



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)

* 0 2 9 0 8 1 6 6 4 1 *

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.

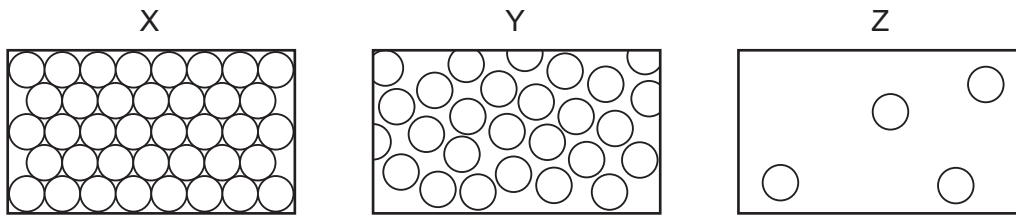
Read the instructions on the Answer Sheet very carefully.

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.

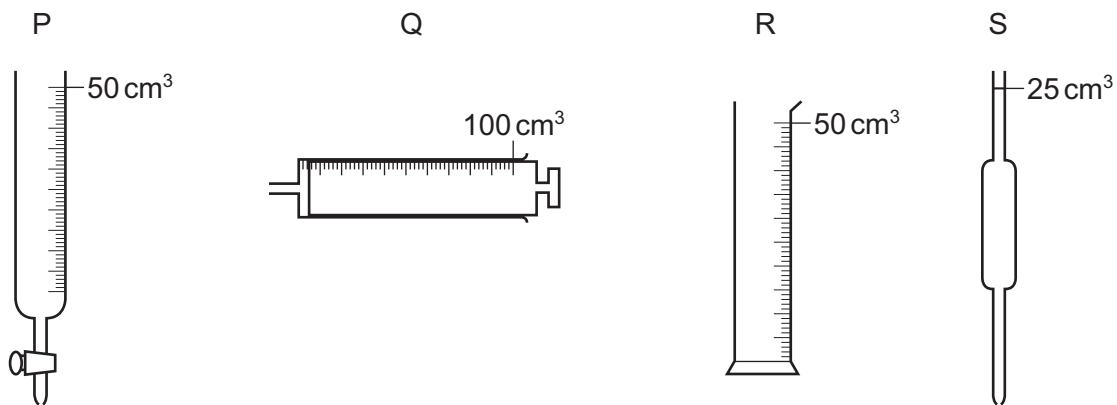
1 Diagrams X, Y and Z represent the three states of matter.



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.



