Cambridge International Examinations
Cambridge International General Certificate of Secondary Education

PHYSICS **0625/23**

Paper 2 Multiple Choice (Extended) **October/November 2018**

45 minutes

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

9510057274

READ THESE INSTRUCTIONS FIRST

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

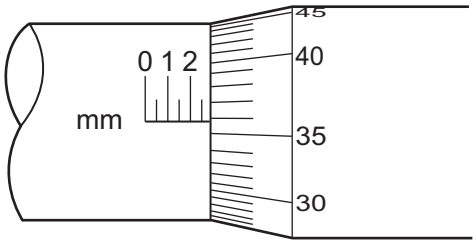
Each correct answer will score one mark. A mark will not be deducted for a wrong answer.
Any rough working should be done in this booklet.
Electronic calculators may be used.
Take the weight of 1.0 kg to be 10 N (acceleration of free fall = 10 m / s^2).

The syllabus is approved for use in England, Wales and Northern Ireland as a Cambridge International Level 1/Level 2 Certificate.

This document consists of **16** printed pages.

© UCLES 2018

1 The diagram shows part of a micrometer screw gauge.



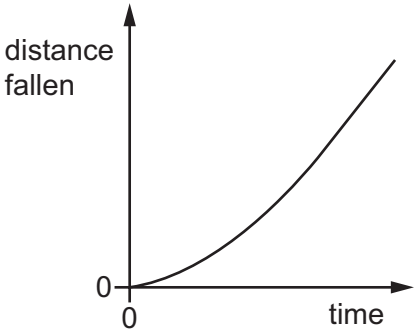
What is the smallest reading that can be achieved using this micrometer screw gauge?

A 0.0001 mm **B** 0.01 mm **C** 0.1 mm **D** 1 mm

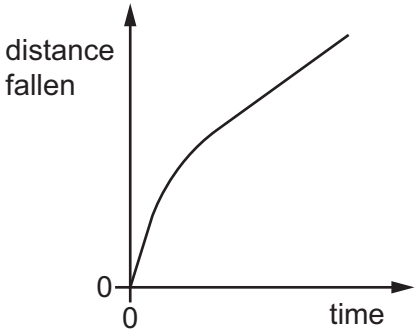
2 An object falls in a gravitational field with air resistance.

Which distance-time graph shows this motion?

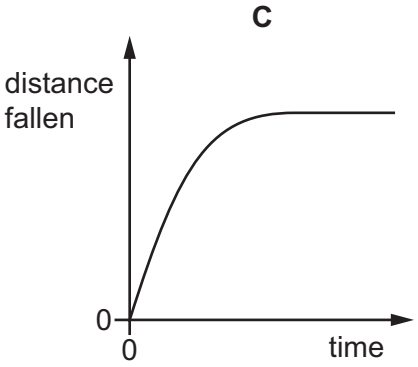
A



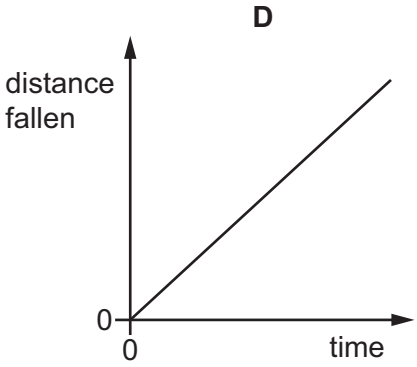
B



C



D



3 A boy runs 400 m at an average speed of 4.0 m / s.

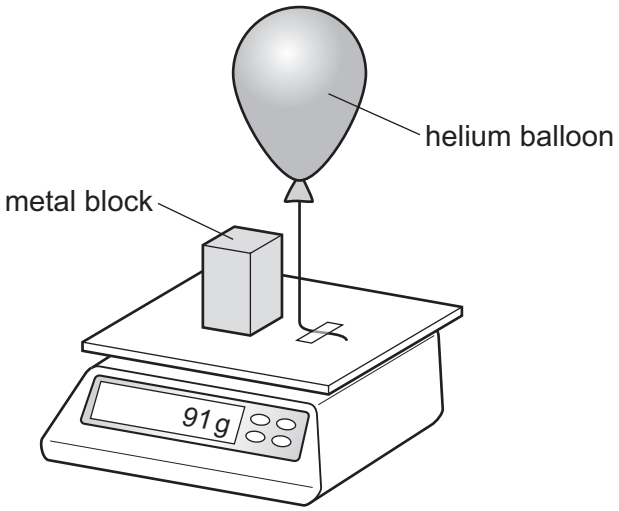
He runs the first 200 m in 40 s.

