Cambridge Assessment International Education

# Cambridge IGCSE™

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

Paper 1 Multiple Choice (Core) **October/November 2021**

**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 **16** pages. Any blank pages are indicated.


© UCLES 2021

**1** Which list places units of length in increasing order of magnitude (size)?

**A** cm → mm → m

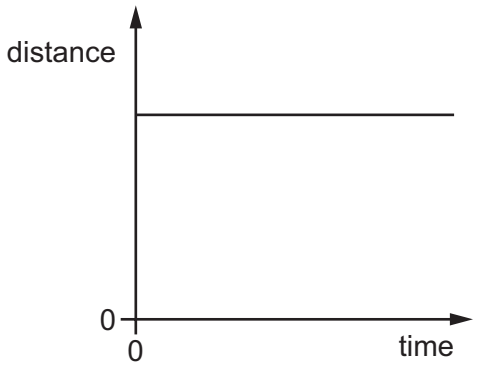
**B** mm → cm → m

**C** mm → m → cm

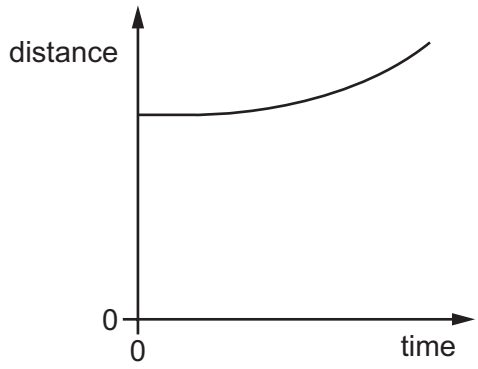
**D** m → mm → cm

**2** Which graph represents an object that is moving at constant speed?

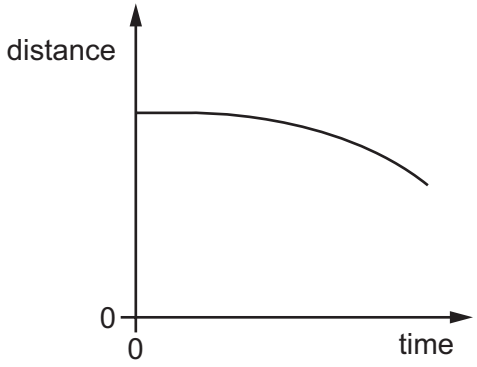
**A**



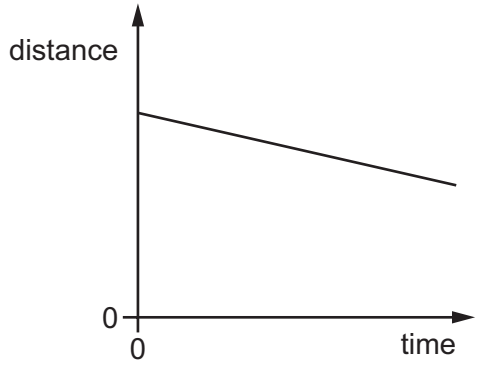

**B**




**C**




**D**




**3** Which statement about the equation shown is correct?

$$W = mg$$

**A** *g* is a force, *m* and *W* are not forces.

**B** *m* is a force, *g* and *W* are not forces.

**C** *W* is a force, *g* and *m* are not forces.

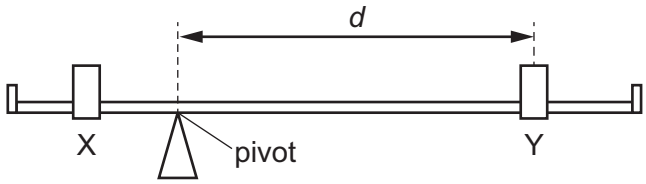
**D** None of *g*, *m* and *W* are forces.

