Cambridge Assessment International Education
Cambridge International General Certificate of Secondary Education

CO-ORDINATED SCIENCES **0654/12**

Paper 1 Multiple Choice (Core) **May/June 2019**

45 minutes

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

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.
A copy of the Periodic Table is printed on page 16.
Electronic calculators may be used.

1 What is correct for **all** living organisms?

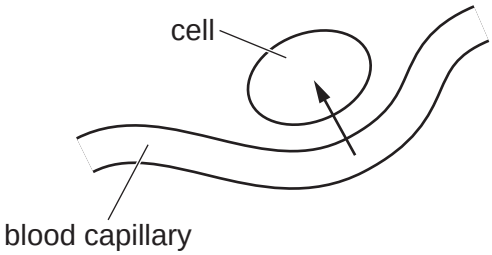
A They are sensitive to changes in their environment.

B They excrete solid waste from their bodies.

C They feed on other living organisms.

D They grow larger by increasing their cell number.

2 The diagram shows a body cell and a blood capillary. The arrow represents the direction of diffusion.



For aerobic respiration to occur in the cell, which substances does the arrow represent?

A carbon dioxide and glucose

B carbon dioxide and water

C oxygen and glucose

D oxygen and water

3 Which chemical element is found in proteins, but **not** in carbohydrates or fats?

A carbon

B hydrogen

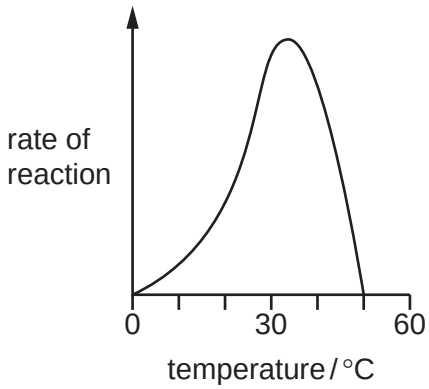
C oxygen

D nitrogen

4 The graphs show the possible effects of temperature on the rate of reaction of an enzyme.

Which graph is correct for a human enzyme?

A



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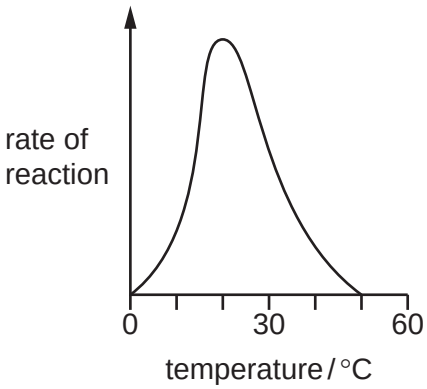

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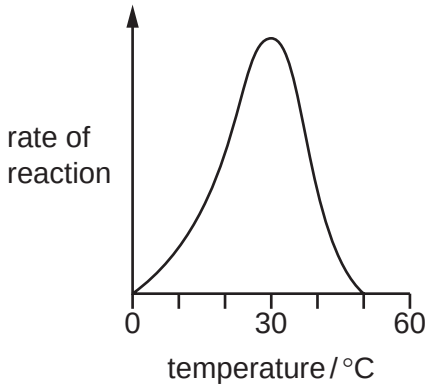

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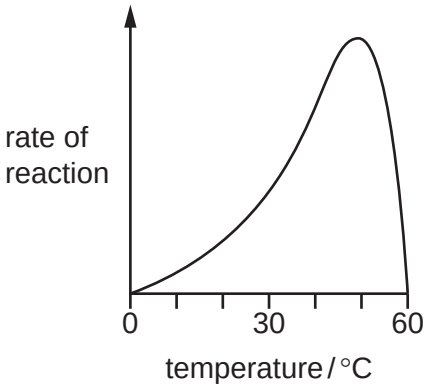


5 Plants make sugars from water and carbon dioxide.

From where do they get the carbon dioxide?

A rain soaking into the leaves

B the air

C the soil through the roots

D they make it in photosynthesis

6 What is the correct definition of ingestion?

A The breakdown of large, insoluble food molecules into small, water-soluble molecules.

B The movement of digested food molecules through the wall of the small intestine into the blood.

