UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
International General Certificate of Secondary Education

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

Paper 1 Multiple Choice **May/June 2013**

**45 minutes**

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

*1730835311*

**READ THESE INSTRUCTIONS FIRST**

Write in soft pencil.
Do not use staples, paper clips, highlighters, 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.

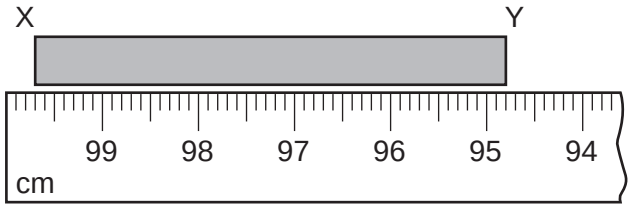
**Read the instructions on the Answer Sheet very carefully.**

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.

This document consists of **19** printed pages and **1** blank page.


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**1** A student measures the length of a rod XY by holding it next to a metre rule.




The student writes down the length as 94.8 cm.

Which statement is correct?

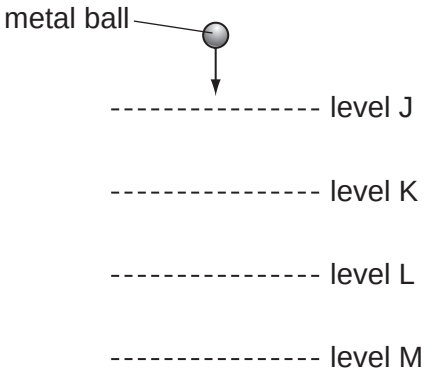
**A** The value is correct.

**B** The value is incorrect because it should be 95.2 cm.

**C** The value is incorrect because it should be in millimetres.

**D** The value is incorrect because the student should subtract the reading for end Y from the reading for end X.

**2** A heavy metal ball falls vertically downwards through air past four equally spaced levels J, K, L and M.




The times taken to fall from one level to the next are measured.

Where is the speed of the ball greatest and which time is shortest?

| | speed is greatest between | time is shortest between |
|---|---|---|
| **A** | J and K | J and K |
| **B** | J and K | L and M |
| **C** | L and M | J and K |
| **D** | L and M | L and M |

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**3** A car travels at various speeds during a short journey.

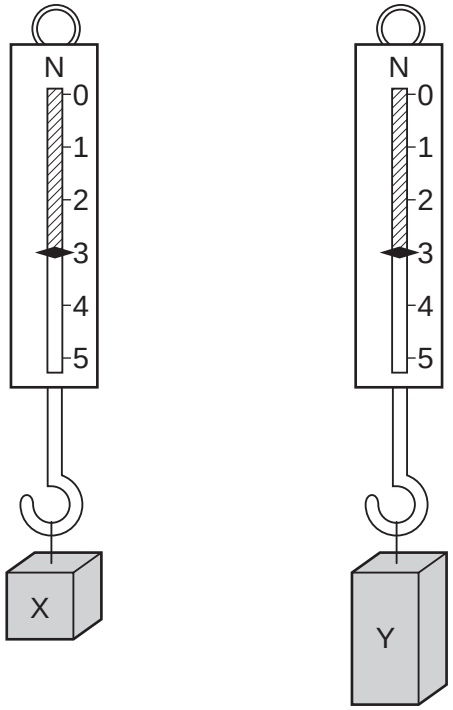
The table shows the distances travelled and the times taken during each of four stages P, Q, R and S.

| stage | P | Q | R | S |
|---|---|---|---|---|
| distance travelled / km | 1.8 | 3.6 | 2.7 | 2.7 |
| time taken / minutes | 2 | 2 | 4 | 3 |

During which two stages is the car travelling at the same average speed?

**A** P and Q **B** P and S **C** Q and R **D** R and S

**4** Two blocks of metal X and Y hang from spring balances, as shown in the diagrams.




What does the diagram show about X and Y?

