



UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS  
International General Certificate of Secondary Education

**CHEMISTRY**

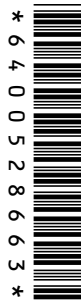
**0620/01**

Paper 1 Multiple Choice

**October/November 2008**

**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.

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.

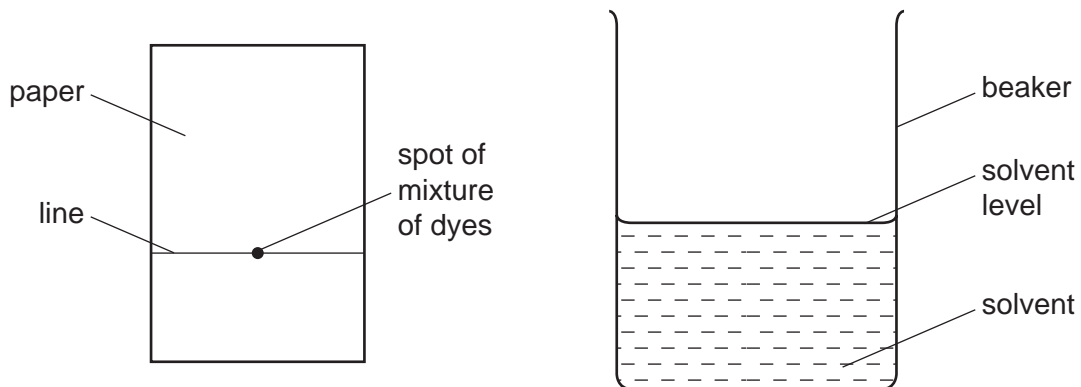
**Read the instructions on the Answer Sheet very carefully.**

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 In which substance are the particles furthest apart at room temperature?
- A ethanol  
B methane  
C salt  
D sugar
- 2 An experiment is carried out to separate a mixture of two dyes. A line is drawn on a piece of chromatography paper and a spot of the dye mixture placed on it. The paper is dipped into a solvent and left for several minutes.



Which statement about this experiment is correct?

- A The dyes must differ in their boiling points.  
B The dyes must differ in their solubilities in the solvent.  
C The line must be drawn in ink.  
D The line must be placed below the level of the solvent.
- 3 An aqueous solution contains barium iodide.

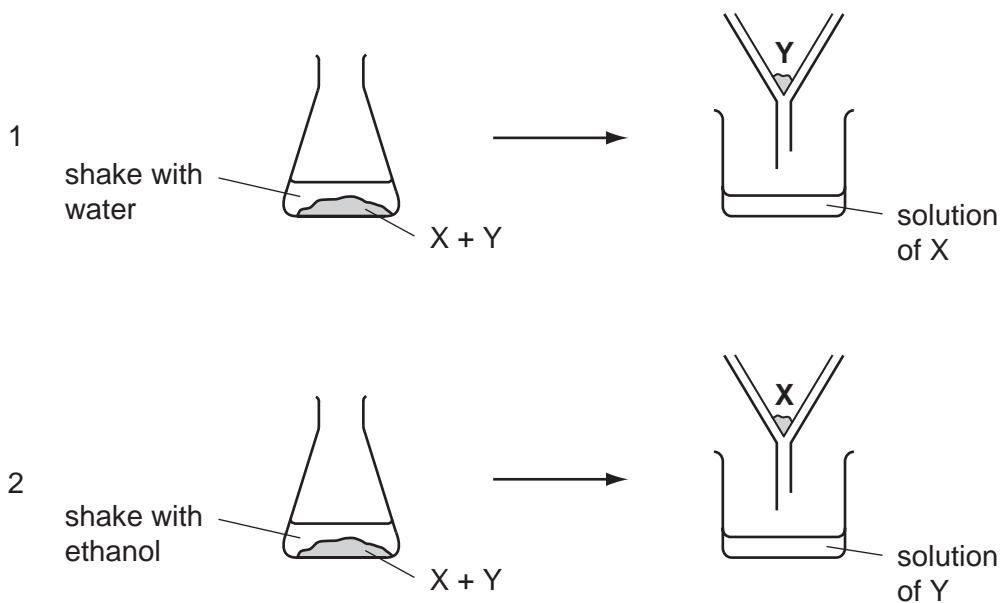
It is possible to obtain a solution that contains  $\text{Ba}^{2+}(\text{aq})$  but no  $\text{I}^{-}(\text{aq})$  by adding .....1..... until no more .....2..... precipitate forms.

