Cambridge International Examinations
Cambridge International General Certificate of Secondary Education

CHEMISTRY **0620/11**

Paper 1 Multiple Choice **October/November 2015**

45 Minutes

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

0290816641

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.

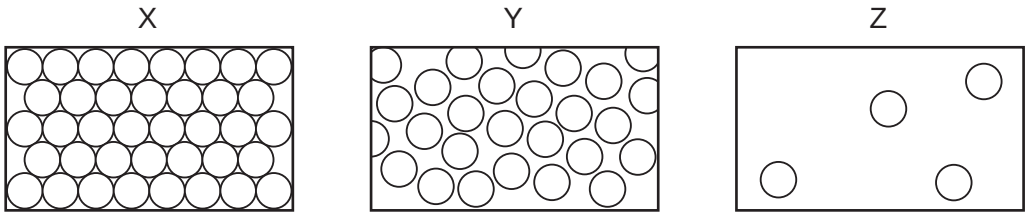
Each correct answer will score one mark. A mark will not be deducted for a wrong answer.
Any rough working should be done in this booklet.
A copy of the Periodic Table is printed on page 20.
Electronic calculators may be used.

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 **17** printed pages and **3** blank pages.

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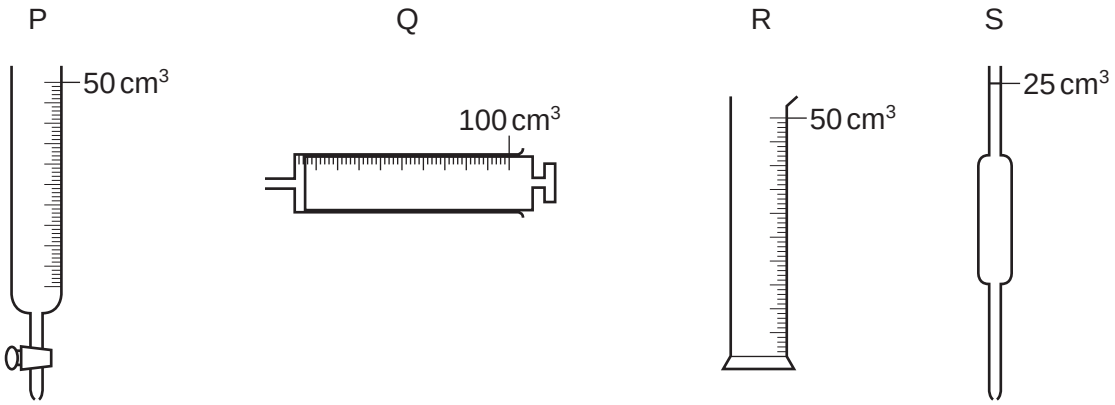
1 Diagrams X, Y and Z represent the three states of matter.



Which change occurs during boiling?

A X to Y **B** Y to Z **C** Z to X **D** Z to Y

2 P, Q, R and S are pieces of apparatus.



Which row describes the correct apparatus for the measurement made?

	apparatus	measurement made
A	P	the volume of acid added to alkali in a titration
B	Q	1 cm^3 of acid to add to calcium carbonate in a rate-determining experiment
C	R	75 cm^3 of a gas given off in a rate-determining experiment
D	S	20 cm^3 of alkali for use in a titration

3 Which statement about atoms is correct?

A Atoms contain protons and electrons in the nucleus.

B Neutrons are negatively charged.

C Protons are positively charged.

D The nucleon number is the number of neutrons.