How long does he take to run the second 200 m?

A 60 s **B** 66.7 s **C** 80 s **D** 140 s

© UCLES 2018

4 A helium balloon is tied to a top-pan balance. A metal block of mass 100 g is placed on the balance. The reading on the balance is 91 g.



Which statement can be deduced from this experiment?

A The balloon exerts a downward force of 0.09 N on the top-pan balance.

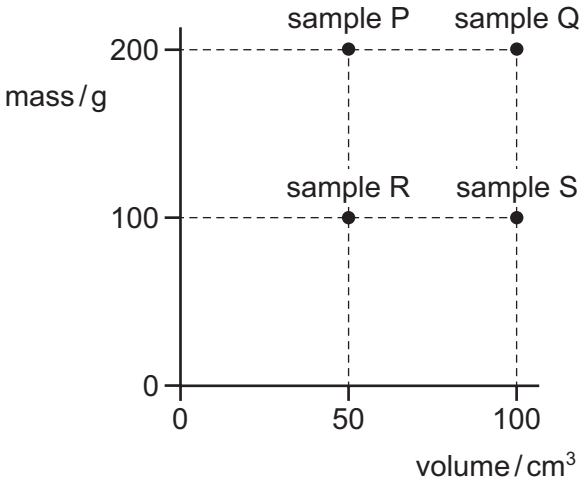
B The helium has a mass of –9 g.

C The helium has a mass of +9 g.

D The resultant downward force on the top-pan balance is 0.91 N.

5 A student carries out experiments to find the mass and the volume of four samples of rock.

The graph shows the results.



Which pair are samples of the same type of rock?

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

6 An object accelerates from 10 m / s to 30 m / s in 4.0 seconds.

The accelerating force is 150 N.

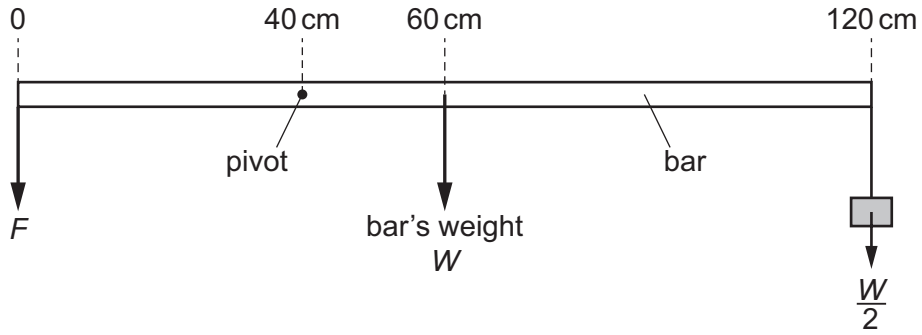
What is the mass of the object?

A 0.033 kg **B** 5.0 kg **C** 7.5 kg **D** 30 kg

7 The diagram shows a uniform bar of length 120 cm and weight W. The bar is pivoted at a point 40 cm from the left end of the bar.

A load of $\frac{W}{2}$ is suspended from the right-hand end of the bar.

A downward force F is applied to the left-hand end of the bar to keep it in equilibrium.



What is the magnitude of force F?

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

8 An electron is moving at a speed of 5×10^6 m / s.
A neutron is moving at a speed of 5×10^4 m / s.

The mass of the electron is m.
The mass of the neutron is $2000m$.

Which row is correct?

	greater momentum	greater kinetic energy
A	electron	electron
B	electron	neutron
C	neutron	electron
D	neutron	neutron

© UCLES 2018

9 Which device is designed to convert chemical energy into kinetic energy?

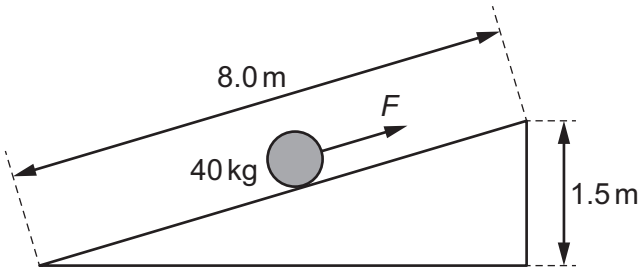
A an a.c. generator

B a battery-powered torch

C a car engine

D a wind-up mechanical clock

10 A barrel of mass 40 kg is raised to a height of 1.5 m by rolling it up a ramp. The length of the ramp is 8.0 m. The force *F* applied to the barrel acts parallel to the ramp. The frictional force is negligible.



