Cambridge Assessment International Education

# Cambridge IGCSE™

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

Paper 1 Multiple Choice (Core) **February/March 2022**

**45 minutes**

You must answer on the multiple choice answer sheet.

You will need: Multiple choice answer sheet
Soft clean eraser
Soft pencil (type B or HB is recommended)

**INSTRUCTIONS**

- 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 multiple choice answer sheet.
- Follow the instructions on the multiple choice answer sheet.
- Write in soft pencil.
- Write your name, centre number and candidate number on the multiple choice answer sheet in the spaces provided unless this has been done for you.
- Do **not** use correction fluid.
- Do **not** write on any bar codes.
- You may use a calculator.
- Take the weight of 1.0 kg to be 10 N (acceleration of free fall = 10 m / $s^2$).

**INFORMATION**

- The total mark for this paper is 40.
- Each correct answer will score one mark.
- Any rough working should be done on this question paper.

This document has **20** pages. Any blank pages are indicated.


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**1** A student investigates a pendulum.

He measures the time for the pendulum to complete 20 oscillations.

He repeats the experiment three more times.

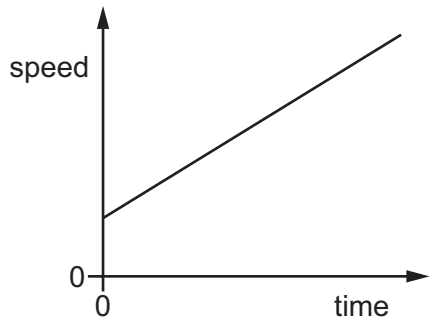
The readings are shown.

| experiment | time for 20 oscillations / s |
|---|---|
| 1 | 17.6 |
| 2 | 19.8 |
| 3 | 17.6 |
| 4 | 18.6 |

What is the average period of the pendulum?

**A** 0.88 s **B** 0.92 s **C** 17.6 s **D** 18.4 s

**2** The diagram shows a speed–time graph for a moving object.




Which statement describes the motion of the object?

**A** The speed of the object is increasing with constant acceleration.

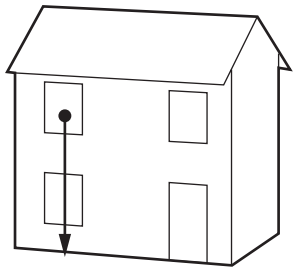
**B** The speed of the object is increasing with an acceleration that is not constant.

**C** The speed of the object is decreasing with constant deceleration.

**D** The speed of the object is decreasing with a deceleration that is not constant.

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**3** A tennis ball falls from the upstairs window of a house.



What can be said about the acceleration of the ball if air resistance is ignored?

**A** It depends on the density of the ball.

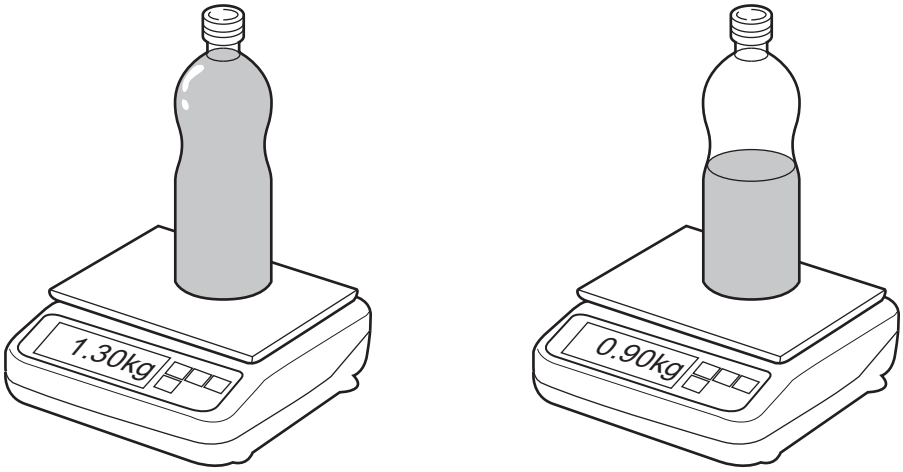
**B** It depends on the mass of the ball.