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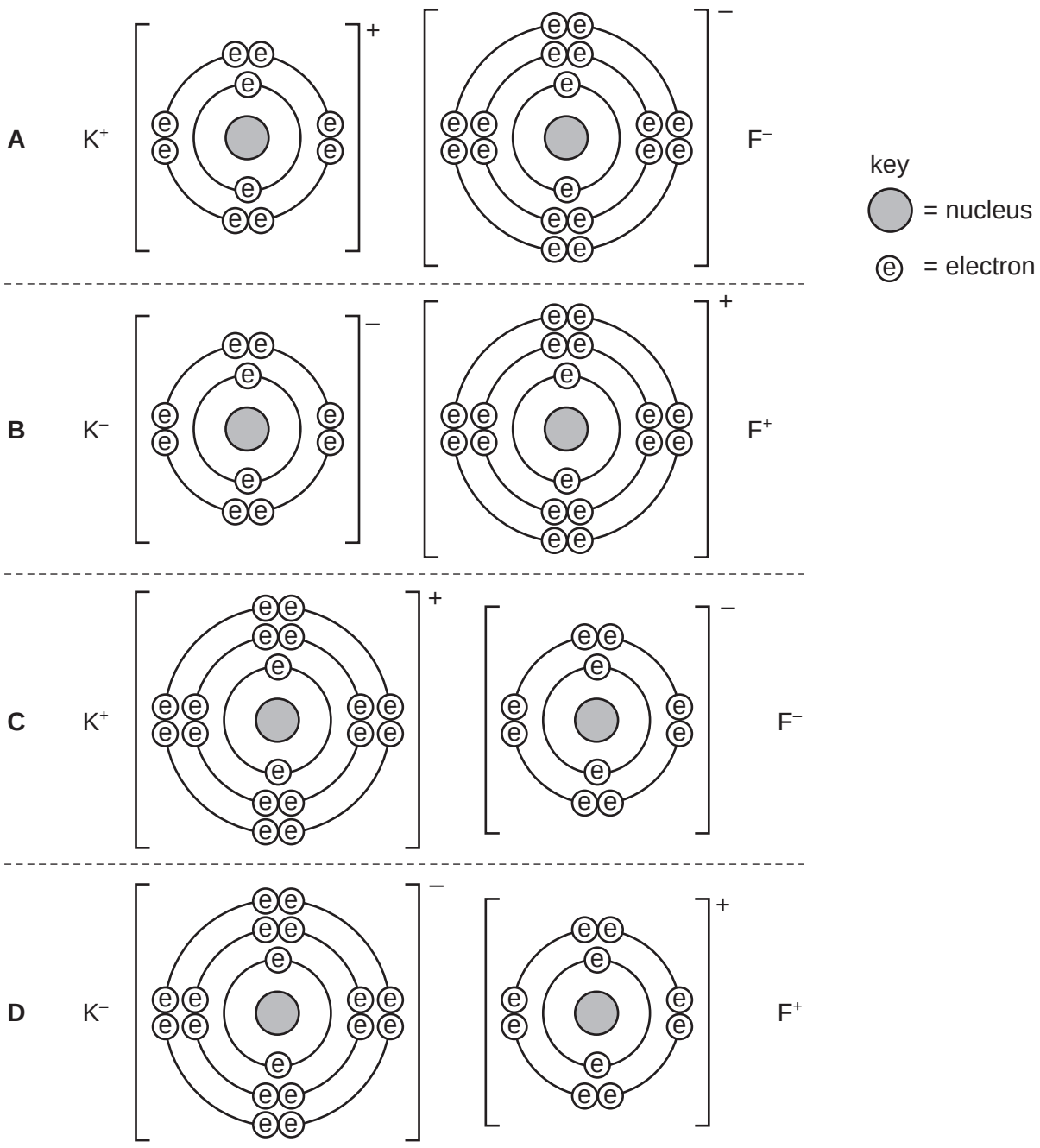
4 Which diagram correctly shows the ions present in the compound potassium fluoride?

A K^+ F^-

B K^- F^+

C K^+ F^-

D K^- F^+



5 What do the nuclei of $^{1}_{1}H$ hydrogen atoms contain?

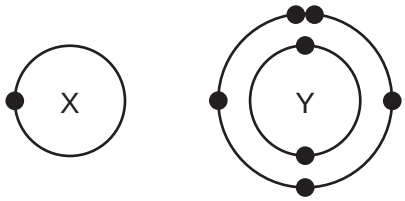
A electrons and neutrons

B electrons and protons

C neutrons only

D protons only

6 The electronic structures of atoms X and Y are shown.



X and Y form a covalent compound.

