



**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.

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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.

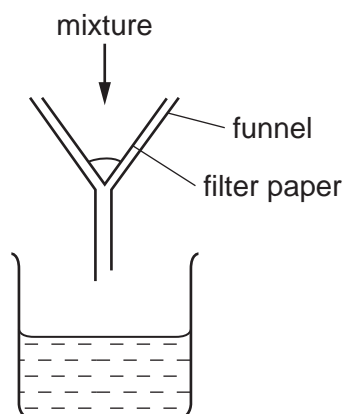
How is ethanol obtained from the fermentation mixture?

- 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.

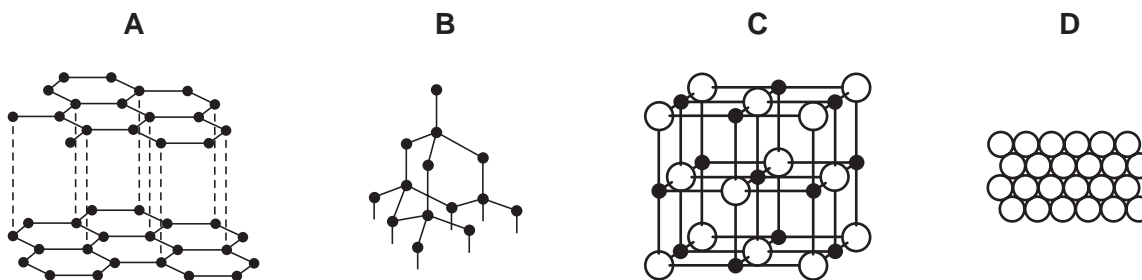


What is the mixture?

- 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?

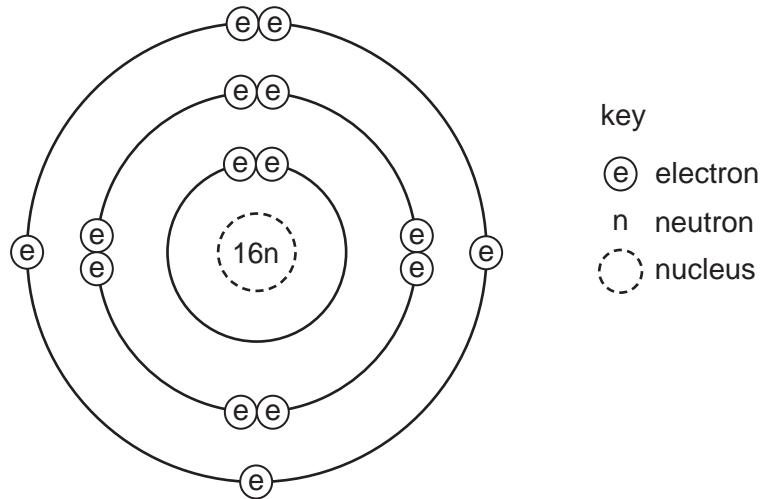
- A Ions are formed when atoms lose or gain electrons.  
 B Ions in sodium chloride are strongly held together.  
 C Ions with the same charge attract each other.  
 D Sodium chloride solution can conduct electricity.
- 7 Caesium chloride and rubidium bromide are halide compounds of Group I elements.

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.

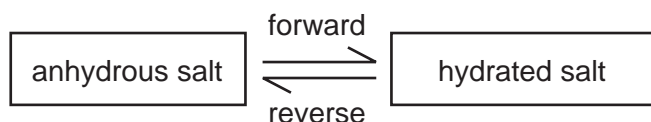
A 1, 2 and 3    B 1 and 2 only    C 1 and 3 only    D 2 and 3 only

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.

17 Which changes decrease the rate of reaction between magnesium and air?

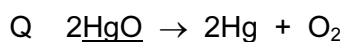
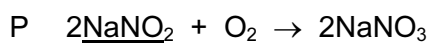
- 1 heating the magnesium to a higher temperature
- 2 using a higher proportion of oxygen in the air
- 3 using magnesium ribbon instead of powdered magnesium

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

18 Which substance is the most acidic?

	substance	pH
<b>A</b>	calcium hydroxide	12
<b>B</b>	lemon juice	4
<b>C</b>	milk	6
<b>D</b>	washing up liquid	8

19 The equations for two reactions P and Q are given.



In which of these reactions does oxidation of the underlined substance occur?