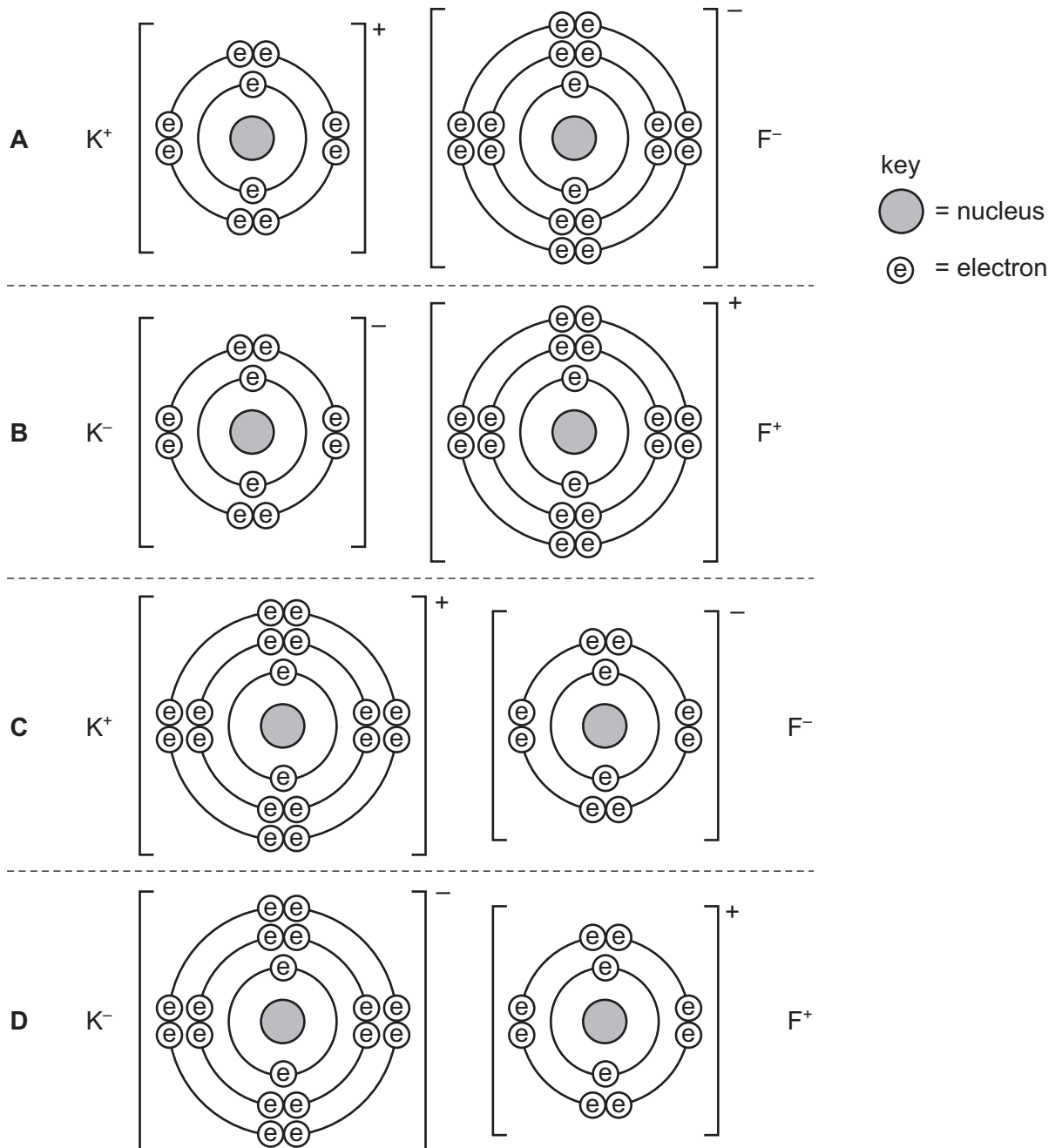
Which row describes the correct apparatus for the measurement made?

	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?

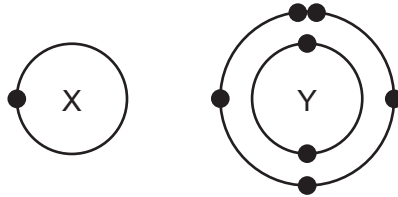
- A** Atoms contain protons and electrons in the nucleus.
B Neutrons are negatively charged.
C Protons are positively charged.
D The nucleon number is the number of neutrons.

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



- 5 What do the nuclei of ${}^1_1\text{H}$ 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.



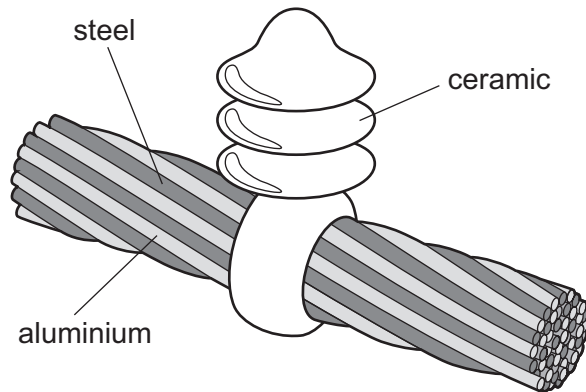
X and Y form a covalent compound.

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

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.