What is its formula?

A XY_5 **B** XY_3 **C** XY **D** X_3Y

7 Two atoms of magnesium, Mg, react with one molecule of oxygen, O_2.

What is the formula of the product?

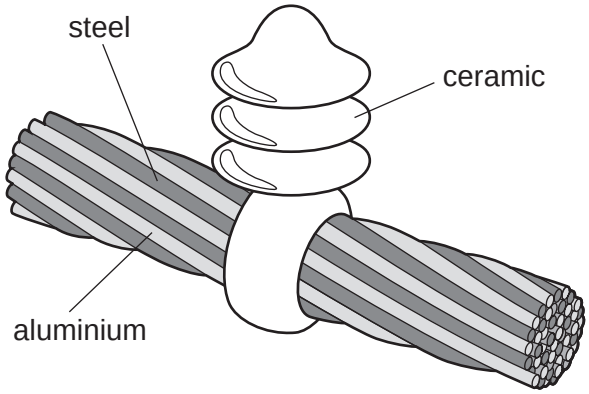
A MgO **B** MgO_2 **C** Mg_2O **D** Mg_2O_2

8 Which row describes the electrolysis of molten potassium bromide?

	product at anode	product at cathode
A	bromine	hydrogen
B	bromine	potassium
C	hydrogen	bromine
D	potassium	bromine

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9 The diagram shows a section of an overhead power cable.



Which statement explains why a particular substance is used?

A Aluminium has a low density and is a good conductor of electricity.

B Ceramic is a good conductor of electricity.

C Steel can rust in damp air.

D Steel is more dense than aluminium.

10 Which reaction is endothermic?

A acid neutralising alkali causing a temperature increase

B adding magnesium to hydrochloric acid

C calcium carbonate decomposing when heated

D combustion of fossil fuels

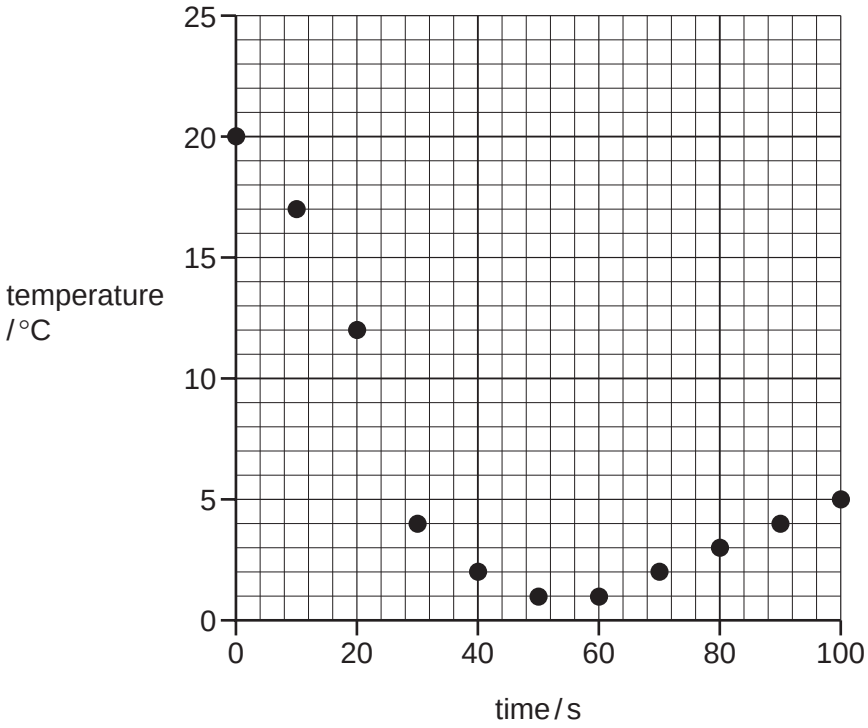
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[Turn over

11 Solid hydrated sodium carbonate was added to solid citric acid.

The mixture was stirred and the temperature recorded every 10 seconds.