C The passing out of food that has not been digested, as faeces, through the anus.

D The taking of substances into the body through the mouth.

7 Which statement about the valves found in the human transport system is correct?

A They are absent in veins.

B They are present in arteries.

C They ensure one-way flow of blood.

D They pump blood from atria to ventricles.

8 Limewater can be used to test for differences in composition between inspired and expired air.

Which row is correct?

	type of air	appearance of limewater	conclusion
A	expired	clear to milky	more carbon dioxide present
B	expired	milky to clear	more carbon dioxide present
C	inspired	clear to milky	more oxygen present
D	inspired	milky to clear	more oxygen present

9 In a reflex arc, which structure carries nerve impulses towards the central nervous system?

A effector

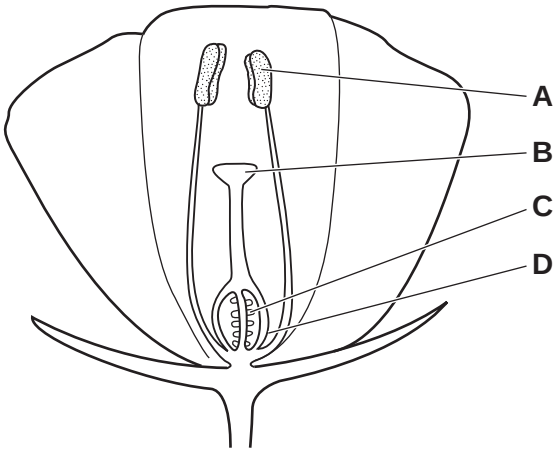
B motor neurone

C sensory neurone

D spinal cord

10 The diagram shows a section through an insect-pollinated flower.

When pollination occurs, where must the pollen grains reach?



11 Which sex chromosomes need to be present in a sperm cell to produce a male zygote?

A X only **B** Y only **C** XX **D** XY

12 How do herbivores get their energy?

A by eating animals and plants

B by eating animals only

C by eating plants only

D directly from sunlight

13 A pupil listed some undesirable effects of deforestation.

1 increase of carbon dioxide in the atmosphere

2 extinction of species

3 flooding

4 increased number of habitats

Which effects are correct?