Which row is correct?

	gain in gravitational potential energy / J	force *F* / N
A	60	7.5
B	60	40
C	600	75
D	600	400

11 What is the main process by which energy is produced in the Sun?

A combustion

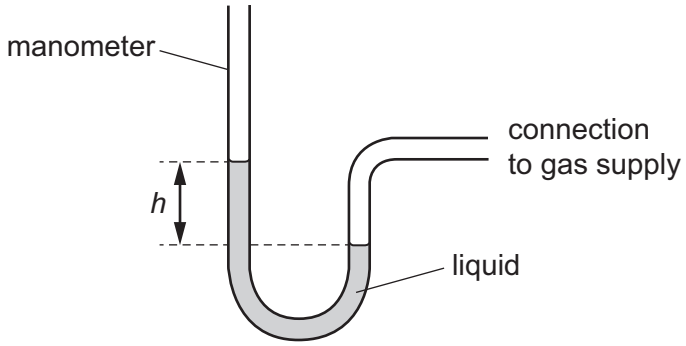
B nuclear fission

C nuclear fusion

D radioactive decay

© UCLES 2018

12 A manometer is used to measure the pressure of a gas supply.



Which change gives a greater value of height *h*?

A using a less dense liquid

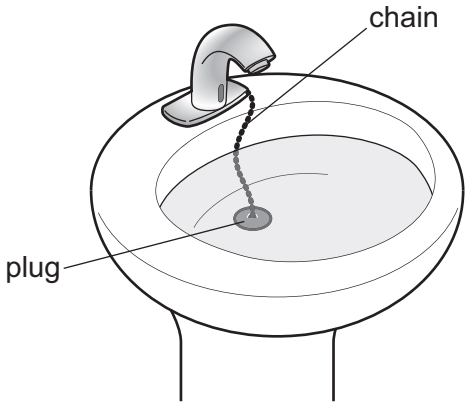
B using a more dense liquid

C using a narrower tube

D using a wider tube

13 A washbasin has an exit pipe covered with a plug of area 12 cm^2. A chain is attached to the centre of the plug to assist in pulling the plug away from the exit hole. The washbasin contains water to a depth of 0.080 m.

The density of the water is 1000 kg/m^3.



What is the force acting on the plug due to the water?

A 0.96 N **B** 800 N **C** 9600 N **D** 80 000 N

© UCLES 2018

14 Diagram 1 shows apparatus being used to observe smoke particles.

Diagram 2 shows how a smoke particle moves randomly.

diagram 1

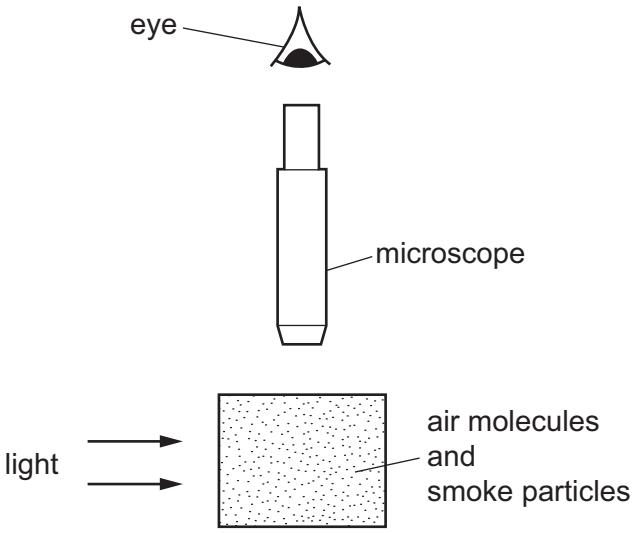
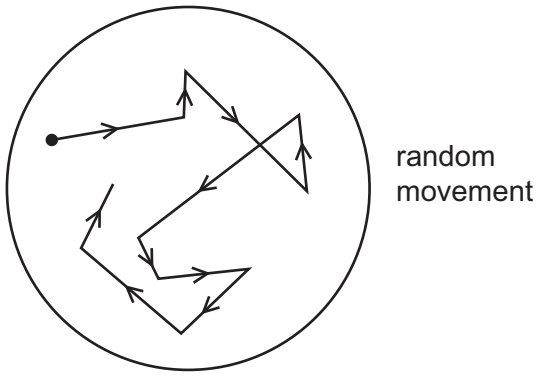


diagram 2



Why do the smoke particles move randomly?