The results are shown on the graph:



Which row describes the reaction?

	reaction type	energy change
A	neutralisation	endothermic
B	neutralisation	exothermic
C	thermal decomposition	endothermic
D	thermal decomposition	exothermic

12 The effect of temperature on the rate of the reaction between marble chips and hydrochloric acid can be investigated by measuring the production of carbon dioxide.

Which item of equipment is **not** required for the investigation?

A condenser

B gas syringe

C stopclock

D thermometer

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13 The element vanadium, V, forms several oxides.

In which change is oxidation taking place?

A $VO_2 \rightarrow V_2O_3$

B $V_2O_5 \rightarrow VO_2$

C $V_2O_3 \rightarrow VO$

D $V_2O_3 \rightarrow V_2O_5$

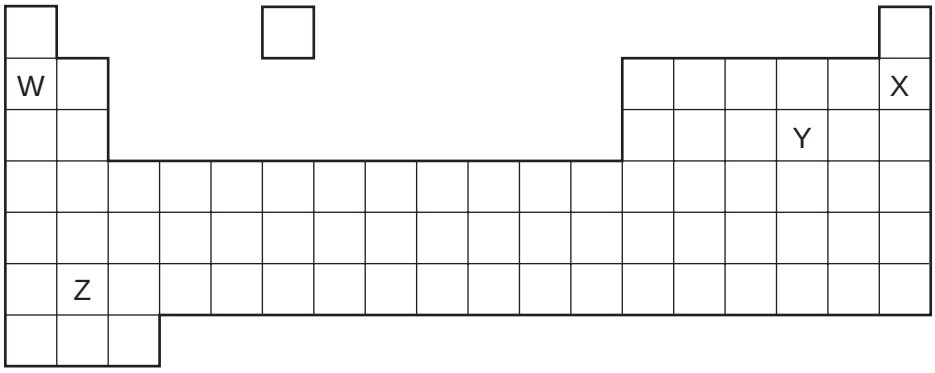
14 Some crystals of hydrated cobalt(II) chloride are heated in a test-tube until no further change is observed.

The test-tube is allowed to cool and a few drops of water are then added to the contents.

Which colours are observed?

	before heating	after heating	after adding water
A	blue	pink	blue
B	blue	white	blue
C	pink	blue	pink
D	white	blue	white

15 The diagram shows a simplified form of the Periodic Table:



Which elements will form an acidic oxide?

A W and Z **B** W only **C** X and Y only **D** Y only

16 A white solid is insoluble in water.

When it is added to hydrochloric acid, bubbles of gas are formed.

Adding aqueous ammonia to the solution formed gives a white precipitate. Adding excess aqueous ammonia causes the precipitate to re-dissolve.

What is the white solid?

A aluminium nitrate

B ammonium nitrate

C calcium carbonate

D zinc carbonate

17 Which property is **not** characteristic of a base?

A It reacts with a carbonate to form carbon dioxide.

B It reacts with an acid to form a salt.

C It reacts with an ammonium salt to form ammonia.

D It turns universal indicator paper blue.

18 Four stages in the preparation of a salt from an acid and a solid metal oxide are listed.

1 Add excess solid.

2 Evaporate half the solution and leave to cool.

3 Filter to remove unwanted solid.

4 Heat the acid.

In which order should the stages be carried out?

A $1 \rightarrow 3 \rightarrow 4 \rightarrow 2$

B $2 \rightarrow 1 \rightarrow 3 \rightarrow 4$

C $4 \rightarrow 1 \rightarrow 3 \rightarrow 2$

D $4 \rightarrow 2 \rightarrow 1 \rightarrow 3$

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19 Which statements about Group I and Group VII elements are correct?

1 In Group I, lithium is more reactive than potassium.

2 In Group VII, chlorine is more reactive than fluorine.

	statement 1	statement 2
A	✓	✓
B	✓	✗
C	✗	✓
D	✗	✗

20 The Periodic Table lists all the known elements.

Elements are arranged in order of .....1..... number.

The melting points of Group I elements .....2..... down the group.

The melting points of Group VII elements .....3..... down the group.

Which words correctly complete the gaps 1, 2 and 3?