A 1, 2, 3 and 4

B 1, 2 and 3 only

C 1, 2 and 4 only

D 2, 3 and 4 only

14 Which process occurs when the arrangement of particles in a substance changes from regular to random?

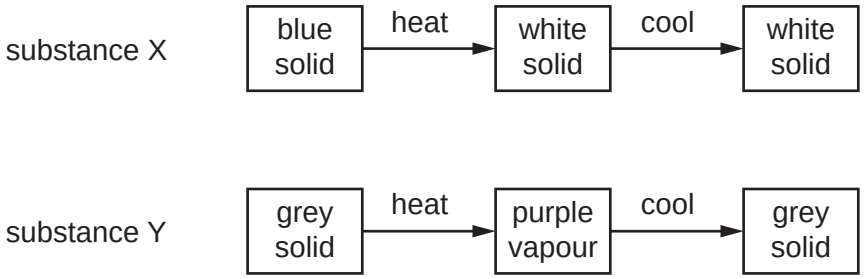
A boiling

B condensing

C freezing

D melting

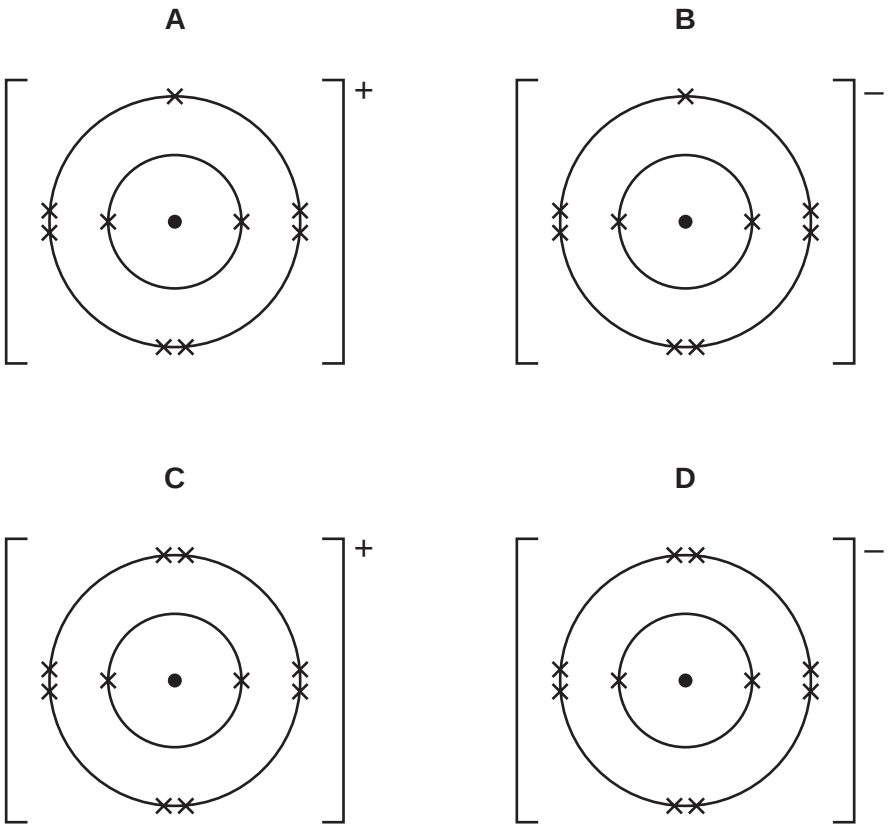
15 Two substances, X and Y, are heated and then cooled. The observations are shown.



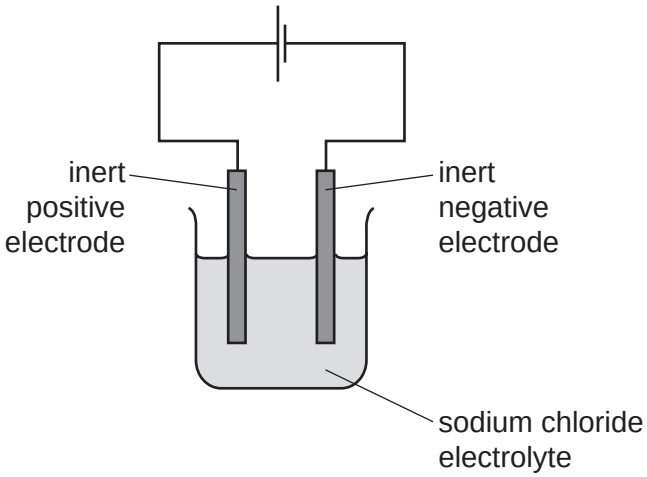
Which type of change occurs when X and Y are heated?

	X	Y
A	chemical	chemical
B	chemical	physical
C	physical	chemical
D	physical	physical

16 Which diagram represents a fluoride ion?



17 The electrolysis of concentrated aqueous sodium chloride is shown.



Which statement describes the product at the cathode?

A It is a colourless gas that pops with a lighted splint.

B It is a colourless gas that relights a glowing splint.

C It is a grey solid.

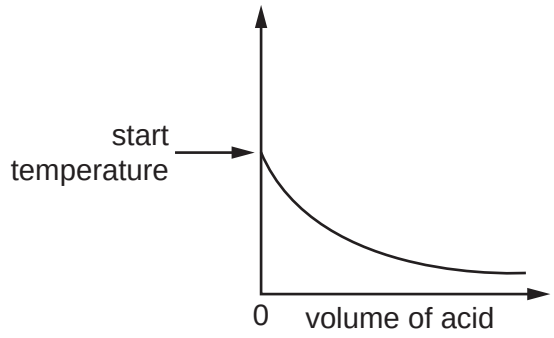
D It is a pale green gas that bleaches litmus paper.

18 An acid is added to an alkali until the final solution is **just** neutral.

The reaction is exothermic.

Which graph shows how the temperature changes as the acid is being added to the alkali?

