Cambridge Assessment International Education

Cambridge IGCSE™

PHYSICS **0625/22**

Paper 2 Multiple Choice (Extended) **May/June 2020**

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. A mark will not be deducted for a wrong answer.
- Any rough working should be done on this question paper.

This document has **16** pages. Blank pages are indicated.

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1 Five athletes P, Q, R, S and T compete in a race. The table shows the finishing times for the athletes.

athlete	P	Q	R	S	T
finishing time / s	22.50	24.40	25.20	26.50	23.20

Which statement is correct?

A Athlete P won the race and was 0.70 s ahead of the athlete in second place.

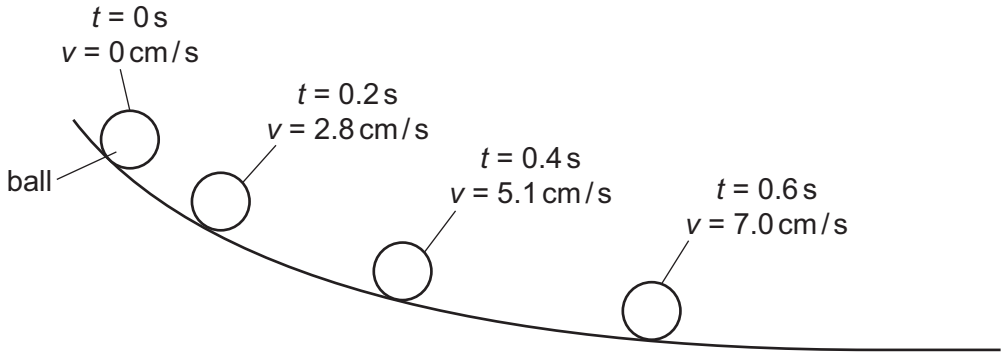
B Athlete P won the race and was 1.90 s ahead of the athlete in second place.

C Athlete S won the race and was 1.30 s ahead of the athlete in second place.

D Athlete S won the race and was 2.10 s ahead of the athlete in second place.

2 A student investigates the motion of a ball rolling down a slope.

The diagram shows the speed v of the ball at different times t.



Which statement describes the motion of the ball?

A The acceleration is not constant.

B The acceleration is negative.

C The speed is decreasing.

D The velocity is constant.

3 Which statement about acceleration is correct?

A It is related to the changing speed of an object.

B It is the distance an object travels in one second.

C It is the force acting on an object divided by the distance it travels in one second.

D It is the force acting on an object when it is near to the Earth.

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4 Which statement correctly describes the effects of placing a heavy load in a car?

A It is easier to accelerate the car and easier to bring the car to rest.

B It is easier to accelerate the car but more difficult to bring the car to rest.

C It is more difficult to accelerate the car and more difficult to bring the car to rest.

D It is more difficult to accelerate the car but easier to bring the car to rest.

5 A space probe is taken from the Earth to Mars.

The force of gravity on the surface of Mars is less than the force of gravity on the surface of the Earth.

How do the weight and the mass of a space probe on the surface of Mars compare to their values when the probe is on the surface of the Earth?

	weight on Mars	mass on Mars
A	decreased	decreased
B	decreased	unchanged
C	unchanged	decreased
D	unchanged	unchanged

6 Water has a density of 1000 kg / m^3.

A rectangular swimming pool has an average depth of 1.6 m.

The length of the pool is 25 m.

The width of the pool is 10 m.

What is the mass of the water in the swimming pool?

A 2.5 kg **B** 400 kg **C** 400 000 kg **D** 800 000 kg

7 A satellite orbits the Earth at constant speed in a circular orbit.

Which statement is correct?

A The resultant force on the satellite is zero.

B The resultant force on the satellite is towards the Earth.

C The resultant force on the satellite is away from the Earth.

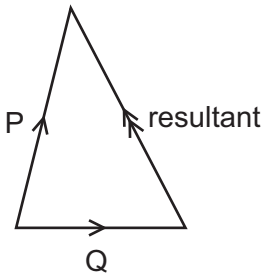
D The resultant force on the satellite is in the direction of motion.