	1	2	3
A	nucleon	decrease	increase
B	nucleon	increase	decrease
C	proton	decrease	increase
D	proton	increase	decrease

21 The table gives information about four elements.

Which element is a transition metal?

	electrical conductivity	density in g/cm^3	melting point in °C
A	good	0.97	98
B	good	7.86	1535
C	poor	2.33	1410
D	poor	3.12	–7

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[Turn over

22 The Group 0 elements are unreactive.

The gas used to fill balloons is .....X..... .

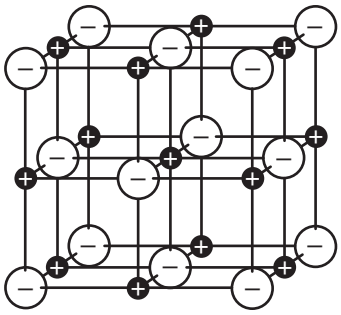
This gas is unreactive because it has .....Y..... electrons in its outermost shell.

Which words correctly complete gaps X and Y?

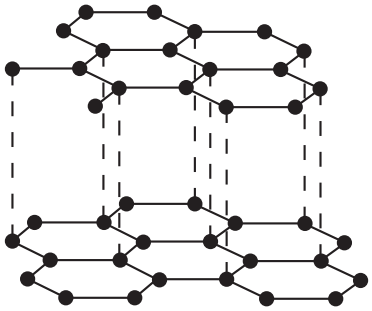
	X	Y
A	argon	eight
B	argon	two
C	helium	eight
D	helium	two

23 Which diagram shows the structure of an alloy?

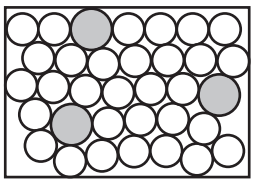
A



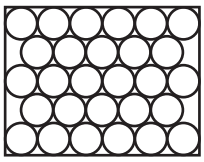
B



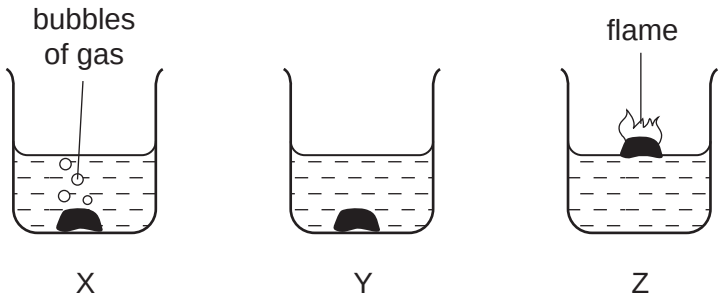
C



D



24 The diagrams show what happens when three different metals are added to water.



What are X, Y and Z?

	X	Y	Z
A	calcium	copper	potassium
B	copper	calcium	potassium
C	potassium	calcium	copper
D	potassium	copper	calcium

25 Which metal would be suitable for all of the following uses?

- making aircraft bodies
- making food containers
- making overhead power cables

A aluminium

B brass

C mild steel

D pure iron

26 Iron is extracted from its ore (hematite) in the blast furnace.

Which gas is produced as a waste product?

A carbon dioxide

B hydrogen

C nitrogen

D oxygen

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[Turn over

27 Which statements about water are correct?

1 Household water may contain salts in solution.

2 Water for household use is filtered to remove soluble impurities.

3 Water is treated with chlorine to kill bacteria.

4 Water is used in industry for cooling.

A 1, 2, 3 and 4

B 1, 2 and 3 only

C 1, 3 and 4 only

D 2, 3 and 4 only

28 Which is a use of oxygen?

A as the gas in a lamp

B to react with ethene to form ethanol

C to react with methane in a Bunsen burner

D to react with hematite to form iron

29 Carbon monoxide is an air pollutant produced when petrol is burned in a car engine.

Why is carbon monoxide considered to be an air pollutant?

A It causes climate change.

B It causes the corrosion of buildings.

C It is a significant greenhouse gas.

D It is poisonous.

