Cambridge Assessment International Education
Cambridge International General Certificate of Secondary Education

CO-ORDINATED SCIENCES **0654/11**

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 20.
Electronic calculators may be used.

This document consists of **17** printed pages and **3** blank pages.

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 Which row correctly describes the diffusion of molecules from P to Q?

	P	Q	movement
A	higher concentration	lower concentration	down a concentration gradient
B	higher concentration	lower concentration	up a concentration gradient
C	lower concentration	higher concentration	down a concentration gradient
D	lower concentration	higher concentration	up a concentration gradient

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

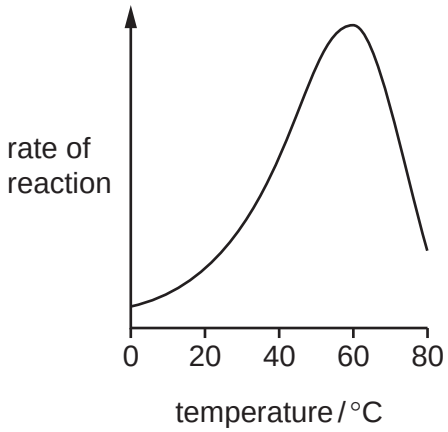
A carbon

B hydrogen

C oxygen

D nitrogen

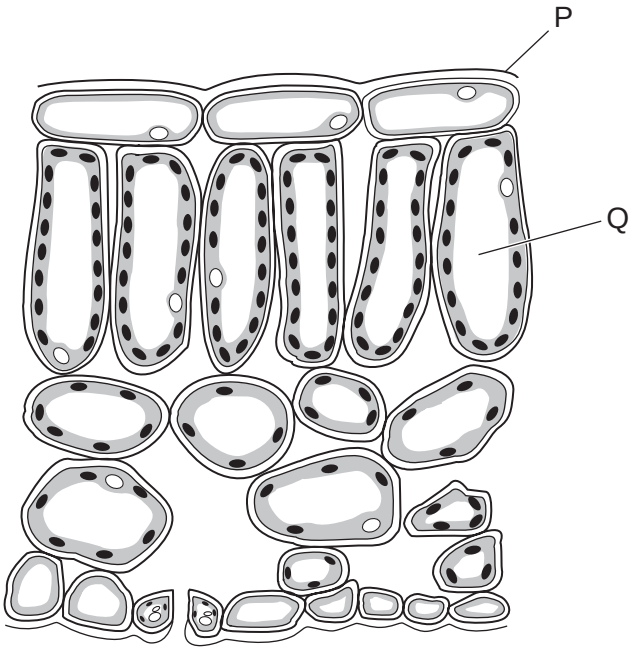
4 The graph shows the activity of an enzyme at different temperatures.



What is the optimum temperature for this enzyme?

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

5 The diagram shows a cross-section through a plant leaf.



Which row identifies P and Q?

	P	Q
A	cuticle	palisade mesophyll
B	cuticle	spongy mesophyll
C	epidermis	palisade mesophyll
D	epidermis	spongy mesophyll

6 Where does most absorption of digested food take place?

A the large intestine

B the liver

C the small intestine

D the stomach

7 Which component is needed for blood to clot?

A hormones

B platelets

C red blood cells

D white blood cells

8 Which substances are used and produced in aerobic respiration?

	carbon dioxide	oxygen	glucose	water
A	produced	used	produced	used
B	produced	used	used	produced
C	used	produced	produced	used
D	used	produced	used	produced

