UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
International General Certificate of Secondary Education

COMBINED SCIENCE **0653/13**

Paper 1 Multiple Choice **May/June 2013**

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, highlighters, 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.

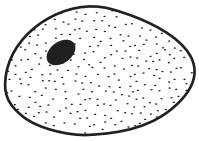
There are **forty** questions on this paper. Answer **all** questions. For each question there are four possible answers **A**, **B**, **C** and **D**.
Choose the **one** you consider correct and record your choice in **soft pencil** on the separate Answer Sheet.

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 The diagram shows an animal cell. The maximum diameter of the diagram is 25 mm.



The actual cell was 0.02 mm maximum diameter.

What is the magnification of the drawing?

A ×25 **B** ×200 **C** ×1250 **D** ×2500

2 Which substance can enter a plant cell by diffusion?

A carbon dioxide

B cellulose

C protein

D starch

3 Which two chemical substances are required for photosynthesis?

A carbon dioxide and glucose

B glucose and oxygen

C oxygen and water

D water and carbon dioxide

4 A test-tube contains a solution of an enzyme.

Which colour is obtained when the biuret test is carried out on this solution?

A blue

B blue-black

C orange

D purple

5 What is the word equation for aerobic respiration?

A carbon dioxide + glucose → oxygen + water

B carbon dioxide + water → glucose + oxygen

C glucose + oxygen → carbon dioxide + water

D oxygen + water → carbon dioxide + glucose

6 Mixtures were made from 5 cm^3 of a starch solution and 2 cm^3 of a solution of an enzyme that digests starch. The mixtures were all kept at the same temperature.

The table shows the different concentrations of the starch and starch-digesting enzyme solutions in each mixture.

In which mixture would it take the **longest** time for all the starch to disappear?

	concentration of starch solution / %	concentration of starch-digesting enzyme / %
A	4	8
B	4	4
C	2	8
D	2	4

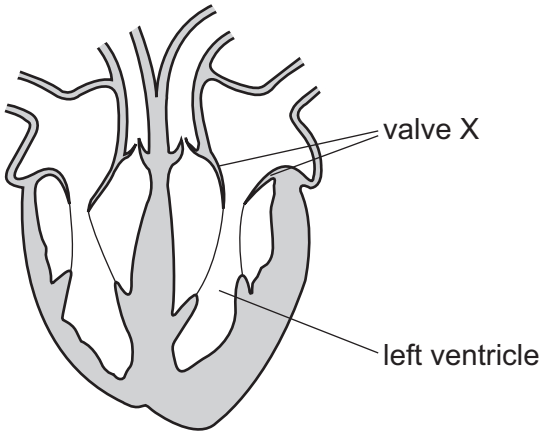
7 In what form is water as it enters and is lost from a plant?

	as it enters	as it is lost
A	liquid	liquid
B	liquid	vapour
C	vapour	liquid
D	vapour	vapour

8 What is the effect of adrenaline in the control of metabolic activity?

	blood glucose concentration	rate of heart beat
A	decreases	decreases
B	decreases	increases
C	increases	decreases
D	increases	increases

9 The diagram shows a section through the heart.



Which events occur as the left ventricle contracts?

A atrial wall contracts and valve X closes

B atrial wall contracts and valve X opens

C atrial wall relaxes and valve X closes

D atrial wall relaxes and valve X opens

10 What occurs about two weeks after menstruation?

A the release of a gamete from an ovary

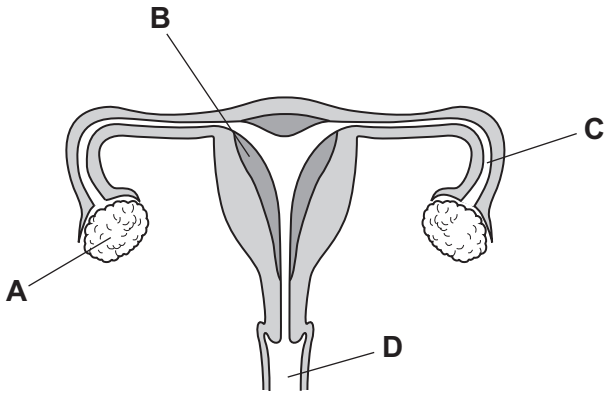
B the release of a gamete from the uterus

C the release of a zygote from an ovary

D the release of a zygote from the uterus

11 The diagram shows a section through the female reproductive system.

Where is the fertilised egg implanted?