30 Fertilisers are mixtures of different compounds used to increase the growth of crops.

Which pair of substances contains the three essential elements for plant growth?

A ammonium nitrate and calcium phosphate

B ammonium nitrate and potassium chloride

C ammonium phosphate and potassium chloride

D potassium nitrate and calcium carbonate

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31 Which process does **not** produce carbon dioxide?

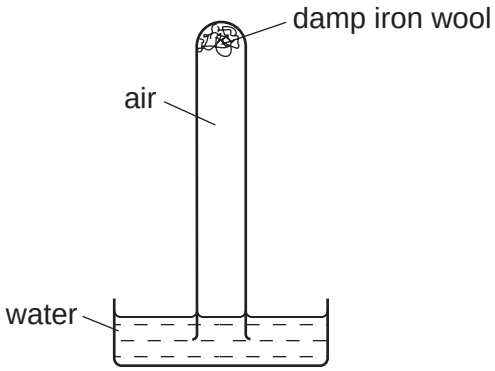
A complete combustion of a fossil fuel

B fermentation

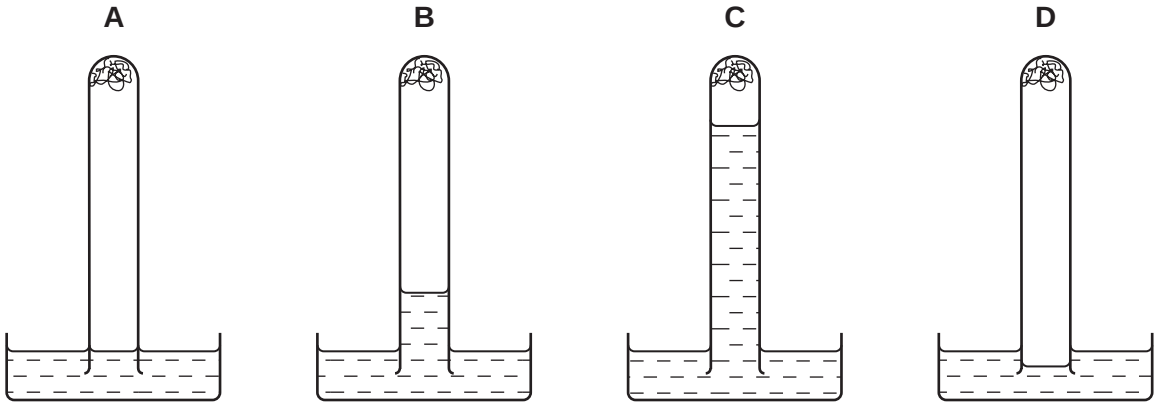
C reaction of an alkali with a carbonate

D respiration

32 The apparatus shown is set up and left for a week.



Which diagram shows the level of the water at the end of the week?



33 Carbon dioxide and methane both contribute to climate change.

Which process produces both gases?

A complete combustion of natural gas

B farming cattle

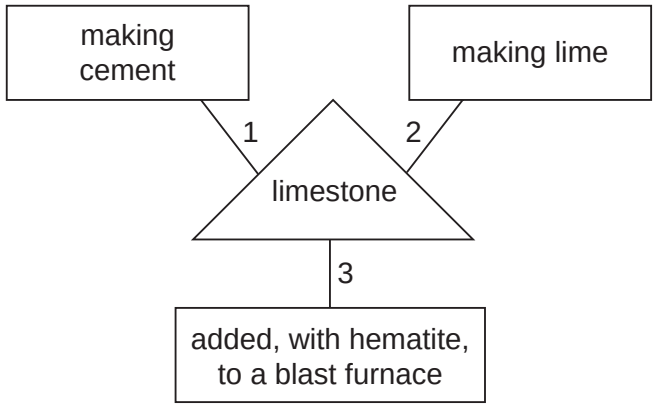
C heating calcium carbonate

D respiration

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34 A student is asked to draw a diagram showing the uses of limestone.



Which numbered lines show a correct use of limestone?