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

A effector

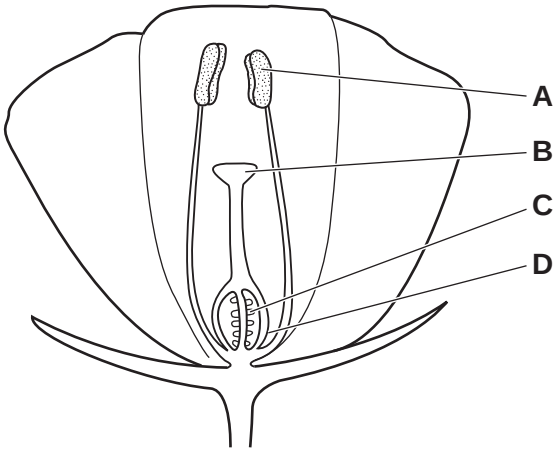
B motor neurone

C sensory neurone

D spinal cord

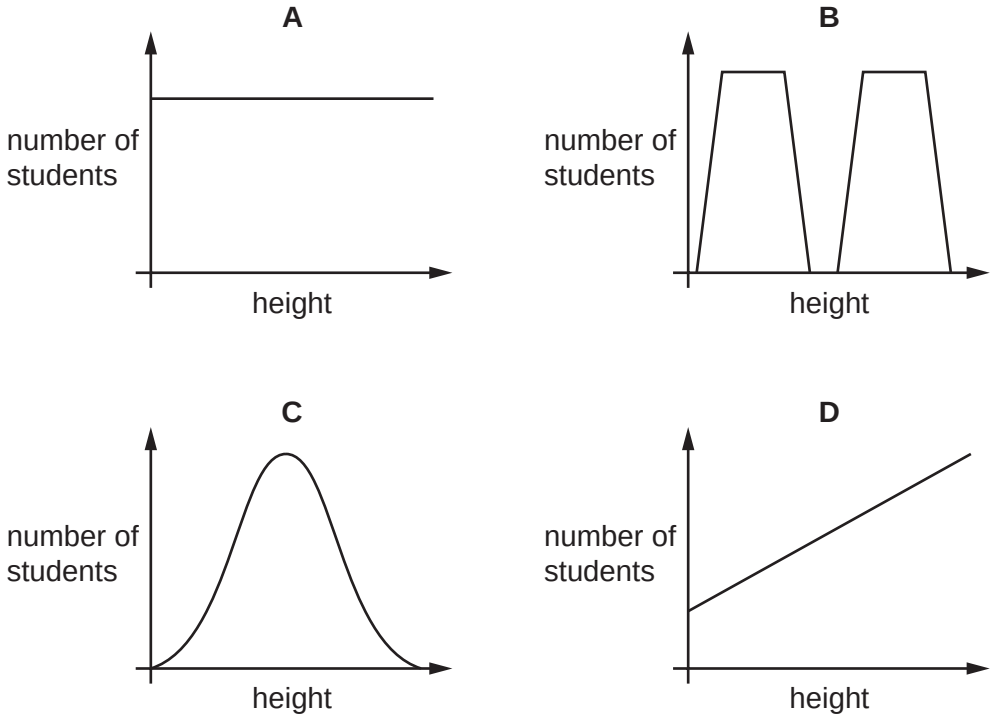
10 The diagram shows a section through an insect-pollinated flower.

When pollination occurs, where must the pollen grains reach?



11 A teacher measures the heights of each student in a class. All the students were born in the same year. She presents the results as a graph.

Which graph is most likely to be correct?



12 In a food chain, what do all living organisms get from their food?

A a supply of water

B oxygen for respiration

C protection from disease

D the energy they need

13 In the carbon cycle, which process decreases the level of carbon dioxide in the atmosphere?

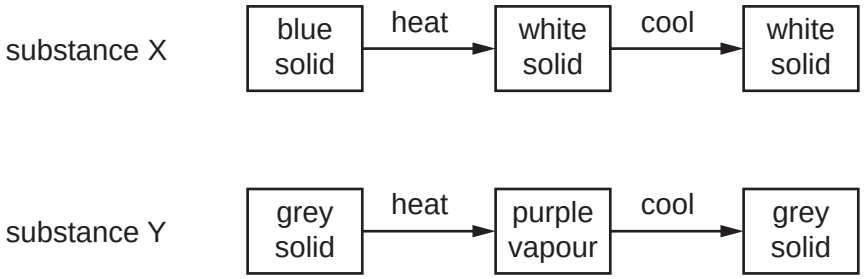
A combustion

B decomposition

C photosynthesis

D respiration

14 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

15 A hydrocarbon contains twice as many hydrogen atoms as carbon atoms.

What is the formula of this compound?