**C** It increases as the ball falls.

**D** It stays the same as the ball falls.

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

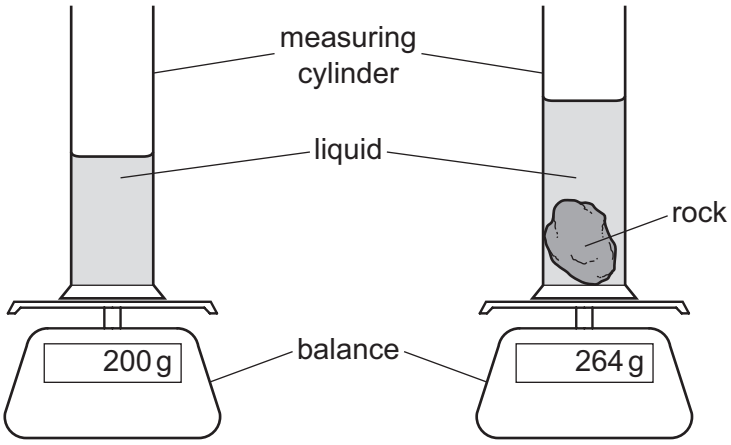
When exactly half of the oil has been used, the mass of the bottle plus the remaining oil is 0.90 kg.




What is the mass of the empty bottle?

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

**5** A student carries out an experiment to find the density of a rock.

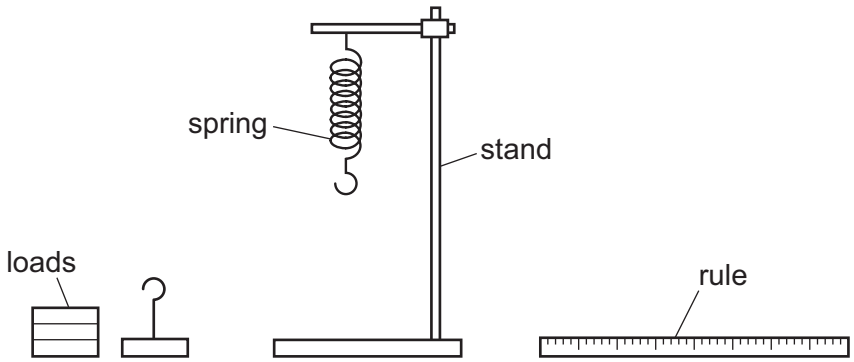



Which two quantities does the student need to make to determine the density of the rock?

| | quantity 1 | quantity 2 |
|---|---|---|
| **A** | increase in mass | increase in volume of liquid |
| **B** | final mass | increase in depth of liquid |
| **C** | increase in mass | increase in depth of liquid |
| **D** | final mass | increase in volume of liquid |

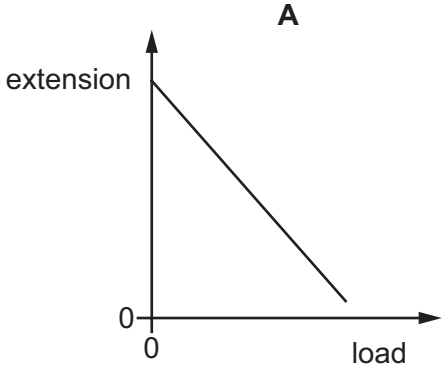
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**6** A spring is suspended from a stand. Loads are added and the extensions of the spring are measured.

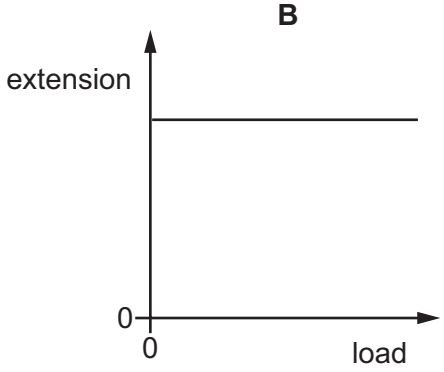



Which graph shows the result of plotting extension against load?

