two forces acting on it.




Which way will the beam move?

**A** accelerate up the page

**B** accelerate down the page

**C** turn anticlockwise

**D** turn clockwise

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**10** Which source of energy uses the production of steam to generate electrical energy?

**A** hydroelectric

**B** nuclear

**C** tides

**D** waves

**11** What is the unit of power?

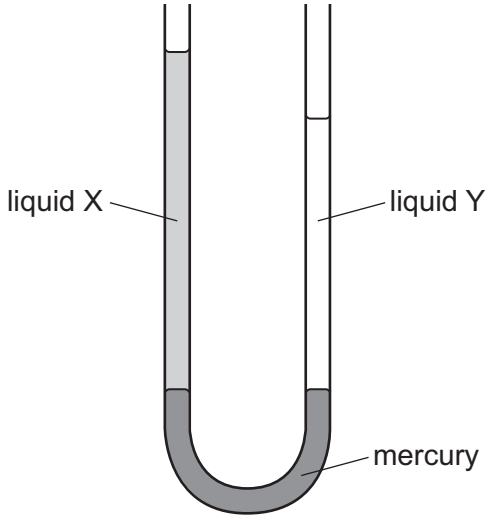
**A** joule

**B** newton

**C** pascal

**D** watt

**12** The diagram shows a U-tube manometer containing three liquids: mercury, liquid X and liquid Y. Neither liquid X or liquid Y mixes with mercury.

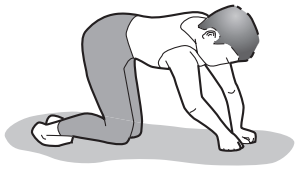



Which row compares the pressure exerted by liquid X and by liquid Y on the mercury, and the density of liquid X and the density of liquid Y?

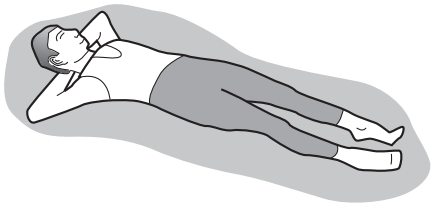
| | pressure exerted by X and by Y on the mercury | densities of X and of Y |
|---|---|---|
| **A** | pressure of X is greater than Y | density of X is greater than Y |
| **B** | pressure of Y is greater than X | density of Y is greater than X |
| **C** | pressure of X and of Y is the same | density of X is greater than Y |
| **D** | pressure of X and of Y is the same | density of Y is greater than X |

**13** Which diagram shows an athlete exerting least pressure on the ground?

**A**



**B**



**C**



**D**



**14** A car tyre runs over a nail which makes a hole in it. The air in the tyre leaks out.




Why does the air leave the tyre?

**A** The pressure inside the tyre is greater than the pressure outside.

**B** The pressure inside the tyre is less than the pressure outside.

**C** The temperature inside the tyre is greater than the temperature outside.

**D** The temperature inside the tyre is less than the temperature outside.

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**15** On a cold day, a metal measuring tape graduated in millimetres is used to measure the distance between two fence posts. The measuring tape reads 3.000 m.

On a much hotter day, the metal measuring tape is used to measure the length of the same distance again. The metal measuring tape has a higher temperature than the ground. The temperature of the ground remains constant.

Which statement is correct?

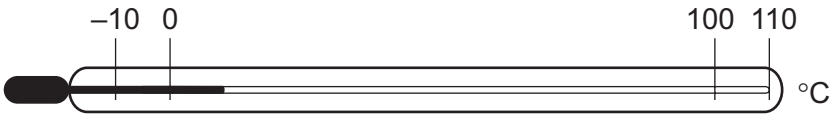
**A** The measuring tape reads less than 3.000 m because the graduations are closer together.

**B** The measuring tape reads less than 3.000 m because the graduations are further apart.

**C** The measuring tape reads more than 3.000 m because the graduations are closer together.

**D** The measuring tape reads more than 3.000 m because the graduations are further apart.

**16** 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 |

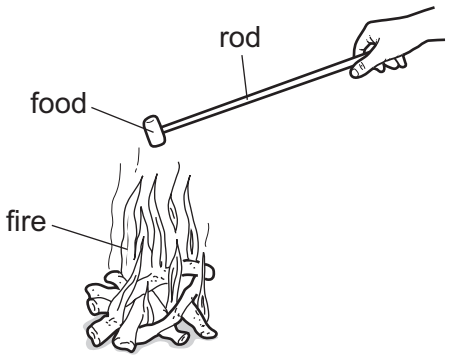
**17** Which row describes the process of melting?

| | initial state | final state | change in temperature? |
|---|---|---|---|
| **A** | liquid | gas | yes |
| **B** | liquid | solid | no |
| **C** | solid | gas | yes |
| **D** | solid | liquid | no |

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**18** Four campers are warming their food on a fire.