A C_3H_6 **B** C_4H_{10} **C** C_2H_6O **D** C_3H_6O

16 What is the electrolyte that is used when a nickel spoon is electroplated with copper?

A copper

B copper sulfate solution

C nickel sulfate solution

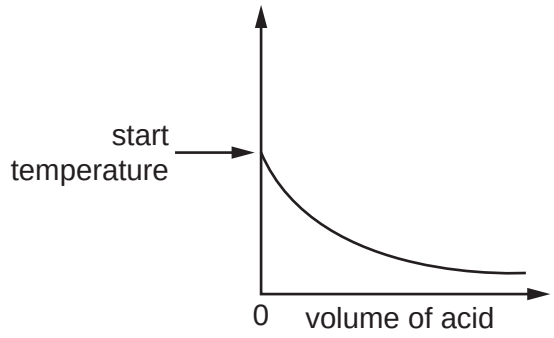
D nickel

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

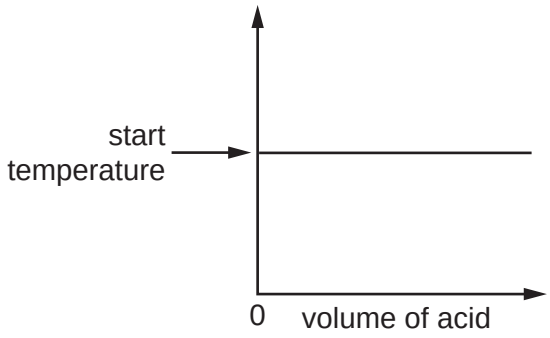
The reaction is exothermic.

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

A



B



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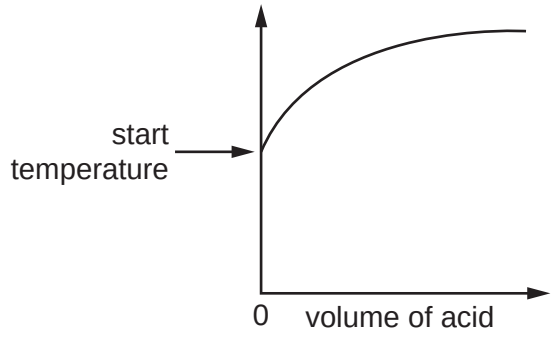
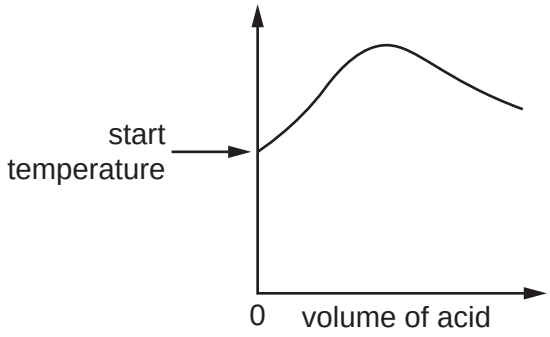


D



18 Iron increases the rate of a reaction.

What is the role of iron in this reaction?

A catalyst

B electrolyte

C element

D isotope

19 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

20 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

21 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.

22 Some properties of aluminium are listed.

1 conducts electricity

2 malleable

3 resistant to corrosion

Which properties make aluminium suitable for use as food containers?

