



**Cambridge International Examinations**  
Cambridge International General Certificate of Secondary Education

**CHEMISTRY**

**0620/12**

Paper 1 Multiple Choice

**October/November 2014**

**45 Minutes**

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

\* 7 9 5 2 5 9 0 1 5 2 \*

**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 16.  
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 **13** printed pages and **3** blank pages.

1 Ethanol is made by fermentation.

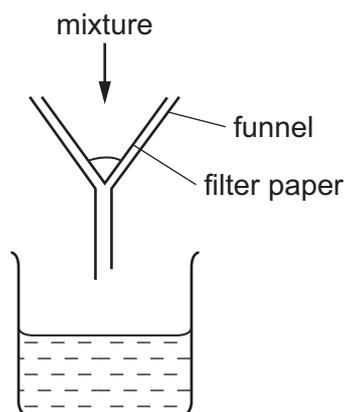
How is ethanol obtained from the fermentation mixture?

- A chromatography
- B crystallisation
- C electrolysis
- D fractional distillation

2 Which statement is an example of diffusion?

- A A kitchen towel soaks up some spilt milk.
- B Ice cream melts in a warm room.
- C Pollen from flowers is blown by the wind.
- D The smell of cooking spreads through a house.

3 A mixture is separated using the apparatus shown.

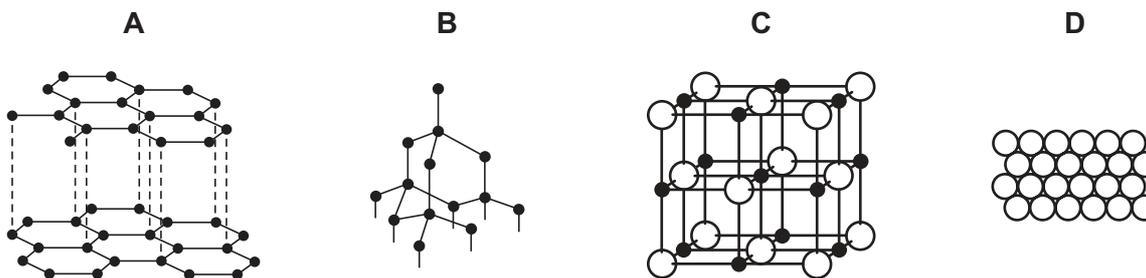


What is the mixture?

- A aqueous copper chloride and copper
  - B aqueous copper chloride and sodium chloride
  - C ethane and methane
  - D ethanol and water
- 4 What is different for isotopes of the same element?
- A nucleon number
  - B number of electron shells
  - C number of electrons in the outer shell
  - D proton number

- 5 Slate has a layered structure and can easily be split into thin sheets.

Which diagram shows a structure most like that of slate?



- 6 Sodium chloride is an ionic solid.

Which statement is **not** correct?

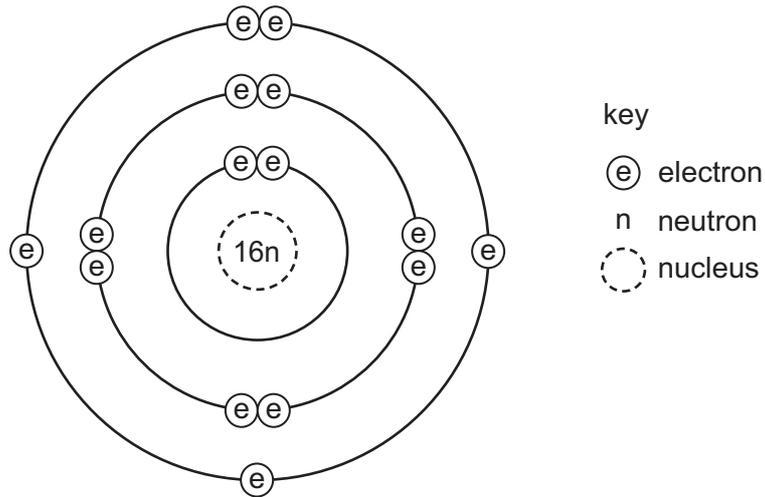
- A** Ions are formed when atoms lose or gain electrons.  
**B** Ions in sodium chloride are strongly held together.  
**C** Ions with the same charge attract each other.  
**D** Sodium chloride solution can conduct electricity.
- 7 Caesium chloride and rubidium bromide are halide compounds of Group I elements.