**A** They have the same mass and the same volume but different weights.

**B** They have the same mass and the same weight but different volumes.

**C** They have the same mass, the same volume and the same weight.

**D** They have the same weight and the same volume but different masses.

**5** A student stands with both feet on some scales in order to measure his weight.

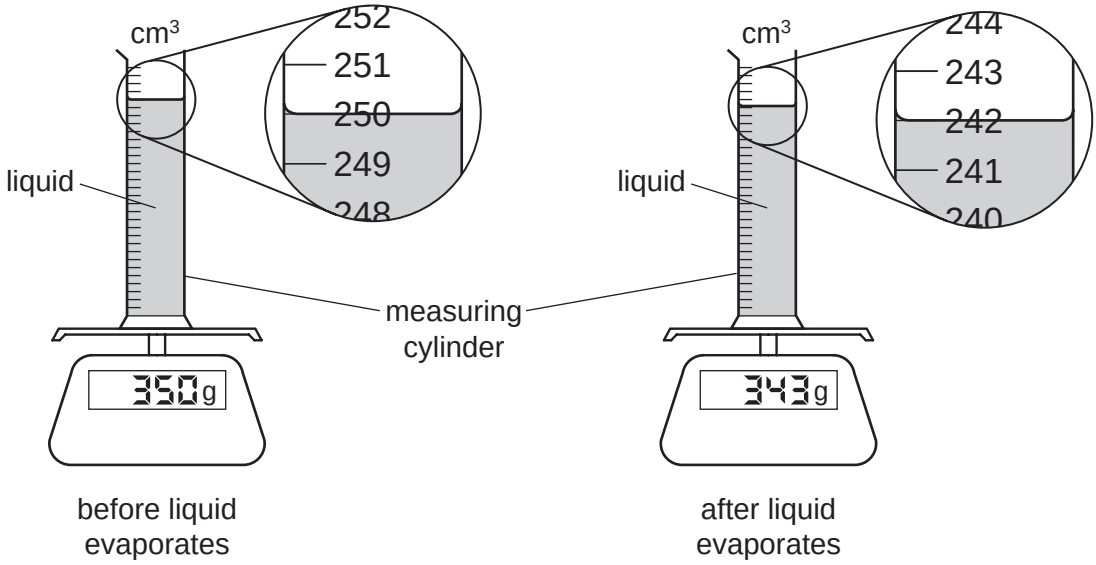
The reading on the scales is 500 N. He lifts one foot off the scales and keeps it lifted.

What is the new reading on the scales?

**A** 0 **B** 250 N **C** 500 N **D** 1000 N

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**6** A measuring cylinder containing liquid is placed on a top-pan balance. The apparatus is left overnight and some of the liquid evaporates. The diagrams show the readings.




before liquid evaporates

after liquid evaporates

What is the density of the liquid?

**A** $0.875\,g/cm^3$ **B** $1.14\,g/cm^3$ **C** $1.40\,g/cm^3$ **D** $1.42\,g/cm^3$

**7** A child sits on a rubber ball and bounces up and down on the ground.



What stays the same when the ball hits the ground?

**A** the acceleration of the ball

**B** the mass of the ball

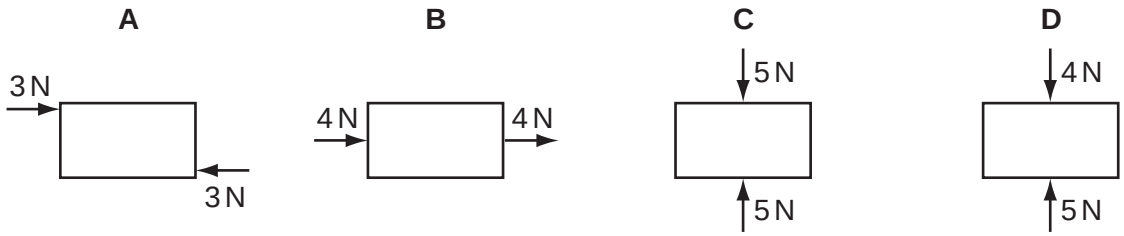
**C** the shape of the ball

**D** the velocity of the ball

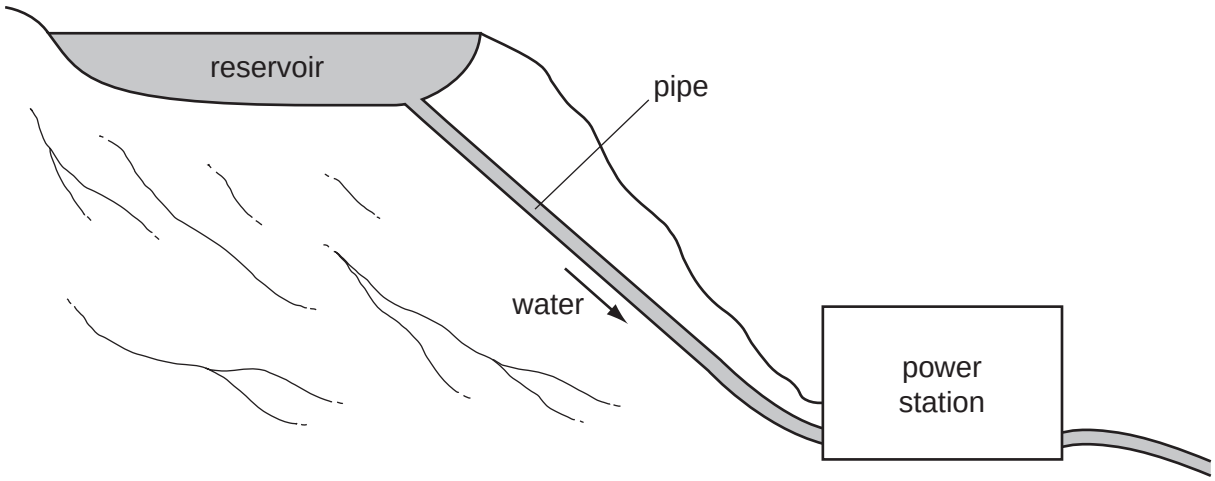
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**8** The diagrams show different objects, each being acted upon by only the two forces shown.