A



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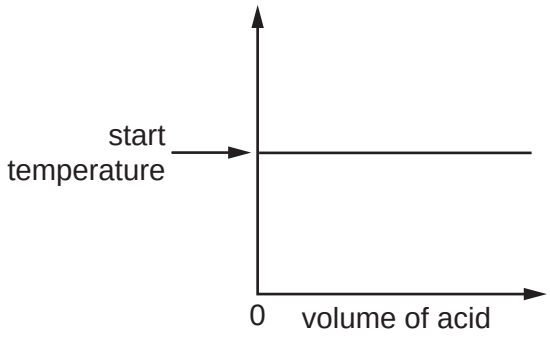

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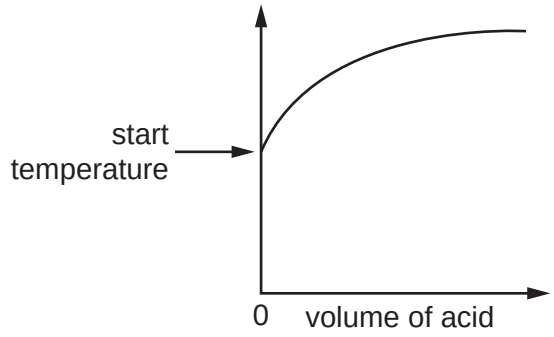

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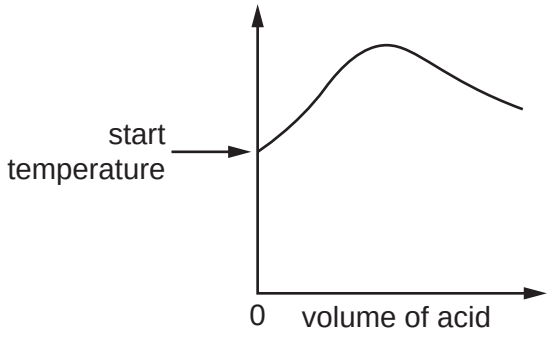


19 In which reaction is zinc being oxidised?

1 $2Zn + O_2 \rightarrow 2ZnO$

2 $ZnO + Mg \rightarrow Zn + MgO$

3 $Zn + CuO \rightarrow ZnO + Cu$

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

20 Which row identifies the types of oxides?

	acidic oxides	basic oxides
A	CaO, Na_2O	CO_2, SO_2
B	CaO, SO_2	CO_2, Na_2O
C	CO_2, Na_2O	CaO, SO_2
D	CO_2, SO_2	CaO, Na_2O

21 Hydrochloric acid and sodium hydroxide neutralise each other to form water and sodium chloride.

Which method is used to make the solution crystallise?

A chromatography

B evaporation

C filtration

D fractional distillation

22 Which statement about the trends in the Periodic Table is correct?

A Elements are arranged in order of nucleon number.

B Elements on the left hand side form acidic oxides.

C The melting point of the Group I elements increases down the group.

D The proton number increases from left to right across the table.

23 Which statement describes the properties of solid metals?

A They are brittle and good thermal conductors.

B They are brittle and poor thermal conductors.

C They are malleable and good thermal conductors.

D They are malleable and poor thermal conductors.

24 A sample of air is analysed before and after it is used in an experiment.

The percentage composition of the air before and after the experiment is recorded.

	nitrogen	oxygen	carbon dioxide	other gases
before	78	21	0.04	small amount
after	78	17	4	small amount

Which process does **not** produce this change in the composition of the air?

A combustion of coal

B combustion of natural gas

C combustion of sulfur

D respiration

25 What is **not** a use of limestone?

A manufacture of calcium oxide

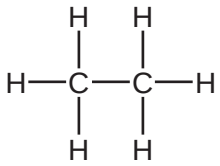
B neutralising industrial waste products

C purification of water

D treating acidic soil

26 The structures of four compounds are shown.

1



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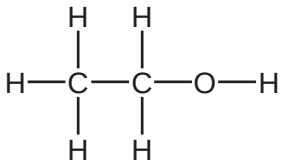

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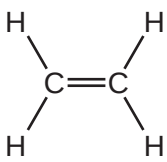

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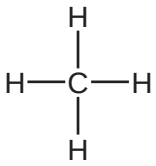


What are the names of the compounds?