Caesium chloride has the formula .....1....., a relative formula mass .....2..... that of rubidium bromide and bonds that are .....3..... .

Which words correctly complete gaps 1, 2 and 3?

	1	2	3
<b>A</b>	$\text{CaCl}$	different from	ionic
<b>B</b>	$\text{CaCl}$	the same as	covalent
<b>C</b>	$\text{CsCl}$	different from	ionic
<b>D</b>	$\text{CsCl}$	the same as	covalent

8 Which element has the atomic structure shown?



- A Al                      B P                      C S                      D Si

9 How many atoms of hydrogen are there in a molecule of ethanol,  $C_2H_5OH$ ?

- A 1                      B 2                      C 5                      D 6

10 Which metal could **not** be used for electroplating by using an aqueous solution?

- A chromium  
B copper  
C silver  
D sodium

11 Which products are formed at the electrodes when a concentrated solution of sodium chloride is electrolysed?

	cathode (-)	anode (+)
A	hydrogen	chlorine
B	hydrogen	oxygen
C	sodium	chlorine
D	sodium	oxygen

12 Iron forms an oxide with the formula  $Fe_2O_3$ .

What is the relative formula mass of this compound?

- A 76                      B 100                      C 136                      D 160

13 Which statements about exothermic and endothermic reactions are correct?

- 1 During an exothermic reaction, heat is given out.
- 2 The temperature of an endothermic reaction goes up because heat is taken in.
- 3 Burning methane in the air is an exothermic reaction.

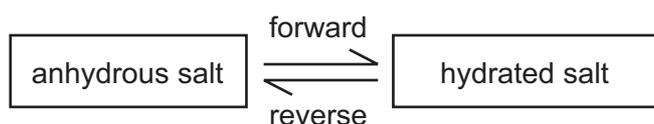
A 1, 2 and 3    B 1 and 2 only    C 1 and 3 only    D 2 and 3 only

14 A power station was designed to burn gaseous fuels only.

Which two substances could be used?

- A carbon dioxide and hydrogen  
B carbon dioxide and  $^{235}\text{U}$   
C hydrogen and methane  
D methane and  $^{235}\text{U}$

15 The diagram shows the change from an anhydrous salt to its hydrated form.



Which statement is correct?

- A forward reaction requires heat and water  
B forward reaction requires water only  
C reverse reaction requires heat and water  
D reverse reaction requires water only

16 The rate of a reaction depends on temperature, concentration, particle size and catalysts.

Which statement is **not** correct?

- A Catalysts can be used to increase the rate of reaction.  
B Higher concentration decreases the rate of reaction.  
C Higher temperature increases the rate of reaction.  
D Larger particle size decreases the rate of reaction.



21 How many different salts could be made from a supply of dilute sulfuric acid, dilute hydrochloric acid, copper, magnesium oxide and zinc carbonate?

- A 3                      B 4                      C 5                      D 6

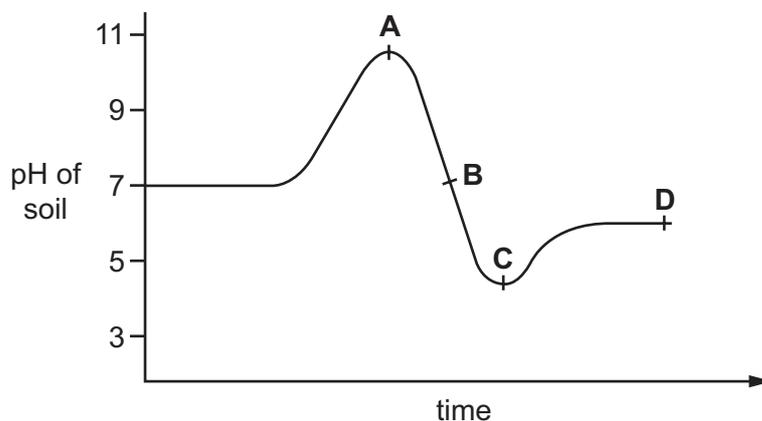
22 Elements in Group I of the Periodic Table react with water.