A They are hit by air molecules.

B They are less dense than air.

C They are moved by convection currents.

D They gain energy from the light.

15 A bubble of air has a volume of $2.0\,cm^3$ at the bottom of a lake where the total pressure is $4.0 \times 10^5\,Pa$. The temperature of the water in the lake is constant. The atmospheric pressure at the surface is $1.0 \times 10^5\,Pa$.

What is the volume of the bubble when it rises to the surface?

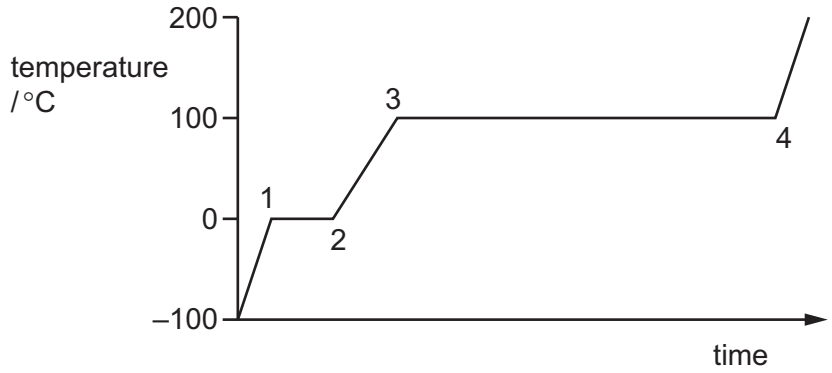
A $0.13\,cm^3$ **B** $0.17\,cm^3$ **C** $6.0\,cm^3$ **D** $8.0\,cm^3$

16 Which row shows the relative order of thermal expansion of solids, liquids and gases?

	most expansion ⟶		least expansion
A	solids	liquids	gases
B	solids	gases	liquids
C	gases	solids	liquids
D	gases	liquids	solids

© UCLES 2018

17 A block of ice is at a temperature of –100 °C. Energy is supplied at a constant rate. The graph shows how its temperature changes.



At which points has the ice completely changed state to water and all the water completely changed state to steam?

	completely changed to water	completely changed to steam
A	1	3
B	1	4
C	2	3
D	2	4

18 The temperature of the water at the bottom of a waterfall is greater than the temperature of the water at the top.

The gravitational potential energy of the water at the top is transferred to thermal energy at the bottom.

The specific heat capacity of water is 4200 J / (kg °C).

What is the temperature difference for a waterfall of height 21 m?

A 0.005 °C **B** 0.05 °C **C** 20 °C **D** 200 °C

19 One end of a shiny metal rod is heated and the other end quickly gets hot.

Which statement describes why the other end quickly gets hot?

A Metals are good thermal conductors.

B Metals are poor thermal conductors.

C Shiny surfaces are good emitters of infra-red radiation.

D Shiny surfaces are poor emitters of infra-red radiation.

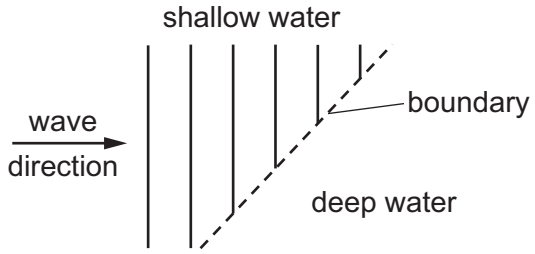
© UCLES 2018

20 Four different surfaces are at the same high temperature.

Which surface will emit thermal radiation at the slowest rate?

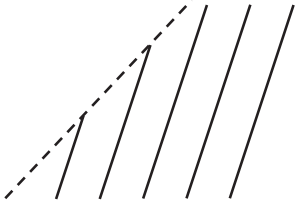
	colour of surface	texture of surface	surface area / cm^2
A	black	dull	10
B	black	dull	100
C	white	shiny	10
D	white	shiny	100

21 Plane water waves travel from a shallow region into a deeper region. They travel more quickly in the deeper water.

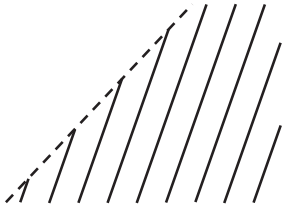


Which diagram shows the wave pattern in the deeper water?