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

23 Which row describes the colour changes when water is added to anhydrous copper(II) sulfate and to cobalt(II) chloride?

	copper(II) sulfate	cobalt(II) chloride
A	blue → white	blue → pink
B	blue → white	pink → blue
C	white → blue	blue → pink
D	white → blue	pink → blue

24 Which processes lead to the formation of a greenhouse gas?

1 reaction of sodium with water

2 respiration

3 combustion of fossil fuels

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

25 Which two statements about calcium carbonate are correct?

1 It neutralises acidic industrial waste.

2 It lowers the pH of soil.

3 It undergoes thermal decomposition to calcium hydroxide.

4 It reacts with dilute hydrochloric acid to form carbon dioxide.

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

26 What is the main constituent of natural gas?

A ethane

B ethene

C methane

D nitrogen

27 Which statements about poly(ethene) molecules are correct?

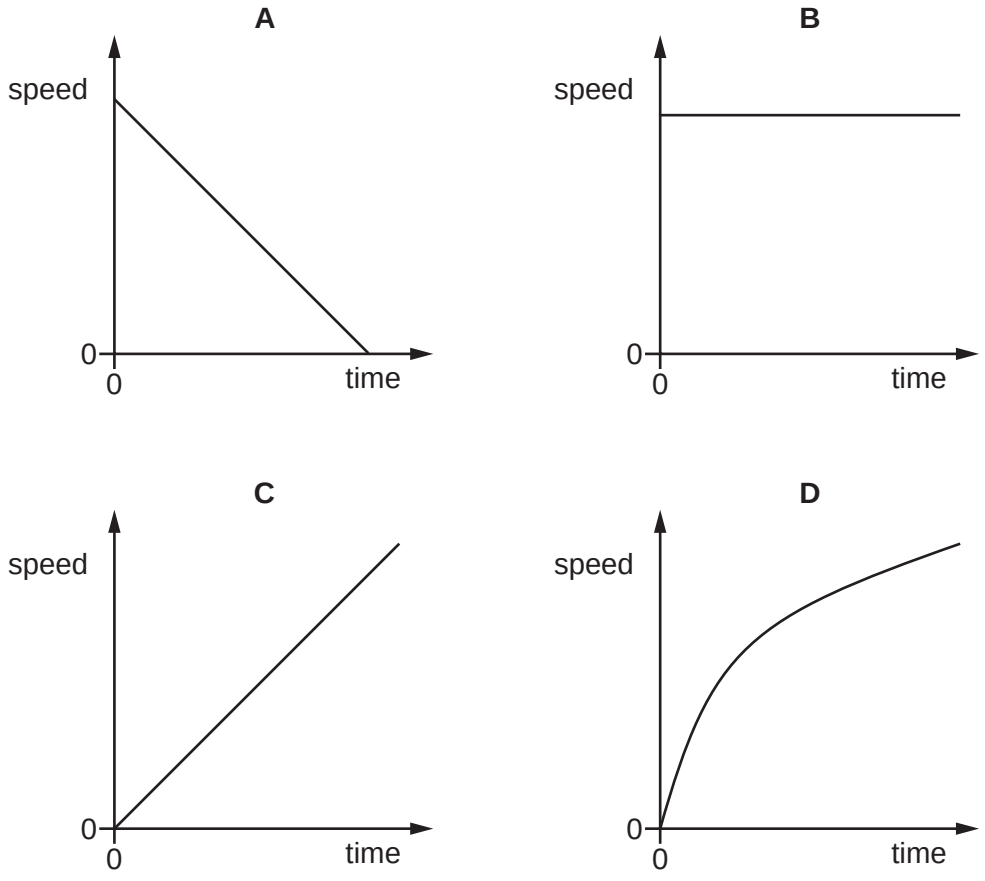
1 They are long chains formed from many monomer units.

2 They are made by addition polymerisation.

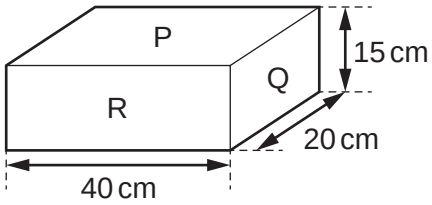
3 They contain many double bonds.

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

28 Which speed-time graph represents an object travelling at constant speed?



29 The diagram shows a rectangular block with three faces labelled P, Q and R. The dimensions of the block are also shown.



Each face of the block is placed in turn on a flat, horizontal surface.

Which statement is correct?