They use different rods, each of the same dimensions, to hold their food near the fire.




Which material is the best choice to prevent their hands from getting too hot?

**A** aluminium

**B** copper

**C** steel

**D** wood

**19** A beaker of water is heated and thermal energy travels through the water by convection.

What happens to the density of the water when it is heated and how does the water move?

**A** The density decreases and the heated water moves downwards.

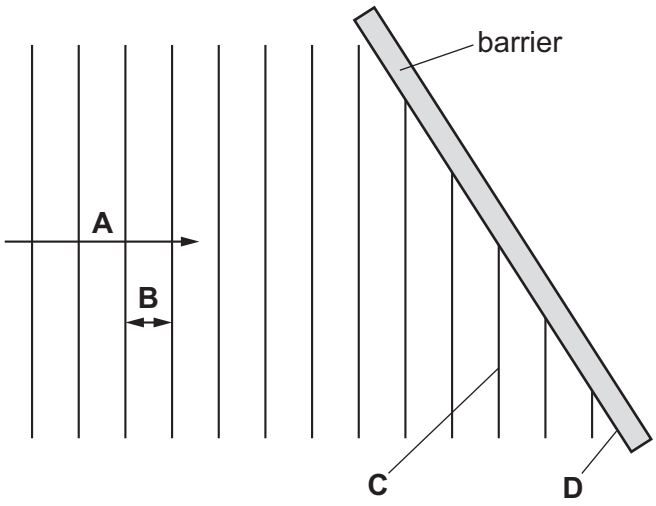
**B** The density decreases and the heated water moves upwards.

**C** The density increases and the heated water moves downwards.

**D** The density increases and the heated water moves upwards.

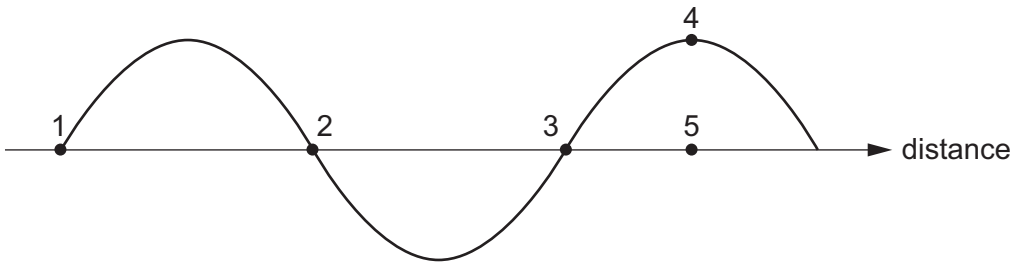
**20** The diagram shows a wave before it reflects from a barrier.

Which labelled section of the diagram represents a wavefront?




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**21** The diagram shows a transverse wave.




Which distance is equal to one wavelength?

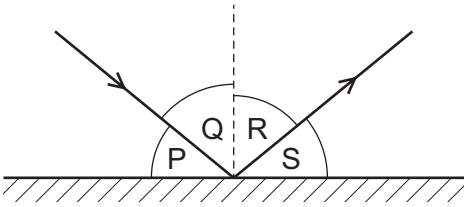
**A** the distance between points 1 and 2

**B** the distance between points 1 and 3

**C** the distance between points 2 and 3

**D** the distance between points 4 and 5

**22** A ray of light is reflected by a plane mirror.

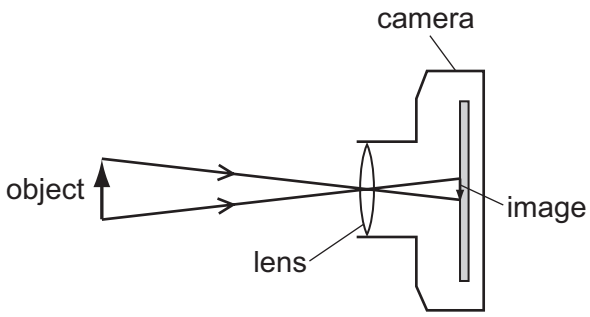



Which row shows the angle of incidence and the angle of reflection?