12 What describes asexual reproduction?

	number of parents	a zygote is produced	offspring identical to the parent
A	1	no	yes
B	1	yes	no
C	2	no	yes
D	2	yes	no

13 The diagram shows five organisms in a food chain.

$$T \rightarrow U \rightarrow V \rightarrow W \rightarrow X$$

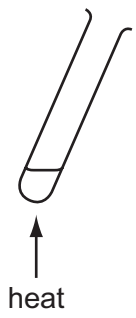
Which organisms are consumers?

A T, U and V **B** T, W and X **C** T, V and X **D** U, V and W

14 Aqueous copper(II) sulfate consists of copper(II) sulfate dissolved in water.

Which apparatus could **not** be used to remove water from this solution?

A



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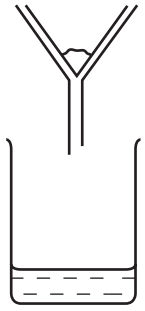
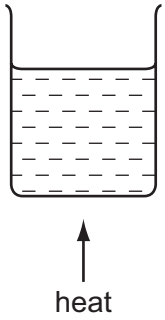
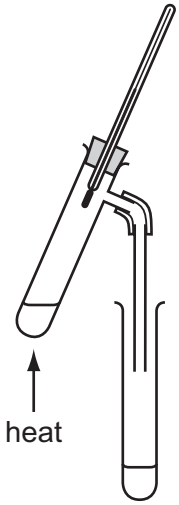


C



D



15 The reaction of zinc and sulfur to form zinc sulfide is exothermic.

Which information in the table is correct?

	elements in zinc sulfide	energy change during the formation of zinc sulfide
A	difficult to separate	heat given out
B	difficult to separate	heat taken in
C	easy to separate	heat given out
D	easy to separate	heat taken in

16 A student carries out experiments with zinc and dilute hydrochloric acid.

Which change in conditions makes the reaction slower?

A adding a suitable catalyst

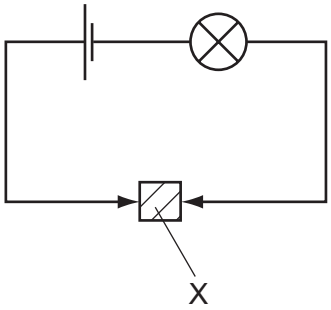
B increasing the concentration of the acid

C increasing the particle size of the zinc

D increasing the temperature

17 A solid X is placed in the circuit shown.

The lamp lights.



What is X?

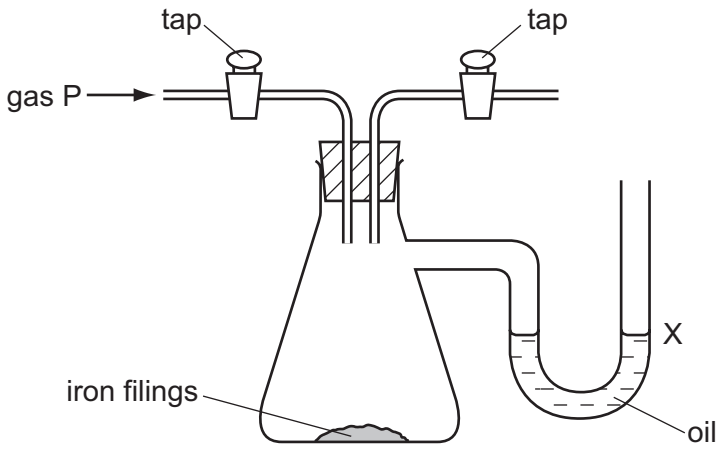
A an alloy

B a compound

C an electrolyte

D a salt

18 The diagram shows an experiment on the rusting of iron.



The flask is filled with gas P. The taps are closed and the apparatus is left for a week.