Which words correctly complete gaps 1 and 2?

	1	2
<b>A</b>	aqueous lead(II) nitrate	white
<b>B</b>	aqueous lead(II) nitrate	yellow
<b>C</b>	dilute sulphuric acid	white
<b>D</b>	dilute sulphuric acid	yellow

- 4 A solid mixture contains an ionic salt, X, and a covalent organic compound, Y.

Two students suggested methods of separating the mixture as shown.



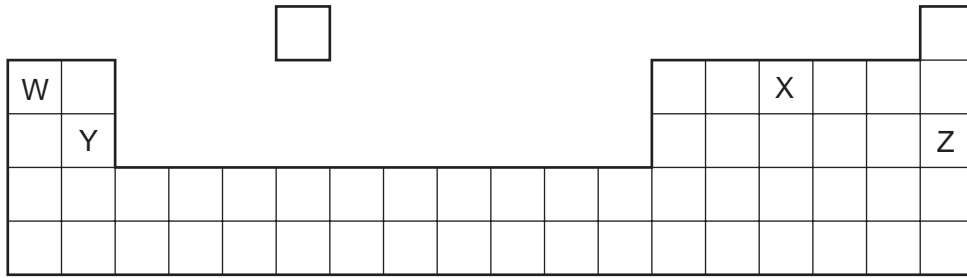
Which methods of separation are likely to work?

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

- 5 What do the nuclei in hydrogen molecules contain?

- A** electrons and neutrons
- B** electrons and protons
- C** neutrons only
- D** protons only

6 The diagram shows part of the Periodic Table.



Which element is correctly matched with its electronic structure?

	element	electronic structure
<b>A</b>	W	2,8,1
<b>B</b>	X	2,4
<b>C</b>	Y	2,8,2
<b>D</b>	Z	2,8

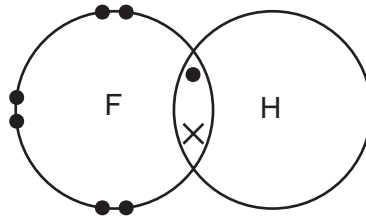
7 Which of the following compounds exist?

	RaAr	RbBr
<b>A</b>	✓	✓
<b>B</b>	✓	x
<b>C</b>	x	✓
<b>D</b>	x	x

8 Which particle is an ion?

	number of protons	number of neutrons	number of electrons
<b>A</b>	1	0	1
<b>B</b>	3	4	3
<b>C</b>	6	6	6
<b>D</b>	11	12	10

- 9 The diagram shows a molecule of hydrogen fluoride.



In the molecule hydrogen fluoride, HF,

- A** the hydrogen and fluorine share a pair of electrons.  
**B** the hydrogen and fluorine share a pair of protons.  
**C** the hydrogen gives the fluorine an electron.  
**D** the hydrogen gives fluorine a proton.
- 10 Lead(II) nitrate can be decomposed as shown.



Which numbers x, y and z balance the equation?

