Cambridge Assessment International Education

Cambridge IGCSE™

PHYSICS **0625/22**

Paper 2 Multiple Choice (Extended) **October/November 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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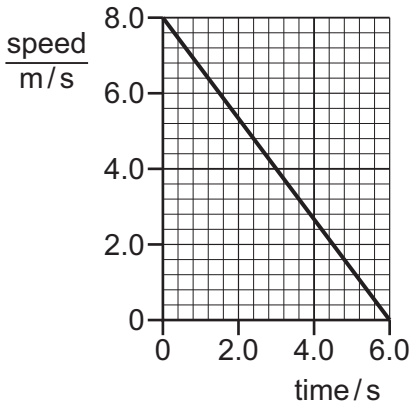
1 Which measuring devices are most suitable to determine the volume of about 200 ml of liquid and the diameter of a thin wire?

	volume of about 200 ml of liquid	diameter of a thin wire
A	measuring cylinder	micrometer screw gauge
B	measuring cylinder	ruler
C	ruler	measuring cylinder
D	ruler	micrometer screw gauge

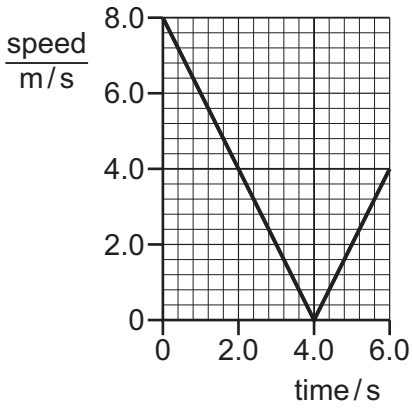
2 The diagrams show speed–time graphs for four different bodies moving for 6.0 s.

Which body travelled the least distance?

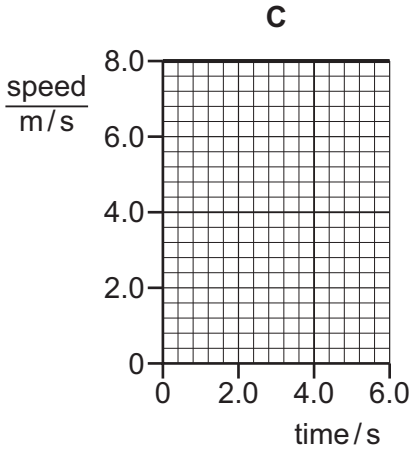
A



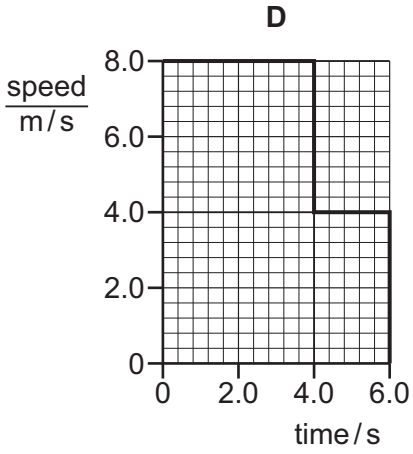
B



C



D



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3 Which statement describes the relationship between mass and weight?

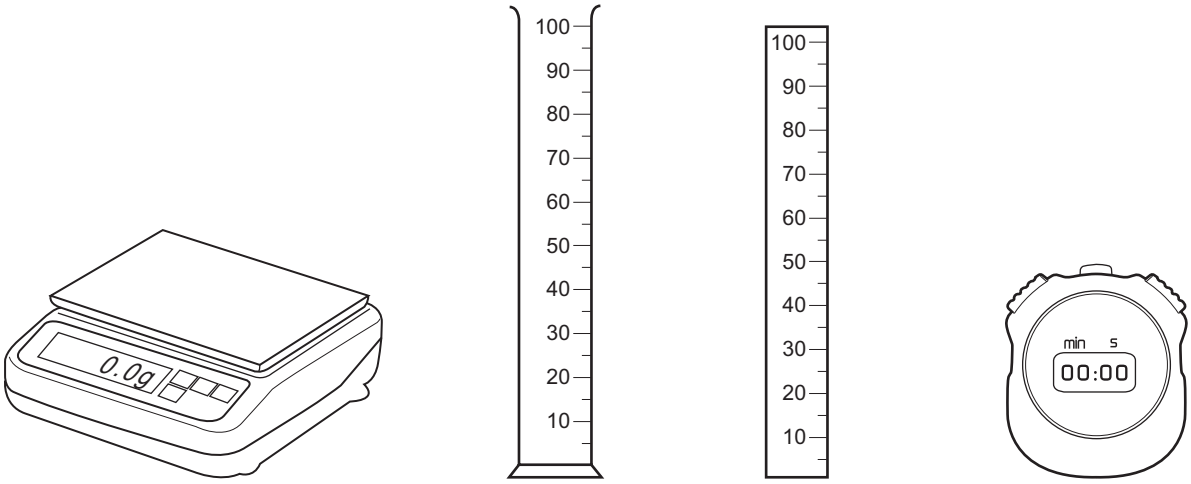
A Mass is the effect of a gravitational field on a weight.