	1	2	3	4
A	ethane	ethanol	ethene	methane
B	ethene	methane	ethanol	ethane
C	ethene	methane	ethane	ethanol
D	methane	ethene	ethane	ethanol

27 Which two statements describe addition polymers?

1 They are large molecules.

2 They contain carbon to carbon double bonds.

3 They are small molecules.

4 They are made from small units.

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

28 Which statement is correct?

A Mass is a force and its unit is the kilogram.

B Mass is a force and its unit is the newton.

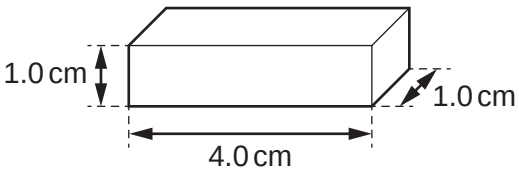
C Weight is a force and its unit is the kilogram.

D Weight is a force and its unit is the newton.

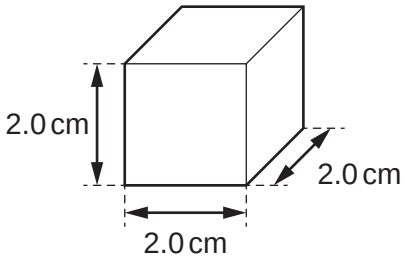
29 The diagrams show four solid objects of equal mass.

Which object is made from the substance with the greatest density?

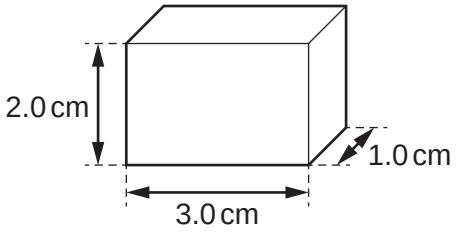
A



B



C



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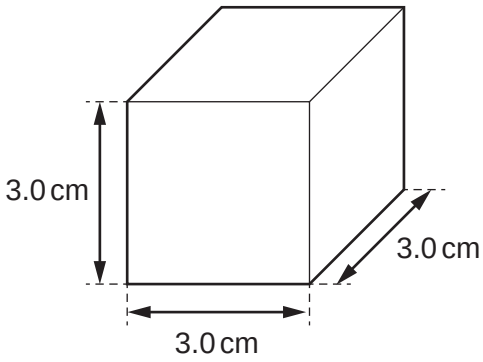


30 To calculate the work done by a force on an object, the size of the force must be known.

Which other quantity must be known?

A the acceleration of the object in the direction of the force

B the distance moved by the object in the direction of the force

C the final speed of the object

D the time for which the force acts on the object

31 Which energy source is non-renewable?

A geothermal

B hydroelectric

C nuclear fission

D wind

32 Diagram 1 represents a wave.

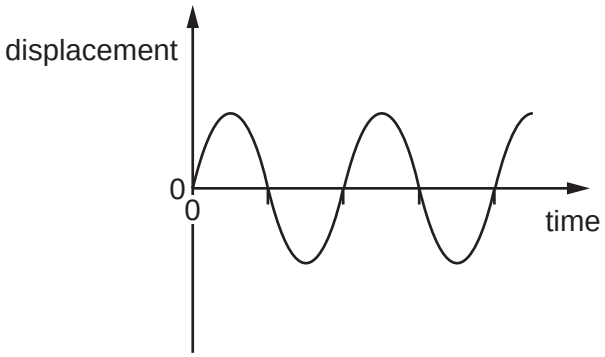
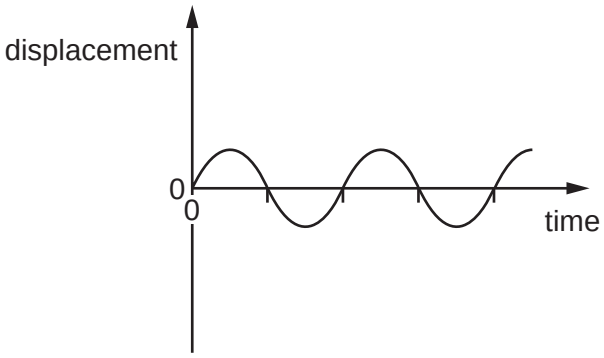


diagram 1

Which diagram represents a wave with twice the frequency and half the amplitude of the wave in diagram 1?