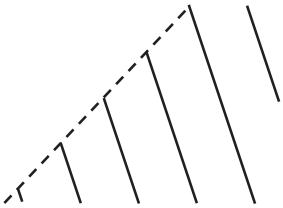
A



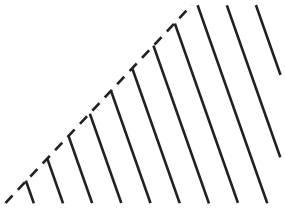
B



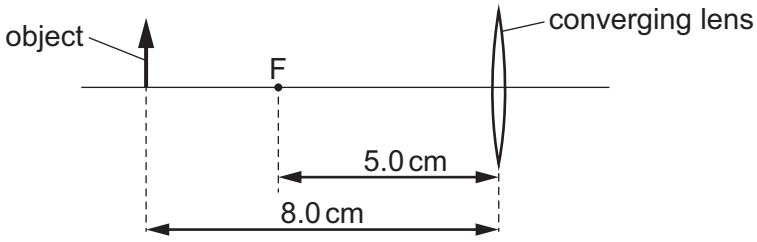
C



D



22 An object is placed 8.0 cm from a thin converging lens of focal length 5.0 cm.



Which statement about the image formed by the lens is correct?

A The image is real and inverted.

B The image is real and upright.

C The image is virtual and inverted.

D The image is virtual and upright.

23 Light travels through air and then enters and travels through a parallel-sided glass block.

Which statement is correct?

A The angle of incidence is greater than the angle of refraction as the light leaves the block.

B The light emerging from the block is parallel to the light entering the block.

C The speed of the light decreases as it leaves the block.

D The wavelength of the light does not change as it enters the block.

24 Different parts of the electromagnetic spectrum are used for different purposes. Below are four statements about parts of the spectrum.

statement 1: Infra-red waves are used in television remote controllers.

statement 2: Radio waves are used to transmit television pictures from satellites to Earth.

statement 3: Ultraviolet waves are used for intruder alarms.

statement 4: X-rays are used for security checks.

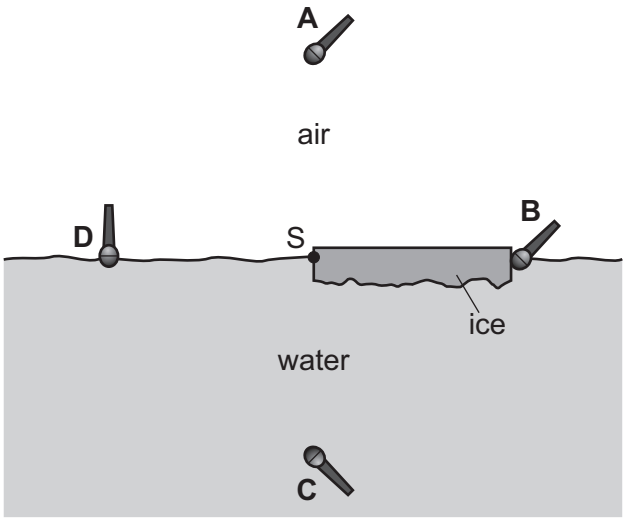
Which statements are correct?

A 1 and 2 **B** 1 and 4 **C** 2 and 3 **D** 3 and 4

25 A sheet of ice floats on water. A source of sound S is positioned at the edge of the ice sheet.

Four microphones are placed equal distances from S.

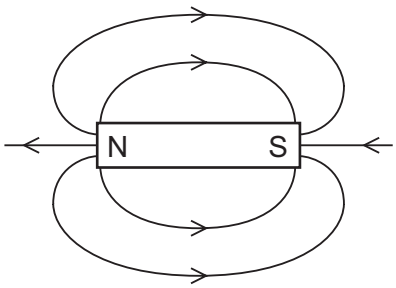
Which microphone detects the sound from S first?