	P	Q
<b>A</b>	✓	✓
<b>B</b>	✓	x
<b>C</b>	x	✓
<b>D</b>	x	x

20 The positions of elements W, X, Y and Z in the Periodic Table are shown.

A simplified periodic table showing the positions of elements W, X, Y, and Z. The table consists of 4 rows and 18 columns. Element W is in the first row, first column. Element X is in the third row, second column. Element Y is in the third row, 14th column. Element Z is in the third row, 17th column. There is also a small square box above the 14th column of the second row.

Which elements form basic oxides?

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

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

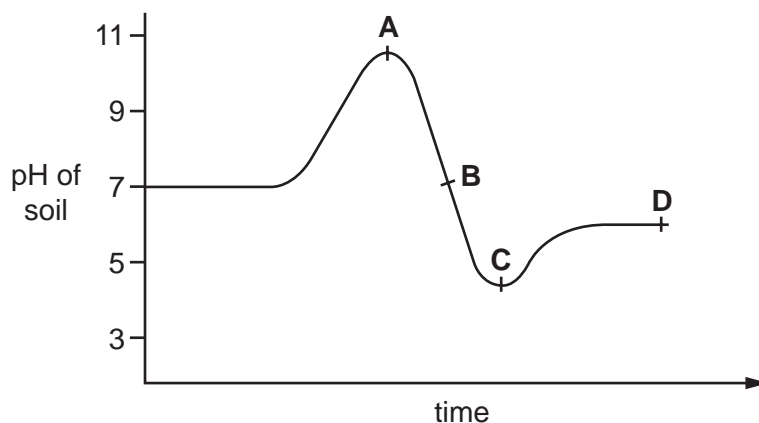
22 Elements in Group I of the Periodic Table react with water.

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

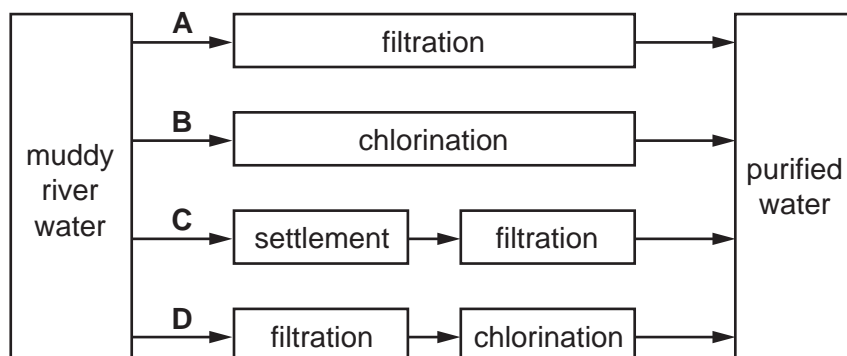
30 Which reaction involves oxidation?

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

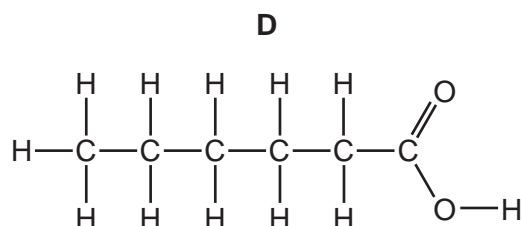
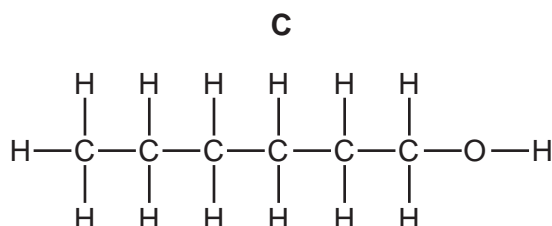
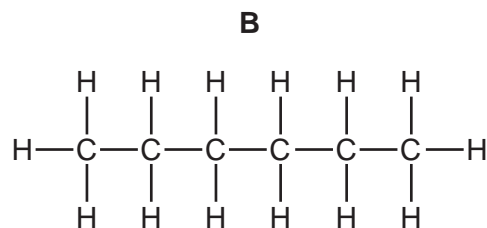
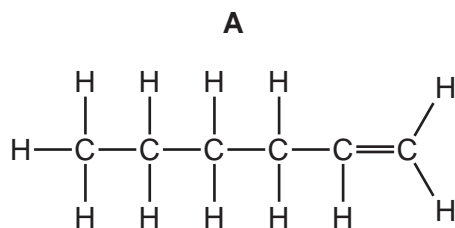
31 Which object is **least** likely to contain aluminium?