B Mass is the effect of a magnetic field on a weight.

C Weight is the effect of a gravitational field on a mass.

D Weight is the effect of a magnetic field on a mass.

4 The diagram shows four pieces of laboratory apparatus.



balance | measuring cylinder | ruler | stop-watch

Which pieces of apparatus are used to find the density of a liquid?

A balance and stop-watch

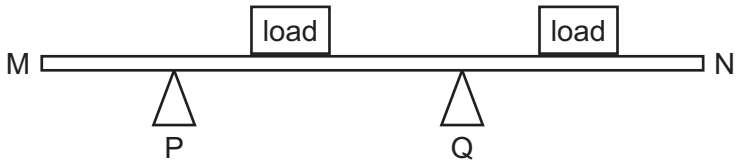
B balance and measuring cylinder

C measuring cylinder and ruler

D stop-watch and ruler

5 The diagram shows a metre rule MN on two supports, P and Q.

Two loads are placed on the rule, as shown.



The rule rests steadily on the supports.

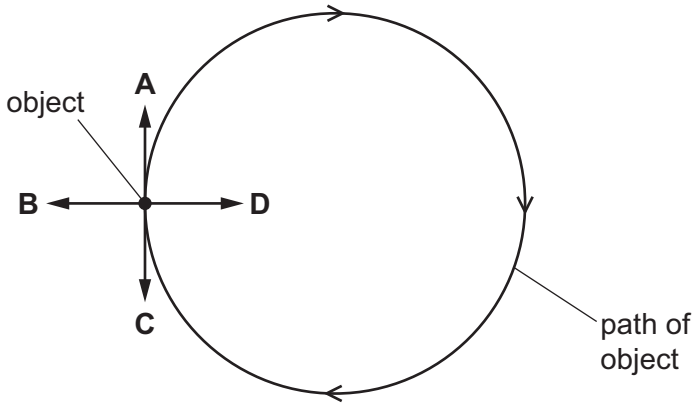
Which row is correct?

	total moment about M	total moment about N
A	is clockwise	is anticlockwise
B	is clockwise	is zero
C	is zero	is clockwise
D	is zero	is zero

6 The diagram shows an object moving at a constant speed in a circular path in the direction shown.

A force acts on the object to keep it in the circular path.

In which labelled direction does this force act, when the object is in the position shown?



7 A trolley of mass 4.0 kg travelling with a velocity of 4.0 m/s collides with a trolley of mass 2.0 kg travelling with a velocity of 2.0 m/s in the same direction. After the collision, the velocity of the 4.0 kg trolley is reduced to 3.0 m/s.



What is the velocity *v* of the 2.0 kg trolley after the collision?

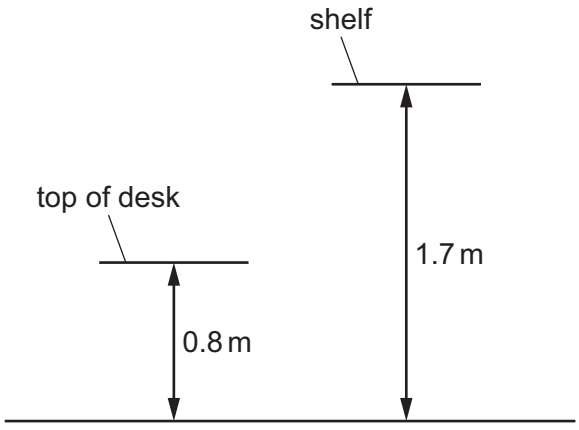
A 0.25 m/s **B** 4.0 m/s **C** 5.0 m/s **D** 16 m/s

8 An object falls towards the Earth's surface.

What happens to the gravitational potential energy and to the kinetic energy of the object?

	gravitational potential energy	kinetic energy
A	decreases	decreases
B	decreases	increases
C	increases	decreases
D	increases	increases

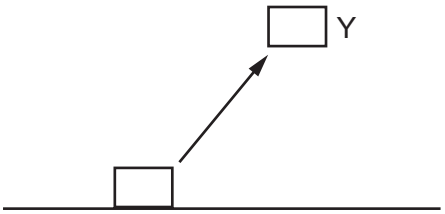
9 A boy takes 0.60 s to lift a book of mass 0.60 kg from the top of a desk and place it on a shelf. The top of the desk is 0.80 m above the floor, and the shelf is 1.7 m above the floor. The gravitational field strength is 10 N/kg.