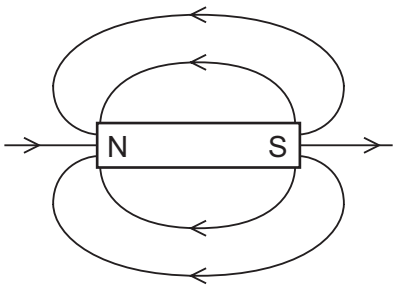
© UCLES 2018

26 Which diagram shows the pattern and the direction of the magnetic field lines around a bar magnet?

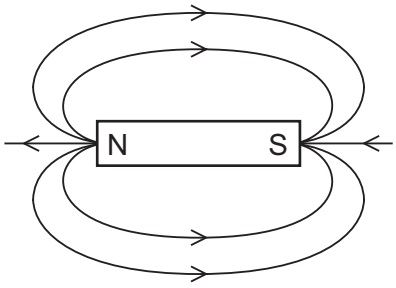
A



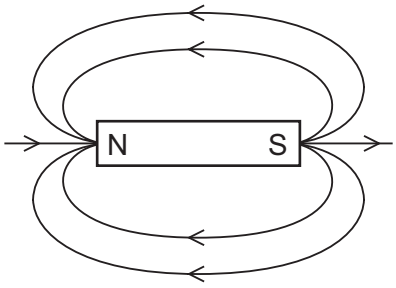
B



C

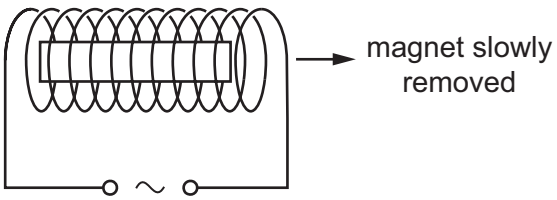


D

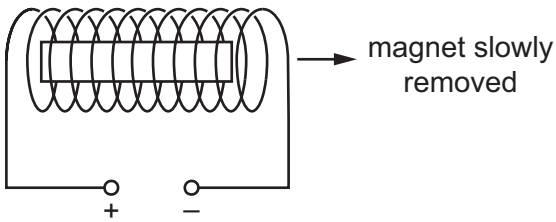


27 A bar magnet is placed inside a current-carrying coil. The diagram shows four different experiments.

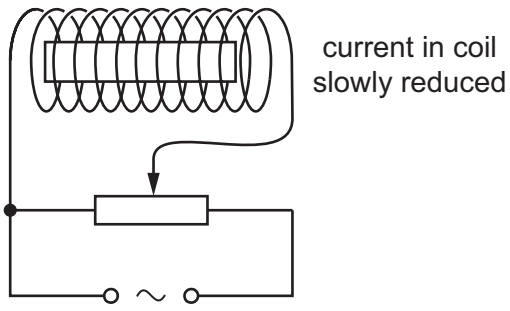
1



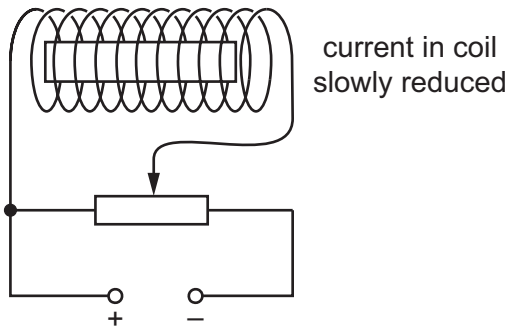
2



3



4



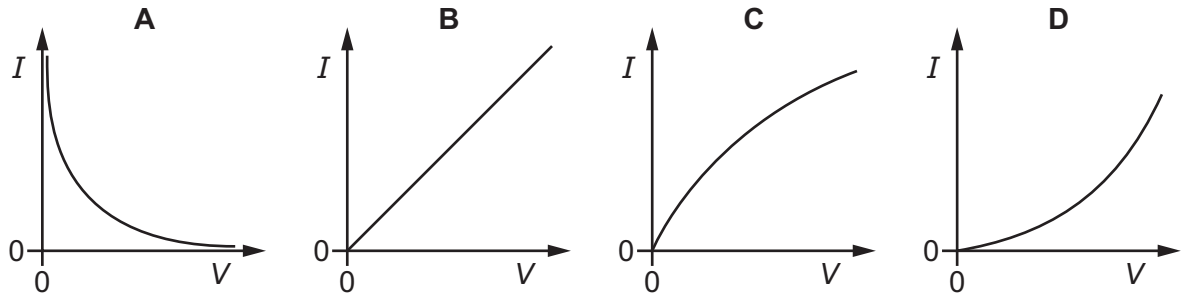
In which experiments is the magnet demagnetised?

