



UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS  
International General Certificate of Secondary Education

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**CHEMISTRY**

**0620/01**

Paper 1 Multiple Choice

**May/June 2008**

**45 Minutes**

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

\* 8 4 6 9 3 5 2 3 9 7 \*

**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.

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.

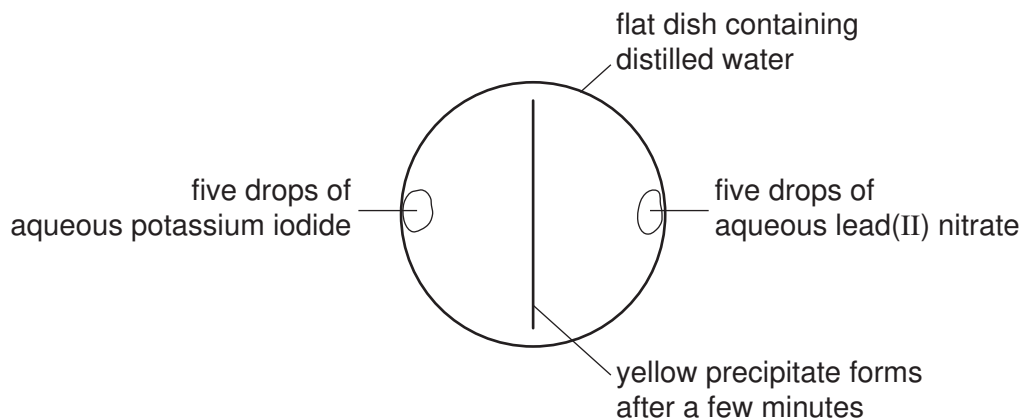
A copy of the Periodic Table is printed on page 16.

You may use a calculator.

This document consists of **15** printed pages and **1** blank page.



- 1 A yellow precipitate is formed in the experiment shown.



How is the precipitate formed?

- A Particles collide, diffuse and then react.
  - B Particles collide, react and then diffuse.
  - C Particles diffuse, collide and then react.
  - D Particles diffuse, react and then collide
- 2 A student is asked to measure the time taken for 4.00 g of magnesium carbonate to react completely with 25.0 cm<sup>3</sup> (an excess) of dilute hydrochloric acid.

Which pieces of apparatus does the student need?

- A balance, clock, pipette
  - B balance, clock, thermometer
  - C balance, pipette, thermometer
  - D clock, pipette, thermometer
- 3 Chromatography and fractional distillation can be used to separate compounds.

In which type of separation is a thermometer needed for checking that complete separation has occurred?

- A chromatographic separation of two colourless solids
- B chromatographic separation of two solids of different colours
- C fractional distillation of two colourless liquids
- D fractional distillation of two liquids of different colours

- 4 The nucleon number and proton number of the lithium atom are shown by the symbol  ${}^7_3\text{Li}$ .

What is the correct symbol for the lithium ion in lithium chloride?

- A  ${}^6_2\text{Li}^-$       B  ${}^6_3\text{Li}^+$       C  ${}^7_3\text{Li}^+$       D  ${}^7_3\text{Li}^-$

- 5 The table shows the numbers of particles present in the nuclei of four atoms or ions.

	protons	neutrons	electron structure
1	18	22	2,8,8
2	19	20	2,8,8
3	19	21	2,8,8,1
4	20	20	2,8,8,2

Which two particles belong to the same element?

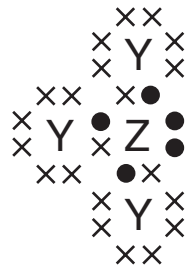
- A 1 and 2      B 1 and 4      C 2 and 3      D 2 and 4
- 6 What are the nucleon numbers for carbon and magnesium?

	carbon	magnesium
A	6	12
B	6	24
C	12	12
D	12	24

- 7 Which of the following can be used as a lubricant?