Which object is in equilibrium?




**9** The diagram shows a hydroelectric system.




What are the main energy changes taking place?

**A** chemical energy → kinetic energy → electrical energy

**B** electrical energy → gravitational energy → kinetic energy

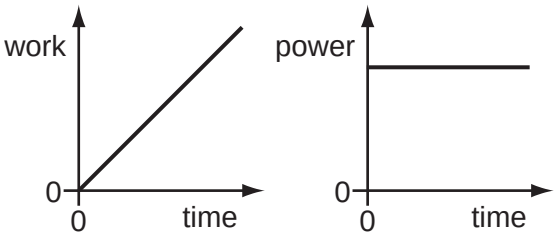
**C** gravitational energy → kinetic energy → electrical energy

**D** kinetic energy → electrical energy → gravitational energy

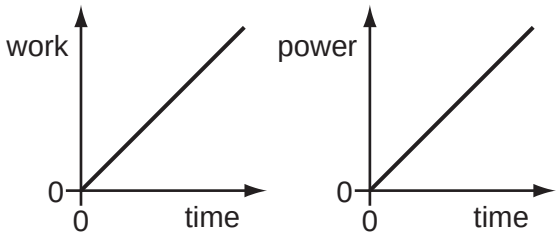
**10** A car moves along a level road at constant speed. Work is done by the engine and power is developed by the engine.

Which pair of graphs shows how the work done and the power developed vary with time?

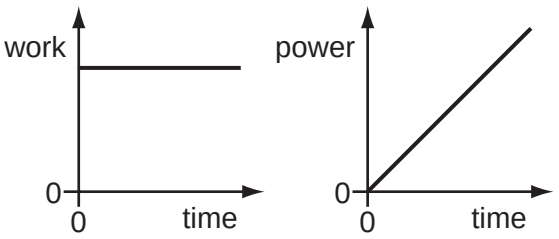
**A**



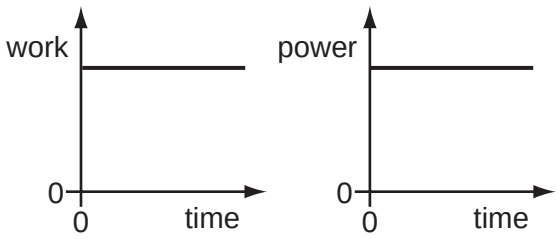

**B**




**C**

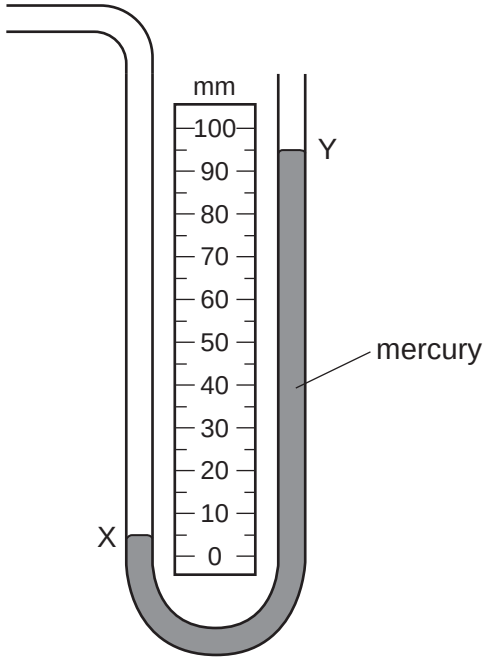



**D**




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**11** A mercury manometer is used to measure a pressure difference. The difference is shown by the levels X and Y in the diagram.




What is the pressure difference represented by X and Y?

**A** 5 mm of mercury

**B** 50 mm of mercury

**C** 90 mm of mercury

**D** 95 mm of mercury

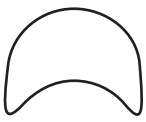
**12** The diagrams show the actual size of the heels of four different lady's shoes, as seen from underneath the shoe.

Which heel is **most** likely to cause damage to floors?