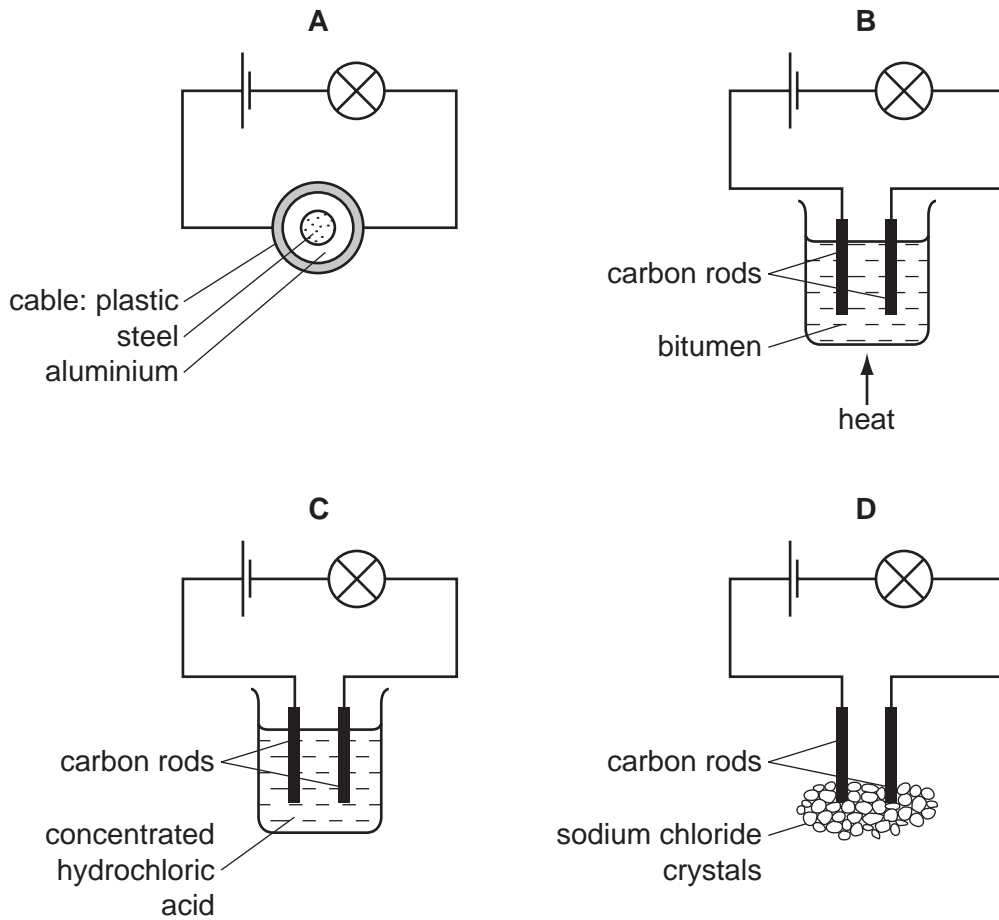
	x	y	z
<b>A</b>	2	2	2
<b>B</b>	2	2	4
<b>C</b>	2	4	4
<b>D</b>	4	4	2

- 11 Carbon and chlorine form a chloride.

What is the formula of this chloride?

- A**  $\text{CCl}_2$       **B**  $\text{CCl}_4$       **C**  $\text{CaCl}_2$       **D**  $\text{CaCl}_4$

12 Which diagram shows an experiment in which the bulb lights?



13 Metal X is low in the reactivity series and it is liberated by electrolysis of its bromide.

Metal X is .....1..... and the bromide is .....2..... .

Which words correctly complete gaps 1 and 2?

	1	2
<b>A</b>	lead	in solution
<b>B</b>	lead	molten
<b>C</b>	sodium	in solution
<b>D</b>	sodium	molten

- 14 Copper and hydrogen can each be formed by electrolysis.

At which electrodes are these elements formed?

	copper	hydrogen
<b>A</b>	anode	anode
<b>B</b>	anode	cathode
<b>C</b>	cathode	anode
<b>D</b>	cathode	cathode

- 15 When solid X is dissolved in water, an endothermic change takes place.

When 5 g of X are dissolved in 1000 cm<sup>3</sup> of water, a temperature change of 10 °C occurs.

Which temperature change occurs when 5 g of X are dissolved in 500 cm<sup>3</sup> of water?

- A** a decrease of 20 °C  
**B** a decrease of 5 °C  
**C** an increase of 20 °C  
**D** an increase of 5 °C
- 16 The elements H<sub>2</sub> and <sup>235</sup>U are both used as fuels.

In these processes, the reactions are .....1..... and .....2..... oxidised.

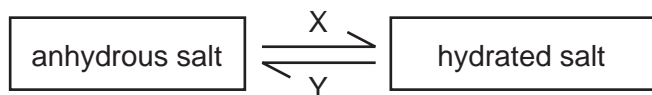
Which words correctly complete gaps 1 and 2?

	1	2
<b>A</b>	endothermic	both elements are
<b>B</b>	endothermic	only hydrogen is
<b>C</b>	exothermic	both elements are
<b>D</b>	exothermic	only hydrogen is

- 17 In which of the following reactions is the substance printed in **bold** oxidised?