The experiment is repeated with four different gases.

What happens to the oil level at X?

	gas P	oil level at X
A	damp nitrogen	rises
B	damp oxygen	falls
C	dry nitrogen	falls
D	dry oxygen	rises

19 Which statements about air are correct?

1 Air contains a small amount of argon which is a noble gas.

2 Air is made up of 78% oxygen and 21% nitrogen.

3 Air contains carbon dioxide which is a product of both respiration and the combustion of natural gas.

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

20 Which mixture **cannot** be separated by distillation?

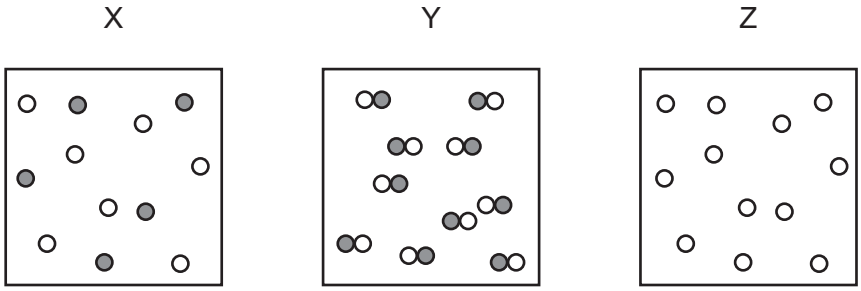
A air

B petroleum

C salt water

D sulfur and iron

21 The diagrams represent the particles in substances X, Y and Z.



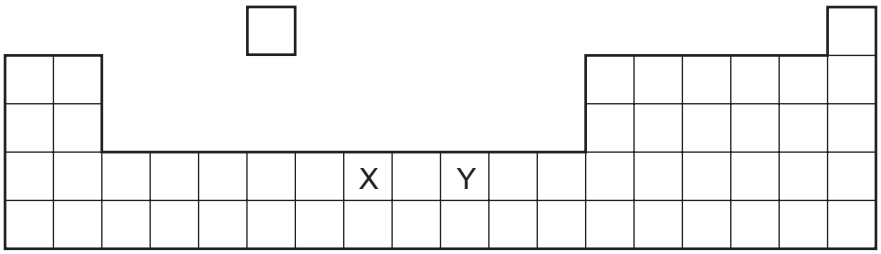
Which row correctly identifies X, Y and Z as an element, a compound or a mixture?

	element	compound	mixture
A	X	Y	Z
B	Y	Z	X
C	Z	X	Y
D	Z	Y	X

22 Which substance conducts electricity?

A $CO_2(g)$ **B** $NaCl(s)$ **C** NaOH(aq) **D** S(s)

23 The diagram shows an outline of part of the Periodic Table.



What do elements X and Y have in common?

1 They form coloured compounds.

2 They can be used as catalysts.

3 They have low melting points.

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

24 The equation shows the reaction of copper oxide with carbon.

$$2CuO + C \rightarrow 2Cu + CO_2$$

In the reaction, the carbon is the ……1…… agent and is ……2…… during the reaction.

Which words complete gaps 1 and 2?

	1	2
A	oxidising	oxidised
B	oxidising	reduced
C	reducing	oxidised
D	reducing	reduced

25 Which pair of gases can be identified using limewater and damp litmus paper?

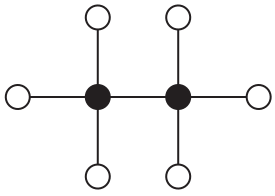
A carbon dioxide and chlorine

B carbon dioxide and hydrogen

C chlorine and oxygen

D hydrogen and chlorine

26 The diagram shows a molecule of ethane.



key
● carbon atom
○ hydrogen atom

What is the molecular formula of ethane?