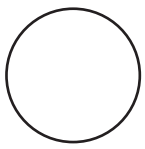
**A**



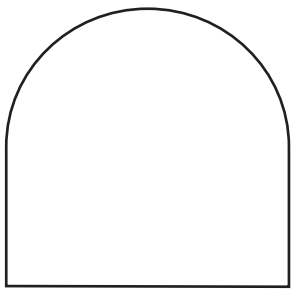
**B**



**C**



**D**

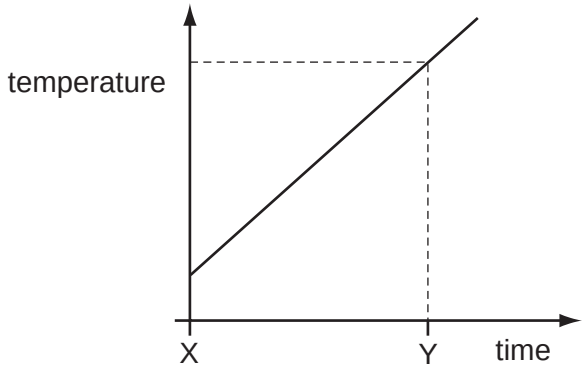


**13** Which diagram best shows the path of a gas molecule?

**A** **B** **C** **D**



**14** A gas storage tank has a fixed volume. The graph shows how the temperature of the gas in the tank varies with time.




At time Y, the gas molecules are

**A** closer together than at time X.

**B** hitting the sides of the tank harder than at time X.

**C** larger in size than at time X.

**D** moving more slowly than at time X.

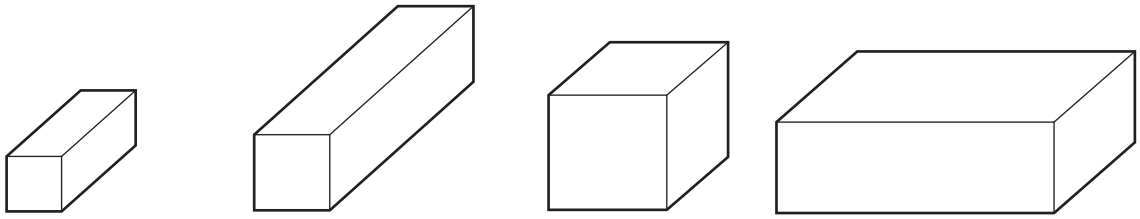
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**15** The diagrams show four blocks of steel. The blocks are all drawn to the same scale.

The same quantity of thermal energy (heat) is given to each block.

Which block shows the greatest rise in temperature?

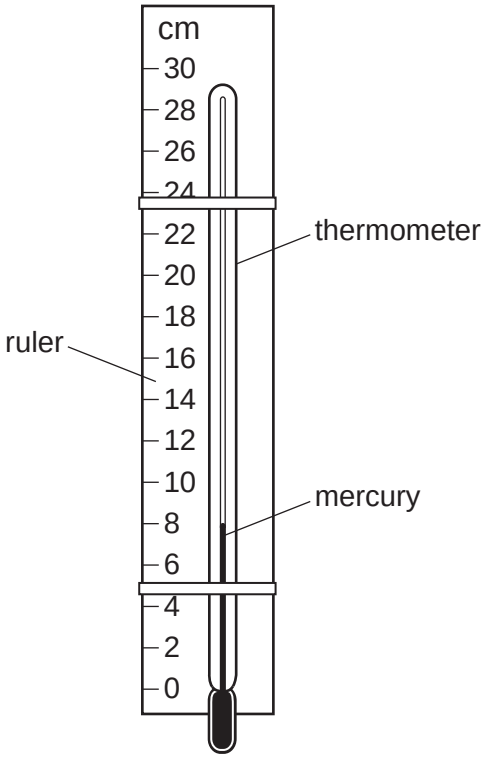
**A** **B** **C** **D**



**16** A mercury thermometer with no scale is taped to a ruler as shown.

When the thermometer is placed in steam, the mercury level rises to 22.0 cm.

When the thermometer is placed in pure melting ice, the mercury level falls to 2.0 cm.




Which temperature is shown by the mercury level in the diagram?

**A** 6 °C **B** 8 °C **C** 30 °C **D** 40 °C

**17** Which statement about the transfer of thermal energy is correct?

**A** Convection can occur in air, but only when the air is trapped.

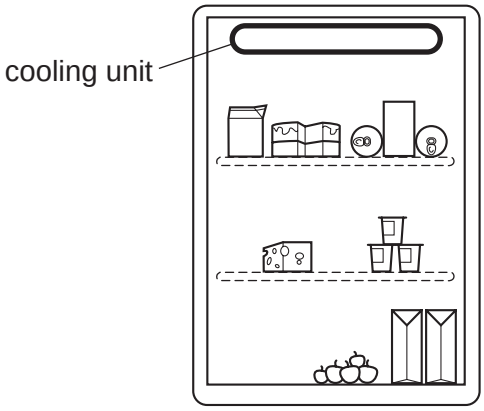
**B** Convection can only occur in a gas.

**C** Radiation cannot occur in air.

**D** Radiation can occur in a vacuum, but convection cannot.

**18** The diagram shows a refrigerator.

The cooling unit is placed at the top. The cooling unit cools the air near it.