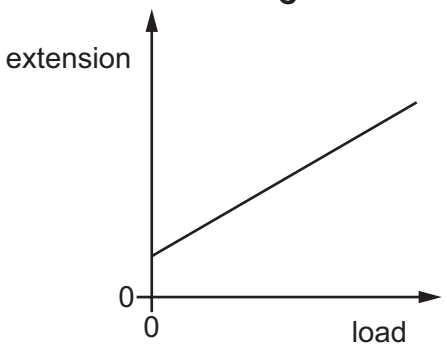
**A**



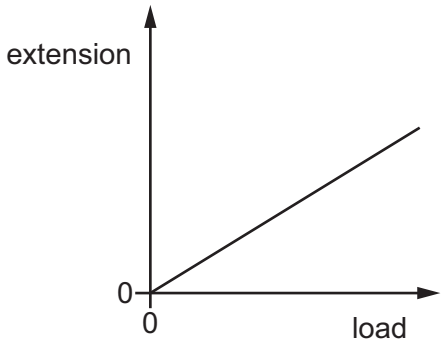

**B**




**C**




**D**




**7** Which are examples of friction?

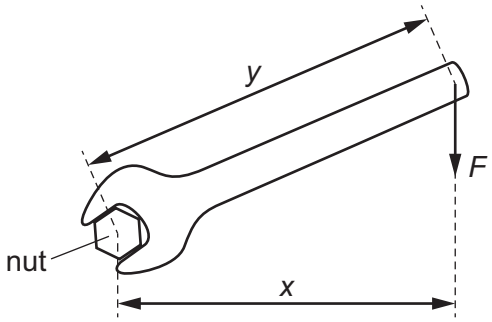
1 tension in a spring

2 air resistance

3 weight

**A** 1 only **B** 1 and 3 **C** 2 only **D** 2 and 3

**8** The diagram shows a nut being turned with a spanner by applying a force *F* to the spanner.




Which equation gives the moment of the force *F* about the centre of the nut?

**A** moment = $Fx$

**B** moment = $Fy$

**C** moment = $\frac{F}{x}$

**D** moment = $\frac{F}{y}$

**9** A child pushes a toy car along a horizontal surface and then releases it.

As the car slows down, what is the main energy transfer?

**A** from chemical to thermal

**B** from chemical to kinetic

**C** from kinetic to gravitational (potential)

**D** from kinetic to thermal

**10** Energy resources are used to produce electricity.

Which resource is non-renewable?

**A** hydroelectric

**B** nuclear fission

**C** waves

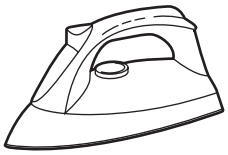
**D** wind

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**11** The diagrams show four appliances and their power ratings.

Which appliance transfers the most energy per second?

**A**



iron
1.0 kW

**B**



TV
150 W

**C**



toaster
800 W

**D**



washing machine
3.0 kW

**12** An object is at rest on a horizontal surface.

Which equation is used to calculate the pressure that the object exerts?

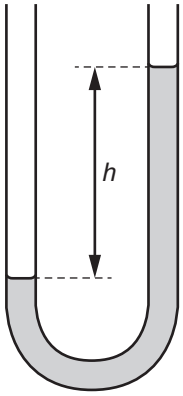
**A** $\frac{\text{mass of the object}}{\text{area of contact}}$

**B** $\frac{\text{weight of the object}}{\text{area of contact}}$

**C** mass of the object × area of contact

**D** weight of the object × area of contact

**13** Which device is shown?




**A** barometer

**B** galvanometer

**C** manometer

**D** newton meter

**14** Which properties does a liquid have?

| | definite shape | can be compressed easily |
|---|---|---|
| **A** | ✓ | ✓ |
| **B** | ✓ | ✗ |
| **C** | ✗ | ✓ |
| **D** | ✗ | ✗ |

key

✓ = has this property

✗ = does not have this property

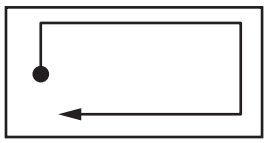
**15** In the diagrams, the black circle represents a smoke particle in air.