A CH_6 **B** CH_3 **C** C_2H_4 **D** C_2H_6

27 Three boiling tubes are each filled with a gas from Group VII in the Periodic Table.

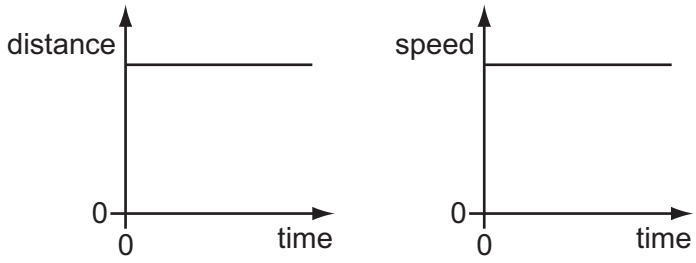
Gas 1 is brown. Gas 2 is purple. Gas 3 is green.

Which gases are in the tubes?

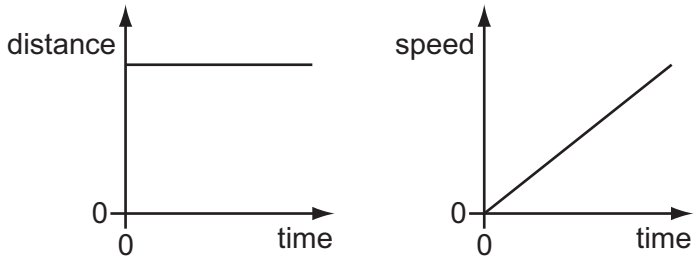
	gas 1	gas 2	gas 3
A	C*l*	I	Br
B	Br	C*l*	I
C	Br	I	C*l*
D	I	Br	C*l*

28 Which pair of distance / time and speed / time graphs represents an object which is ... h constant speed?

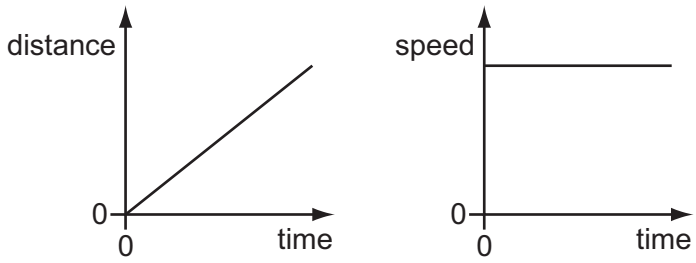
A



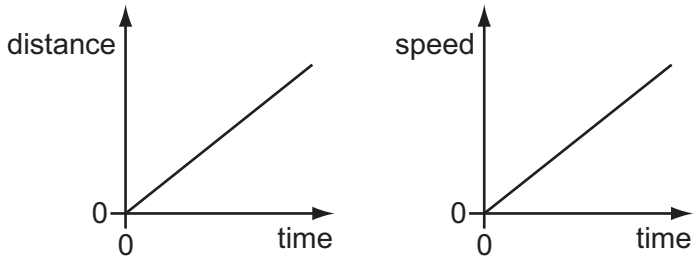
B



C



D



29 When sweat evaporates, which change of state takes place?

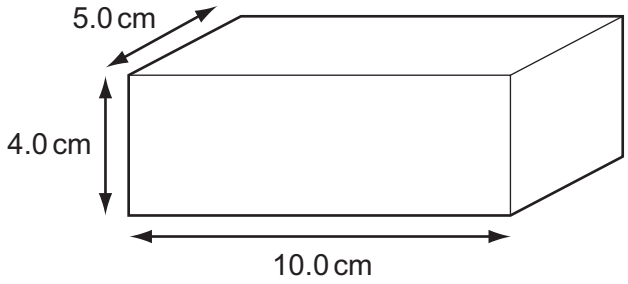
A gas to liquid

B liquid to gas

C liquid to solid

D solid to gas

30 A rectangular metal block has the dimensions shown. The density of the metal is 8.0 g



What is the mass of the metal block?