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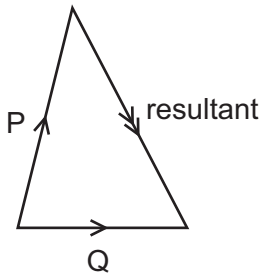
8 Two forces P and Q act on an object.

Which diagram shows the resultant of these two forces?

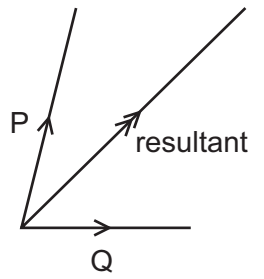
A



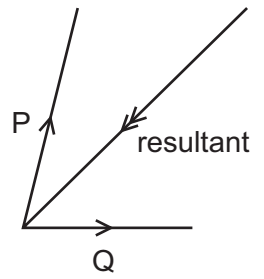
B



C



D



9 An object is moving at +3.0 m / s.

A force acts on the object.

After a time, the object is moving at –4.0 m / s.

The mass of the object is 5.0 kg.

What is the change in momentum of the body?

A –35 kg m / s **B** –5.0 kg m / s **C** +5.0 kg m / s **D** +35 kg m / s

10 Which energy resource is **not** renewable?

A geothermal

B nuclear fission

C solar

D wind

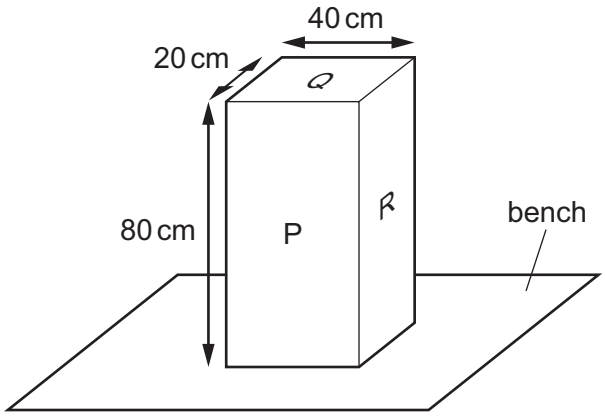
11 A car of mass 500 kg is moving at 10 m / s. The engine does work on the car and the speed increases to 16 m / s.

How much work is done by the engine to increase the speed of the car?

A 3000 J **B** 9000 J **C** 39 000 J **D** 78 000 J

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12 The diagram shows a solid block resting on a bench. The dimensions of the block are shown.



On which labelled surface should the block rest to produce the smallest pressure on the bench?

A P

B Q

C R

D P, Q and R produce the same pressure

13 An object is 60 cm below the surface of a liquid. The pressure due to the liquid at this depth is 9000 Pa.

What is the density of the liquid?

A 15 kg / m^3 **B** 540 kg / m^3 **C** 1500 kg / m^3 **D** 54 000 kg / m^3

14 Which row describes the forces between the molecules and the motion of the molecules in a solid?

	forces between molecules	motion of molecules
A	strong	move freely
B	strong	vibrate only
C	weak	move freely
D	weak	vibrate only

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15 Wet clothes are hanging outside to dry.

Which condition decreases the rate of evaporation of the water from the clothes?

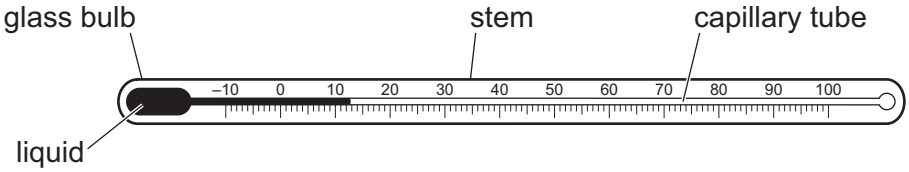
A folded clothes

B higher temperature

C wetter clothes

D windy day

16 The diagram shows a liquid-in-glass thermometer.



The design of this thermometer includes the following features.