Which power does the boy develop?

A 0.9 W **B** 1.7 W **C** 9.0 W **D** 17 W

10 A mass is lifted from rest on the ground to Y. There is no air resistance.



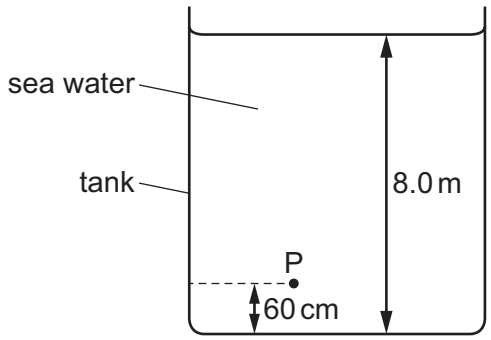
P is the increase in gravitational energy of the mass.

Q is the kinetic energy of the mass at Y.

Which expression is equal to the mechanical work done on the mass?

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

11 The diagram shows a tank containing sea water.



NOT TO SCALE

The density of the sea water is 1020 kg / m^3.

What is the pressure at point P relative to atmospheric pressure?

A 7400 Pa above atmospheric pressure

B 7500 Pa above atmospheric pressure

C 75 000 Pa above atmospheric pressure

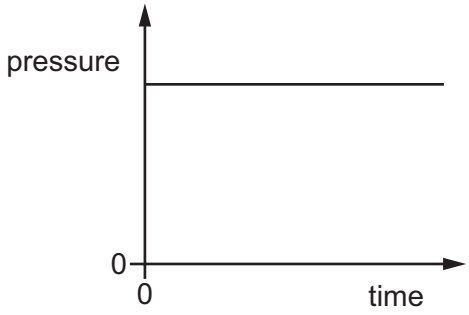
D 82 000 Pa above atmospheric pressure

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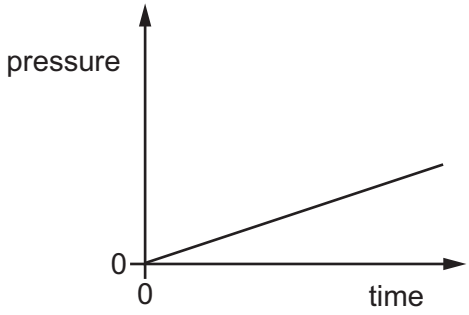
12 The pressure of a fixed mass of gas in a cylinder is measured. The volume of the gas in the cylinder is slowly decreased. The temperature of the gas does not change.

Which graph shows how the pressure of the gas changes during this process?

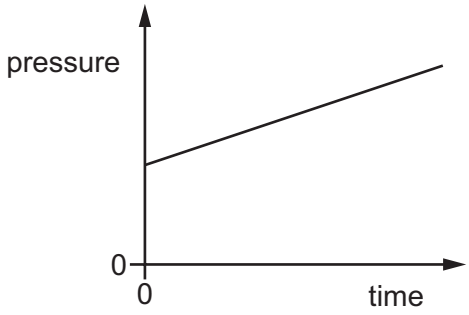
A



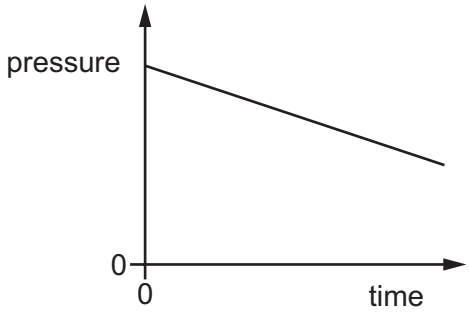
B



C



D



13 Wet clothes are hanging outside to dry.

What are the best conditions for the clothes to dry most quickly?

	wind speed	temperature
A	high	high
B	high	low
C	low	high
D	low	low

14 Which change in the design of a liquid-in-glass thermometer makes it more sensitive?

A a larger liquid reservoir

B a longer tube

C a smaller liquid reservoir

D a wider tube

15 A scientist is determining the specific latent heat of vaporisation of a liquid.

He puts the liquid in a vacuum flask and heats it with a 100 W heater. The mass of liquid in the vacuum flask when it starts to boil is 300 g. He continues to heat the liquid for a further 12 minutes after which the mass of the remaining liquid is 100 g.