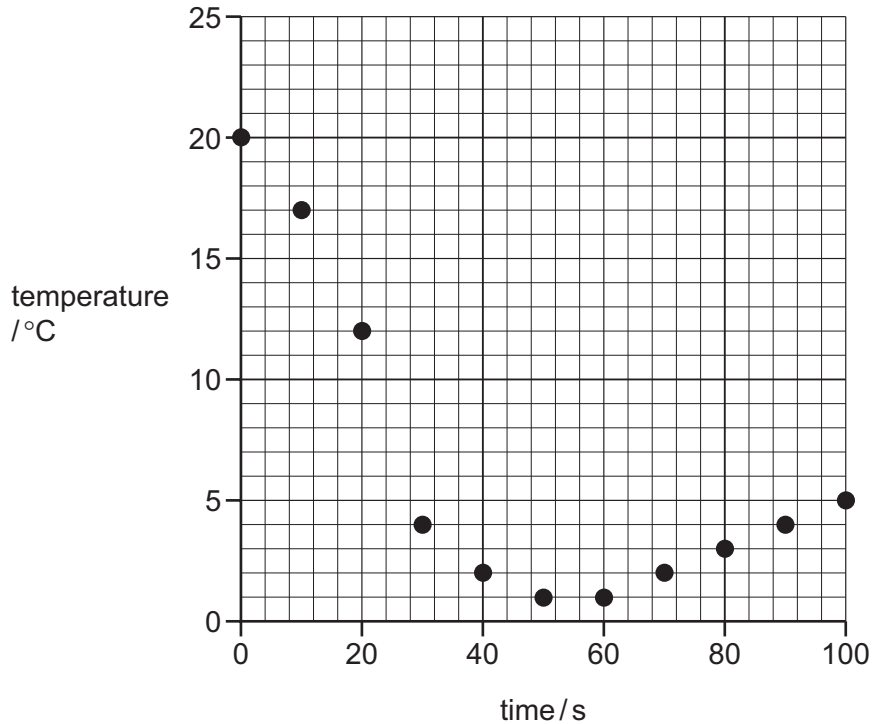
10 Which reaction is endothermic?

- 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

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

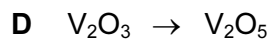
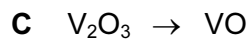
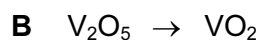
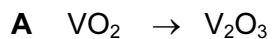
12 The effect of temperature on the rate of the reaction between marble chips and hydrochloric acid can be investigated by measuring the production of carbon dioxide.

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

- A** condenser
- B** gas syringe
- C** stopclock
- D** thermometer

13 The element vanadium, V, forms several oxides.

In which change is oxidation taking place?



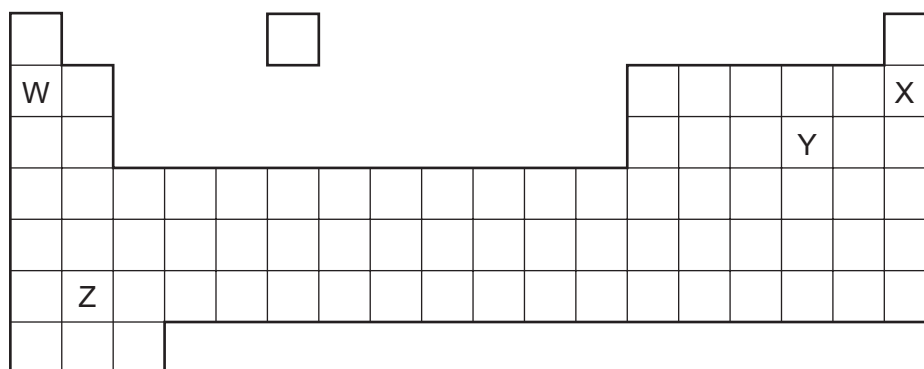
14 Some crystals of hydrated cobalt(II) chloride are heated in a test-tube until no further change is observed.

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 → 3 → 4 → 2
- B 2 → 1 → 3 → 4
- C 4 → 1 → 3 → 2
- D 4 → 2 → 1 → 3

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	✓	x
C	x	✓
D	x	x

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

22 The Group 0 elements are unreactive.

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

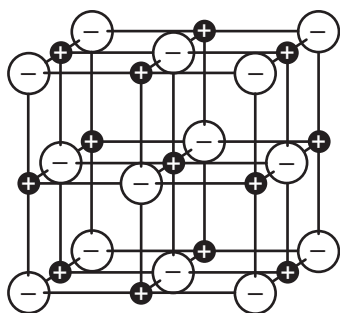
This gas is unreactive because it has Y..... electrons in its outermost shell.

Which words correctly complete gaps X and Y?