Which row describes the products made in the reaction and the trend in reactivity of the elements?

	products	trend in reactivity
<b>A</b>	metal hydroxide and hydrogen	less reactive down the group
<b>B</b>	metal hydroxide and hydrogen	more reactive down the group
<b>C</b>	metal oxide and hydrogen	less reactive down the group
<b>D</b>	metal oxide and hydrogen	more reactive down the group

23 The graph shows how the pH of soil in a field changes over time.

At which point was the soil neutral?



24 The table shows the reactions of four different metals with water.

metal	reaction
W	reacts vigorously with cold water
X	no reaction with water
Y	reacts very slowly with water, more vigorously with steam
Z	reacts violently with cold water

What is the correct order of reactivity, from most reactive to least reactive?

- A**  $W \rightarrow X \rightarrow Y \rightarrow Z$   
**B**  $W \rightarrow Z \rightarrow Y \rightarrow X$   
**C**  $Z \rightarrow W \rightarrow X \rightarrow Y$   
**D**  $Z \rightarrow W \rightarrow Y \rightarrow X$

25 An inert gas X is used to fill weather balloons.

Which descriptions of X are correct?

	number of outer electrons in atoms of X	structure of gas X
<b>A</b>	2	single atoms
<b>B</b>	2	diatomic molecules
<b>C</b>	8	single atoms
<b>D</b>	8	diatomic molecules

26 An element X has the two properties listed.

- 1 It acts as a catalyst.
- 2 It forms colourless ions.

Which of these properties suggest that X is a transition element?

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

27 The oxide of element X is reduced by heating with carbon.

Element X does not react with cold water, steam or dilute hydrochloric acid.

What is X?

- A copper
- B iron
- C magnesium
- D zinc

28 Which information about an element can be used to predict its chemical properties?

- A boiling point
- B density
- C melting point
- D position in the Periodic Table

29 Aluminium is the most common metal in the Earth's crust.

Which is **not** a property of aluminium?

- A low density
- B resistance to corrosion
- C good conductor of electricity
- D poor conductor of heat

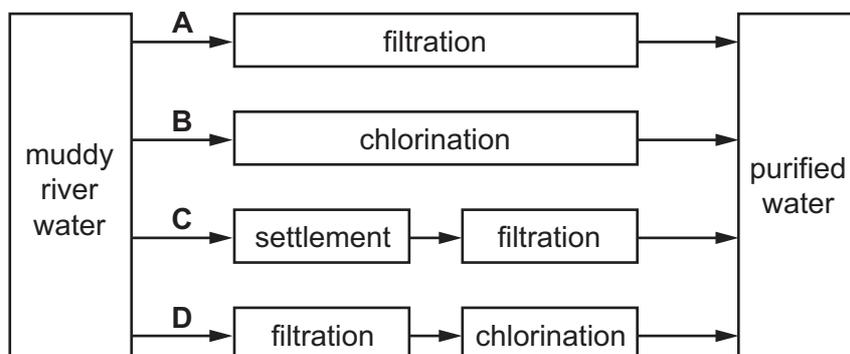
30 Which reaction involves oxidation?

- A heating hydrated copper(II) sulfate in the air
- B polymerisation of ethene
- C rusting of iron
- D thermal decomposition of calcium carbonate