- A** burning the **wax** in a candle  
**B** dissolving **hydrogen chloride** in water  
**C** making glucose from **carbon dioxide** and water by photosynthesis  
**D** reacting **sodium hydroxide** with sulphuric acid

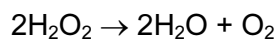
18 The diagram shows the change from a salt to its hydrated form.



Which labels can be used for X and Y?

	X	Y
<b>A</b>	+ heat	+ water
<b>B</b>	+ heat	– water
<b>C</b>	+ water	+ heat
<b>D</b>	+ water	– heat

19 Oxygen is formed when manganese(IV) oxide is added to hydrogen peroxide,  $\text{H}_2\text{O}_2$ .



In this reaction, the manganese(IV) oxide acts as

- A** an acid.
- B** a base.
- C** a catalyst.
- D** a drying agent.

20 Dilute hydrochloric acid is added to aqueous barium nitrate in a test-tube.

What happens?

	the pH of the liquid in the test-tube	a precipitate forms
<b>A</b>	decreases	yes
<b>B</b>	decreases	no
<b>C</b>	increases	yes
<b>D</b>	increases	no



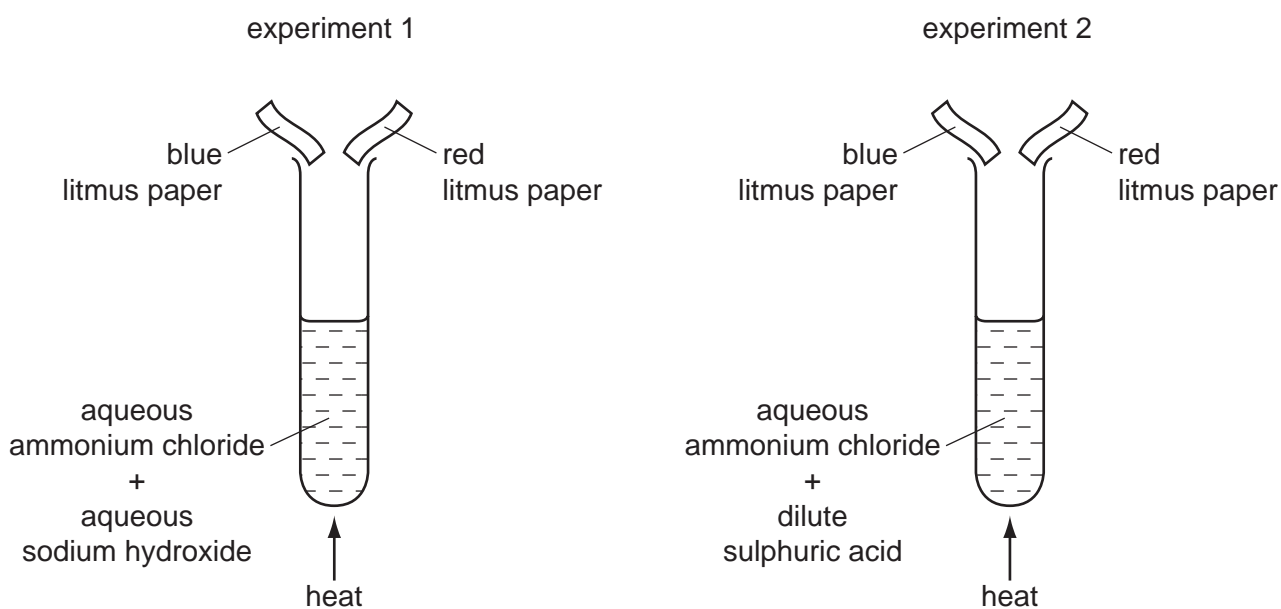
21 A colourless liquid in an unlabelled bottle is tested as shown.

- Litmus paper turns red.
- Magnesium ribbon fizzed.
- Reaction with aqueous barium nitrate produced a white precipitate.

What is the colourless liquid?