1 a liquid which expands linearly when it is heated

2 a glass bulb which has a thick glass wall

3 a capillary tube with a very small diameter

Which features increase the sensitivity of the thermometer?

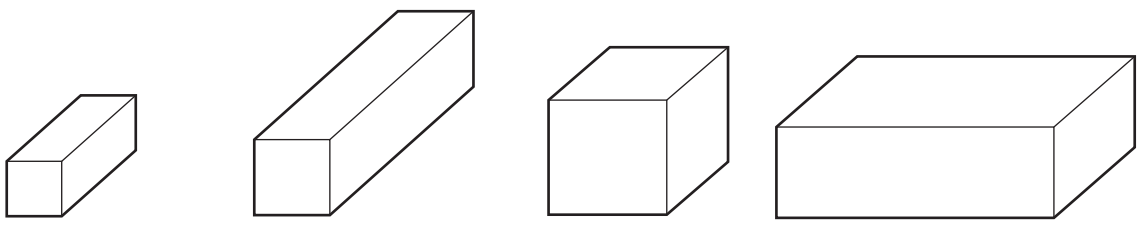
A 1 only **B** 1 and 2 **C** 2 and 3 **D** 3 only

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

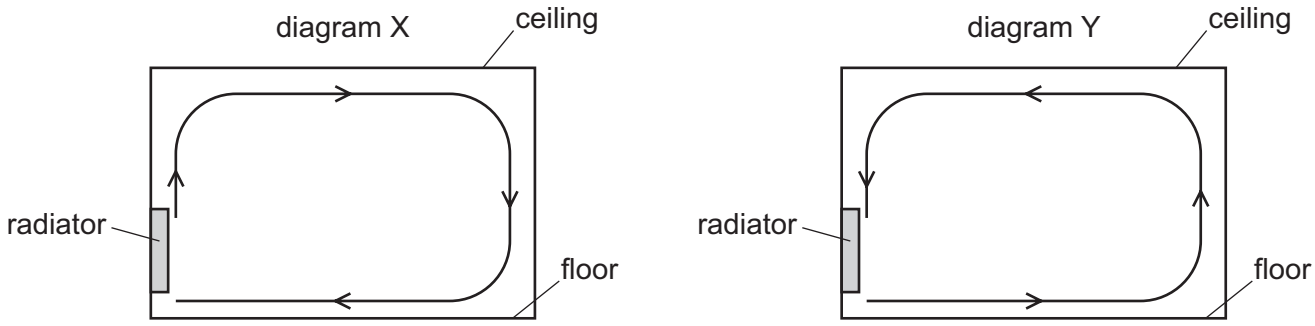
The same quantity of thermal energy is given to each block.

Which block shows the greatest rise in temperature?

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



18 A room is heated by a radiator. The diagrams X and Y show two possible circulations of hot air, which heat the room.

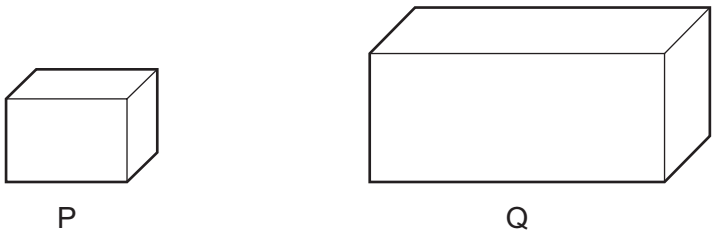


Which diagram and reason explain the heating of the room by convection?

	diagram	reason
A	X	air density decreases when air is heated
B	X	air density increases when air is heated
C	Y	air density decreases when air is heated
D	Y	air density increases when air is heated

19 Two copper containers P and Q are filled with hot water.

The diagrams are both drawn to the same scale.



Container P emits more infrared radiation from its surfaces than container Q.

What is a possible reason for this?

A The surfaces of P are painted white and the surfaces of Q are painted black.