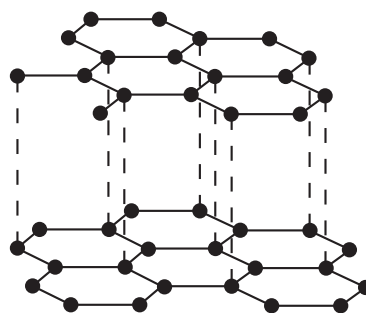
	X	Y
A	argon	eight
B	argon	two
C	helium	eight
D	helium	two

23 Which diagram shows the structure of an alloy?

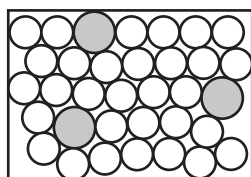
A



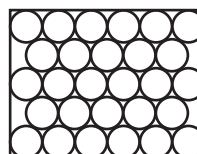
B



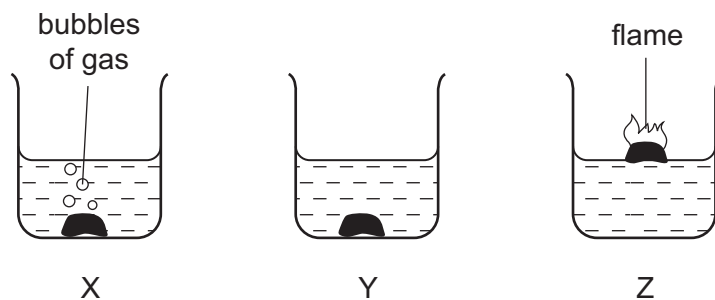
C



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

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.

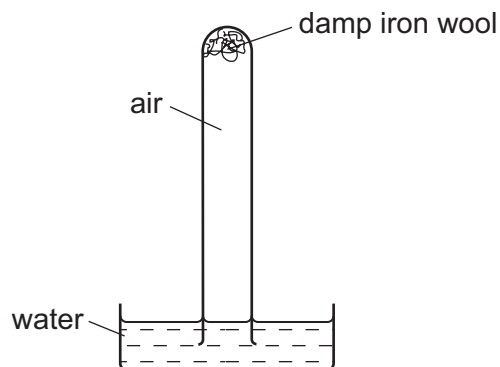
Which pair of substances contains the three essential elements for plant growth?

- A** ammonium nitrate and calcium phosphate
B ammonium nitrate and potassium chloride
C ammonium phosphate and potassium chloride
D potassium nitrate and calcium carbonate

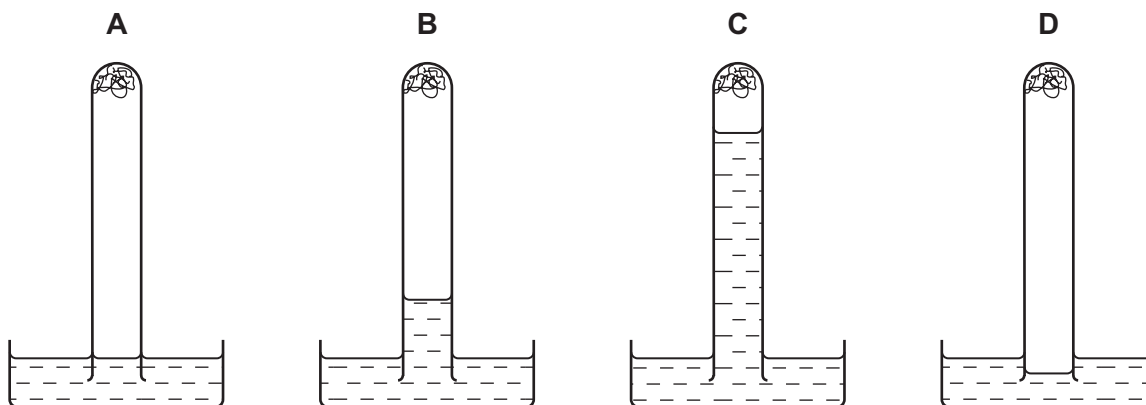
31 Which process does **not** produce carbon dioxide?

- 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?

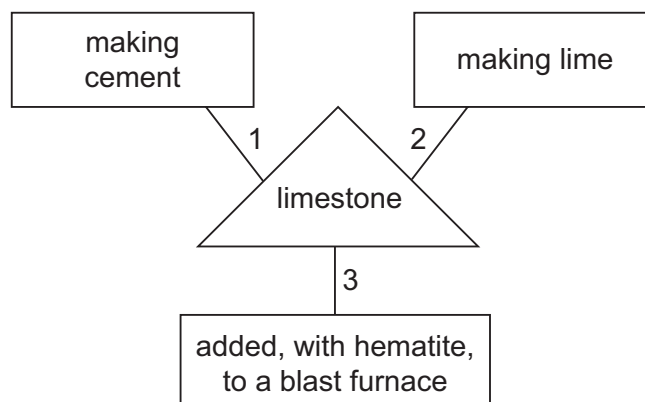


33 Carbon dioxide and methane both contribute to climate change.

Which process produces both gases?