- A** aqueous sodium hydroxide  
**B** aqueous sodium sulphate  
**C** dilute hydrochloric acid  
**D** dilute sulphuric acid

22 The diagrams show two experiments.



What happens to the pieces of litmus paper?

	experiment 1	experiment 2
<b>A</b>	blue → red	both pieces bleached
<b>B</b>	blue → red	no change
<b>C</b>	red → blue	both pieces bleached
<b>D</b>	red → blue	no change

23 Which substances react with dilute sulphuric acid to form a salt?

	magnesium	magnesium oxide	magnesium carbonate	magnesium chloride
<b>A</b>	✓	✓	✓	✗
<b>B</b>	✓	✓	✗	✓
<b>C</b>	✓	✗	✓	✓
<b>D</b>	✗	✓	✓	✓

24 Which properties of the element titanium, Ti, can be predicted from its position in the Periodic Table?

	can be used as a catalyst	conducts electricity when solid	has low density	forms coloured compounds
<b>A</b>	✗	✓	✓	✓
<b>B</b>	✓	✗	✓	✓
<b>C</b>	✓	✓	✗	✓
<b>D</b>	✓	✓	✓	✗

25 The table gives information about four elements.

Which element could be in Group I of the Periodic Table?

	proton number	reaction with water
<b>A</b>	even	reacts
<b>B</b>	even	no reaction
<b>C</b>	odd	reacts
<b>D</b>	odd	no reaction

26 What is the formula of a strontium ion?

- A**  $\text{Sr}^{2+}$       **B**  $\text{Sr}^+$       **C**  $\text{Sr}^-$       **D**  $\text{Sr}^{2-}$

- 27 Nichrome is an alloy of the two transition elements nickel and chromium. The alloy is used as the heating coil in electric fires and electric toasters.

Which properties of nichrome are important for these uses?

	high melting point	resistant to oxidation
<b>A</b>	✓	✓
<b>B</b>	✓	x
<b>C</b>	x	✓
<b>D</b>	x	x

- 28 Mild steel is an alloy of iron and carbon.

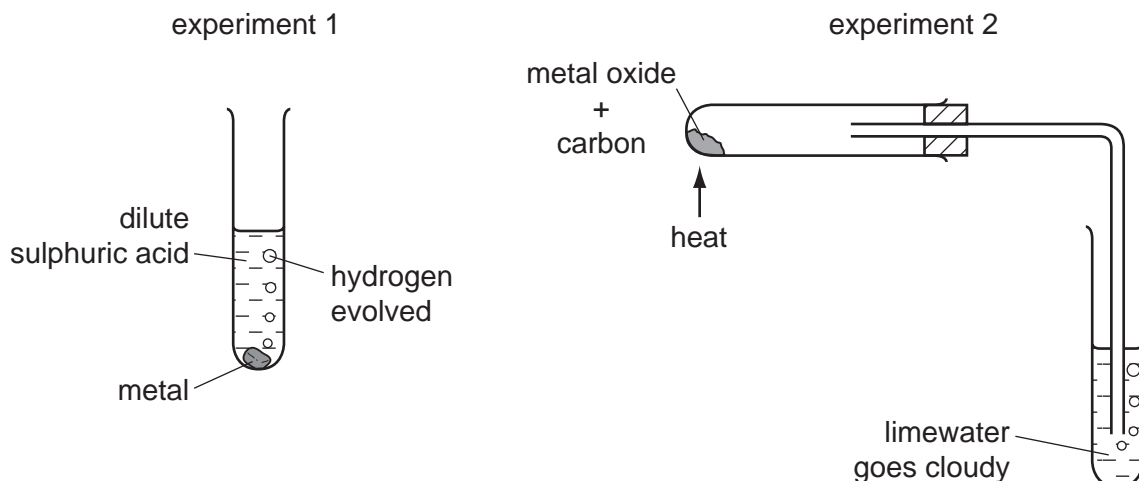
How does the carbon affect the properties of mild steel?

- A** The carbon makes the alloy a better conductor of electricity than iron.
- B** The carbon makes the alloy harder than the iron.
- C** The carbon makes the alloy softer than the iron.
- D** The carbon stops the iron rusting.
- 29 A new isotope of a divalent metal is discovered. Some students are asked to predict its properties.

Which student's predictions are correct?

student	number of electrons in outer shell	bonding in the oxide
<b>A</b>	2	covalent
<b>B</b>	2	ionic
<b>C</b>	6	covalent
<b>D</b>	6	ionic

30 The diagrams show two experiments to investigate metal reactivity.



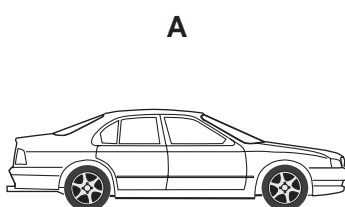
In which of these experiments could the metal be copper?