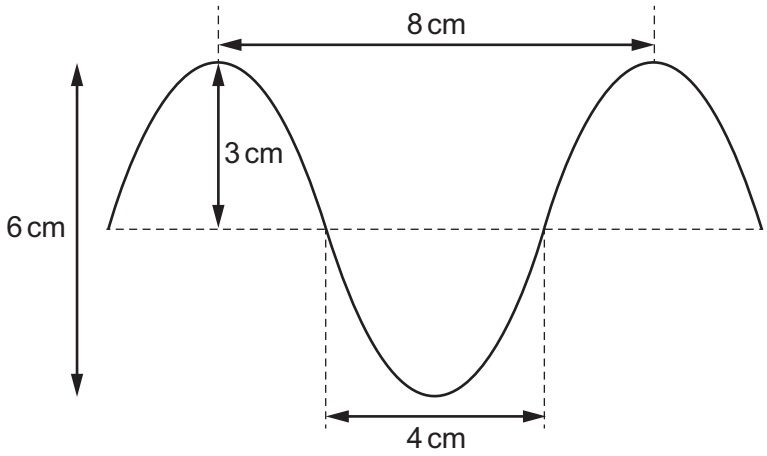
B The surfaces of P are shiny and the surfaces of Q are dull.

C The surfaces of P have a smaller area than the surfaces of Q.

D The water in P is hotter than the water in Q.

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20 The diagram shows a wave.



What are the amplitude and the wavelength of this wave?

	amplitude / cm	wavelength / cm
A	3	4
B	3	8
C	6	4
D	6	8

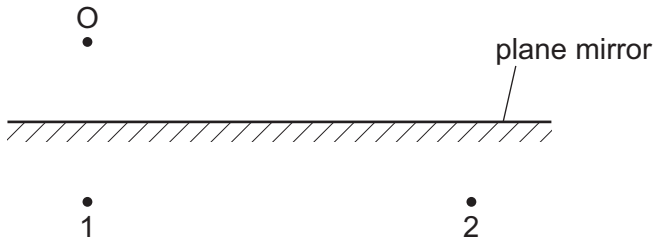
21 The frequency of the microwaves used in a microwave oven is 2400 MHz.

What is the wavelength of these microwaves?

A 0.125 m **B** 8.00 m **C** 125 m **D** 7200 m

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22 An object O is placed in front of a plane mirror as shown.



Which row is correct?

	position of the image	nature of the image
A	1	real
B	1	virtual
C	2	real
D	2	virtual

23 Which statement is correct?

A The speed of light in glass is equal to the speed of light in a vacuum multiplied by the refractive index of glass.

B The incident angle of a light ray at an air-glass surface is the angle between the ray and the glass surface.

C The sine of the critical angle at an air-glass surface is equal to $\frac{1}{\text{refractive index of glass}}$.

D The angle of refraction for light passing through an air-glass surface is proportional to the angle of incidence at that surface.

24 An intruder alarm sensor detects that a person is warmer than his surroundings.

Which type of electromagnetic wave does the sensor detect?

A infrared

B radio

C ultraviolet

D visible light

25 A dolphin sends out a sound wave. An echo returns 0.010 s later from a fish which is 7.5 m from the dolphin.

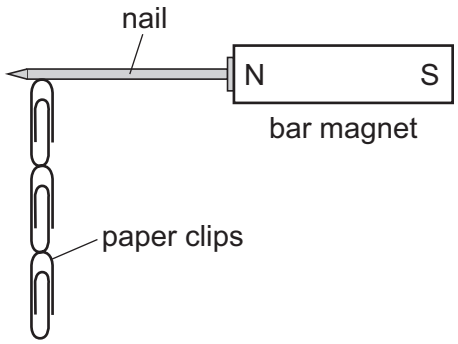
What is the speed of the sound wave in water?

A 0.075 m / s **B** 0.15 m / s **C** 750 m / s **D** 1500 m / s

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26 Four nails **A**, **B**, **C** and **D** are tested to find which makes the strongest permanent magnet.