A 160 g **B** 320 g **C** 400 g **D** 1600 g

31 Which energy resource is non-renewable?

A geothermal energy

B hydroelectric energy

C nuclear energy

D wave energy

32 The International Space Station orbits the Earth in the vacuum above the atmosphere.

The electrical systems in the Space Station produce heat.

How is this heat transferred from the external surfaces of the Space Station into space?

A conduction only

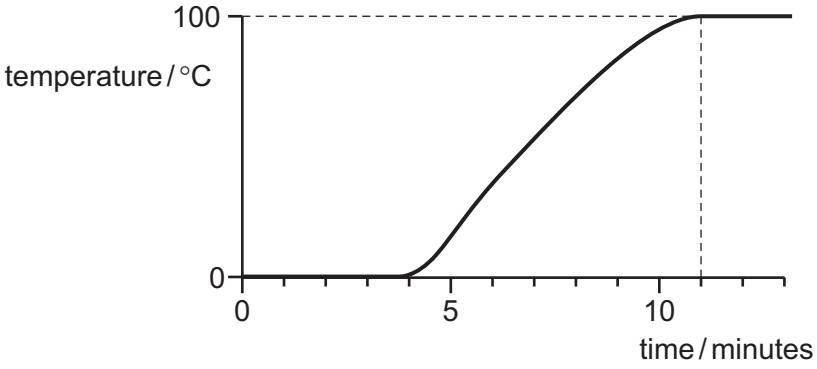
B convection only

C radiation only

D conduction, convection and radiation

33 A block of ice is supplied with heat at a constant rate. Eventually, the melted ice boils.

The graph shows how the temperature changes with time.



How long does it take to melt all the ice?

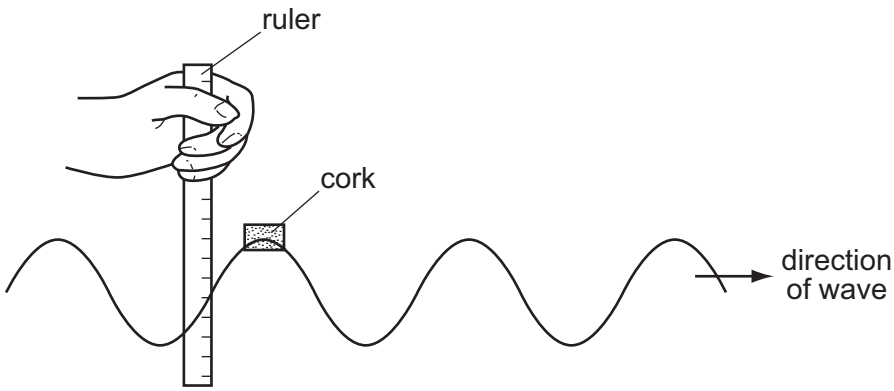
A 4 minutes **B** 7 minutes **C** 11 minutes **D** 13 minutes

34 Electromagnetic waves have many different applications.

Which row identifies the type of electromagnetic wave used in each application?

	satellite television	terrestrial television (not satellite)	television remote controllers
A	microwaves	radio waves	infrared waves
B	microwaves	radio waves	microwaves
C	radio waves	infrared waves	infrared waves
D	radio waves	infrared waves	microwaves

35 A student measures the distance a cork moves up and down on a wave in a tank of w



Which quantity can she obtain from this measurement?