A The smallest pressure is produced with the block resting on face P.

B The smallest pressure is produced with the block resting on face Q.

C The smallest pressure is produced with the block resting on face R.

D The pressure is the same whether the block is resting on face P, face Q or face R.

30 When evaporation occurs, molecules escape from the surface of a liquid.

Which molecules escape, and what happens to the average speed of the molecules remaining in the liquid?

	escaping molecules	average speed of remaining molecules
A	less energetic	decreases
B	less energetic	increases
C	more energetic	decreases
D	more energetic	increases

31 Which region of the electromagnetic spectrum is often involved in heat transfer by radiation?

A infra-red

B radio

C ultraviolet

D X-ray

32 Diagram 1 represents a wave.

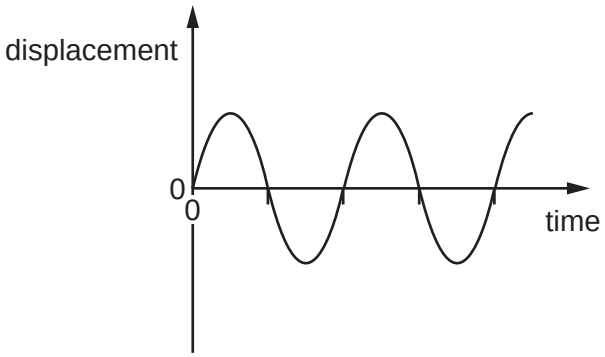
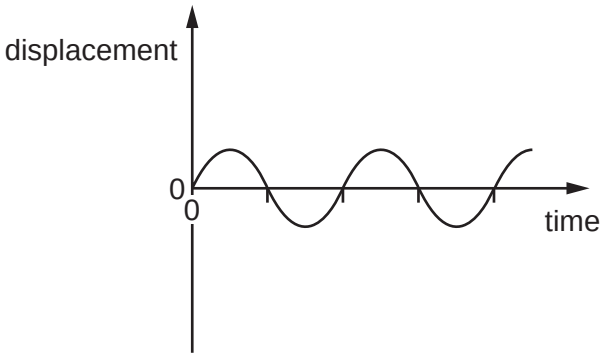


diagram 1

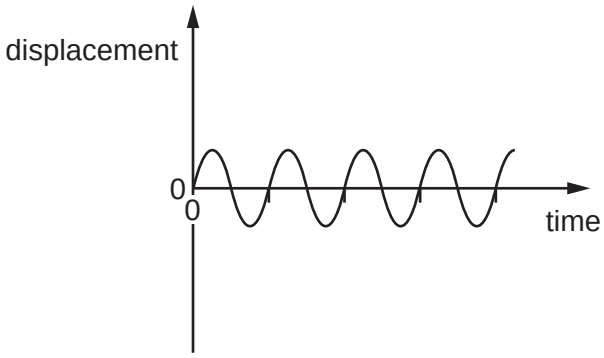
Which diagram represents a wave with twice the frequency and half the amplitude of the wave in diagram 1?

The scales are the same in all the diagrams.