© UCLES 2021

**4** Which substance in the table has the lowest density?

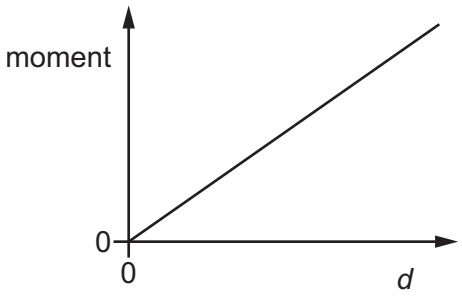
| | substance | mass / g | volume / $cm^3$ |
|---|---|---|---|
| **A** | nylon | 1.2 | 1.0 |
| **B** | cotton | 1.5 | 1.0 |
| **C** | olive oil | 1.8 | 2.0 |
| **D** | water | 2.0 | 2.0 |

**5** The diagram shows a simple balance. The two loads, X and Y, can be moved along the beam.

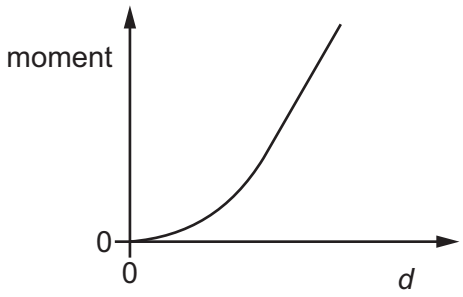



Which graph shows how the moment produced by load Y varies as the perpendicular distance *d* from the pivot changes?

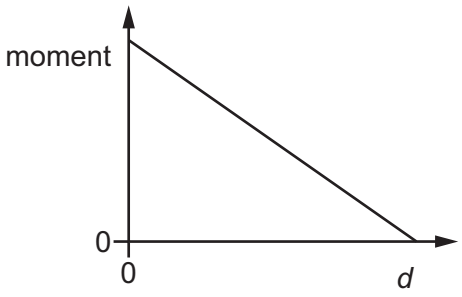
**A**



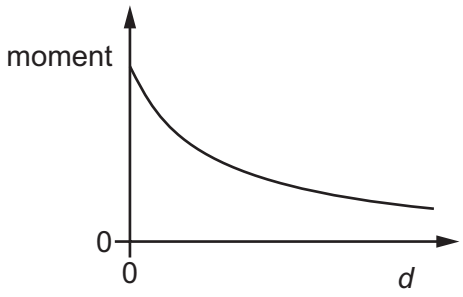

**B**




**C**




**D**



**6** A spacecraft is travelling in space with no resultant force and no resultant moment acting on it.

Which statement about the spacecraft is correct?

**A** Its direction is changing.

**B** It is in equilibrium.

**C** Its speed is decreasing.

**D** Its speed is increasing.

**7** A student carries out an investigation by pulling four different boxes across the floor.

The results are shown in the table.

On which box is the most work done?

| | frictional force needed to pull the box / N | distance moved across the floor / m |
|---|---|---|
| **A** | 5 | 4 |
| **B** | 10 | 2 |
| **C** | 15 | 2 |
| **D** | 20 | 4 |

**8** Electrical energy may be obtained from nuclear fission.

In which order is the energy transferred in this process?

**A** nuclear fuel → generator → reactor and boiler → turbines

**B** nuclear fuel → generator → turbines → reactor and boiler

**C** nuclear fuel → reactor and boiler → generator → turbines

**D** nuclear fuel → reactor and boiler → turbines → generator

**9** A stone falls.

Which row gives the energy changes?

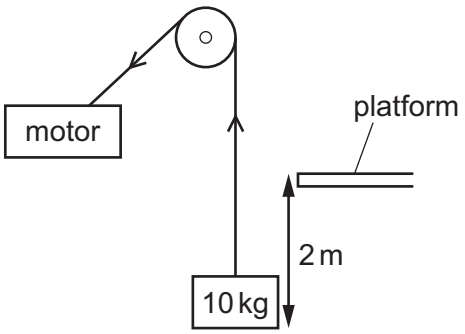
| | gravitational potential energy | kinetic energy |
|---|---|---|
| **A** | decreases | decreases |
| **B** | decreases | increases |
| **C** | increases | decreases |
| **D** | increases | increases |

© UCLES 2021

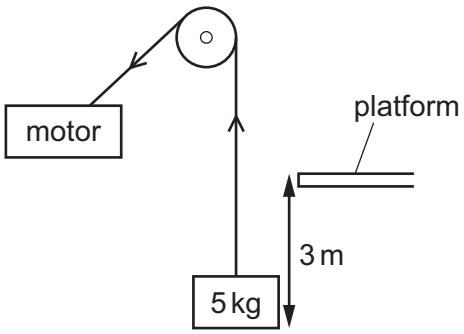
**10** A rope, connected to a pulley system and motor, is used to lift different objects through different distances. The time taken to lift each object is the same. The diagrams are not to scale.