What is the specific latent heat of vaporisation of the liquid?

(Assume that all the thermal energy from the heater is used to vaporise the liquid.)

A 6000 J / kg

B 240 000 J / kg

C 360 000 J / g

D 360 000 J / kg

16 Which piece of equipment is designed to produce a type of electromagnetic wave?

A electric fire

B electric generator

C electric motor

D electromagnet

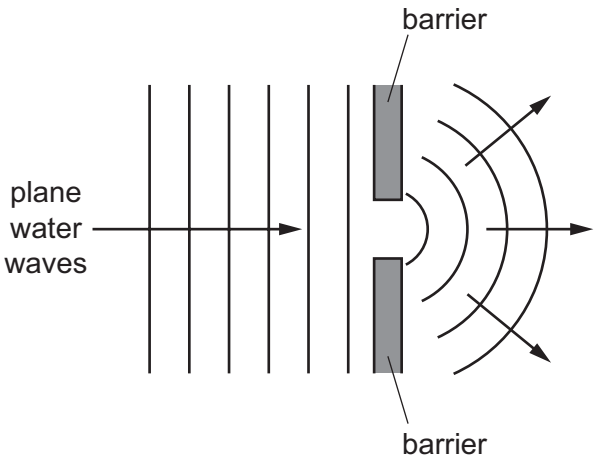
17 A sound wave travels from air into water.

Which row describes what happens to the frequency and the wavelength of the wave?

	frequency	wavelength
A	decreases	increases
B	decreases	stays the same
C	stays the same	decreases
D	stays the same	increases

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18 The diagram shows plane water waves in a ripple tank passing through a gap between two barriers and spreading out.



Which name is given to this effect?

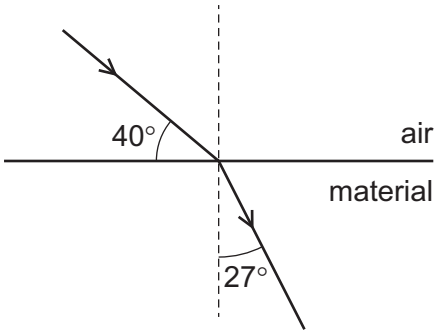
A diffraction

B reflection

C refraction

D total internal reflection

19 A ray of light travels from air into a material, as shown.

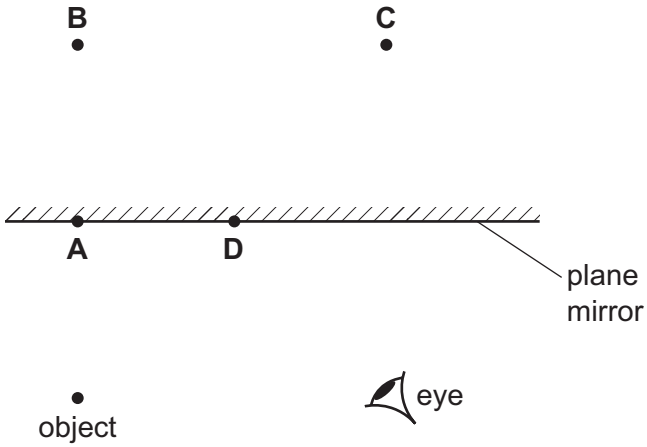


What is the refractive index of the material?

A 1.4 **B** 1.5 **C** 1.7 **D** 1.9

20 The diagram shows an object in front of a plane mirror.

At which labelled position is the image of the object formed?

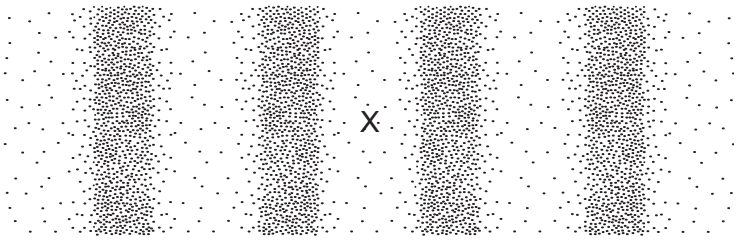


21 The angle between an incident ray and the surface of a plane mirror reflecting the ray is 70°.

What is the angle of incidence?