- 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.

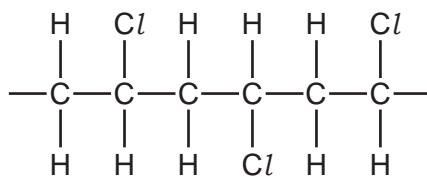
What is the correct order?

	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

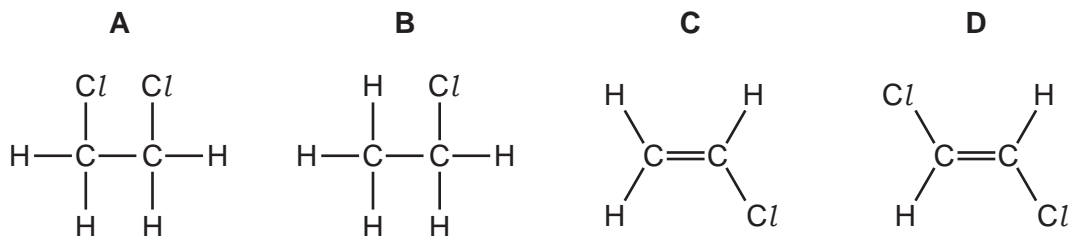
38 Which statement about alkenes is **not** correct?

- 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.

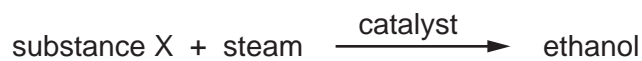
39 The diagram shows three repeat units in the structure of an addition polymer.



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															
7 <b>Li</b> Lithium 3	9 <b>Be</b> Beryllium 4											4 <b>He</b> Helium 2					
23 <b>Na</b> Sodium 11	24 <b>Mg</b> Magnesium 12	11 <b>B</b> Boron 5	12 <b>C</b> Carbon 6	13 <b>Al</b> Aluminium 13	14 <b>Si</b> Silicon 14	15 <b>P</b> Phosphorus 15	16 <b>S</b> Sulfur 16	17 <b>Cl</b> Chlorine 17	18 <b>Ar</b> Argon 18	19 <b>F</b> Fluorine 9	20 <b>Ne</b> Neon 10						
39 <b>K</b> Potassium 19	40 <b>Ca</b> Calcium 20	27 <b>Al</b> Aluminium 13	28 <b>Si</b> Silicon 14	29 <b>Co</b> Cobalt 27	30 <b>Zn</b> Zinc 30	31 <b>Ga</b> Gallium 31	32 <b>Ge</b> Germanium 32	33 <b>As</b> Arsenic 33	34 <b>Se</b> Selenium 34	35 <b>Br</b> Bromine 35	36 <b>Kr</b> Krypton 36						
85 <b>Rb</b> Rubidium 37	88 <b>Sr</b> Strontium 38	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				
133 <b>Cs</b> Caesium 55	137 <b>Ba</b> Barium 56	91 <b>Zr</b> Zirconium 40	92 <b>Nb</b> Niobium 41	93 <b>Mo</b> Molybdenum 42	94 <b>Tc</b> Technetium 43	95 <b>Ru</b> Ruthenium 44	96 <b>Rh</b> Rhodium 45	97 <b>Pd</b> Palladium 46	98 <b>Ag</b> Silver 47	99 <b>Cd</b> Cadmium 48	100 <b>In</b> Indium 49	101 <b>Sn</b> Tin 50	102 <b>Sb</b> Antimony 51	103 <b>Te</b> Tellurium 52	104 <b>I</b> Iodine 53	105 <b>Xe</b> Xenon 54	
226 <b>Ra</b> Radium 88	227 <b>Ac</b> Actinium 89	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>Rn</b> Radon 86	
87 <b>Fr</b> Francium	88 <b>Ra</b> Radium	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>Rn</b> Radon 86	

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

a	<b>X</b>	b
Key	a = relative atomic mass 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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