The scales are the same in all the diagrams.

A



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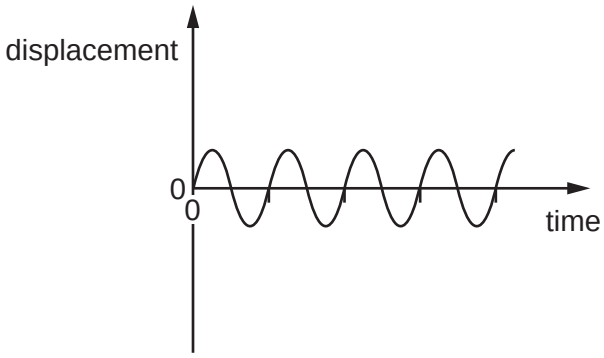

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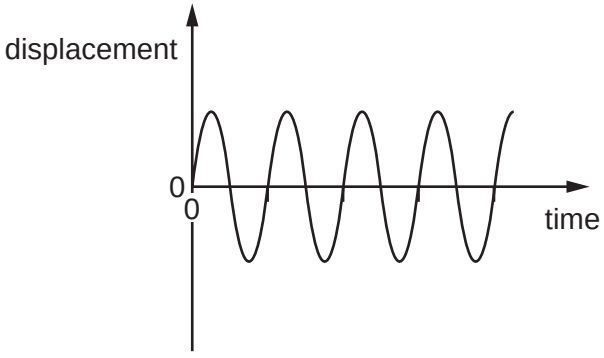

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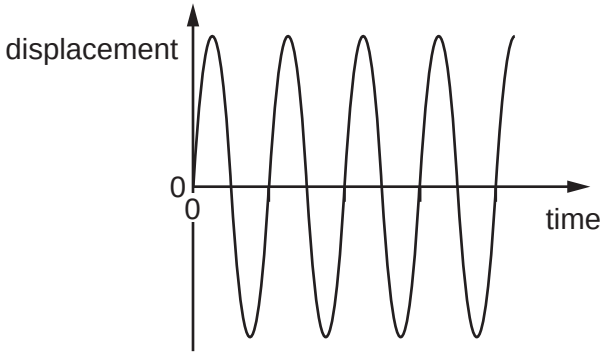


33 A student stands in front of a plane mirror on a wall.

Which statement about the image of the student is **not** correct?

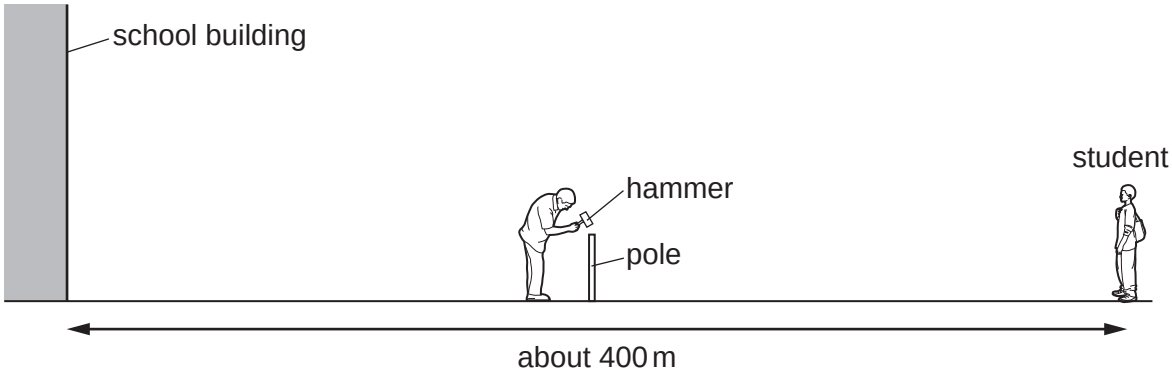
A The image is laterally inverted.

B The image is smaller than the student.

C The image is upright.

D The student and the image are equal distances from the mirror.

34 A sports field is next to a large school building. A student at the far side of the sports field sees a groundsman hit a pole with a hammer.



After the hammer hits the pole, the student hears two bangs.