A 20° **B** 40° **C** 70° **D** 140°

22 The diagram shows the air molecules in part of a sound wave at a particular moment in time.



Which statement is **not** correct?

A Earlier, there was compression at X.

B Later, there will be a rarefaction at X.

C This part of the wave is travelling horizontally across the page.

D This part of the wave is travelling towards the top of the page.

23 An object is reflected in a plane mirror.

Which description of the image is correct?

A diminished and real

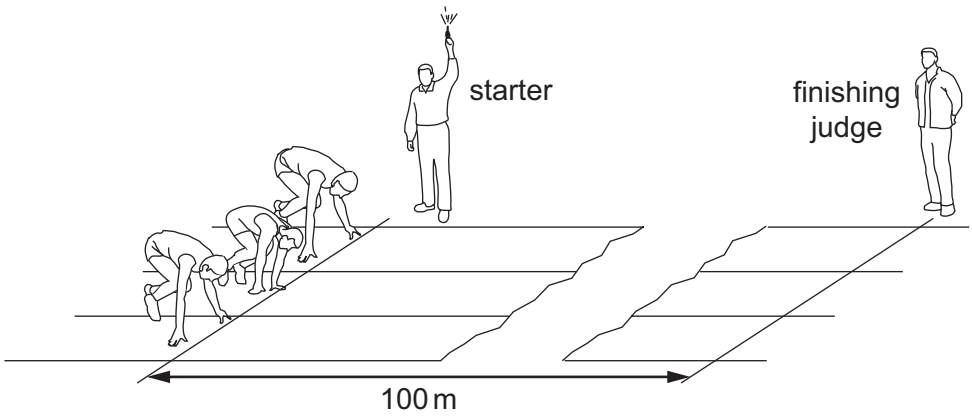
B enlarged and virtual

C same size and real

D same size and virtual

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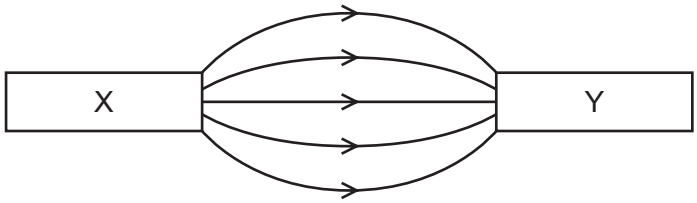
24 A 100 m race is started by firing a gun. The gun makes a bang and a puff of smoke at the same time.



When does the finishing judge see the smoke and when does he hear the bang?

	sees the smoke	hears the bang
A	almost immediately	almost immediately
B	almost immediately	after about 0.3 s
C	after about 0.3 s	almost immediately
D	after about 0.3 s	after about 0.3 s

25 Two magnets X and Y are placed end to end on a bench. The diagram shows the magnetic field pattern between the poles of the magnets.



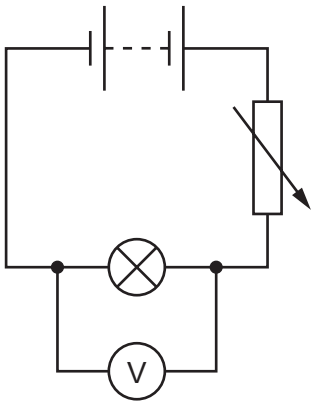
Which row shows the direction of the forces exerted on X and Y by the magnetic field?

	force on X	force on Y
A	→	→
B	→	←
C	←	→
D	←	←

26 The diagram shows a circuit used to control the potential difference (p.d.) across a lamp.

The variable resistor is adjusted until the p.d. across the lamp is 6.0 V.

The current in the lamp is 0.5 A.



What is the resistance of the lamp?

A 0.083 Ω **B** 3.0 Ω **C** 6.5 Ω **D** 12.0 Ω

27 A charge Q flows for time t through a resistor of resistance R.

Which equation gives the current I in the resistor?

A $I = Qt$ **B** $I = Rt$ **C** $I = \frac{Q}{t}$ **D** $I = \frac{R}{t}$

28 A plastic rod is rubbed with a dry woollen cloth. The rod becomes positively charged.

Which statement is correct?