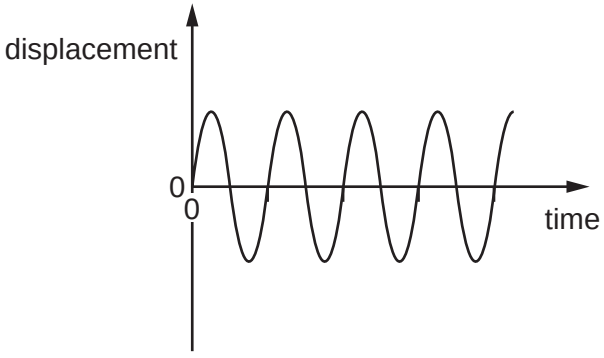
A



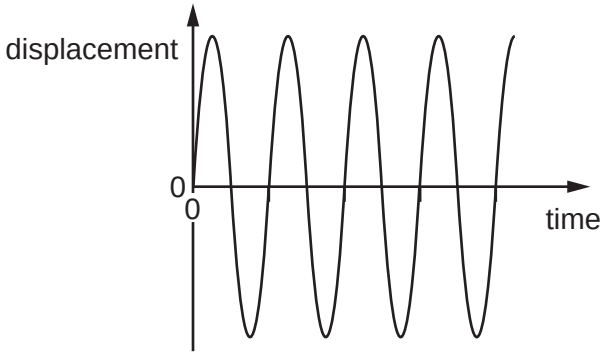
B



C

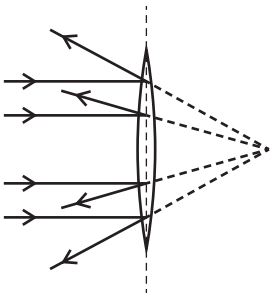


D

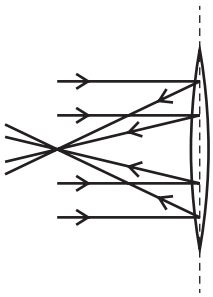


33 Which diagram shows the effect of a converging lens on parallel rays of light?

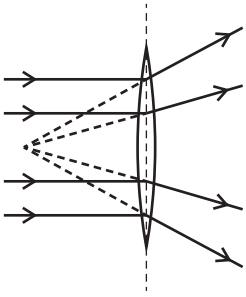
A



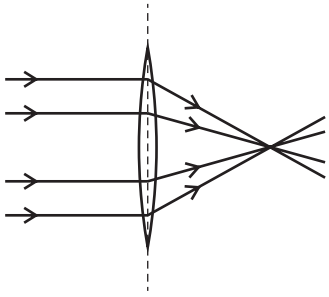
B



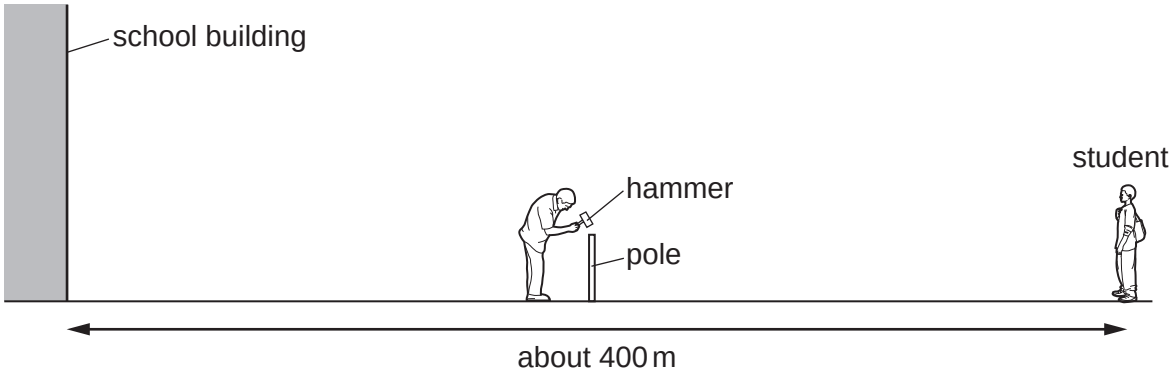
C



D



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.

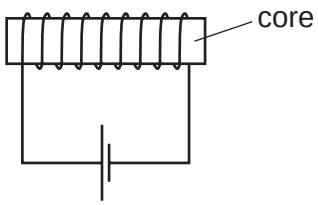


After the hammer hits the pole, the student hears two bangs.

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

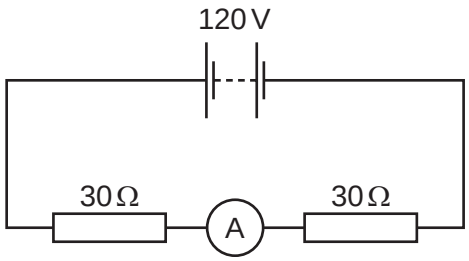
35 The diagram shows an electromagnet.