A 1 and 2 **B** 1 and 3 **C** 2 and 4 **D** 3 and 4

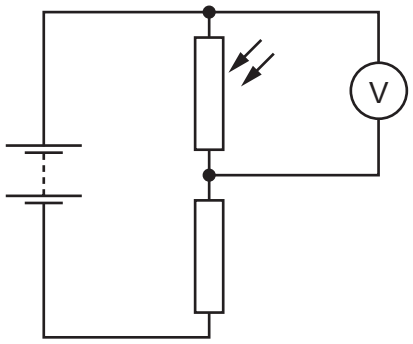
28 Which row shows the meaning of the quantity e.m.f. and the unit in which it is measured?

	meaning	unit
A	electromagnetic force	N
B	electromagnetic force	V
C	electromotive force	N
D	electromotive force	V

29 Which diagram shows the current-voltage (I - V) characteristic for a filament lamp?



30 The diagram shows a light-dependent resistor (LDR) connected in a potential divider circuit.



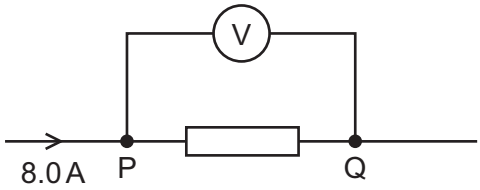
The brightness of the light falling on the LDR is increased.

Which row shows what happens to the resistance of the LDR, and what happens to the reading on the voltmeter?

	resistance of LDR	reading on voltmeter
A	decreases	decreases
B	decreases	increases
C	increases	decreases
D	increases	increases

© UCLES 2018

31 The diagram shows part of an electric circuit. The reading on the voltmeter is 16 V. The current in the resistor is 8.0 A.



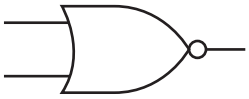
One coulomb of charge flows from P to Q through the resistor.

How much energy is transferred in the resistor?

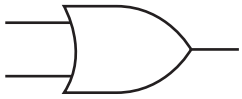
A 2.0 J **B** 8.0 J **C** 16 J **D** 128 J

32 Which symbol represents an AND gate?

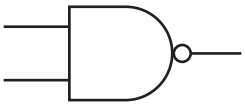
A



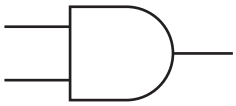
B



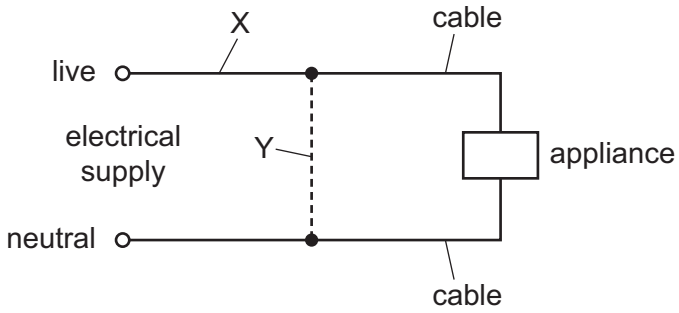
C



D



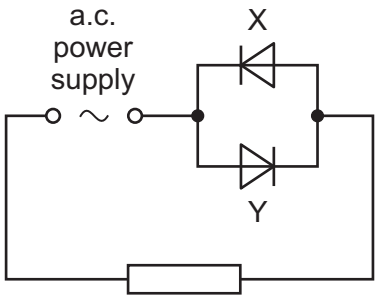
33 Either a fuse or a circuit-breaker can be used to protect electrical cables from large currents that could cause overheating.



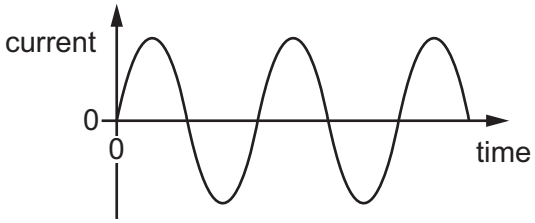
When a fuse is used, where should it be connected, and when a circuit-breaker is used, where should it be connected?

	position of fuse	position of circuit-breaker
A	X	X
B	X	Y
C	Y	X
D	Y	Y

34 The circuit diagram shows an a.c. power supply connected to two diodes and a resistor.

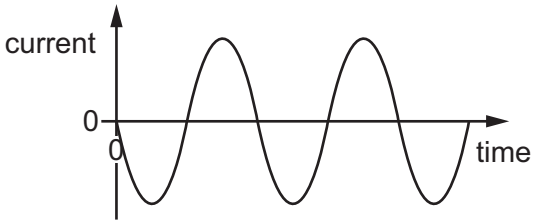


The graph shows the current from the supply.

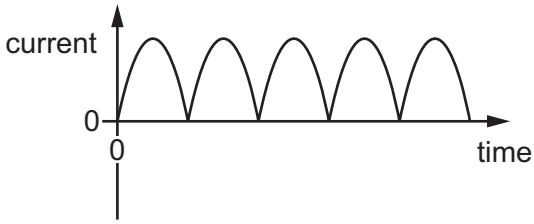


Which graph shows the current in diode X?