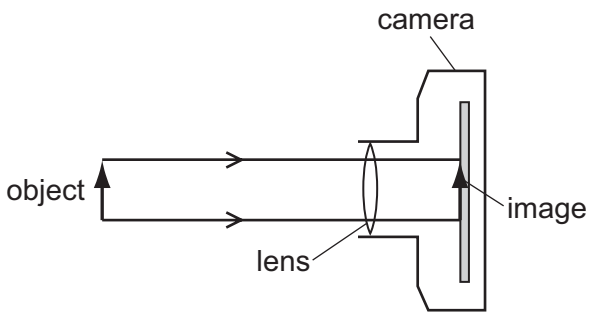
| | angle of incidence | angle of reflection |
|---|---|---|
| **A** | P | Q |
| **B** | P | S |
| **C** | Q | R |
| **D** | R | S |

**23** Which diagram correctly represents rays of light passing through a converging lens in a camera?

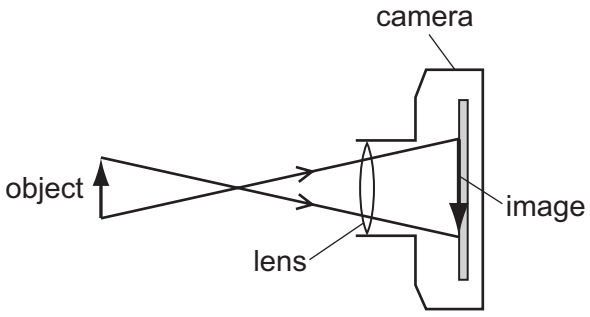
**A**



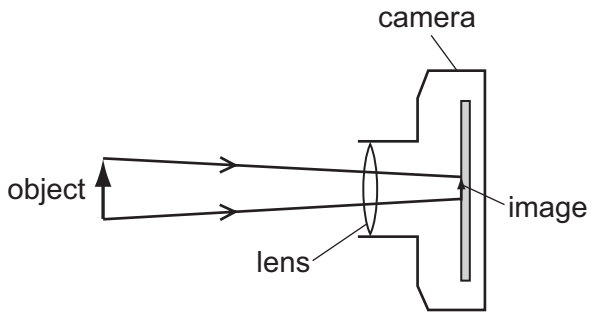

**B**




**C**




**D**




**24** Which statement about microwaves is correct?

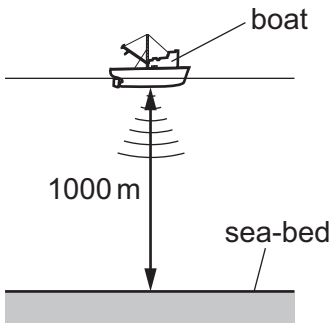
**A** Microwaves are longitudinal waves.

**B** The frequencies of microwaves are greater than the frequencies of visible light.

**C** The speed of microwaves in a vacuum is equal to the speed of visible light in a vacuum.

**D** The wavelengths of microwaves are smaller than the wavelengths of infra-red.

**25** 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** 770 m / s **B** 1300 m / s **C** 1500 m / s **D** 2600 m / s

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**26** Which action will **not** magnetise a rod?

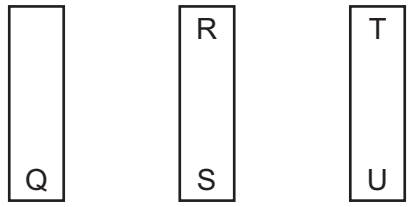
**A** placing a copper rod inside a coil carrying a direct current

**B** stroking a steel rod with a permanent magnet

**C** hammering a steel rod aligned with the Earth's magnetic field

**D** placing a soft-iron rod close to a permanent magnet

**27** The ends of three metal rods are tested by holding end Q of rod 1 close to the others in turn.




The results are as follows.

End Q attracts end R.

End Q attracts end S.

End Q attracts end T.

End Q repels end U.

Which of the metal rods is a magnet?

**A** rod 1 only

**B** rod 1 and rod 2

**C** rod 1 and rod 3

**D** rod 3 only

**28** Which statement about a voltmeter is correct?

**A** A voltmeter measures the current in a component and is connected in series with the component.

**B** A voltmeter measures the current in a component and is connected in parallel with the component.

**C** A voltmeter measures the potential difference (p.d.) across a component and is connected in series with the component.