Which diagram shows a likely path that the particle takes because of Brownian motion?

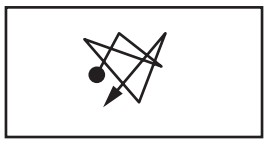
**A**



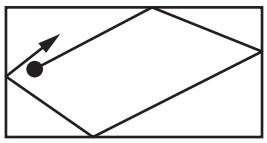
**B**



**C**



**D**



**16** Which name is given to the change in volume of a gas when it is heated at constant pressure?

**A** thermal capacity

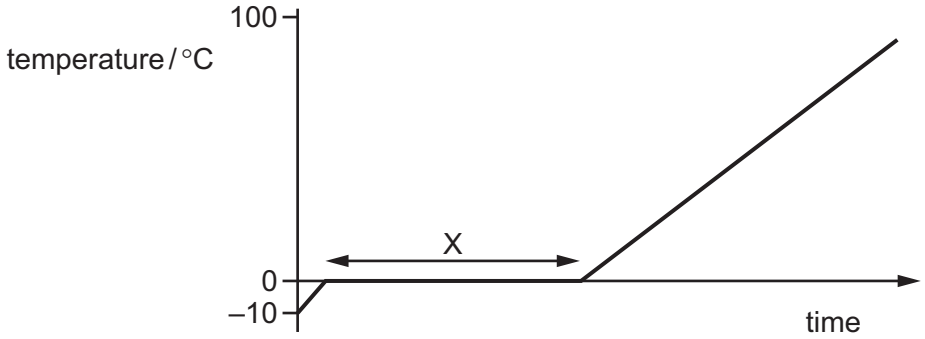
**B** thermal conduction

**C** thermal energy

**D** thermal expansion

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**17** Some ice is slowly heated and its temperature is measured. A graph is plotted of temperature against time.




Which row describes what happens to the thermal energy and to the temperature in section X?

| | thermal energy | temperature of ice |
|---|---|---|
| **A** | gained by ice | rises |
| **B** | gained by ice | stays the same |
| **C** | not gained by ice | rises |
| **D** | not gained by ice | stays the same |

**18** The melting point of a substance is –78 °C and its boiling point is 23 °C.

Which row gives the correct state of matter of the substance at the given temperatures?

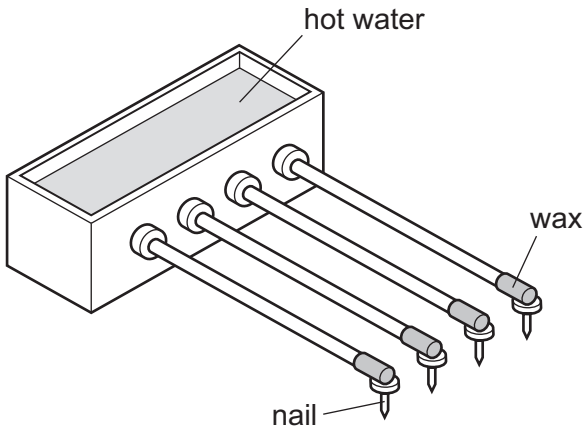
| | state at temperature of 0 °C | state at temperature of 100 °C |
|---|---|---|
| **A** | solid | liquid |
| **B** | solid | gas |
| **C** | liquid | solid |
| **D** | liquid | gas |

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**[Turn over**

**19** A student sets up an experiment to find out how well different metals conduct thermal energy.

One end of a rod of each metal is in hot water and the other end has a small nail attached to it by wax.




The rods have the same thickness.