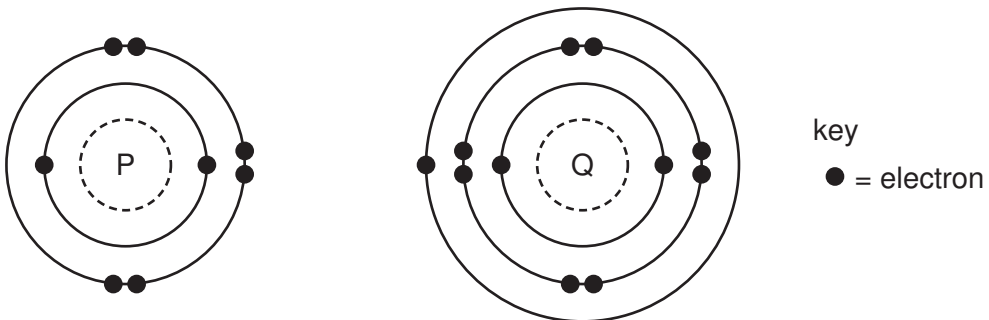
	graphite	a liquid fraction from petroleum
A	✓	✓
B	✓	x
C	x	✓
D	x	x

- 8 The diagram shows the outer shell electron arrangement of compound J that contains the elements Y and Z.



What type of compound is J?

- A an alloy  
 B a macromolecule  
 C covalent  
 D ionic
- 9 The electronic structures of atoms P and Q are shown.



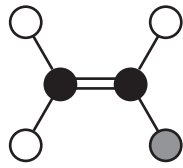
P and Q react to form an ionic compound.

What is the formula of this compound?

- A  $PQ_2$       B  $P_2Q$       C  $P_2Q_6$       D  $P_6Q_2$
- 10 For which compound is the formula correct?

	compound	formula
A	ammonium chloride	$NH_3Cl$
B	copper(II) sulphide	$CuS$
C	iron(II) sulphide	$Fe_3S$
D	silver nitrate	$Ag_2NO_3$