- A complete combustion of natural gas
- B farming cattle
- C heating calcium carbonate
- D respiration

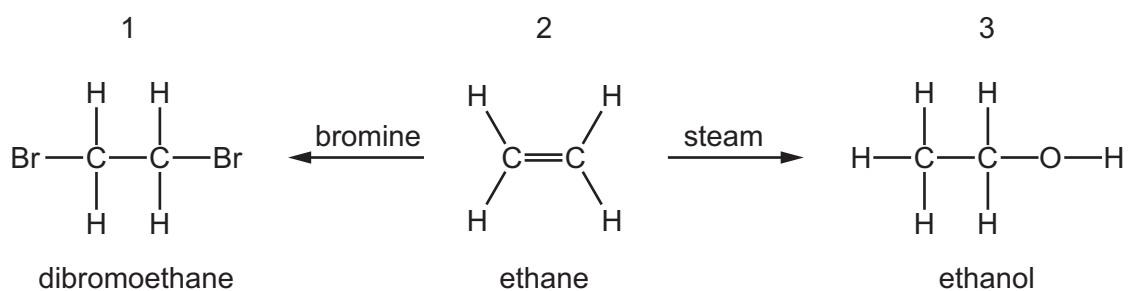
34 A student is asked to draw a diagram showing the uses of limestone.



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	✓	✓	x
B	✓	x	✓
C	x	✓	✓
D	x	✓	x

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

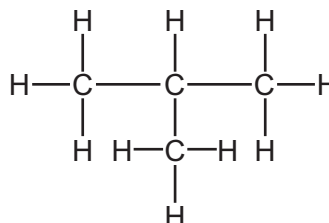
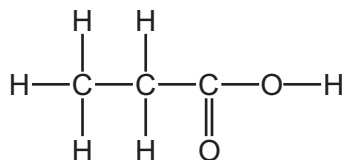
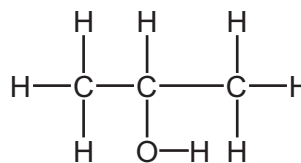
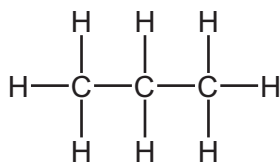
38 Ethanol can be formed by

- 1 fermentation
- 2 reaction between steam and ethene

Which of these processes uses a catalyst?

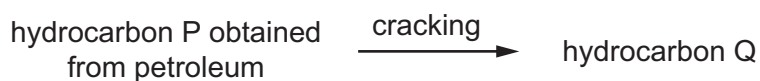
	1	2
A	✓	✓
B	✓	x
C	x	✓
D	x	x

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.