Which conditions should be satisfied in order to make this a valid test?

| | same size nails | hot water kept at constant temperature | same length rods |
|---|---|---|---|
| **A** | ✓ | ✓ | ✓ |
| **B** | ✓ | ✓ | ✗ |
| **C** | ✓ | ✗ | ✓ |
| **D** | ✗ | ✓ | ✓ |

key

✓ = condition applies

✗ = condition does not apply

**20** Two similar metal containers, P and Q, each contain water at 90 °C. Both containers are the same size and both are sealed.

The water in container P cools more quickly than the water in container Q.

Which statement is correct?

**A** P contains more water than Q.

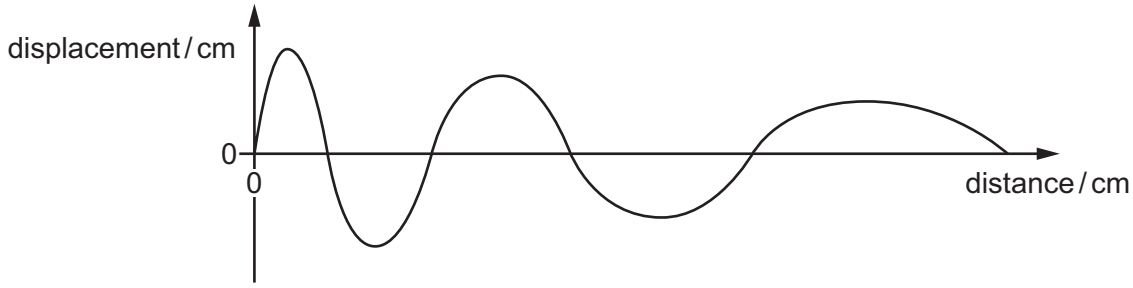
**B** P has a shinier surface than Q.

**C** P is painted a darker colour than Q.

**D** P is surrounded by a vacuum and Q is surrounded by air.

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**21** A wave has the appearance shown.




How do the properties of the wave change as the distance from the origin increases?

| | amplitude | wavelength |
|---|---|---|
| **A** | decreases | increases |
| **B** | decreases | stays the same |
| **C** | increases | increases |
| **D** | increases | stays the same |

**22** A tank contains water. Ripples are produced on the surface of the water. Refraction is observed.

What causes the ripples to refract?

**A** The cold water in the tank is replaced by warm water.

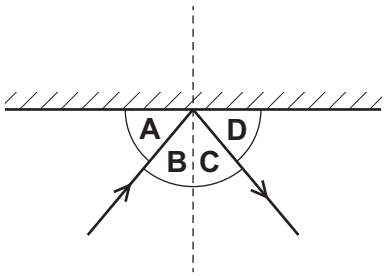
**B** The ripples change speed as they move from deep to shallow water.

**C** The ripples hit the wall of the tank.

**D** The ripples pass through a narrow gap.

**23** The diagram shows a plane mirror and a ray of light reflected from it.

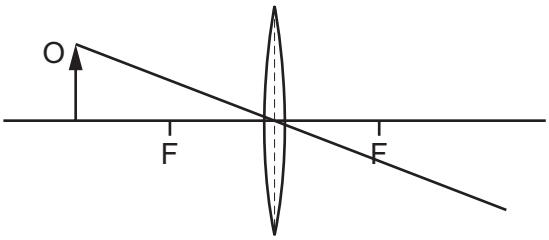
Which angle is the angle of incidence?



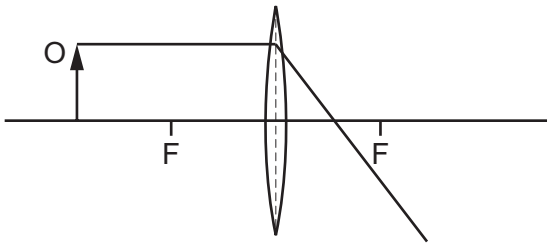
**24** The diagrams each show a ray of light from an object O passing through a thin converging lens.

The principal focuses in each diagram are labelled F.