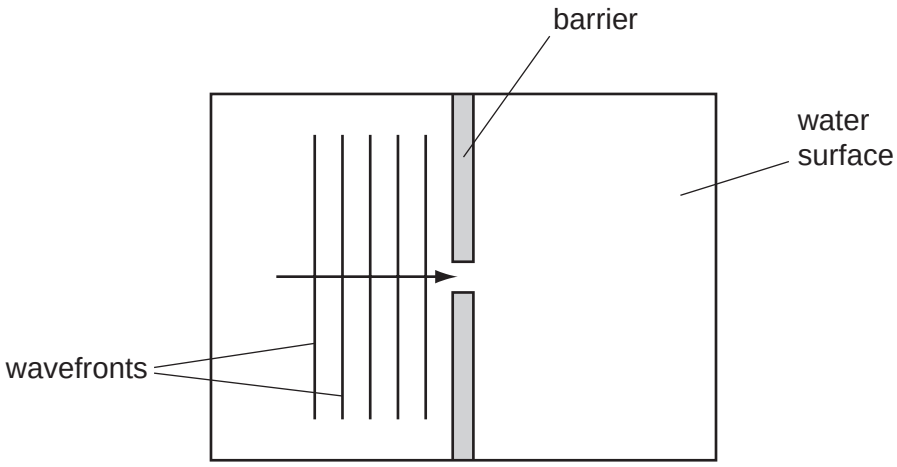



What happens to the density of the air as it cools, and how does it move?

| | density of the air | movement of the air |
|---|---|---|
| **A** | decreases | moves down |
| **B** | decreases | stays at the top |
| **C** | increases | moves down |
| **D** | increases | stays at the top |

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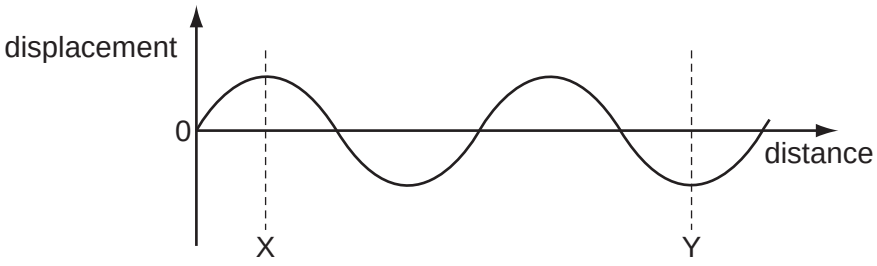
**19** The diagram shows the surface of water in a ripple tank. A wave is travelling in the direction of the arrow towards a gap in a barrier.




What happens to the wave as it passes through the gap, and what happens to the shape of the wavefronts after passing through the gap?

| | what happens at the gap | shape after passing through the gap |
|---|---|---|
| **A** | diffraction | curved |
| **B** | diffraction | straight |
| **C** | refraction | curved |
| **D** | refraction | straight |

**20** The diagram represents a wave.




How many wavelengths are there between X and Y?

**A** $\frac{2}{3}$ **B** 1 **C** $1\frac{1}{2}$ **D** 3

**21** Which group of electromagnetic radiations is arranged in order of increasing frequency?

**A** infra-red, visible light, ultraviolet

**B** $\gamma$-rays, X-rays, infra-red

**C** ultra-violet, visible light, radio waves

**D** X-rays, radio waves, $\gamma$-rays

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**22** An electronic engineer makes devices which can receive television pictures from satellites.

Which type of electromagnetic radiation must these devices be able to receive?