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

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	
3	7 Li Lithium 4	9 Be Beryllium 4		5 B Boron 5	12 C Carbon 6	14 N Nitrogen 7	16 O Oxygen 8	19 F Fluorine 9	20 Ne Neon 10			
11	23 Na Sodium 11	24 Mg Magnesium 12		13 Al Aluminium 13	28 Si Silicon 14	31 P Phosphorus 15	32 S Sulfur 16	35.5 Cl Chlorine 17	40 Ar Argon 18			
19	39 K Potassium 19	40 Ca Calcium 20		27 Fe Iron 26	30 Ni Nickel 28	33 Co Cobalt 27	44 Ru Ruthenium 44	46 Pd Palladium 46	49 In Indium 49	50 Sn Tin 50	52 Te Tellurium 52	54 Xe Xenon 54
37	85 Rb Rubidium 37	88 Sr Strontium 38		44 Zn Zinc 30	48 Cu Copper 29	47 Ag Silver 47	106 Pd Palladium 46	108 Ag Silver 47	115 In Indium 49	119 Sn Tin 50	128 Te Tellurium 52	131 Xe Xenon 54
55	133 Cs Caesium 55	137 Ba Barium 56		59 Ni Nickel 28	59 Co Cobalt 27	64 Cu Copper 29	80 Hg Mercury 80	79 Au Gold 79	81 Tl Thallium 81	82 Pb Lead 82	84 Po Polonium 84	86 Rn Radon 86
87	Fr Francium 87	226 Ra Radium 88		55 Mn Manganese 25	59 Co Cobalt 27	65 Zn Zinc 30	80 Hg Mercury 80	83 Bi Bismuth 83	85 At Astatine 85			
				56 Fe Iron 26	59 Co Cobalt 27	65 Zn Zinc 30	80 Hg Mercury 80	83 Bi Bismuth 83				
				75 Re Rhenium 75	76 Os Osmium 76	78 Pt Platinum 78	80 Hg Mercury 80	83 Bi Bismuth 83				
				74 W Tungsten 74	77 Ir Iridium 77	81 Tl Thallium 81	80 Hg Mercury 80	83 Bi Bismuth 83				
				73 Ta Tantalum 73	77 Ir Iridium 77	81 Tl Thallium 81	80 Hg Mercury 80	83 Bi Bismuth 83				
				41 Nb Niobium 41	73 Ta Tantalum 73	81 Tl Thallium 81	80 Hg Mercury 80	83 Bi Bismuth 83				
				42 Mo Molybdenum 42	74 W Tungsten 74	81 Tl Thallium 81	80 Hg Mercury 80	83 Bi Bismuth 83				
				43 Tc Technetium 43	75 Re Rhenium 75	81 Tl Thallium 81	80 Hg Mercury 80	83 Bi Bismuth 83				
				44 Ru Ruthenium 44	76 Os Osmium 76	81 Tl Thallium 81	80 Hg Mercury 80	83 Bi Bismuth 83				
				23 Cr Chromium 24	74 W Tungsten 74	81 Tl Thallium 81	80 Hg Mercury 80	83 Bi Bismuth 83				
				25 Mn Manganese 25	75 Re Rhenium 75	81 Tl Thallium 81	80 Hg Mercury 80	83 Bi Bismuth 83				
				26 Fe Iron 26	76 Os Osmium 76	81 Tl Thallium 81	80 Hg Mercury 80	83 Bi Bismuth 83				
				27 Co Cobalt 27	77 Ir Iridium 77	81 Tl Thallium 81	80 Hg Mercury 80	83 Bi Bismuth 83				
				28 Ni Nickel 28	78 Pt Platinum 78	81 Tl Thallium 81	80 Hg Mercury 80	83 Bi Bismuth 83				
				29 Cu Copper 29	79 Au Gold 79	81 Tl Thallium 81	80 Hg Mercury 80	83 Bi Bismuth 83				
				30 Zn Zinc 30	80 Hg Mercury 80	81 Tl Thallium 81	80 Hg Mercury 80	83 Bi Bismuth 83				
				31 Ga Gallium 31	81 Tl Thallium 81	81 Tl Thallium 81	80 Hg Mercury 80	83 Bi Bismuth 83				
				32 Ge Germanium 32	82 Pb Lead 82	81 Tl Thallium 81	80 Hg Mercury 80	83 Bi Bismuth 83				
				33 As Arsenic 33	83 Bi Bismuth 83	81 Tl Thallium 81	80 Hg Mercury 80	83 Bi Bismuth 83				
				34 Se Selenium 34	84 Kr Krypton 36	81 Tl Thallium 81	80 Hg Mercury 80	83 Bi Bismuth 83				
				35 Br Bromine 35	85 At Astatine 85	81 Tl Thallium 81	80 Hg Mercury 80	83 Bi Bismuth 83				
				36 Kr Krypton 36	86 Rn Radon 86	81 Tl Thallium 81	80 Hg Mercury 80	83 Bi Bismuth 83				
				37 Rb Rubidium 37	87 Fr Francium 87	81 Tl Thallium 81	80 Hg Mercury 80	83 Bi Bismuth 83				
				38 Sr Strontium 38	88 Ra Radium 88	81 Tl Thallium 81	80 Hg Mercury 80	83 Bi Bismuth 83				