Which motor requires the greatest power?

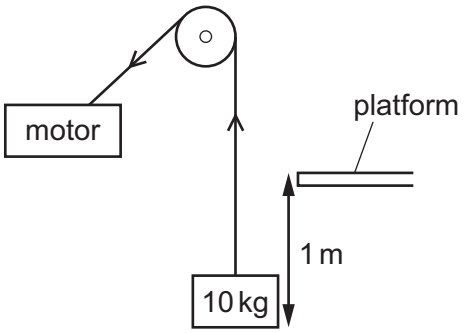
**A**



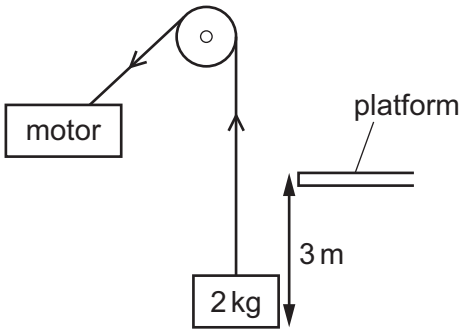

**B**




**C**

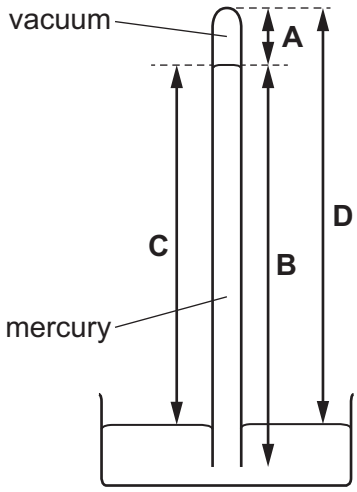



**D**




**11** The diagram shows a simple mercury barometer.

Which length is used to indicate atmospheric pressure in a simple mercury barometer?



**12** A liquid is evaporating. The liquid is not boiling.

Which statement about the liquid is correct at an instant in time?

**A** Any molecule can escape, and from any part of the liquid.

**B** Any molecule can escape, but only from the liquid's surface.

**C** Only molecules with enough energy can escape, and only from the liquid's surface.

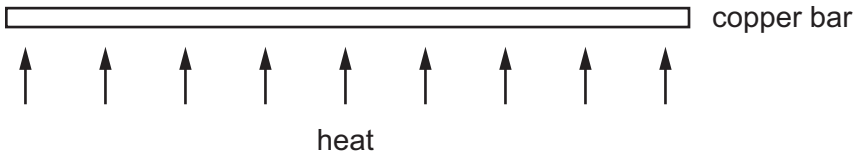
**D** Only molecules with enough energy can escape, but from any part of the liquid.

**13** The temperature of the gas in a sealed container of constant volume decreases from 20 °C to 12 °C.

Which row is correct?

| | pressure of the gas in the container | average speed of the molecules of gas |
|---|---|---|
| **A** | decreases | decreases |
| **B** | stays the same | increases |
| **C** | increases | stays the same |
| **D** | stays the same | decreases |

**14** A long, thin bar of copper is heated gently and evenly along its length.




What happens to the bar?

**A** It becomes less heavy.

**B** It becomes longer.

**C** It becomes shorter.

**D** It bends at the ends.

© UCLES 2021

**15** A teacher makes the statement, 'Object P has a higher thermal capacity than object Q.'

What does this statement mean?

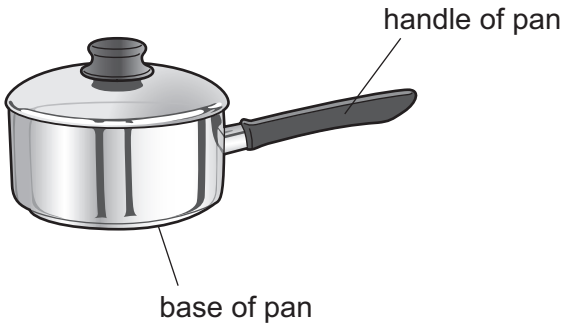
**A** Object P has a higher melting point than object Q.