One of the nails is placed against a bar magnet and the number of paper clips which the nail can support is recorded.



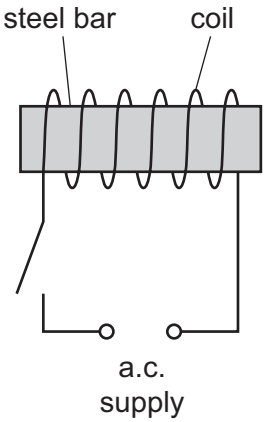
The bar magnet is then removed and the number of paper clips remaining attached to the nail is recorded. Each nail is tested individually.

Which nail becomes the strongest permanent magnet?

	number of paper clips attached to the nail	
	bar magnet present	bar magnet removed
A	2	0
B	2	1
C	4	3
D	5	2

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27 A student wants to demagnetise a steel bar. He uses the apparatus shown. He switches on the circuit for a few seconds and then switches off. He finds that the steel bar is still magnetised.



What should he do to improve his method?

A change the supply from an alternating to a direct voltage

B use a lower alternating voltage

C remove the steel bar from the coil whilst the circuit is switched on

D use a coil that has fewer turns on it

28 A cloth is used to rub an uncharged plastic rod.

Both the rod and the cloth become charged.

Why does the plastic rod become negatively charged and the cloth become positively charged?

A The rod gains electrons and the cloth gains positive charges.

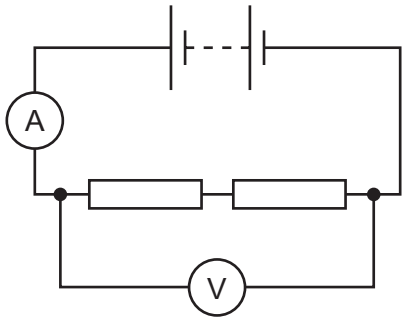
B The rod gains electrons and the cloth loses electrons.

C The rod loses electrons and the cloth gains electrons.

D The rod loses electrons and the cloth loses positive charges.

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29 A student uses the circuit shown to determine the resistance of two identical resistors.



The voltmeter reading is 2.2 V and the ammeter reading is 0.25 A.

What is the resistance of each resistor?

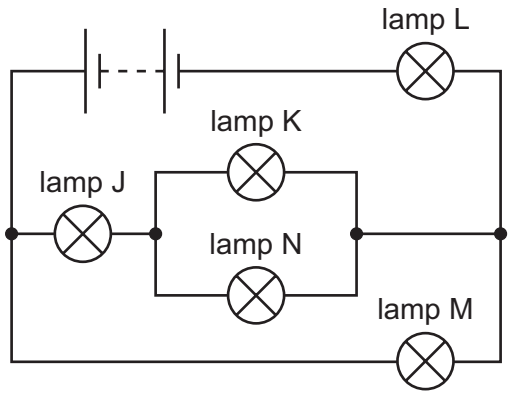
A 0.275 Ω **B** 0.55 Ω **C** 4.4 Ω **D** 8.8 Ω

30 A cell passes a current of 2.0 A in a circuit for 30 s. In this time the cell transfers 120 J of energy.

What is the electromotive force (e.m.f.) of the cell?

A 0.50 V **B** 1.5 V **C** 2.0 V **D** 8.0 V

31 The circuit shown contains five lamps J, K, L, M and N. All the lamps are glowing.



One lamp is removed and two other lamps go out.

Which lamp is removed?

A lamp J

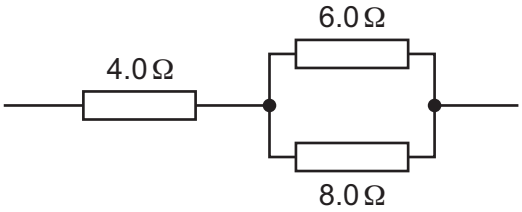
B lamp K

C lamp L

D lamp M

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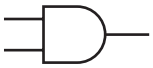
32 What is the effective resistance of the following combination of resistors?