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

31 Which reaction is **not** a step in the production of iron from hematite in the Blast Furnace?

- A** carbon (coke) burning in air to produce carbon dioxide
- B** carbon monoxide being formed from carbon and carbon dioxide
- C** iron oxide reacting with carbon monoxide to form iron
- D** iron reacting with limestone to produce slag

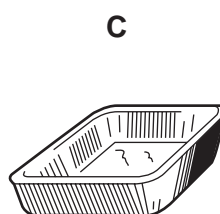
32 Which item is sometimes made from stainless steel?



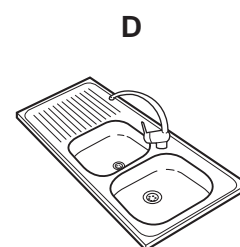
car body



drinks can



food container



kitchen sink

33 Some pollutant gases are present in the atmosphere because of the combustion of fossil fuels.

For which gases is this statement correct?

	CO	NO <sub>2</sub>	SO <sub>2</sub>
<b>A</b>	✓	✓	✓
<b>B</b>	✓	✓	x
<b>C</b>	✓	x	✓
<b>D</b>	x	✓	✓

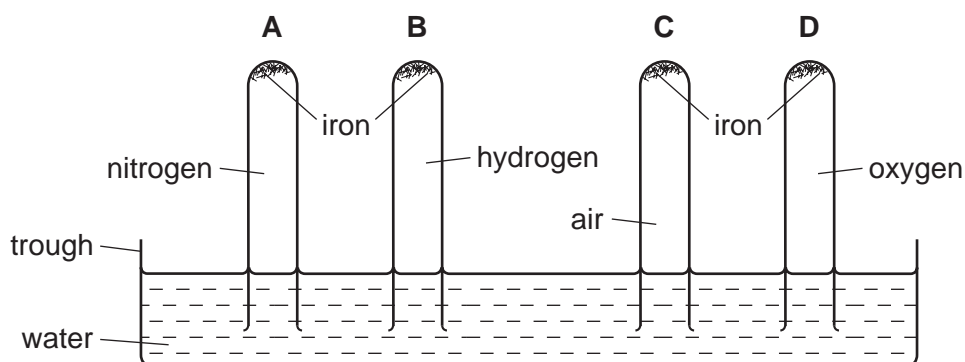
34 Air is a mixture of gases.

Which gas is present in the largest amount?

- A** argon
- B** carbon dioxide
- C** nitrogen
- D** oxygen

35 The experiment shown in the diagram was set up.

Which tube had the highest water level after one month?



36 An excess of fertiliser on a field can be dissolved by rain water and washed into streams and rivers. Fertiliser can then find its way into water supplies.

Which process at the water works, if any, would remove this fertiliser?

	filtration	chlorination
<b>A</b>	no	no
<b>B</b>	no	yes
<b>C</b>	yes	no
<b>D</b>	yes	yes

37 When added in turn to four solutions, aqueous sodium carbonate gives the following results.

Which solution is acidic?

solution	result
<b>A</b>	a blue precipitate forms
<b>B</b>	a white precipitate forms
<b>C</b>	bubbles of gas form
<b>D</b>	no visible reaction occurs

38 Which products are obtained by the cracking of an alkane?

	alkene	hydrogen	water
<b>A</b>	✓	✓	✓
<b>B</b>	✓	✓	x
<b>C</b>	✓	x	✓
<b>D</b>	x	✓	✓

39 A compound takes part in an addition reaction.

How does its name end?

- A** .....ane
- B** .....ene
- C** .....ol
- D** .....oic acid

40 When glucose is fermented, ethanol is formed together with

- A** carbon dioxide.
- B** ethene.
- C** methane.
- D** oxygen.