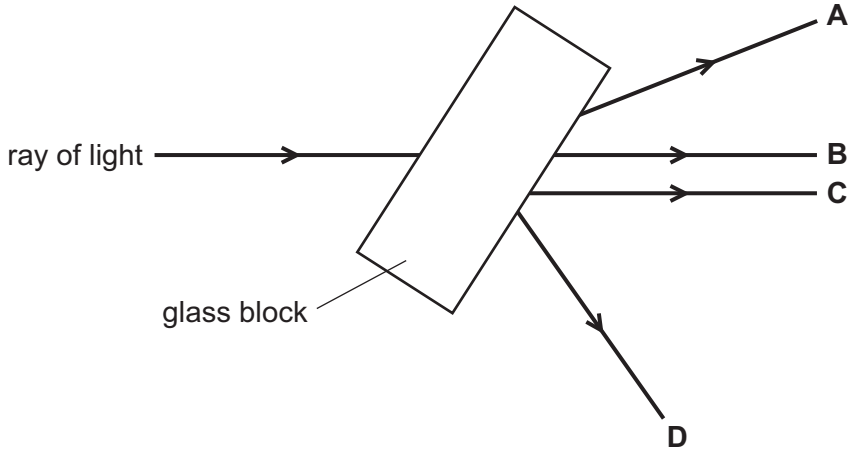
A amplitude

B frequency

C speed

D wavelength

36 Which labelled ray shows the path of the ray of light after it has passed through the glass block?

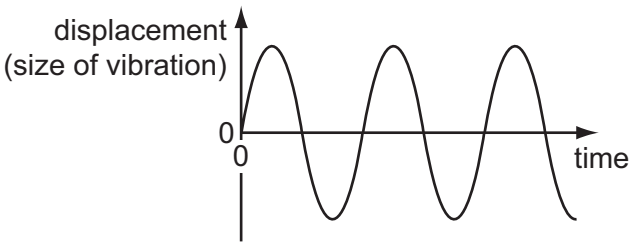


37 A microphone is connected to an oscilloscope. The oscilloscope produces graphs of [illegible] sounds.

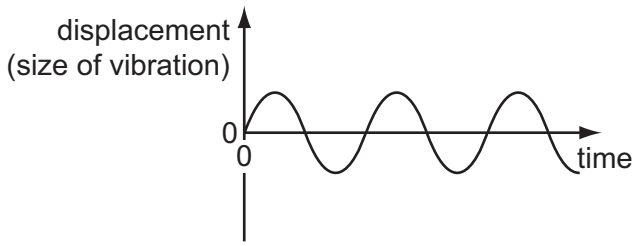
The scales for the graphs are the same.

Which graph shows the quietest sound with the highest pitch?

A



B



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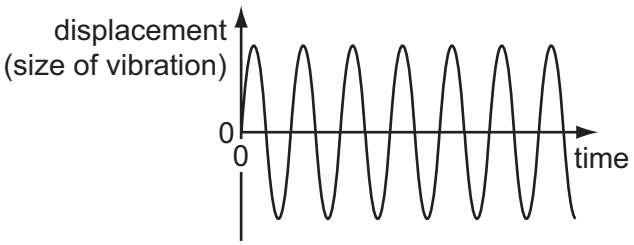

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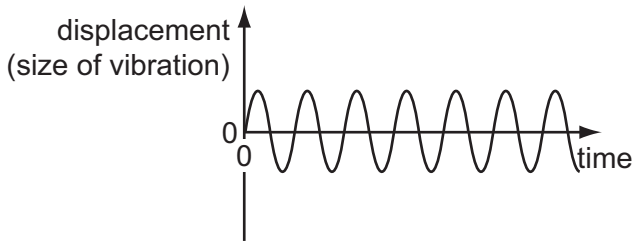
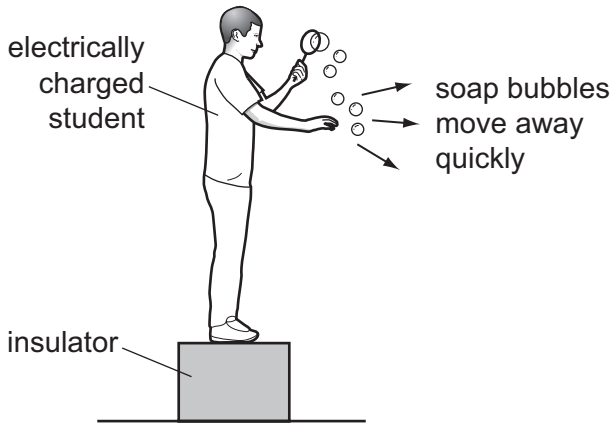