11 The diagram shows a molecule of vinyl chloride (used to make pvc).



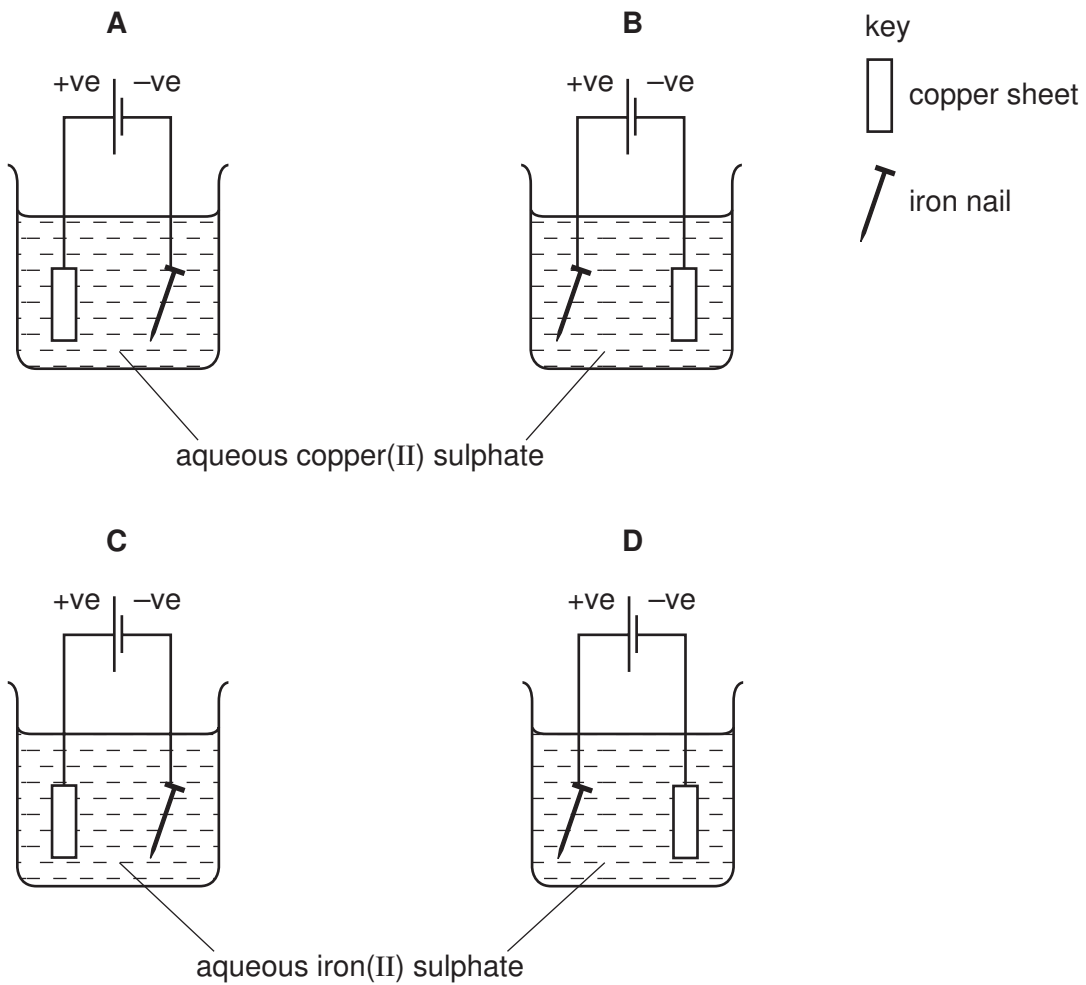
key

- a carbon atom
- a chlorine atom
- a hydrogen atom

What is the formula of vinyl chloride?

- A  $\text{CH}_2\text{Cl}_3$       B  $\text{CH}_3\text{Cl}_2$       C  $\text{C}_2\text{HCl}_3$       D  $\text{C}_2\text{H}_3\text{Cl}$

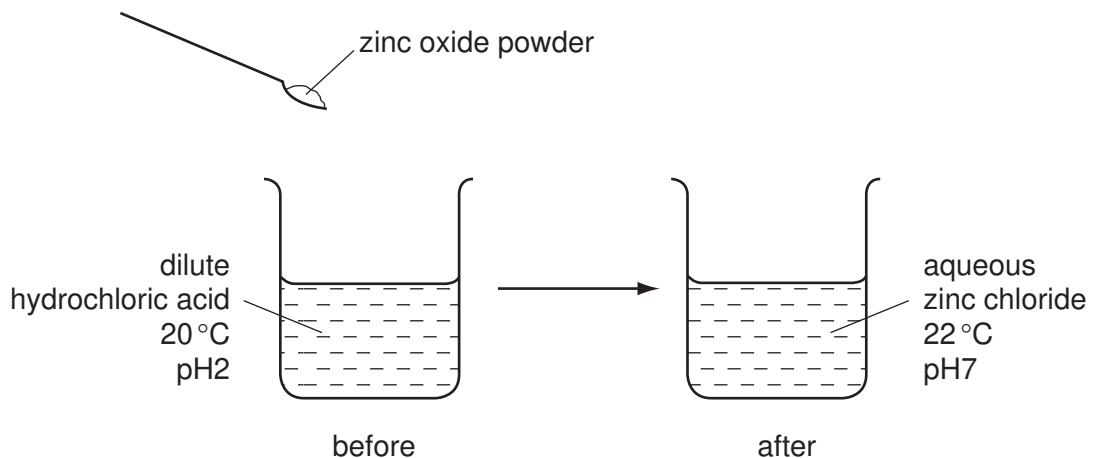
12 Which apparatus could be used to electroplate an iron nail with copper?



- 13 Two elements X and Y form ionic compounds,  $XBr_2$  and  $Y_2O_3$ . The compounds are separately melted and electricity is passed through the liquids.

What are the products at the cathodes?

- A bromine and oxygen  
 B bromine and Y  
 C oxygen and X  
 D X and Y
- 14 Which change can take place during electrolysis?
- A lead(IV) oxide  $\rightarrow$  lead(II) oxide + oxygen  
 B concentrated hydrochloric acid  $\rightarrow$  hydrogen + chlorine  
 C sodium hydroxide + nitric acid  $\rightarrow$  sodium nitrate + water  
 D lead(II) nitrate + sulphuric acid  $\rightarrow$  lead(II) sulphate + nitric acid
- 15 The diagram shows an experiment.