Why does the student hear two bangs?

	first bang caused by	second bang caused by
A	sound of hammer hitting pole	sound of pole hitting hammer
B	sound reaching the student's left ear	sound reaching the student's right ear
C	sound reaching student directly	sound reflected back from school building
D	sound reflected back from school building	sound reaching student directly

35 Which statement about the core of an electromagnet is correct?

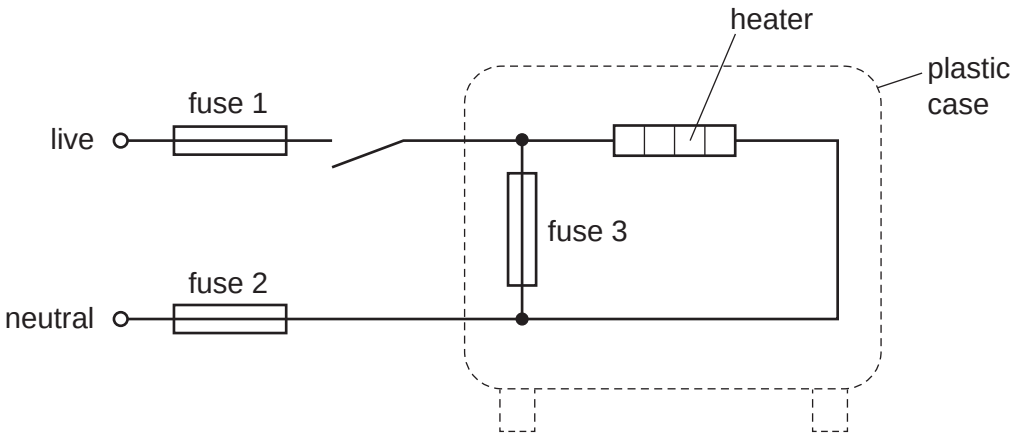
A It is made of soft iron because soft iron is easy to magnetise.

B It is made of soft iron because soft iron does not lose its magnetism easily.

C It is made of steel because steel is easy to magnetise.

D It is made of steel because steel loses its magnetism easily.

36 The diagram shows the connections to an electric heater. The circuit includes three fuses.



Which of the fuses are correctly placed?

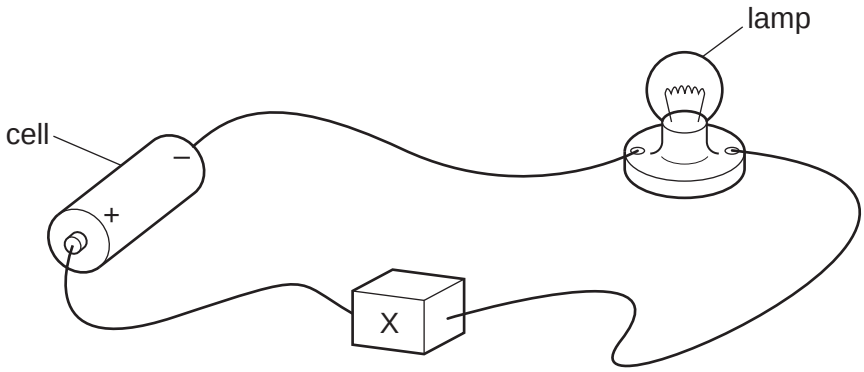
A fuse 1, fuse 2 and fuse 3

B fuse 1 and fuse 2 only

C fuse 1 only

D fuse 2 only

37 In the circuit, component X is used to control the brightness of the lamp.



What is component X?

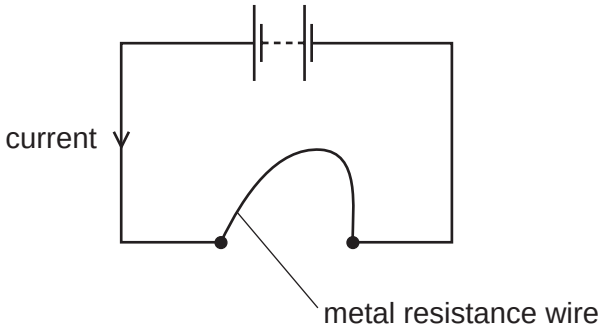
A an ammeter

B a fixed resistor

C a fuse

D a variable resistor

38 A student connects a length of metal resistance wire to a battery.



The student wishes to increase the current in the resistance wire.