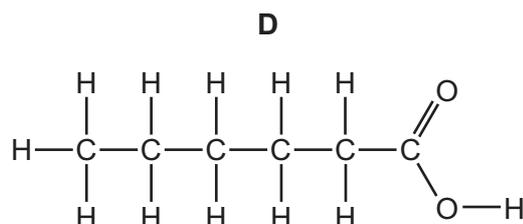
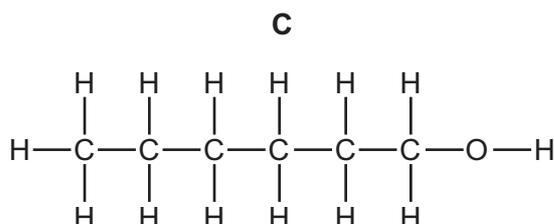
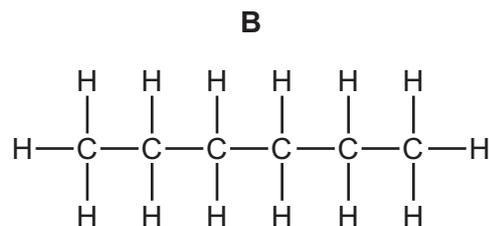
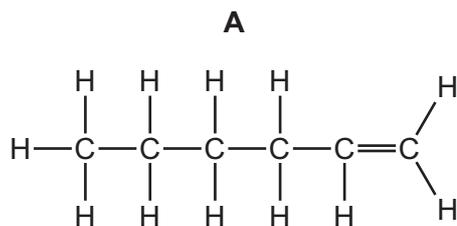
31 Which object is **least** likely to contain aluminium?

- A a bicycle frame
- B a hammer
- C a saucepan
- D an aeroplane body

- 32 Which method can be used to obtain ammonia from ammonium sulfate?
- A Heat it with an acid.
  - B Heat it with an alkali.
  - C Heat it with an oxidising agent.
  - D Heat it with a reducing agent.
- 33 Which is an air pollutant that affects a part of the body other than the lungs and blood system?
- A lead compounds
  - B nitrogen
  - C oxides of nitrogen
  - D sulfur dioxide
- 34 Which statement about methane is **not** correct?
- A It is a liquid produced by distilling petroleum.
  - B It is produced as vegetation decomposes.
  - C It is produced by animals, such as cows.
  - D It is used as a fuel.
- 35 Which method of purification would produce water **most** suitable for drinking?



36 Which molecular structure shows hexene?



37 Increasing the number of atoms in one molecule of a hydrocarbon increases the amount of energy released when it burns.

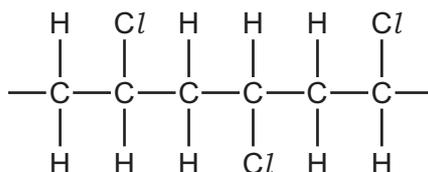
What is the correct order?

	less energy released	→	more energy released
<b>A</b>	ethene	ethane	methane
<b>B</b>	ethene	methane	ethane
<b>C</b>	methane	ethane	ethene
<b>D</b>	methane	ethene	ethane

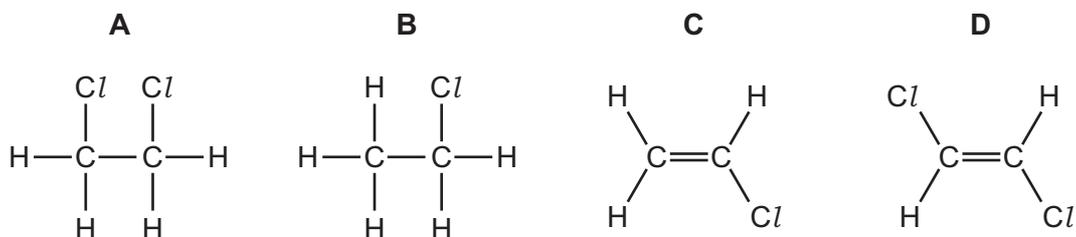
38 Which statement about alkenes is **not** correct?

- A** The functional group is C=C.
- B** The structural difference between one member and the next is  $-\text{CH}_3-$ .
- C** They form a homologous series.
- D** They turn aqueous bromine from brown to colourless.

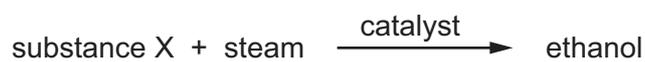
39 The diagram shows three repeat units in the structure of an addition polymer.



Which alkene monomer is used to make this polymer?



40 Ethanol can be manufactured from substance X.



What is substance X?