**B** Object P has a lower melting point than object Q.

**C** The increase in temperature of object P is greater than that of object Q for the same increase in internal energy.

**D** The increase in temperature of object P is smaller than that of object Q for the same increase in internal energy.

**16** The diagram shows a pan used for cooking food.




Which row is correct for the materials used to make the base and the handle of the pan?

| | base of pan | handle of pan |
|---|---|---|
| **A** | good thermal conductor | good thermal conductor |
| **B** | good thermal conductor | poor thermal conductor |
| **C** | poor thermal conductor | good thermal conductor |
| **D** | poor thermal conductor | poor thermal conductor |

© UCLES 2021

**17** The diagrams show two patterns produced by water waves.

diagram 1

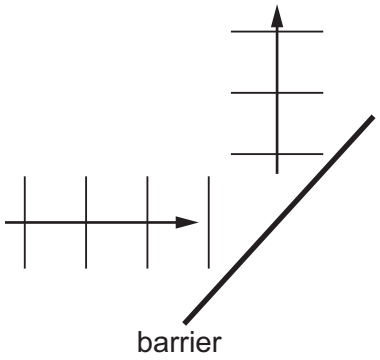
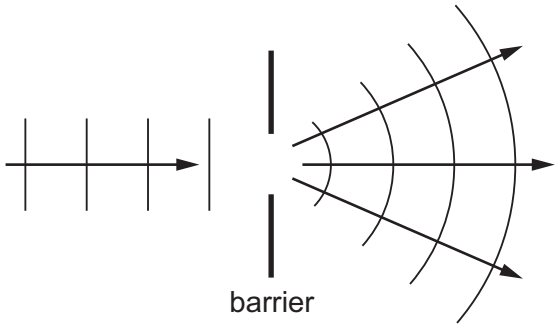



diagram 2




Which two effects are shown in the diagrams?

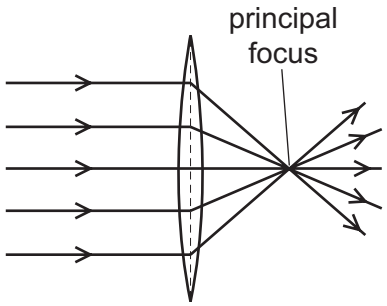
| | diagram 1 | diagram 2 |
|---|---|---|
| **A** | reflection | diffraction |
| **B** | reflection | refraction |
| **C** | refraction | diffraction |
| **D** | refraction | reflection |

**18** Which row is **not** correct for a wave on the surface of water?

| | quantity | usual unit |
|---|---|---|
| **A** | amplitude | m |
| **B** | frequency | Hz |
| **C** | wavelength | $\lambda$ |
| **D** | speed | m / s |

© UCLES 2021

**19** A thin, converging lens causes parallel rays of light to converge to a single point known as the principal focus.




Which statement explains this?

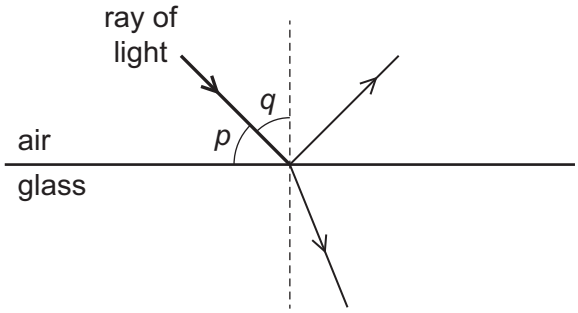
**A** The light diffracts.

**B** The light disperses.

**C** The light reflects.

**D** The light refracts.

**20** The diagram shows a ray of light in air incident on a glass block. Some of the light is refracted and some of the light is reflected. Two angles, *p* and *q*, are marked on the diagram.




Which row gives the angle of incidence and states whether total internal reflection occurs?

| | angle of incidence | total internal reflection |
|---|---|---|
| **A** | *p* | no |
| **B** | *p* | yes |
| **C** | *q* | no |
| **D** | *q* | yes |

**21** The letter F is reflected in a mirror.

What does the optical image look like?