Which terms describe the experiment?

	endothermic	neutralisation
<b>A</b>	✓	✓
<b>B</b>	✓	x
<b>C</b>	x	✓
<b>D</b>	x	x

16 Charcoal and uranium are used as sources of energy.

Which of them are oxidised when used in this way?

	charcoal	uranium
<b>A</b>	✓	✓
<b>B</b>	✓	x
<b>C</b>	x	✓
<b>D</b>	x	x

17 Magnesium reacts with acids to produce hydrogen gas.

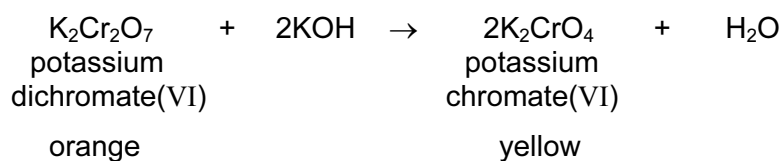
Under which set of conditions is hydrogen formed the most slowly?

	magnesium	acid	temperature/°C
<b>A</b>	ribbon	concentrated	40
<b>B</b>	ribbon	dilute	20
<b>C</b>	powder	concentrated	40
<b>D</b>	powder	dilute	20

18 When written as formulae, which compound has the greatest number of oxygen atoms?

- A** calcium oxide
- B** copper(II) oxide
- C** iron(III) oxide
- D** potassium oxide

- 19 The equation explains the colour change that occurs when aqueous potassium hydroxide is added to aqueous potassium dichromate(VI).



As a result of adding an excess of aqueous potassium hydroxide to aqueous potassium dichromate(VI), what happens to the oxidation state of the chromium and the pH of the reaction mixture?

	oxidation state of the chromium	pH of the mixture
<b>A</b>	decreases	decreases
<b>B</b>	decreases	increases
<b>C</b>	stays the same	decreases
<b>D</b>	stays the same	increases

- 20 An oxide of element X dissolves in water to form a solution of pH 5.

Which line in the table is correct?

	type of element	type of oxide
<b>A</b>	metallic	acidic
<b>B</b>	metallic	basic
<b>C</b>	non-metallic	acidic
<b>D</b>	non-metallic	basic

- 21 Which statement describes a test for carbon dioxide gas?

- A** It bleaches damp litmus paper.
- B** It relights a glowing splint.
- C** It turns cobalt(II) chloride paper pink.
- D** It turns limewater cloudy.



- 22 A solution of zinc sulphate can be made by adding an excess **either** of zinc carbonate **or** of zinc hydroxide to dilute sulphuric acid.

In which forms are these zinc compounds added to the acid?

	zinc carbonate	zinc hydroxide
<b>A</b>	aqueous	aqueous
<b>B</b>	aqueous	solid
<b>C</b>	solid	aqueous
<b>D</b>	solid	solid

- 23 Which aqueous ion causes a white precipitate to form when acidified aqueous silver nitrate is added to it?

- A** chloride  
**B** iodide  
**C** nitrate  
**D** sulphate

- 24 What is the colour of gaseous chlorine and of solid sodium chloride?

	chlorine	sodium chloride
<b>A</b>	colourless	yellow-green
<b>B</b>	colourless	white
<b>C</b>	yellow-green	yellow-green
<b>D</b>	yellow-green	white

- 25 The Group I elements lithium and potassium are tested.

Which element has the higher melting point and which element reacts more vigorously with water?

	higher melting point	more vigorous reaction with water
<b>A</b>	lithium	lithium
<b>B</b>	lithium	potassium
<b>C</b>	potassium	lithium
<b>D</b>	potassium	potassium

26 The proton numbers of four elements are shown.

Which element forms a singly charged positive ion in its salts?

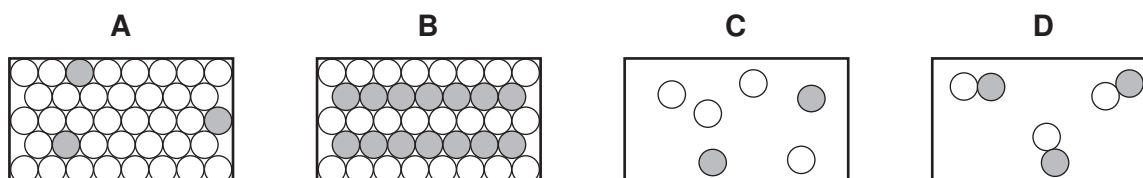
element	proton number
<b>A</b>	34
<b>B</b>	35
<b>C</b>	36
<b>D</b>	37

27 The table gives information about four elements.

Which element is a transition metal?

	electrical conductivity	density $\text{g/cm}^3$	melting point in $^{\circ}\text{C}$
<b>A</b>	good	0.97	98
<b>B</b>	good	7.86	1535
<b>C</b>	poor	2.33	1410
<b>D</b>	poor	3.12	-7

28 Which diagram best represents the structure of a solid alloy?



29 Element E

- forms an alloy;
- has a basic oxide;
- is below hydrogen in the reactivity series.