**A** infra-red waves

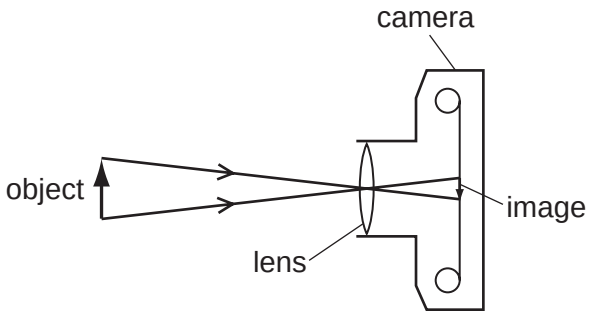
**B** microwaves

**C** radio waves

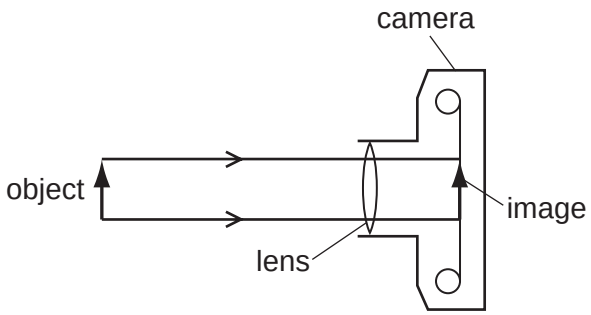
**D** ultra-violet waves

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

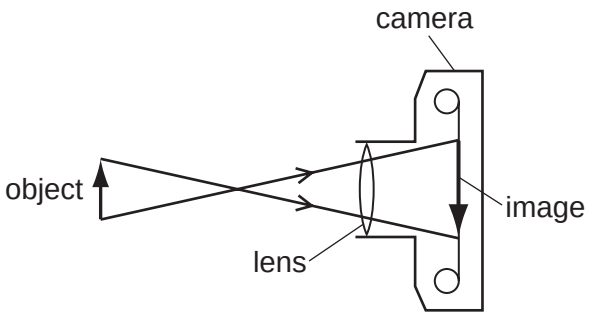
**A**



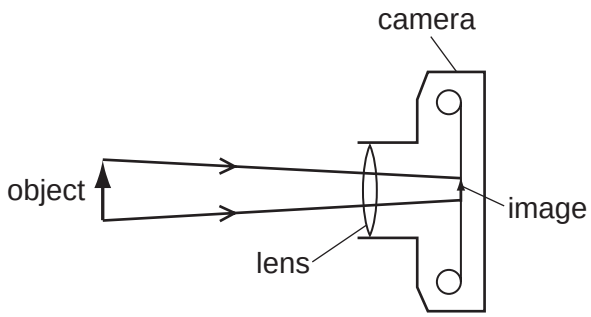

**B**




**C**

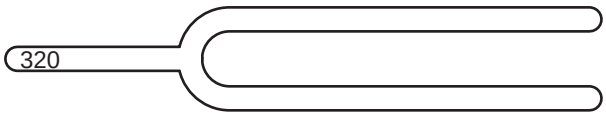



**D**




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**24** A tuning fork is marked with the number 320.




This indicates the size of the frequency.

What does this mean?

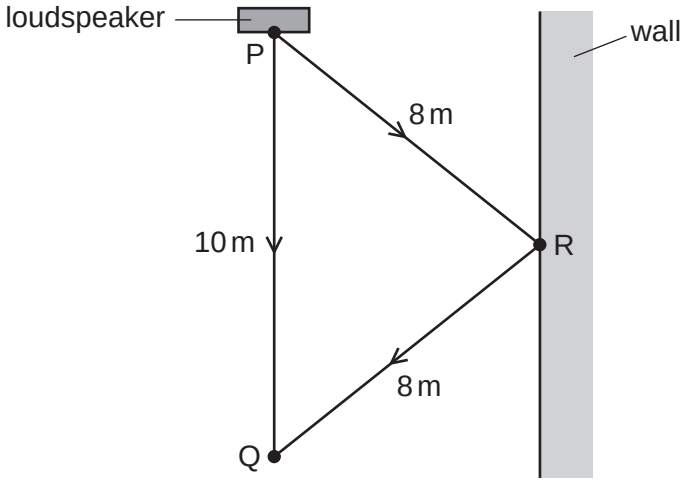
**A** The length of the tuning fork is 320 mm.

**B** The note from the tuning fork will last for up to 320 s.

**C** The sound waves produced by the tuning fork travel at 320 m / s.

**D** The tuning fork vibrates 320 times every second.

**25** Some sound from a loudspeaker at P travels directly to Q. Sound also reaches Q after being reflected from a wall at R.




The speed of sound is 330 m / s.

What is the **difference** in time for a sound to travel from P to Q by the two routes?

**A** $\left(\frac{6}{330}\right)$ s **B** $\left(\frac{16}{330}\right)$ s **C** $(6 \times 330)$ s **D** $(16 \times 330)$ s

**26** An electromagnet is used to separate magnetic metals from non-magnetic metals.

Why is steel **not** suitable as the core of the electromagnet?

**A** It forms a permanent magnet.

**B** It has a high density.

**C** It has a high thermal capacity.

**D** It is a good conductor of electricity.

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**27** An old and expensive steel watch becomes magnetised.

The owner wants to use the watch again. He must demagnetise the watch.

What is the **best** method to do this?

**A** Heat it until it glows red hot.

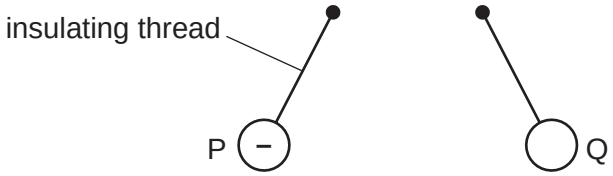
**B** Pass direct current though it.

**C** Place it in a plastic bag and put the bag in hot water for several hours.

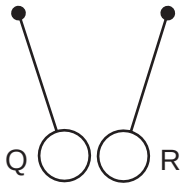
**D** Place it in a solenoid that carries alternating current and then slowly remove it.