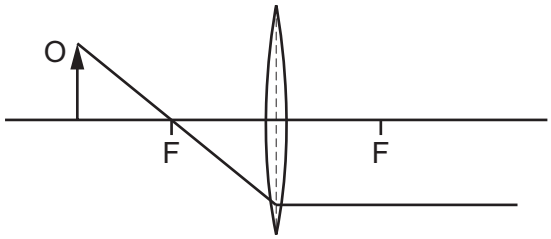
1




2




3




Which diagrams are correct?

**A** 1 and 2 **B** 2 only **C** 1 and 3 **D** 3 only

**25** Which row is correct?

| | frequency of infrared waves compared to microwaves | use of infrared waves |
|---|---|---|
| **A** | greater | radiant heater |
| **B** | greater | satellite television |
| **C** | lower | radiant heater |
| **D** | lower | satellite television |

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**26** A student investigates sound waves from a loudspeaker.

The frequency of the sound wave is 25 000 Hz. The student has normal hearing but she cannot hear the sound.

What should she do if she wants to hear a sound from the loudspeaker?

**A** decrease the amplitude

**B** decrease the frequency

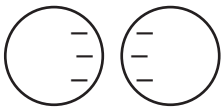
**C** increase the amplitude

**D** increase the frequency

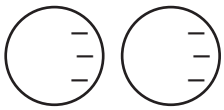
**27** Two isolated metal spheres are both negatively charged. The spheres are brought close together but do not touch.

Which diagram shows the charge distribution on the spheres?

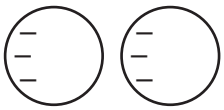
**A**



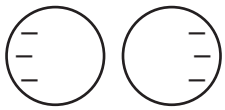
**B**



**C**



**D**



**28** When a plastic comb is placed next to a small piece of aluminium foil hanging from a nylon thread, the foil is repelled by the comb.

Why is this?

**A** The comb is charged and the foil is uncharged.

**B** The comb is uncharged and the foil is charged.

**C** The comb and the foil have charges of opposite sign.

**D** The comb and the foil have charges of the same sign.

**29** The diagram shows a piece of metal resistance wire.



Which wire, made of the same metal, has a smaller resistance?

**A** a wire of the same length with a larger diameter

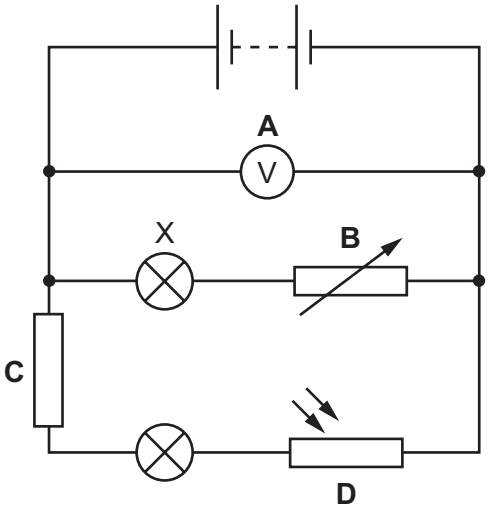
**B** a wire of the same length with a smaller diameter

**C** a wire of greater length with the same diameter

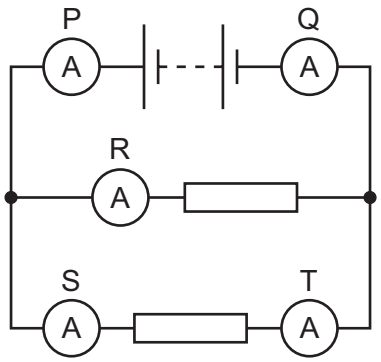
**D** a wire of greater length with a smaller diameter

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**30** Which labelled component in the circuit shown controls the brightness of lamp X?




**31** A circuit includes a battery, two identical resistors and five ammeters, P, Q, R, S and T.




Which statement about the readings on the ammeters is **not** correct?

**A** P has a greater reading than Q.

**B** P has a greater reading than R.

**C** P has a greater reading than S.

**D** P has a greater reading than T.

**32** An electrician sets up a potential divider circuit in a fridge so that when the fridge door is open and light from the room enters the fridge, a warning light turns on.