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

**22** Visible light, X-rays and microwaves are all components of the electromagnetic spectrum.

Which statement about the waves is correct?

**A** In a vacuum, microwaves travel faster than visible light and have a shorter wavelength.

**B** In a vacuum, microwaves travel at the same speed as visible light and have a shorter wavelength.

**C** In a vacuum, X-rays travel faster than visible light and have a shorter wavelength.

**D** In a vacuum, X-rays travel at the same speed as visible light and have a shorter wavelength.

**23** Which radiation has a higher frequency than red light?

**A** ultraviolet

**B** radio waves

**C** microwaves

**D** infrared

**24** What is ultrasound?

**A** sound waves that are so loud that they damage human hearing

**B** sound waves that are too high-pitched for humans to hear

**C** sound waves that are too low-pitched for humans to hear

**D** sound waves that are too quiet for humans to hear

© UCLES 2021

**25** Which material is magnetic?

**A** aluminium

**B** copper

**C** iron

**D** silver

**26** Which circuit symbol represents a component used to measure electric current?

**A**

**B**

**C**

**D**

**27** Four wires made of the same metal have different lengths and different diameters.

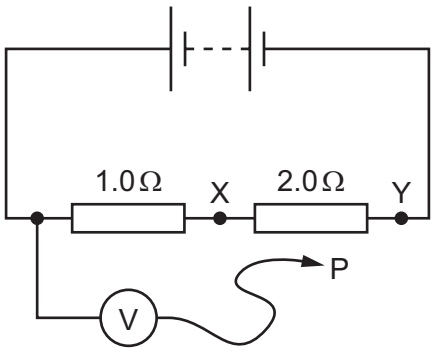
Which wire has the lowest resistance?

| | length | diameter |
|---|---|---|
| **A** | long | large |
| **B** | long | small |
| **C** | short | large |
| **D** | short | small |

**28** The diagram shows a circuit containing two resistors of resistance 1.0 Ω and 2.0 Ω.

A voltmeter is connected across the 1.0 Ω resistor by connecting P to X.

The reading on the voltmeter is 6.0 V.




P is moved to point Y in the circuit.

What is the new reading on the voltmeter?

**A** 3.0 V **B** 6.0 V **C** 12 V **D** 18 V

**29** Which device is used to measure the flow of charge in an electrical circuit?

**A** ammeter

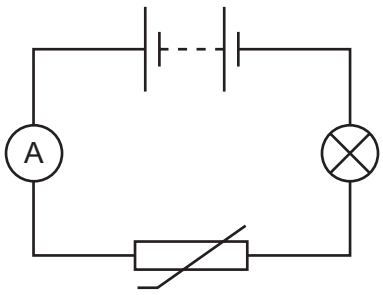
**B** voltmeter

**C** battery

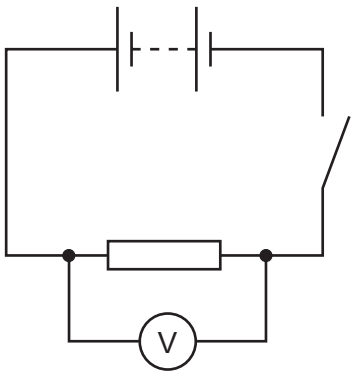
**D** newton meter

**30** Which circuit contains a fuse?

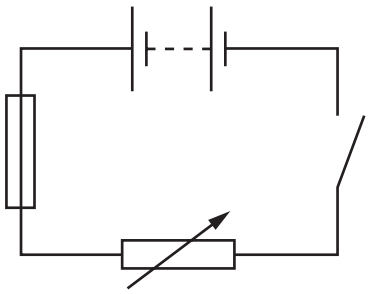
**A**



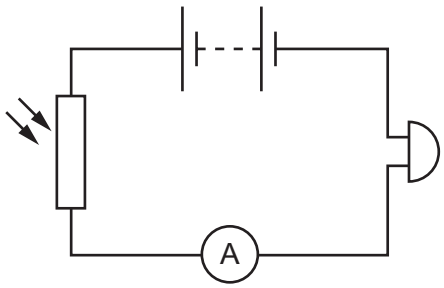

**B**




**C**



**D**

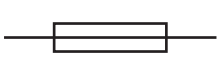



**31** A student designs a circuit to turn on a fan when the temperature increases.

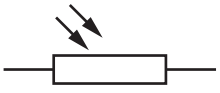
Which component does the student need to use in her circuit?