38 An electrically charged student produces soap bubbles. When he holds his hand near the bubbles, they move away quickly from his hand.



For this movement of the bubbles to happen, which statement is correct?

A The bubbles must be negatively charged.

B The bubbles must be positively charged.

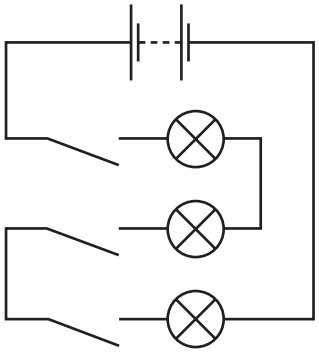
C The bubbles must have the opposite charge to the charge on the student.

D The bubbles must have the same charge as the charge on the student.

39 An electrician wishes to connect three lamps in a circuit so that each lamp can be switched on and off separately.

Which circuit should be used?

A



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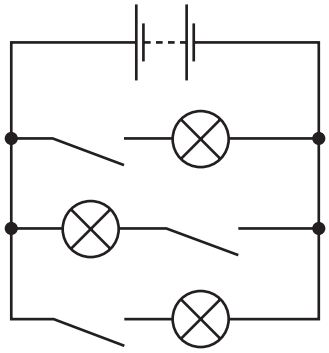

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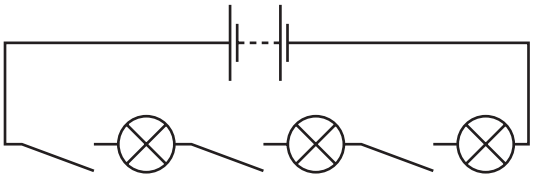

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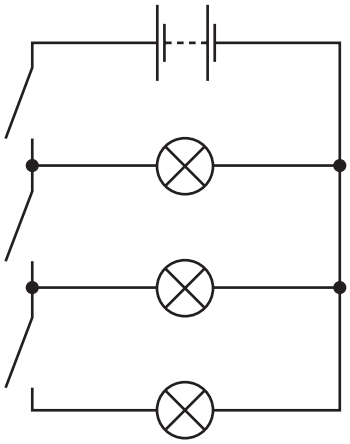
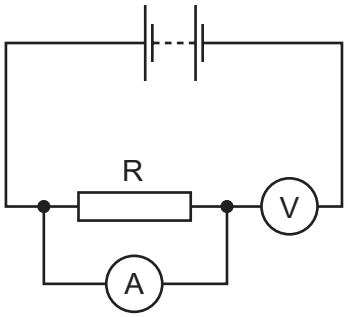


40 A student wishes to find the resistance of resistor R.

The diagrams show four possible circuits which the student could use.

Which circuit can be used to find the resistance of resistor R?