Which metal is used for the core of the electromagnet and why?

	metal	reason
A	iron	it becomes a permanent magnet
B	iron	it is easily magnetised
C	steel	it becomes a permanent magnet
D	steel	it is easily magnetised

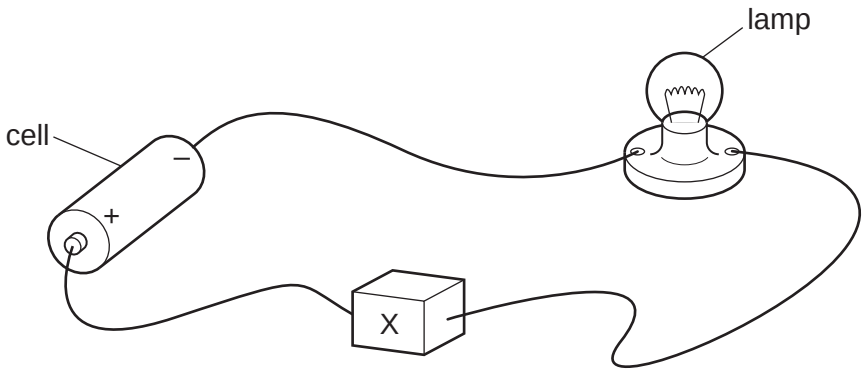
36 The diagram shows two 30 Ω resistors and an ammeter connected to a 120 V battery.



What is the reading on the ammeter?

A 0.25 A **B** 0.50 A **C** 2.0 A **D** 4.0 A

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



What is component X?

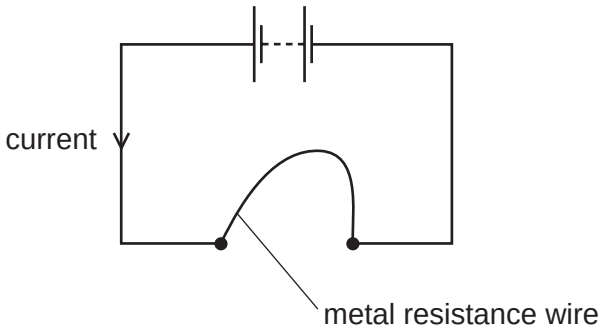
A an ammeter

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

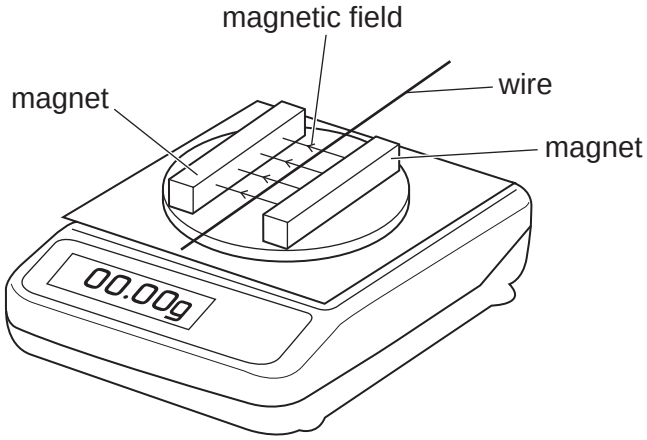
B heating the wire

C making the wire shorter

D making the wire thinner

39 The diagram shows two magnets on an electronic balance. The magnets produce a magnetic field in the direction shown. A wire lies in the magnetic field.

The reading on the balance is zero.



A current is produced in the wire and the balance now shows a positive reading.

Which change produces a negative reading on the balance?

A decreasing the current

B increasing the current

C reversing the current direction

D switching off the current

40 There are three different isotopes of hydrogen.

$$^{1}_{1}H \qquad ^{2}_{1}H \qquad ^{3}_{1}H$$

Which statement about the nuclei of these three isotopes is correct?

A They have different numbers of electrons.

B They have the same number of nucleons.

C They have the same number of neutrons.

D They have the same number of protons.

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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.).