**A**

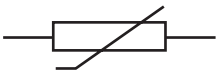
**B**



**C**

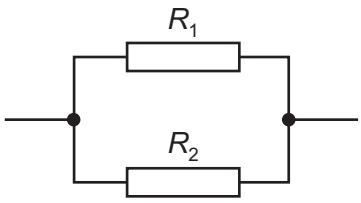


**D**



**32** 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?

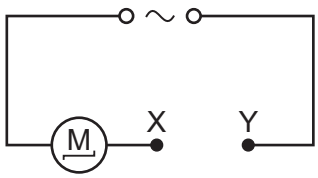
**A** less than either $R_1$ or $R_2$

**B** equal to $R_1$

**C** equal to $R_2$

**D** the average of $R_1$ and $R_2$

**33** The diagram shows a motor connected to an a.c. supply. The circuit is incomplete.




Which device needs to be connected between point X and point Y to prevent the wires from overheating if a fault in the motor causes the current to get too high?

**A** an ammeter

**B** a fuse

**C** a transformer

**D** a length of thick copper wire

**34** A hairdresser is using a hairdryer with a plastic casing. He notices that there is no wire attached to the earth pin of the plug.

Why is an earth connection **not** needed?

**A** Plastic is an insulator.

**B** The hairdresser only touches the handle of the dryer.

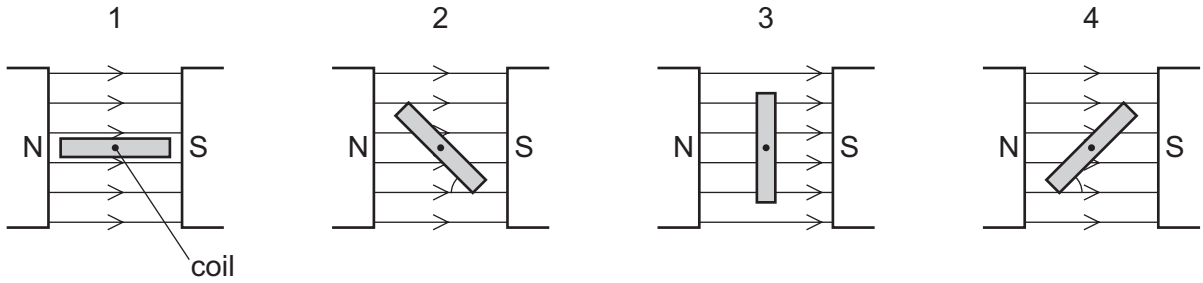
**C** The hairdryer uses a.c. so cannot give the hairdresser a shock.

**D** Wet hands do not conduct electricity.

© UCLES 2021

**[Turn over**

**35** Four positions of a current-carrying coil in a magnetic field, as in a d.c. motor, are shown. In diagrams 2 and 4, the coil is at an angle of 45° to the field lines.




Which row is correct?

| | turning effect of the forces in positions 1 and 3 | turning effect of the forces in positions 2 and 4 |
|---|---|---|
| **A** | different | different |
| **B** | different | same |
| **C** | same | different |
| **D** | same | same |

**36** An electric drill, operating from a supply voltage of 240 V, uses a current of 3.5 A.

Which rating of fuse should be used to protect the drill's cable?

**A** 250 V **B** 200 V **C** 5 A **D** 3 A

**37** A very important experiment improved scientists' understanding of the structure of matter.

The experiment involved $\alpha$-particles being fired at a thin, gold foil.

What happened?

**A** All the $\alpha$-particles were absorbed by the nuclei of the gold atoms.

**B** All the $\alpha$-particles were unaffected by the gold atoms.

**C** Some of the $\alpha$-particles were attracted by the neutrons in the nuclei of the gold atoms.

**D** Some of the $\alpha$-particles were repelled by the protons in the nuclei of the gold atoms.

**38** A sample contains 0.0016 g of a radioactive isotope.

After 4.0 hours the mass of the radioactive isotope in the sample falls to 0.00080 g.