A



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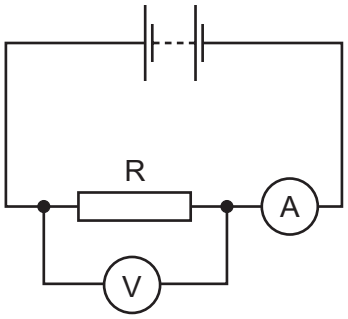

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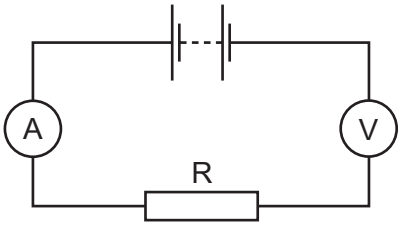

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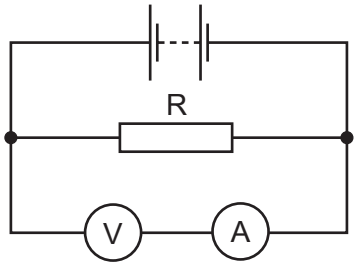

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DATA SHEET
The Periodic Table of the Elements

Group																	
I	II									III	IV	V	VI	VII	0
				1 H Hydrogen 1											4 He Helium 2
7 Li Lithium 3	9 Be Beryllium 4									11 B Boron 5	12 C Carbon 6	14 N Nitrogen 7	16 O Oxygen 8	19 F Fluorine 9	20 Ne Neon 10
23 Na Sodium 11	24 Mg Magnesium 12									27 Al Aluminium 13	28 Si Silicon 14	31 P Phosphorus 15	32 S Sulfur 16	35.5 Cl Chlorine 17	40 Ar Argon 18
39 K Potassium 19	40 Ca Calcium 20	45 Sc Scandium 21	48 Ti Titanium 22	51 V Vanadium 23	52 Cr Chromium 24	55 Mn Manganese 25	56 Fe Iron 26	59 Co Cobalt 27	59 Ni Nickel 28	64 Cu Copper 29	65 Zn Zinc 30	70 Ga Gallium 31	73 Ge Germanium 32	75 As Arsenic 33	79 Se Selenium 34	80 Br Bromine 35	84 Kr Krypton 36
85 Rb Rubidium 37	88 Sr Strontium 38	89 Y Yttrium 39	91 Zr Zirconium 40	93 Nb Niobium 41	96 Mo Molybdenum 42	Tc Technetium 43	101 Ru Ruthenium 44	103 Rh Rhodium 45	106 Pd Palladium 46	108 Ag Silver 47	112 Cd Cadmium 48	115 In Indium 49	119 Sn Tin 50	122 Sb Antimony 51	128 Te Tellurium 52	127 I Iodine 53	131 Xe Xenon 54
133 Cs Caesium 55	137 Ba Barium 56	139 La Lanthanum 57 *	178 Hf Hafnium 72	181 Ta Tantalum 73	184 W Tungsten 74	186 Re Rhenium 75	190 Os Osmium 76	192 Ir Iridium 77	195 Pt Platinum 78	197 Au Gold 79	201 Hg Mercury 80	204 Tl Thallium 81	207 Pb Lead 82	209 Bi Bismuth 83	Po Polonium 84	At Astatine 85	Rn Radon 86
Fr Francium 87	226 Ra Radium 88	227 Ac Actinium 89 †															

140 Ce Cerium 58	141 Pr Praseodymium 59	144 Nd Neodymium 60	Pm Promethium 61	150 Sm Samarium 62	152 Eu Europium 63	157 Gd Gadolinium 64	159 Tb Terbium 65	162 Dy Dysprosium 66	165 Ho Holmium 67	167 Er Erbium 68	169 Tm Thulium 69	173 Yb Ytterbium 70	175 Lu Lutetium 71
232 Th Thorium 90	Pa Protactinium 91	238 U Uranium 92	Np Neptunium 93	Pu Plutonium 94	Am Americium 95	Cm Curium 96	Bk Berkelium 97	Cf Californium 98	Es Einsteinium 99	Fm Fermium 100	Md Mendelevium 101	No Nobelium 102	Lr Lawrencium 103

*58-71 Lanthanoid series
†90-103 Actinoid series

Key: a = relative atomic mass; X = atomic symbol; b = proton (atomic) number

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