What is element E?

- A** carbon  
**B** copper  
**C** sulphur  
**D** zinc

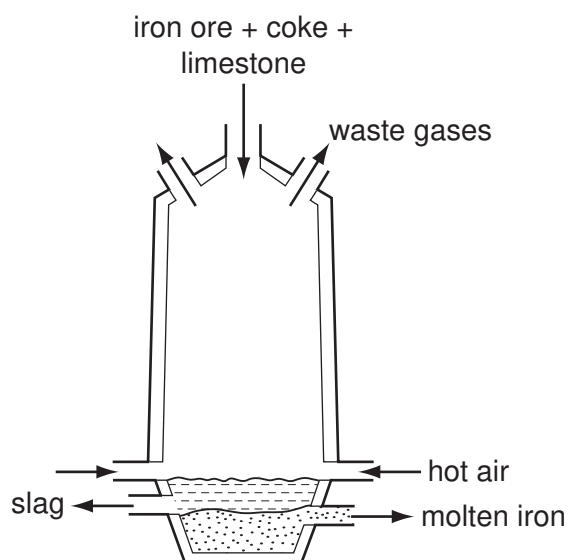
30 The position of metal X in the reactivity series is shown.



Which statements about X and its oxide are correct?

	reaction of X with dilute hydrochloric acid	reaction of oxide of X with carbon
<b>A</b>	hydrogen formed	no reaction
<b>B</b>	hydrogen formed	oxide reduced
<b>C</b>	no reaction	no reaction
<b>D</b>	no reaction	oxide reduced

31 The diagram shows a blast furnace used to extract iron from iron ore.



Why is limestone added to the furnace?

- A** to cause the furnace to heat up
- B** to change the ore into iron
- C** to convert impurities in the ore into slag
- D** to produce oxygen for the coke to burn

32 Which uses of the metals shown are both correct?

	aluminium	stainless steel
<b>A</b>	aircraft bodies	car bodies
<b>B</b>	car bodies	aircraft bodies
<b>C</b>	chemical plant	food containers
<b>D</b>	food containers	chemical plant

33 In which industrial process is water essential?

- A** the production of aluminium from bauxite
- B** the production of calcium oxide from limestone
- C** the production of ethanol from ethene
- D** the production of petrol from crude oil