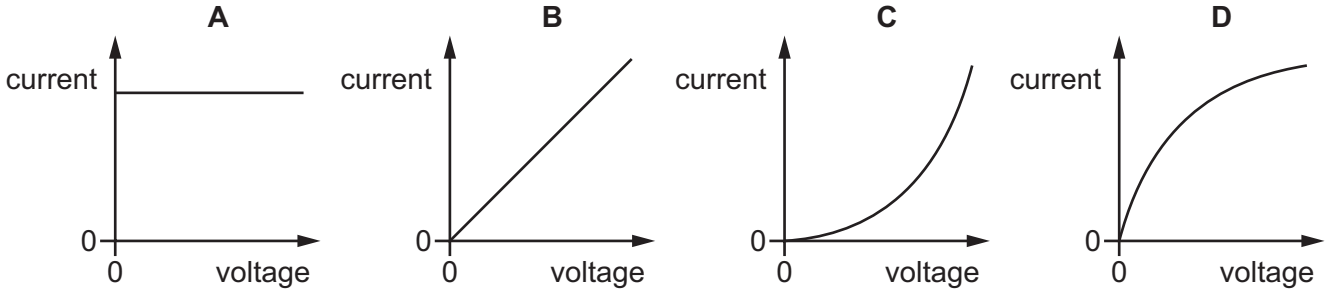
A Electrons move from the cloth to the rod.

B Electrons move from the rod to the cloth.

C Protons move from the cloth to the rod.

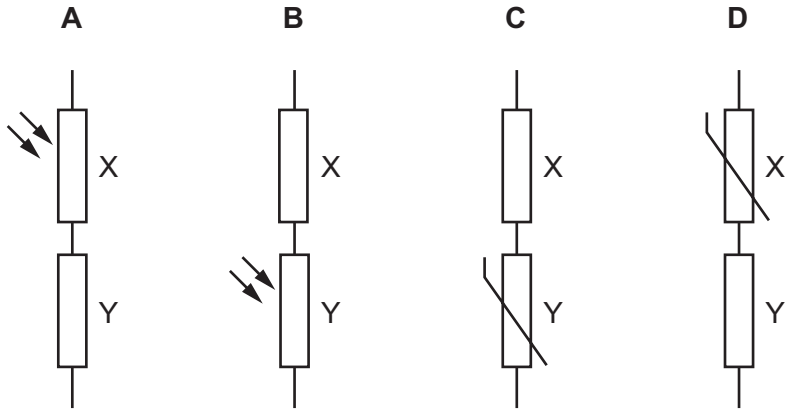
D Protons move from the rod to the cloth.

29 Which diagram shows a graph of current against voltage for a filament lamp?



30 Each potential divider is placed in a circuit with a power supply.

Which potential divider makes the potential difference (p.d.) across component Y increase when the light intensity increases?



31 Diagram 1 is a circuit diagram showing an a.c. power supply connected to four diodes and a resistor.

Diagram 2 shows the output voltage from the power supply.

diagram 1

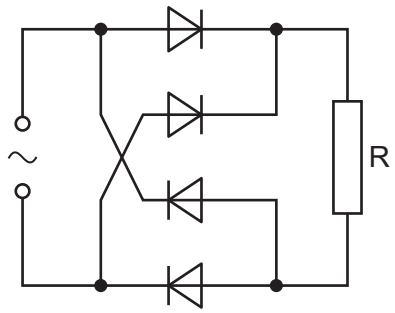
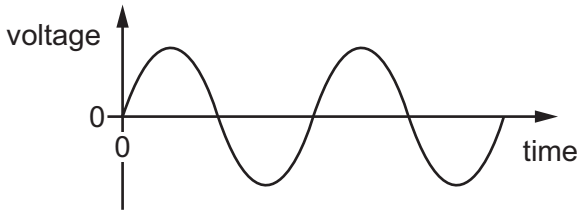
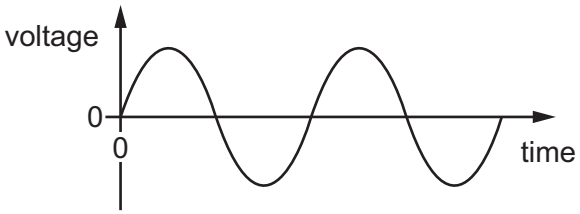


diagram 2

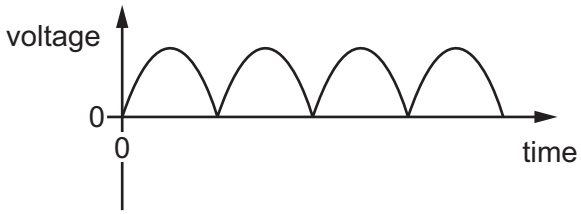


Which graph correctly shows the voltage–time curve across resistor R?