**DATA SHEET**  
**The Periodic Table of the Elements**

Group		III	IV	V	VI	VII	0																																																																																																																																																																	
I	II	<table border="1"> <tr> <td align="center">1 <b>H</b> Hydrogen 1</td> </tr> <tr> <td align="center">11 <b>B</b> Boron 5</td> <td align="center">12 <b>C</b> Carbon 6</td> <td align="center">13 <b>Al</b> Aluminium 13</td> <td align="center">14 <b>Si</b> Silicon 14</td> <td align="center">15 <b>P</b> Phosphorus 15</td> <td align="center">16 <b>S</b> Sulphur 16</td> <td align="center">17 <b>Cl</b> Chlorine 17</td> <td align="center">18 <b>Ar</b> Argon 18</td> </tr> <tr> <td align="center">7 <b>Li</b> Lithium 3</td> <td align="center">9 <b>Be</b> Beryllium 4</td> <td align="center">27 <b>Co</b> Cobalt 27</td> <td align="center">28 <b>Ni</b> Nickel 28</td> <td align="center">29 <b>Cu</b> Copper 29</td> <td align="center">30 <b>Zn</b> Zinc 30</td> <td align="center">31 <b>Ga</b> Gallium 31</td> <td align="center">32 <b>Ge</b> Germanium 32</td> <td align="center">33 <b>As</b> Arsenic 33</td> <td align="center">34 <b>Se</b> Selenium 34</td> <td align="center">35 <b>Br</b> Bromine 35</td> <td align="center">36 <b>Kr</b> Krypton 36</td> <td align="center">37 <b>Rb</b> Rubidium 37</td> <td align="center">38 <b>Sr</b> Strontium 38</td> <td align="center">39 <b>Y</b> Yttrium 39</td> <td align="center">40 <b>Ca</b> Calcium 20</td> <td align="center">41 <b>Nb</b> Niobium 41</td> <td align="center">42 <b>Mo</b> Molybdenum 42</td> <td align="center">43 <b>Tc</b> Technetium 43</td> <td align="center">44 <b>Ru</b> Ruthenium 44</td> <td align="center">45 <b>Rh</b> Rhodium 45</td> <td align="center">46 <b>Pd</b> Palladium 46</td> <td align="center">47 <b>Ag</b> Silver 47</td> <td align="center">48 <b>Cd</b> Cadmium 48</td> <td align="center">49 <b>In</b> Indium 49</td> <td align="center">50 <b>Sn</b> Tin 50</td> <td align="center">51 <b>Sb</b> Antimony 51</td> <td align="center">52 <b>Te</b> Tellurium 52</td> <td align="center">53 <b>I</b> Iodine 53</td> <td align="center">54 <b>Xe</b> Xenon 54</td> </tr> <tr> <td align="center">19 <b>K</b> Potassium 19</td> <td align="center">20 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<b>K</b> Potassium 19	20 <b>Ca</b> Calcium 20	49 <b>In</b> Indium 49	50 <b>Sn</b> Tin 50	51 <b>Sb</b> Antimony 51	52 <b>Te</b> Tellurium 52	53 <b>I</b> Iodine 53	54 <b>Xe</b> Xenon 54	85 <b>At</b> Astatine 85	86 <b>Rn</b> Radon 86	23 <b>Na</b> Sodium 11	24 <b>Mg</b> Magnesium 12	55 <b>Mn</b> Manganese 25	56 <b>Fe</b> Iron 26	57 <b>Co</b> Cobalt 27	58 <b>Ni</b> Nickel 28	59 <b>Cu</b> Copper 29	60 <b>Zn</b> Zinc 30	61 <b>Ga</b> Gallium 31	62 <b>Ge</b> Germanium 32	63 <b>As</b> Arsenic 33	64 <b>Se</b> Selenium 34	65 <b>Br</b> Bromine 35	66 <b>Kr</b> Krypton 36	67 <b>Rb</b> Rubidium 37	68 <b>Sr</b> Strontium 38	69 <b>Y</b> Yttrium 39	70 <b>Zr</b> Zirconium 