A 1.8Ω **B** 7.4Ω **C** 11Ω **D** 18Ω

33 Which symbol represents a NAND gate?

A



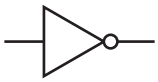
B



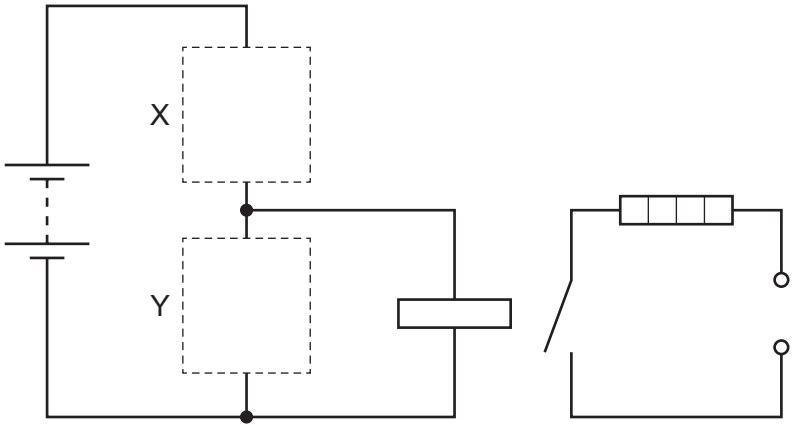
C



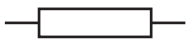
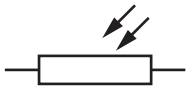
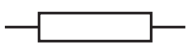
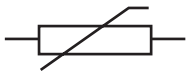
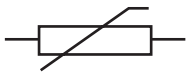
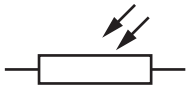
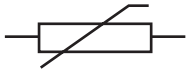
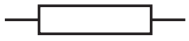
D



34 The diagram shows a circuit used to switch on a heater when the temperature drops below a certain value.

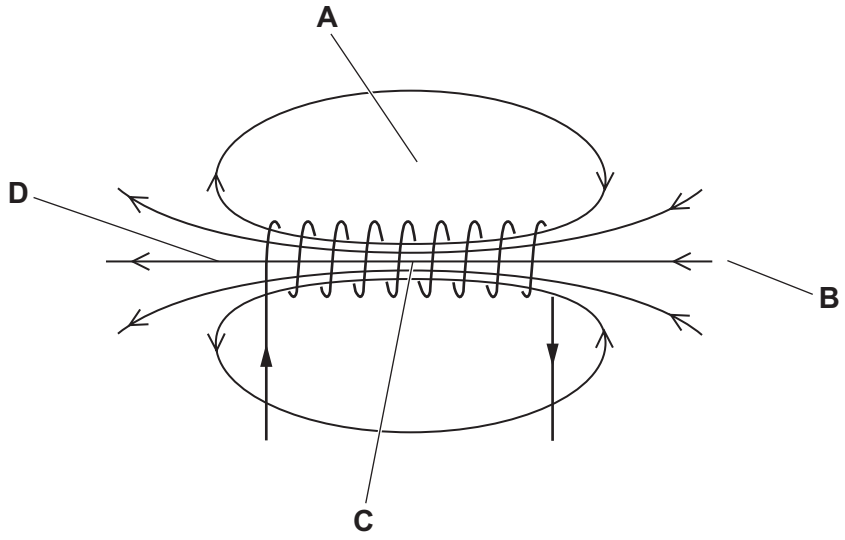


Which row shows the components that should be connected at X and at Y?

	X	Y
A		
B		
C		
D		

35 The diagram shows the magnetic field due to a current in a solenoid.

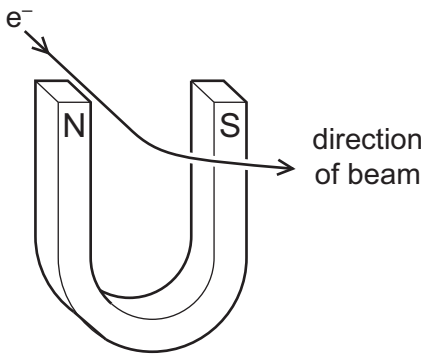
Where is the magnetic field the strongest?