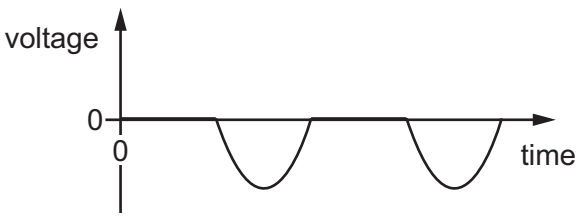
A



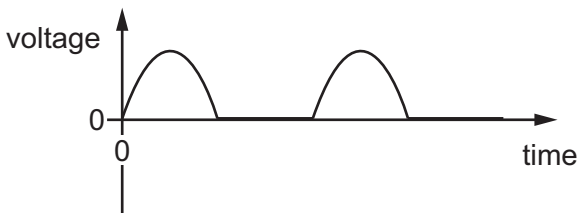
B



C

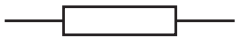


D

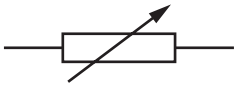


32 Which diagram shows the circuit symbol for a fuse?

A



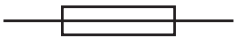
B



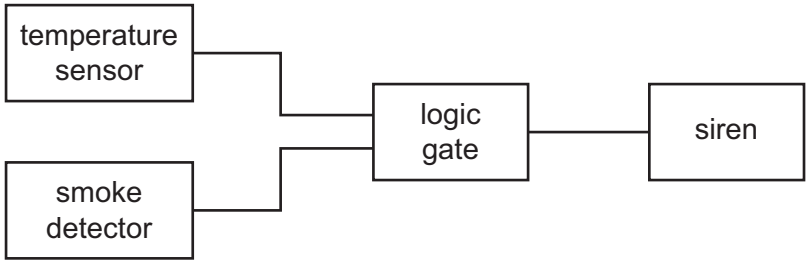
C



D



33 The diagram represents an alarm system using a logic gate.



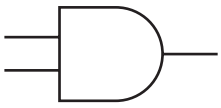
The data for the system is shown.

state	0	1
temperature sensor	cold	hot
smoke detector	no smoke	smoke
siren	no sound	sound

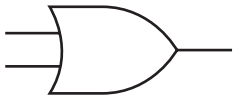
The siren sounds when there is any indication of a fire.

Which logic gate is used?

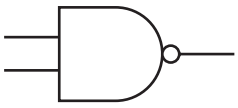
A



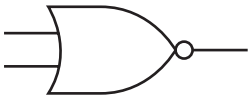
B



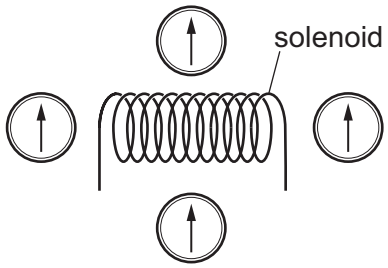
C



D



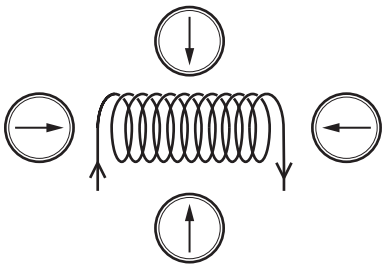
34 Four small compasses are placed around a solenoid.



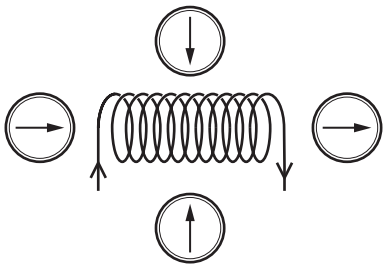
A current is now switched on in the solenoid.

Which diagram shows possible new directions of the compass needles?