40	71 <b>Nb</b> Niobium 41	72 <b>Mo</b> Molybdenum 42	73 <b>Tc</b> Technetium 43	74 <b>Ru</b> Ruthenium 44	75 <b>Rh</b> Rhodium 45	76 <b>Pd</b> Palladium 46	77 <b>Ag</b> Silver 47	78 <b>Cd</b> Cadmium 48	79 <b>In</b> Indium 49	80 <b>Sn</b> Tin 50	81 <b>Sb</b> Antimony 51	82 <b>Te</b> Tellurium 52	83 <b>I</b> Iodine 53	84 <b>Xe</b> Xenon 54	39 <b>K</b> Potassium 19	40 <b>Ca</b> Calcium 20	81 <b>Fr</b> Francium 87	82 <b>Ra</b> Radium 88	83 <b>Ac</b> Actinium 89	84 <b>Th</b> Thorium 90	85 <b>Pa</b> Protactinium 91	86 <b>U</b> Uranium 92	87 <b>Np</b> Neptunium 93	88 <b>Pu</b> Plutonium 94	89 <b>Am</b> Americium 95	90 <b>Cm</b> Curium 96	91 <b>Bk</b> Berkelium 97	92 <b>Cf</b> Californium 98	93 <b>Es</b> Einsteinium 99	94 <b>Fm</b> Fermium 100	95 <b>Md</b> Mendelevium 101	96 <b>No</b> Nobelium 102	97 <b>Lr</b> Lawrencium 103	133 <b>Cs</b> Caesium 55	137 <b>Ba</b> Barium 56	140 <b>Ce</b> Cerium 58	141 <b>Pr</b> Praseodymium 59	142 <b>Nd</b> Neodymium 60	143 <b>Pm</b> Promethium 61	144 <b>Sm</b> Samarium 62	145 <b>Eu</b> Europium 63	146 <b>Gd</b> Gadolinium 64	147 <b>Tb</b> Terbium 65	148 <b>Dy</b> Dysprosium 66	149 <b>Ho</b> Holmium 67	150 <b>Er</b> Erbium 68	151 <b>Tm</b> Thulium 69	152 <b>Yb</b> Ytterbium 70	153 <b>Lu</b> Lutetium 71	154 <b>Hf</b> Hafnium 72	155 <b>Ta</b> Tantalum 73	156 <b>W</b> Tungsten 74	157 <b>Re</b> Rhenium 75	158 <b>Os</b> Osmium 76	159 <b>Ir</b> Iridium 77	160 <b>Pt</b> Platinum 78	161 <b>Au</b> Gold 79	162 <b>Hg</b> Mercury 80	163 <b>Tl</b> Thallium 81	164 <b>Pb</b> Lead 82	165 <b>Bi</b> Bismuth 83	166 <b>Po</b> Polonium 84	167 <b>At</b> Astatine 85	168 <b>Rn</b> Radon 86	226 <b>Ra</b> Radium 88	227 <b>Ac</b> Actinium 89	170 <b>Th</b> Thorium 90	171 <b>Pa</b> Protactinium 91	172 <b>U</b> Uranium 92	173 <b>Np</b> Neptunium 93	174 <b>Pu</b> Plutonium 94	175 <b>Am</b> Americium 95	176 <b>Cm</b> Curium 96	177 <b>Bk</b> Berkelium 97	178 <b>Cf</b> Californium 98	179 <b>Es</b> Einsteinium 99	180 <b>Fm</b> Fermium 100	181 <b>Md</b> Mendelevium 101	182 <b>No</b> Nobelium 102	183 <b>Lr</b> Lawrencium 103	184 <b>Hf</b> Hafnium 72	185 <b>Ta</b> Tantalum 73	186 <b>W</b> Tungsten 74	187 <b>Re</b> Rhenium 75	188 <b>Os</b> Osmium 76	189 <b>Ir</b> Iridium 77	190 <b>Pt</b> Platinum 78	191 <b>Au</b> Gold 79	192 <b>Hg</b> Mercury 80	193 <b>Tl</b> Thallium 81	194 <b>Pb</b> Lead 82	195 <b>Bi</b> 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 19 **F** Fluorine 9 | 16 **O** Oxygen 8 | 14 **N** Nitrogen 7 | 12 **C** Carbon 6 | 11 **B** Boron 5 | 10 **Ne** Neon 10 | 4 **He** Helium 2 ||  |  | 169 **Tm** Thulium 69 | 170 **Yb** Ytterbium 70 | 171 **Lu** Lutetium 71 | 172 **Hf** Hafnium 72 | 173 **Yb** Ytterbium 70 | 174 **Lr** Lawrencium 103 |

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

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

a	<b>X</b>	b
a = relative atomic mass	X = atomic symbol	b = proton (atomic) number

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