What is the half-life of the radioactive isotope?

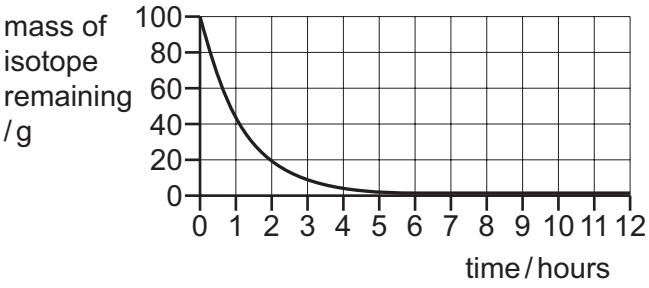
**A** 2.0 hours **B** 4.0 hours **C** 8.0 hours **D** 16 hours

© UCLES 2021

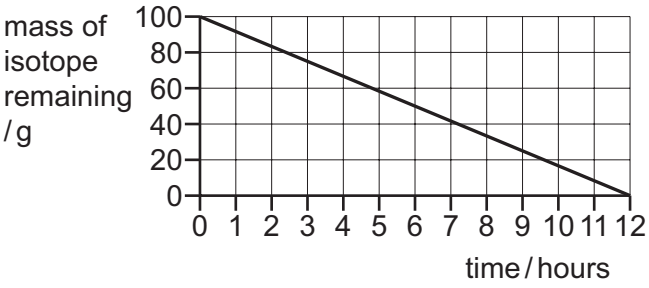
**39** A sample of a radioactive isotope has a mass of 100 g. The half-life of the radioactive isotope is 6.0 hours.

Which graph shows the decay for this isotope?

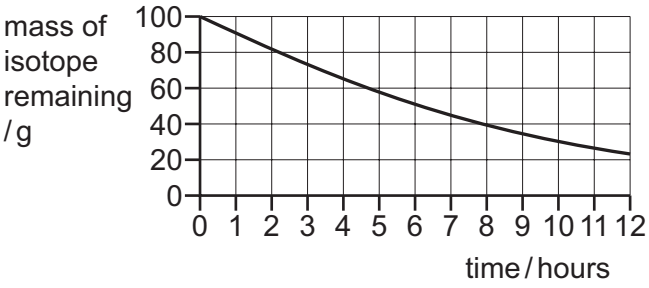
**A**



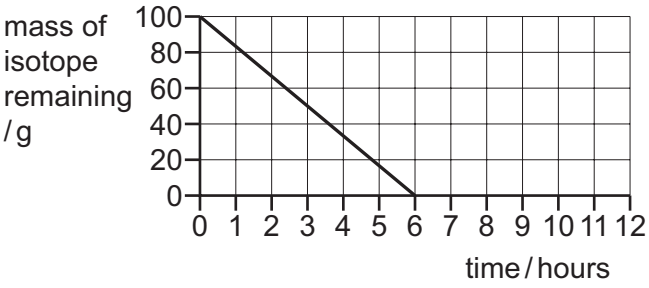

**B**




**C**




**D**




**40** Which statement best describes background radiation?

**A** any harmful level of radiation

**B** radiation that is only found in space

**C** radiation from natural sources

**D** radiation that is absorbed by rocks

© UCLES 2021

**BLANK PAGE**

Permission to reproduce items where third-party owned material protected by copyright is included has been sought and cleared where possible. Every reasonable effort has been made by the publisher (UCLES) to trace copyright holders, but if any items requiring clearance have unwittingly been included, the publisher will be pleased to make amends at the earliest possible opportunity.

To avoid the issue of disclosure of answer-related information to candidates, all copyright acknowledgements are reproduced online in the Cambridge Assessment International Education Copyright Acknowledgements Booklet. This is produced for each series of examinations and is freely available to download at www.cambridgeinternational.org after the live examination series.

Cambridge Assessment International Education is part of the Cambridge Assessment Group. Cambridge Assessment is the brand name of the University of Cambridge Local Examinations Syndicate (UCLES), which itself is a department of the University of Cambridge.