**D** A voltmeter measures the potential difference (p.d.) across a component and is connected in parallel with the component.

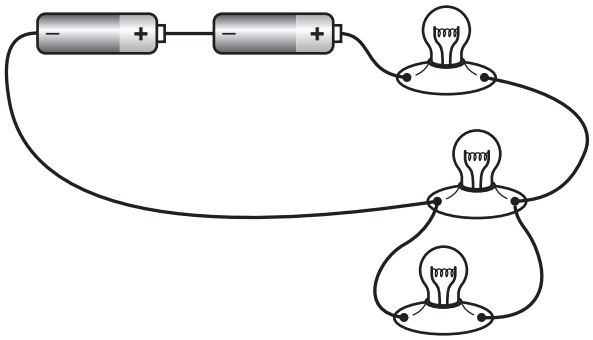
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**29** Four wires are made from the same metal.

Which wire has the lowest resistance?

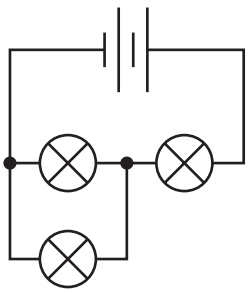
| | length of wire / cm | diameter of wire / mm |
|---|---|---|
| **A** | 20 | 0.20 |
| **B** | 20 | 0.40 |
| **C** | 40 | 0.20 |
| **D** | 40 | 0.40 |

**30** A student sets up a circuit containing a battery of two cells and three lamps, as shown.

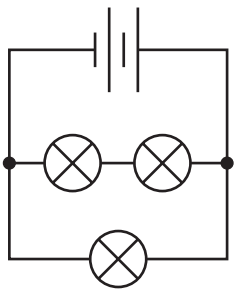


What is the circuit diagram for this arrangement?

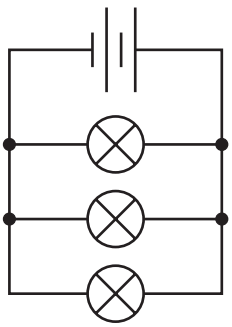
**A**



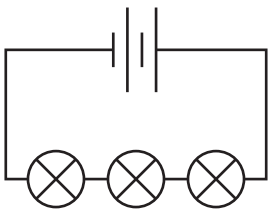
**B**



**C**



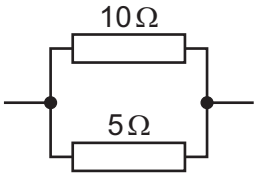
**D**



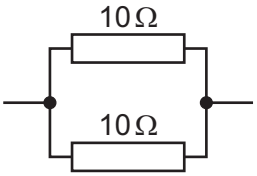
**31** The diagrams show different resistor arrangements.

Which arrangement has the smallest combined resistance?

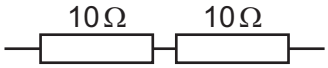
**A**



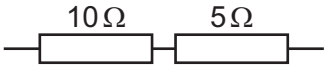

**B**




**C**

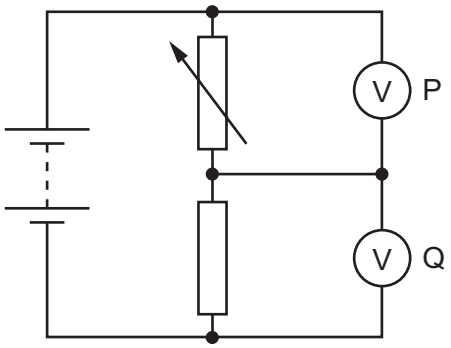



**D**




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**32** The diagram shows a potential divider circuit.




The resistance of the variable resistor is increased.

Which row shows what happens to the reading on voltmeter P and on voltmeter Q?

| | reading on voltmeter P | reading on voltmeter Q |
|---|---|---|
| **A** | decreases | decreases |
| **B** | decreases | increases |
| **C** | increases | decreases |
| **D** | increases | increases |

**33** The current in a kettle is 10 A and the kettle is protected by a 13 A fuse.

The owner of the kettle replaces the 13 A fuse with a 3 A fuse.

What happens when the kettle is switched on?

**A** The fuse melts and the kettle might be damaged.

**B** The fuse melts and the kettle is undamaged.

**C** The fuse does not melt and the kettle works correctly.

**D** The fuse does not melt but the kettle fails to work.

**34** A student wishes to demonstrate electromagnetic induction.

He has a magnet and connecting wires.