34 Some students are asked to suggest why acetylene, rather than ethanol, is the fuel used for welding metals.

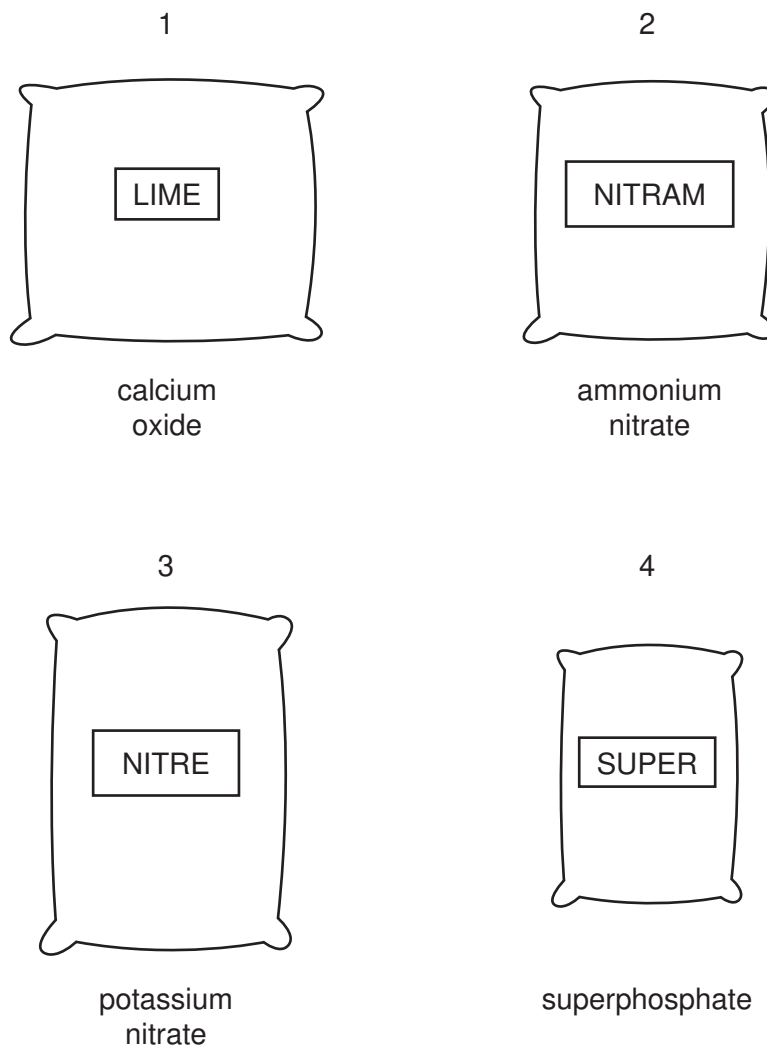
Two suggestions are

- 1 acetylene is a gas but ethanol is a liquid;
- 2 acetylene burns with a hotter flame.

Which suggestions are correct?

	1	2
<b>A</b>	✓	✓
<b>B</b>	✓	x
<b>C</b>	x	✓
<b>D</b>	x	x

35 The diagrams show four sacks which a farmer has in his barn.



Which sacks should be mixed to make a complete fertiliser, containing all the essential elements needed by plants?

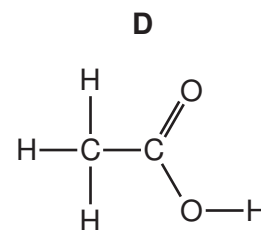
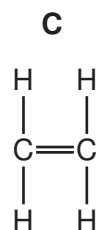
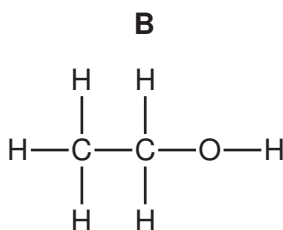
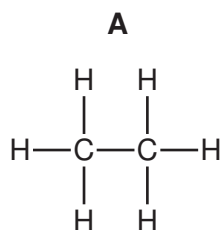
- A** 1 and 2      **B** 1 and 4      **C** 2 and 3      **D** 3 and 4

36 Which of the following does **not** produce carbon dioxide?

- A** adding hydrochloric acid to carbon  
**B** adding hydrochloric acid to potassium carbonate  
**C** burning coke  
**D** burning petrol

37 Cholesterol occurs naturally in the body.

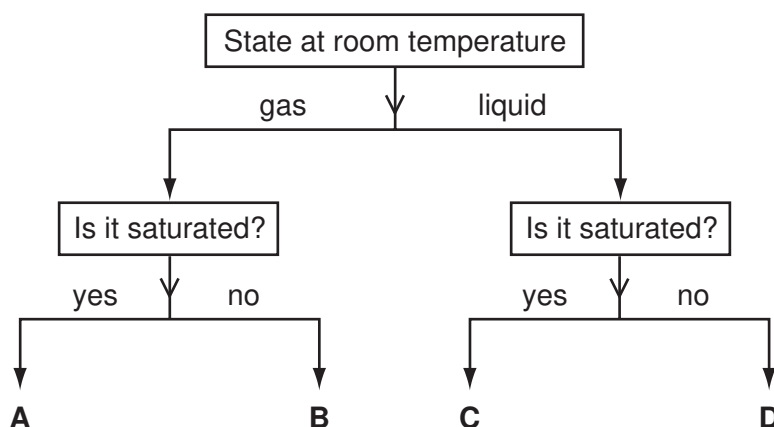
Its name indicates that it has the same functional group as



38 Which fuel is a mixture of hydrocarbons?

- A coal
- B methane
- C petroleum
- D wood

39 In the diagram, which substance could be ethene?



40 Which properties do butane, propene and ethanol **all** have?

	burn	polymerise
<b>A</b>	✓	✓
<b>B</b>	✓	x
<b>C</b>	x	✓
<b>D</b>	x	x



## DATA SHEET

### The Periodic Table of the Elements

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

\*58-71 Lanthanoid series

†90-103 Actinoid series

Key

a
<b>X</b>
b

a = relative atomic mass

X = atomic symbol

b = proton (atomic) number

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

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

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