**28** Three charged balls, P, Q and R are suspended by insulating threads. Ball P is negatively charged.

Ball Q is brought close to ball P.




Ball Q is now brought close to ball R.




What are the charges on ball Q and on ball R?

| | ball Q | ball R |
|---|---|---|
| **A** | positive | positive |
| **B** | positive | negative |
| **C** | negative | positive |
| **D** | negative | negative |

**29** Which group contains only good electrical conductors?

**A** air, carbon (graphite), plastic

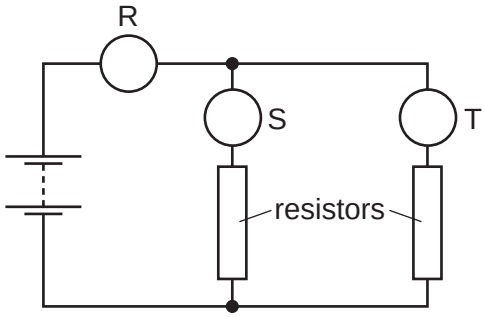
**B** air, gold, mercury

**C** carbon (graphite), copper, mercury

**D** copper, gold, plastic

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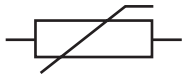
**30** A student investigates a circuit that contains two parallel resistors. The circuit includes meters R, S and T which are all connected correctly.




Which types of meter are R, S and T?

| | meter R | meter S | meter T |
|---|---|---|---|
| **A** | ammeter | ammeter | ammeter |
| **B** | ammeter | voltmeter | voltmeter |
| **C** | voltmeter | ammeter | ammeter |
| **D** | voltmeter | voltmeter | voltmeter |

**31** A circuit contains the component shown by the following symbol.



Which change would the component detect?

A change in

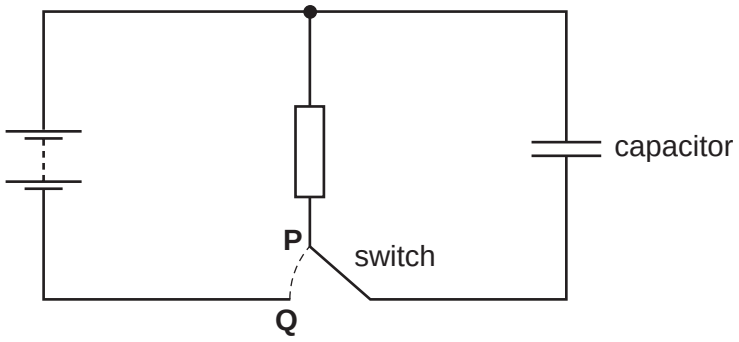
**A** light level.

**B** potential difference.

**C** radioactivity.

**D** temperature.

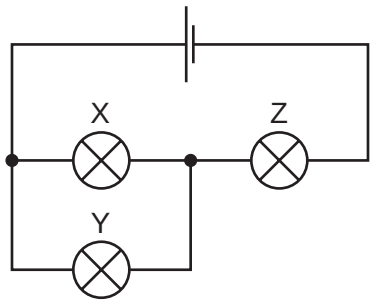
**32** The diagram shows a circuit which includes a switch and a capacitor.




What happens to the capacitor when the switch is at **P** and when it is at **Q**?

| | switch at **P** | switch at **Q** |
|---|---|---|
| **A** | charging | charging |
| **B** | charging | discharging |
| **C** | discharging | charging |
| **D** | discharging | discharging |

**33** The circuit diagram shows a cell connected to three identical lamps X, Y and Z. All the lamps are lit.




Lamp Y is removed by unscrewing it from its holder.

What happens to lamp Z?

**A** It goes out completely.

**B** It becomes dimmer but stays lit.

**C** It stays the same brightness.

**D** It becomes brighter.

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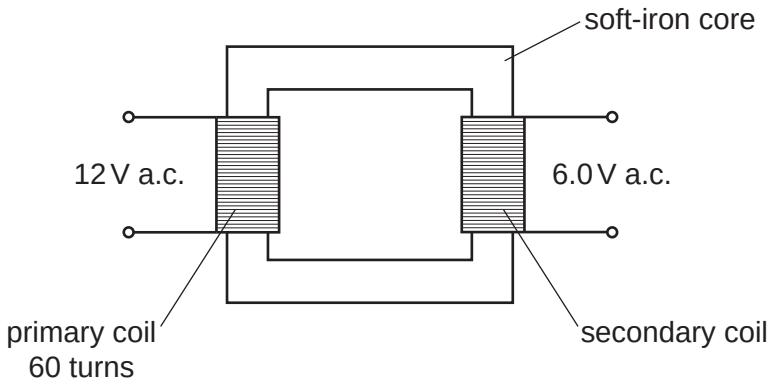
**34** Each branch of a domestic circuit often includes a circuit-breaker. This protects the wiring if too much current flows in the circuit.