Which other apparatus does he need?

| | voltmeter | battery |
|---|---|---|
| **A** | ✓ | ✓ |
| **B** | ✓ | ✗ |
| **C** | ✗ | ✓ |
| **D** | ✗ | ✗ |

key

✓ = needed

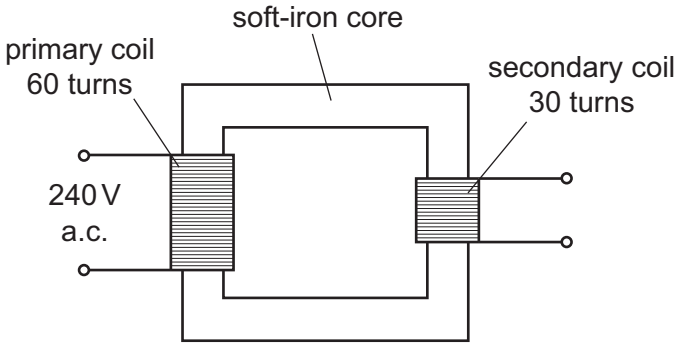
✗ = not needed

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**[Turn over**

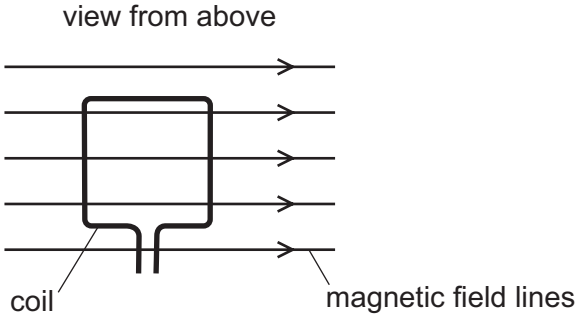
**35** The diagram shows a transformer connected to a 240 V a.c. supply.




What is the potential difference across the secondary coil of the transformer?

**A** 30 V **B** 120 V **C** 240 V **D** 480 V

**36** A current-carrying coil is placed in a magnetic field.




Which effect does the coil experience?

**A** a change in shape

**B** a change in weight

**C** a resultant force

**D** a turning effect

**37** Which statement about the structure of an atom is correct?

**A** Negative electrons surround a neutral nucleus.

**B** Negative electrons surround a positive nucleus.

**C** Positive electrons surround a neutral nucleus.

**D** Positive electrons surround a negative nucleus.

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**38** What are isotopes of an element?

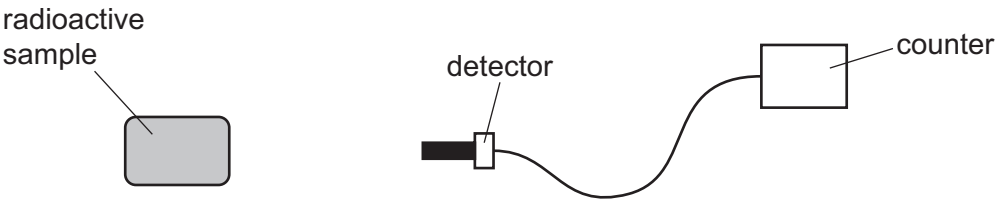
**A** atoms of a different element with a different number of neutrons

**B** atoms of a different element with a different number of protons

**C** atoms of the same element with a different number of neutrons

**D** atoms of the same element with a different number of protons

**39** A student measures the level of radiation emitted by a radioactive sample.




The table shows the readings she records on the counter over a short period of time.

| | | | | |
|---|---|---|---|---|
| counter reading / counts per minute | 106 | 96 | 98 | 100 |

The sample is removed and the counter then shows a background radiation reading of 4 counts per minute.

What is the best estimate for the average count rate due to the radioactive sample?

**A** 96 counts per minute

**B** 98 counts per minute

**C** 100 counts per minute

**D** 104 counts per minute

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**[Turn over**

**40** Four students are discussing ideas about radioactive decay.

Which student's statement is correct?

**A**



When a β-particle is emitted, the nucleus remains unchanged.

**B**



When an α-particle is emitted, the nucleus changes to that of a different element.

**C**



When a γ-ray is emitted, the nucleus changes to that of a different element.

**D**



Stable nuclei are dangerous because they emit high levels of γ-radiation.

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