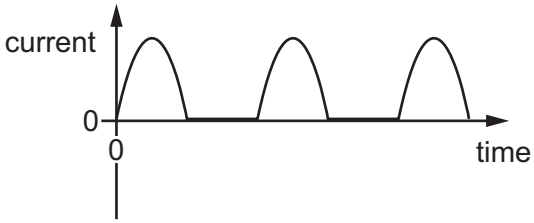
A



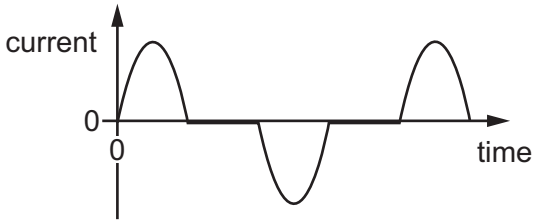
B



C



D



35 A 100% efficient step-down transformer has primary voltage V_p and primary current I_p.

Which row compares the secondary voltage with V_p and the secondary current with I_p?

	secondary voltage	secondary current
A	greater than V_p	greater than I_p
B	greater than V_p	less than I_p
C	less than V_p	greater than I_p
D	less than V_p	less than I_p

© UCLES 2018

36 There is an electric current in a wire. The wire is placed in a magnetic field. A force acts on the wire due to the current.

Which statement is correct?

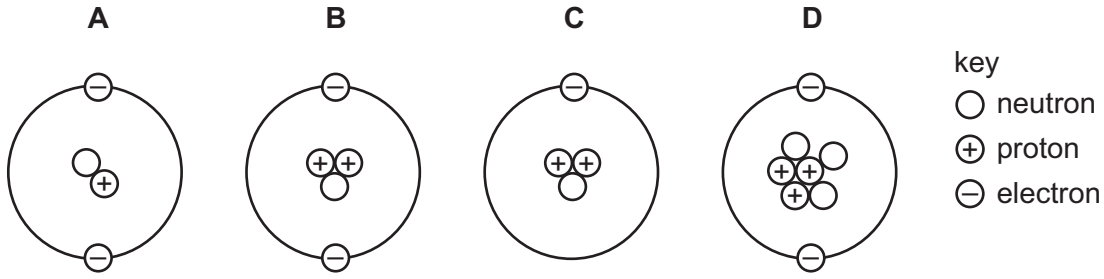
A The magnetic field must be produced by a permanent magnet and not by an electromagnet.

B The wire must be made from a magnetic material.

C When both the current and the magnetic field are reversed, the direction of the force is unchanged.

D When the current is reversed, but not the magnetic field, there will be no force on the wire.

37 Which diagram represents the structure of a neutral atom?



38 A nucleus of $^{228}_{88}\text{Ra}$ decays into an isotope of actinium, which then decays into a nucleus of $^{228}_{90}\text{Th}$.

What types of radiation have been emitted during this process?

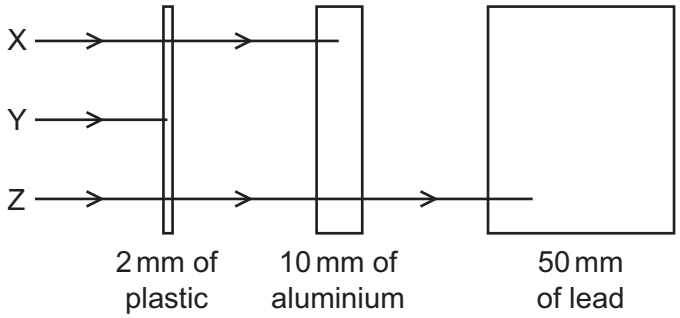
A one alpha particle only

B one alpha particle and one beta particle

C two alpha particles

D two beta particles

39 The diagram shows the paths of three different types of radiation X, Y and Z.



Which row correctly identifies X, Y and Z?

	X	Y	Z
A	α-particles	β-particles	γ-rays
B	β-particles	α-particles	γ-rays
C	β-particles	γ-rays	α-particles
D	γ-rays	α-particles	β-particles

40 The count rate due to a sample of a radioactive isotope is measured for 80 minutes.

time / minutes	count rate / counts / second
0	480
20	380
40	300
60	240
80	190

What is the half-life of the isotope?

A 20 minutes **B** 40 minutes **C** 60 minutes **D** 80 minutes

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 International Examinations Copyright Acknowledgements Booklet. This is produced for each series of examinations and is freely available to download at www.cie.org.uk after the live examination series.

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

© UCLES 2018