In which wire is the circuit-breaker placed and what does it do when it operates?

| | circuit-breaker in | when the circuit-breaker operates it |
|---|---|---|
| **A** | live wire | disconnects the circuit |
| **B** | live wire | reduces the current to a safe value (not zero) |
| **C** | neutral wire | disconnects the circuit |
| **D** | neutral wire | reduces the current to a safe value (not zero) |

**35** A student wants to make a transformer to step 12 V down to 6.0 V.

She winds 60 turns of wire around an iron core as shown in the diagram.




How many turns of wire should she wind on the secondary coil of her transformer?

**A** 5 **B** 30 **C** 60 **D** 120

**36** A toy railway engine is driven around a track by a d.c. electric motor.

How can the speed of the motor be increased?

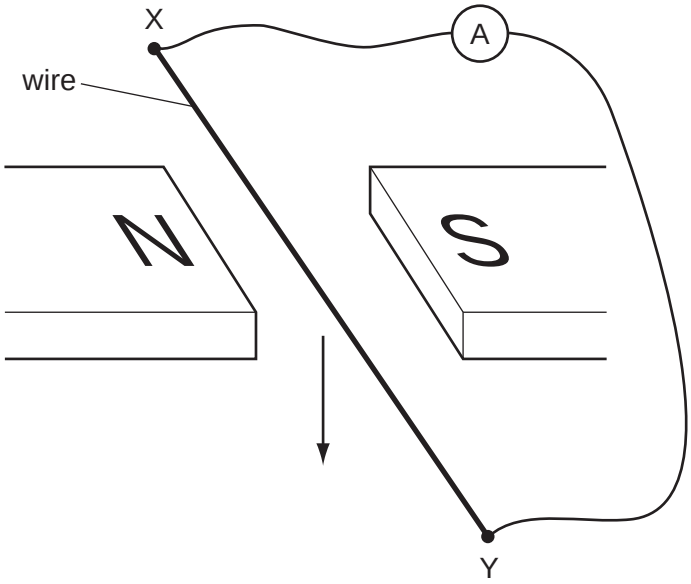
**A** Use a motor made with fewer turns of wire.

**B** Use a smaller d.c. voltage.

**C** Use a stronger magnet in the motor.

**D** Use the supply with its connections reversed.

**37** The diagram shows an experiment to demonstrate electromagnetic induction.




X and Y are joined, in turn, by four wires, each made of a different material.

Each wire is then moved quickly downwards between the magnets.

Which material will **not** give rise to an induced current in the wire?

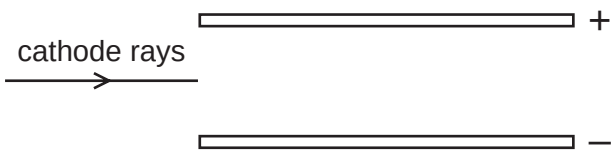
**A** aluminium

**B** copper

**C** iron

**D** nylon

**38** A beam of cathode rays passes between two charged metal plates.




What happens to the beam as it passes between the plates?

**A** It is deflected into the paper.

**B** It is deflected out of the paper.

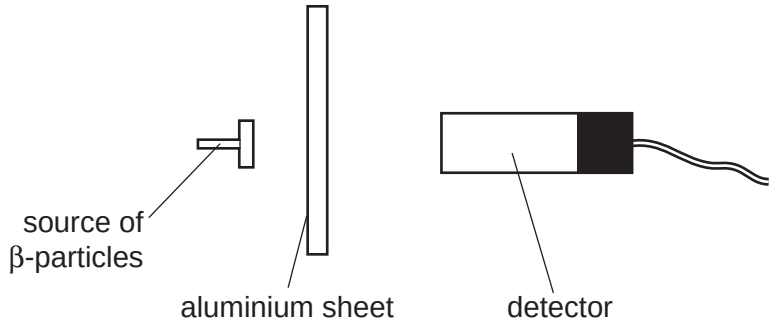
**C** It is deflected towards the negative plate.

**D** It is deflected towards the positive plate.

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**39** A radiation detector is placed close to a source of β-particles.

Aluminium sheets of increasing thickness are placed between the source and the detector.




Eventually a sheet which is 2.0 cm thick is used. The reading on the detector decreases, but does not fall to zero.

Why does the reading not fall to zero?

**A** Some of the β-particles go round the edges of the sheet.

**B** The detector is too close to the source.

**C** There is always some background radiation.

**D** The sheet can never be thick enough to absorb all the β-particles.

**40** A nuclide is represented by the notation shown.

$$^{P}_{Q}X$$

How many nucleons are there in one atom of this nuclide?

**A** P **B** Q **C** P + Q **D** P – Q

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