Which component does the electrician need for the potential divider in addition to a variable resistor?

**A** light-dependent resistor

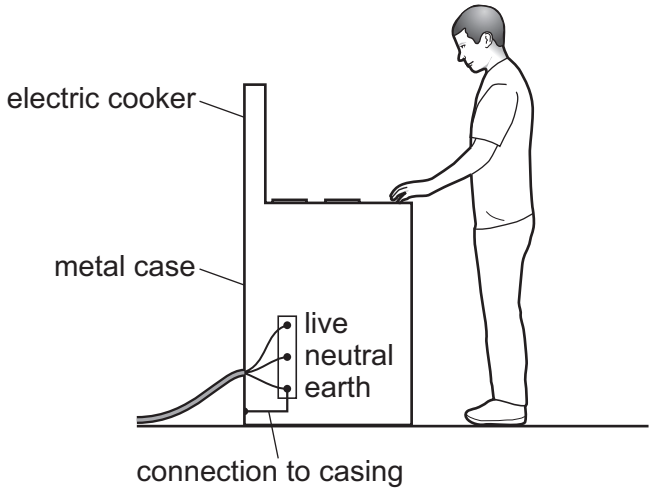
**B** relay

**C** thermistor

**D** motor

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**33** A simple wiring diagram for an electric cooker is shown.




Why is there a wire connecting the metal case of the cooker to earth?

**A** It improves the efficiency of the cooker.

**B** It prevents the metal case from becoming too hot when the cooker is left on.

**C** It reduces the risk of an electric shock if the live wire touches the metal case.

**D** The electric cooker will not switch on without it.

**34** Three statements about a.c. and d.c. currents are given.

1 A d.c. current is in one direction only whilst an a.c. current repeatedly changes direction.

2 d.c. is the abbreviation for direct current and a.c. is the abbreviation for amplitude current.

3 An a.c. current is in one direction only whilst a d.c. current repeatedly changes direction.

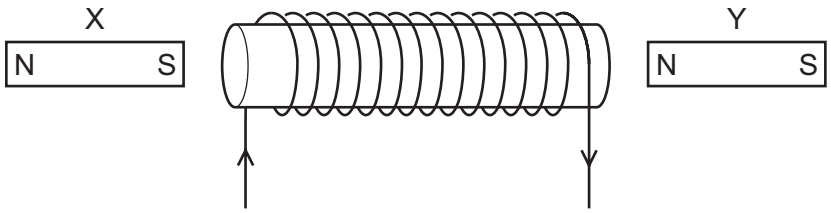
Which statements are correct?

**A** 1 and 2 **B** 1 only **C** 2 and 3 **D** 3 only

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**35** Two magnets are placed near a current-carrying coil.

The diagram shows this experimental arrangement and the current direction in the coil.




Which statement is correct?