				39 K Potassium 39	89 Y Yttrium 39	81 Tl Thallium 81	80 Hg Mercury 80	83 Bi Bismuth 83				
				40 Ca Calcium 40	90 Th Thorium 90	81 Tl Thallium 81	80 Hg Mercury 80	83 Bi Bismuth 83				
				41 Nb Niobium 41	91 Pa Protactinium 91	81 Tl Thallium 81	80 Hg Mercury 80	83 Bi Bismuth 83				
				42 Mo Molybdenum 42	92 U Uranium 92	81 Tl Thallium 81	80 Hg Mercury 80	83 Bi Bismuth 83				
				43 Tc Technetium 43	93 Np Neptunium 93	81 Tl Thallium 81	80 Hg Mercury 80	83 Bi Bismuth 83				
				44 Ru Ruthenium 44	94 Pu Plutonium 94	81 Tl Thallium 81	80 Hg Mercury 80	83 Bi Bismuth 83				
				45 Rh Rhodium 45	95 Am Americium 95	81 Tl Thallium 81	80 Hg Mercury 80	83 Bi Bismuth 83				
				46 Pd Palladium 46	96 Cm Curium 96	81 Tl Thallium 81	80 Hg Mercury 80	83 Bi Bismuth 83				
				47 Ag Silver 47	97 Bk Berkelium 97	81 Tl Thallium 81	80 Hg Mercury 80	83 Bi Bismuth 83				
				48 Cu Copper 29	98 Cf Californium 98	81 Tl Thallium 81	80 Hg Mercury 80	83 Bi Bismuth 83				
				49 In Indium 49	99 Es Einsteinium 99	81 Tl Thallium 81	80 Hg Mercury 80	83 Bi Bismuth 83				
				50 Sn Tin 50	100 Fm Fermium 100	81 Tl Thallium 81	80 Hg Mercury 80	83 Bi Bismuth 83				
				51 Sb Antimony 51	101 Md Mendelevium 101	81 Tl Thallium 81	80 Hg Mercury 80	83 Bi Bismuth 83				
				52 Te Tellurium 52	102 No Nobelium 102	81 Tl Thallium 81	80 Hg Mercury 80	83 Bi Bismuth 83				
				53 I Iodine 53	103 Lr Lawrencium 103	81 Tl Thallium 81	80 Hg Mercury 80	83 Bi Bismuth 83				
				54 Xe Xenon 54								
				55 Cs Caesium 55								
				56 Ba Barium 56								
				57 La Lanthanum 57								
				58 Ce Cerium 58								
				59 Pr Praseodymium 59								
				60 Nd Neodymium 60								
				61 Pm Promethium 61								
				62 Sm Samarium 62								
				63 Eu Europium 63								
				64 Gd Gadolinium 64								
				65 Tb Terbium 65								
				66 Dy Dysprosium 66								
				67 Ho Holmium 67								
				68 Er Erbium 68								
				69 Tm Thulium 69								
				70 Yb Ytterbium 70								
				71 Lu Lutetium 71								
				72 Hf Hafnium 72								
				73 Ta Tantalum 73								
				74 W Tungsten 74								
				75 Re Rhenium 75								
				76 Os Osmium 76								
				77 Ir Iridium 77								
				78 Pt Platinum 78								
				79 Au Gold 79								
				80 Hg Mercury 80								
				81 Tl Thallium 81								
				82 Pb Lead 82								
				83 Bi Bismuth 83								
				84 Po Polonium 84								
				85 At Astatine 85								
				86 Rn Radon 86								
				87 Fr Francium 87								
				88 Ra Radium 88								
				89 Ac Actinium 89 †								
				90 Th Thorium 90								
				91 Pa Protactinium 91								
				92 U Uranium 92								
				93 Np Neptunium 93								
				94 Pu Plutonium 94								
				95 Am Americium 95								
				96 Cm Curium 96								
				97 Bk Berkelium 97								
				98 Cf Californium 98								
				99 Es Einsteinium 99								
				100 Fm Fermium 100								
				101 Md Mendelevium 101								
				102 No Nobelium 102								
				103 Lr Lawrencium 103								
				104 Rf Rutherfordium 104								
				105 Db Dubnium 105								
				106 Sg Seaborgium 106								
				107 Bh Bohrium 107								
				108 Hs Hassium 108								
				109 Mt Meitnerium 109								
				110 Ds Darmstadtium 110								
				111 Rg Roentgenium 111								
				112 Cn Copernicium 112								
				113 Nh								