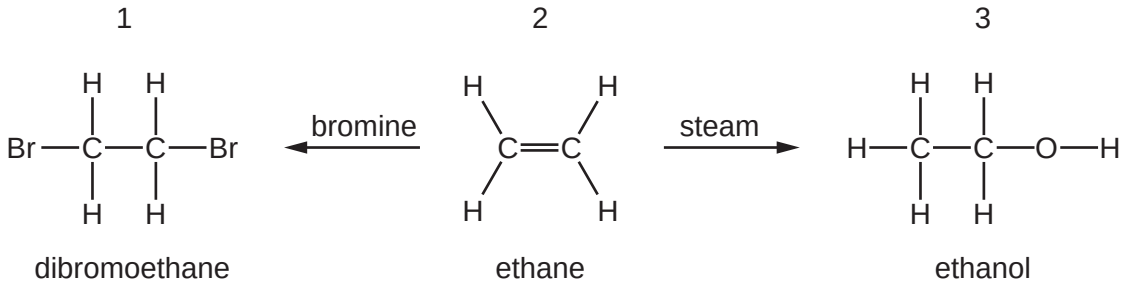
A 1, 2 and 3

B 1 and 2 only

C 1 and 3 only

D 2 and 3 only

35 The diagram shows the structure of a simple hydrocarbon and the products of two of its reactions.



Which structures are named correctly?

	structure		
	1	2	3
A	✓	✓	✗
B	✓	✗	✓
C	✗	✓	✓
D	✗	✓	✗

36 Which row describes the formation of a polymer?

	monomer	polymer
A	ethane	poly(ethane)
B	ethane	poly(ethene)
C	ethene	poly(ethane)
D	ethene	poly(ethene)

37 What is **not** the correct use for the fraction named?

	name of fraction	use
A	fuel oil	making waxes
B	gas oil	diesel engines
C	kerosene	jet fuel
D	naphtha fraction	making chemicals

38 Ethanol can be formed by

1 fermentation

2 reaction between steam and ethene

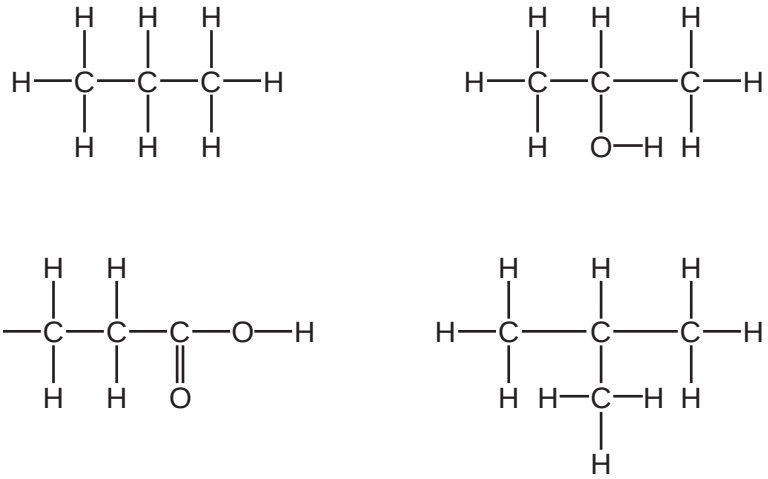
Which of these processes uses a catalyst?

	1	2
A	✓	✓
B	✓	✗
C	✗	✓
D	✗	✗

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[Turn over

39 Which homologous series is **not** represented in the compounds shown below?



A alcohols

B alkanes

C alkenes

D carboxylic acids

40 Alkenes are manufactured by cracking hydrocarbons obtained from petroleum.

hydrocarbon P obtained from petroleum $\xrightarrow{\text{cracking}}$ hydrocarbon Q

Which row describes the size of the molecules in hydrocarbons P and Q and the effect of Q on aqueous bromine?

	size of P molecules	size of Q molecules	effect of Q on aqueous bromine
A	large	small	decolourises
B	large	small	no effect
C	small	large	decolourises
D	small	large	no effect

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DATA SHEET
The Periodic Table of the Elements

Group I	Group II											Group III	Group IV	Group V	Group VI	Group VII	Group 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 X b — 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.).