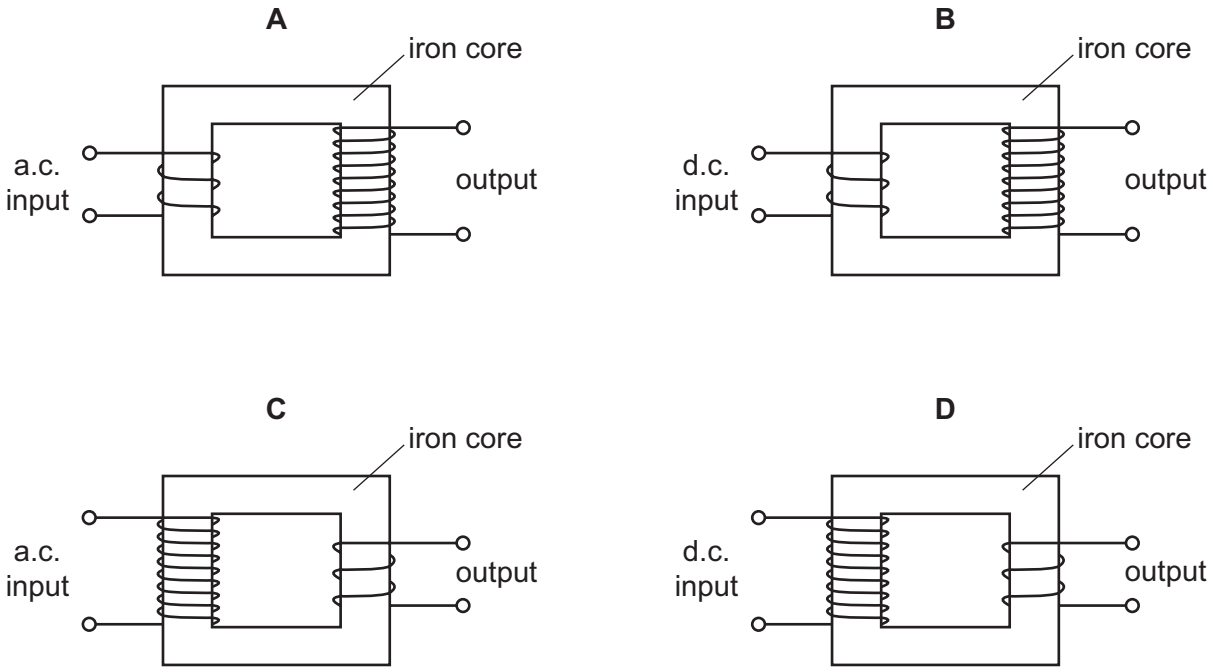
**A** Both X and Y are attracted to the coil.

**B** Both X and Y are repelled by the coil.

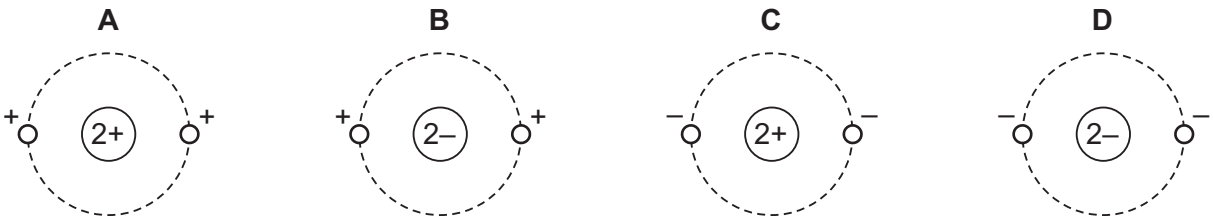
**C** X is attracted to the coil and Y is repelled.

**D** X is repelled by the coil and Y is attracted.

**36** Which arrangement can be used to step up a voltage?




**37** Which diagram shows the structure of an atom containing a nucleus and two orbiting electrons?



**38** A nuclide has the symbol $^{14}_{6}C$.

Which statement about all atoms of this nuclide is correct?

**A** There are 6 protons in the nucleus.

**B** There are 14 neutrons in the nucleus.

**C** There are 6 electrons in the nucleus.

**D** There are 20 nucleons in the nucleus.

**39** The table compares the penetrating abilities and ionising effects of $\alpha$-particles and of $\gamma$-radiation.

Which row is correct?

| | least penetrating | most ionising |
|---|---|---|
| **A** | $\alpha$ | $\alpha$ |
| **B** | $\alpha$ | $\gamma$ |
| **C** | $\gamma$ | $\alpha$ |
| **D** | $\gamma$ | $\gamma$ |

**40** When a radioactive isotope is set up close to a counter, a count rate of 38 000 counts / s is obtained. The table shows the count rate from the isotope over a three-year period.

| time / years | $\frac{\text{count rate}}{\text{counts / s}}$ |
|---|---|
| 0 | 38 000 |
| 1 | 26 000 |
| 2 | 17 000 |
| 3 | 12 000 |

What is the half-life of the isotope?

**A** less than 1 year

**B** more than 1 year but less than 2 years

**C** more than 2 years but less than 3 years

**D** more than 3 years

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