Which change does this?

A connecting a second wire in series with the first wire

B heating the wire

C making the wire shorter

D making the wire thinner

39 An atom of an isotope of strontium (Sr) has a proton number of 38 and contains 52 neutrons.

What is the nuclide notation for this isotope?

A $^{52}_{38}\text{Sr}$ **B** $^{90}_{38}\text{Sr}$ **C** $^{38}_{52}\text{Sr}$ **D** $^{90}_{52}\text{Sr}$

40 The half-life of a radioactive isotope is 8.0 days.

How long does it take for the activity to decrease to $\frac{1}{16}$ of its original value?

A 16 days **B** 24 days **C** 32 days **D** 64 days

The Periodic Table of Elements

Group																	
I	II											III	IV	V	VI	VII	VIII
							1 H hydrogen 1										2 He helium 4
3 Li lithium 7	4 Be beryllium 9											5 B boron 11	6 C carbon 12	7 N nitrogen 14	8 O oxygen 16	9 F fluorine 19	10 Ne neon 20
11 Na sodium 23	12 Mg magnesium 24											13 Al aluminium 27	14 Si silicon 28	15 P phosphorus 31	16 S sulfur 32	17 Cl chlorine 35.5	18 Ar argon 40
19 K potassium 39	20 Ca calcium 40	21 Sc scandium 45	22 Ti titanium 48	23 V vanadium 51	24 Cr chromium 52	25 Mn manganese 55	26 Fe iron 56	27 Co cobalt 59	28 Ni nickel 59	29 Cu copper 64	30 Zn zinc 65	31 Ga gallium 70	32 Ge germanium 73	33 As arsenic 75	34 Se selenium 79	35 Br bromine 80	36 Kr krypton 84
37 Rb rubidium 85	38 Sr strontium 88	39 Y yttrium 89	40 Zr zirconium 91	41 Nb niobium 93	42 Mo molybdenum 96	43 Tc technetium –	44 Ru ruthenium 101	45 Rh rhodium 103	46 Pd palladium 106	47 Ag silver 108	48 Cd cadmium 112	49 In indium 115	50 Sn tin 119	51 Sb antimony 122	52 Te tellurium 128	53 I iodine 127	54 Xe xenon 131
55 Cs caesium 133	56 Ba barium 137	57–71 lanthanoids	72 Hf hafnium 178	73 Ta tantalum 181	74 W tungsten 184	75 Re rhenium 186	76 Os osmium 190	77 Ir iridium 192	78 Pt platinum 195	79 Au gold 197	80 Hg mercury 201	81 Tl thallium 204	82 Pb lead 207	83 Bi bismuth 209	84 Po polonium –	85 At astatine –	86 Rn radon –
87 Fr francium –	88 Ra radium –	89–103 actinoids	104 Rf rutherfordium –	105 Db dubnium –	106 Sg seaborgium –	107 Bh bohrium –	108 Hs hassium –	109 Mt meitnerium –	110 Ds darmstadtium –	111 Rg roentgenium –	112 Cn copernicium –		114 Fl flerovium –		116 Lv livermorium –		

Key

atomic number
atomic symbol
name
relative atomic mass

lanthanoids	57 La lanthanum 139	58 Ce cerium 140	59 Pr praseodymium 141	60 Nd neodymium 144	61 Pm promethium –	62 Sm samarium 150	63 Eu europium 152	64 Gd gadolinium 157	65 Tb terbium 159	66 Dy dysprosium 163	67 Ho holmium 165	68 Er erbium 167	69 Tm thulium 169	70 Yb ytterbium 173	71 Lu lutetium 175
actinoids	89 Ac actinium –	90 Th thorium 232	91 Pa protactinium 231	92 U uranium 238	93 Np neptunium –	94 Pu plutonium –	95 Am americium –	96 Cm curium –	97 Bk berkelium –	98 Cf californium –	99 Es einsteinium –	100 Fm fermium –	101 Md mendelevium –	102 No nobelium –	103 Lr lawrencium –

The volume of one mole of any gas is 24 dm^3 at room temperature and pressure (r.t.p.).