- A carbon dioxide
- B ethene
- C hydrogen
- D oxygen







**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											19 <b>F</b> Fluorine 9	20 <b>Ne</b> Neon 10																											
23 <b>Na</b> Sodium 11	24 <b>Mg</b> Magnesium 12											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											79 <b>Se</b> Selenium 34	84 <b>Kr</b> Krypton 36																											
85 <b>Rb</b> Rubidium 37	88 <b>Sr</b> Strontium 38											127 <b>I</b> Iodine 53	131 <b>Xe</b> Xenon 54																											
133 <b>Cs</b> Caesium 55	137 <b>Ba</b> Barium 56											209 <b>Bi</b> Bismuth 83	210 <b>Po</b> Polonium 84																											
226 <b>Fr</b> Francium 87	226 <b>Ra</b> Radium 88											210 <b>At</b> Astatine 85	210 <b>Rn</b> Radon 86																											
													11 <b>B</b> Boron 5	12 <b>C</b> Carbon 6	14 <b>N</b> Nitrogen 7	15 <b>O</b> Oxygen 8	16 <b>Si</b> Silicon 14	17 <b>P</b> Phosphorus 15	18 <b>S</b> Sulfur 16	20 <b>Al</b> Aluminium 13	21 <b>Ge</b> Germanium 32	22 <b>As</b> Arsenic 33	24 <b>Se</b> Selenium 34	26 <b>Br</b> Bromine 35	29 <b>Zn</b> Zinc 30	30 <b>Ga</b> Gallium 31	32 <b>In</b> Indium 49	33 <b>Sn</b> Tin 50	35 <b>Pb</b> Lead 82											
													59 <b>Ni</b> Nickel 28	60 <b>Cu</b> Copper 29	63 <b>Ni</b> Nickel 28	64 <b>Cu</b> Copper 29	70 <b>Ga</b> Gallium 31	71 <b>Ge</b> Germanium 32	73 <b>As</b> Arsenic 33	74 <b>Se</b> Selenium 34	75 <b>Br</b> Bromine 35	76 <b>Zn</b> Zinc 30	77 <b>Ga</b> Gallium 31	78 <b>Ge</b> Germanium 32	79 <b>As</b> Arsenic 33	80 <b>Se</b> Selenium 34	81 <b>Br</b> Bromine 35	82 <b>Cd</b> Cadmium 48	83 <b>In</b> Indium 49	84 <b>Sn</b> Tin 50	86 <b>Hg</b> Mercury 80									
													56 <b>Fe</b> Iron 26	57 <b>Mn</b> Manganese 25	58 <b>Cr</b> Chromium 24	59 <b>Co</b> Cobalt 27	60 <b>Ni</b> Nickel 28	61 <b>Cu</b> Copper 29	62 <b>Zn</b> Zinc 30	63 <b>Ga</b> Gallium 31	64 <b>Ge</b> Germanium 32	65 <b>As</b> Arsenic 33	66 <b>Se</b> Selenium 34	67 <b>Br</b> Bromine 35	68 <b>Kr</b> Krypton 36	69 <b>Rb</b> Rubidium 37	70 <b>Sr</b> Strontium 38	71 <b>Y</b> Yttrium 39	72 <b>Zr</b> Zirconium 40	73 <b>Nb</b> Niobium 41	74 <b>Mo</b> Molybdenum 42	75 <b>Tc</b> Technetium 43	76 <b>Ru</b> Ruthenium 44	77 <b>Rh</b> Rhodium 45	78 <b>Pd</b> Palladium 46	79 <b>Ag</b> Silver 47	80 <b>Cd</b> Cadmium 48	81 <b>In</b> Indium 49	82 <b>Sn</b> Tin 50	84 <b>Hg</b> Mercury 80
													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>Th</b> Thorium 90	155 <b>Pa</b> Protactinium 91	156 <b>U</b> Uranium 92	157 <b>Np</b> Neptunium 93	158 <b>Pu</b> Plutonium 94	159 <b>Am</b> Americium 95	160 <b>Cm</b> Curium 96	161 <b>Bk</b> Berkelium 97	162 <b>Cf</b> Californium 98	163 <b>Es</b> Einsteinium 99	164 <b>Fm</b> Fermium 100	165 <b>Md</b> Mendelevium 101	166 <b>No</b> Nobelium 102	167 <b>Lr</b> Lawrencium 103

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

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

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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