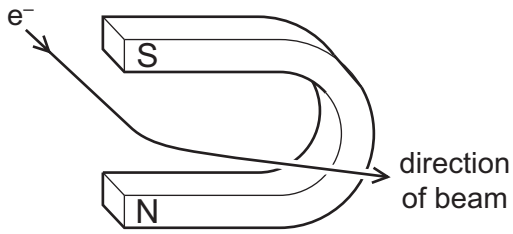
36 A beam of electrons is passed through the magnetic field of a magnet.

How must the magnet be positioned to deflect the beam in the direction shown?

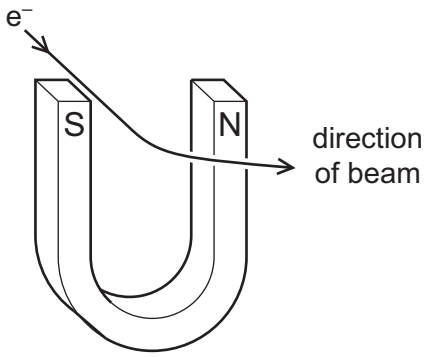
A



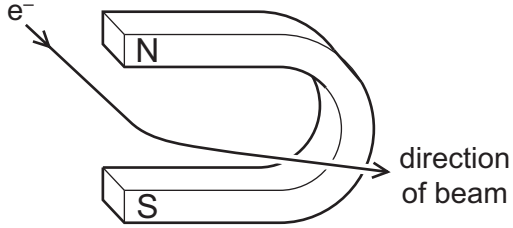
B



C



D



37 Uranium-235 can undergo nuclear fission in many ways.

Which equation correctly shows a possible fission reaction for uranium-235?

A $^{1}_{0}n + {}^{235}_{92}U \rightarrow {}^{141}_{56}Ba + {}^{92}_{36}Kr + 3{}^{1}_{0}n$

B $^{1}_{0}n + {}^{235}_{92}U \rightarrow {}^{91}_{38}Sr + {}^{144}_{54}Xe + 2{}^{1}_{0}n$

C $^{1}_{0}n + {}^{235}_{92}U \rightarrow {}^{95}_{37}Rb + {}^{136}_{55}Cs + 3{}^{1}_{0}n$

D $^{1}_{0}n + {}^{235}_{92}U \rightarrow {}^{87}_{35}Br + {}^{146}_{57}La + 4{}^{1}_{0}n$

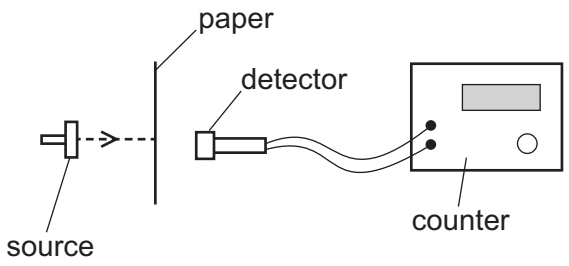
38 A radioactive material has a half-life of 20 days.

A sample of the material contains 8.0×10^{10} atoms.

How many atomic nuclei have decayed after 60 days?

A 1.0×10^{10} **B** 4.0×10^{10} **C** 6.0×10^{10} **D** 7.0×10^{10}

39 A thin sheet of paper is placed between a radioactive source and a radiation detector. The count rate falls to a very low reading.



From this result, which type of radiation is the source emitting?

A α-particles

B β-particles

C γ-rays

D X-rays

40 α-particles, β-particles and γ-rays are emitted by radioactive nuclei when they decay.

Which emissions can be deflected by an electric field?

A α-particles and β-particles only

B β-particles and γ-rays only

C γ-rays and α-particles only

D α-particles, β-particles and γ-rays

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