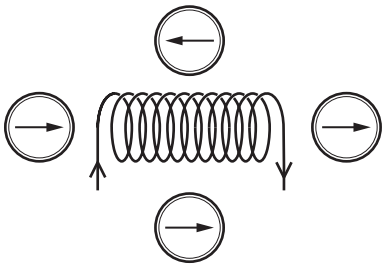
A



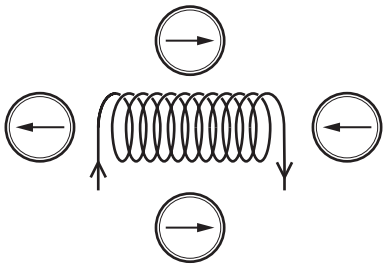
B



C



D



35 Transformers are used in the transmission of electrical power to houses.

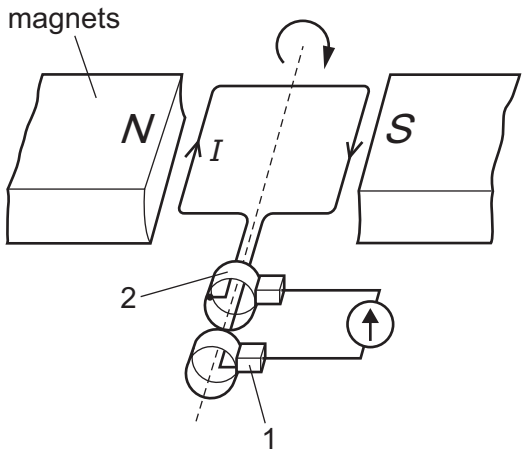
Which type of transformer is used at the power station prior to connection to the power lines and which type is used prior to delivery to the houses?

	power station	before houses
A	step-down	step-down
B	step-down	step-up
C	step-up	step-down
D	step-up	step-up

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[Turn over

36 The diagram shows an a.c. generator rotating in a clockwise direction.



What are the names of parts 1 and 2?

	1	2
A	brush	slip-ring
B	brush	split-ring commutator
C	slip-ring	brush
D	slip-ring	split-ring commutator

37 A thin metal foil is placed in a vacuum. α-particles are fired at the foil and most go straight through. A very small proportion of the α-particles are deflected through large angles.

What does this provide evidence for?

A α-particles are very small.

B There are negative electrons in each atom.

C There is a tiny nucleus in each atom.

D There are neutrons in each atom.

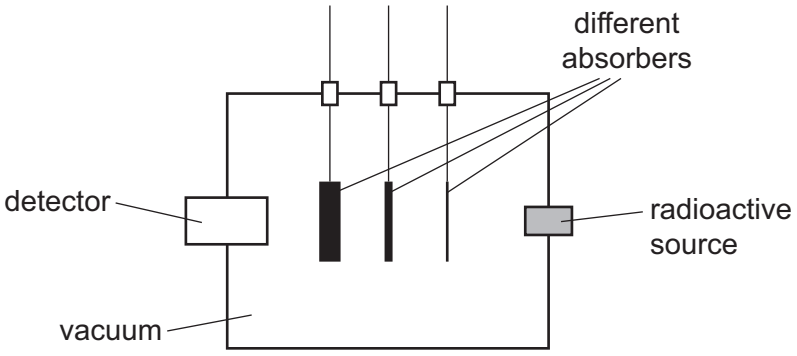
38 Thorium-230 is represented by the symbol $^{230}_{90}\mathrm{Th}$. This isotope is radioactive and decays to radium by emitting α-particles.

Which nuclide is produced by this decay?

A $^{226}_{88}\mathrm{Ra}$ **B** $^{230}_{89}\mathrm{Ra}$ **C** $^{230}_{91}\mathrm{Ra}$ **D** $^{234}_{92}\mathrm{Ra}$

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39 The diagram shows a piece of apparatus used to determine the nature of the emissions from a radioactive source. The absorbers can be raised out of or lowered into the path of the radiation from the source to the detector. The apparatus is evacuated.



The table gives a set of results for a particular radioactive source.

absorber in use	count rate on detector (counts per second)
none	350
thin paper	350
1.0 mm aluminium	180
1.0 cm lead	23

Which types of radiation are being emitted by the radioactive source?

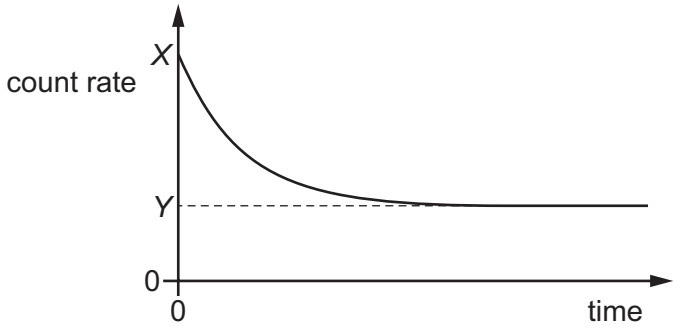
A α-particles and β-particles

B α-particles only

C β-particles and γ-rays

D β-particles only

40 The graph shows the measured count rate of radiation from a source containing a radioactive isotope. The detector is in a laboratory, with no shielding from background radiation.



What is the measured count rate after a time of one half-life?

A $\frac{X}{2}$ **B** $\frac{Y}{2}$ **C** $\frac{(X-Y)}{2}$ **D** $\frac{(X+Y)}{2}$

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