



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.

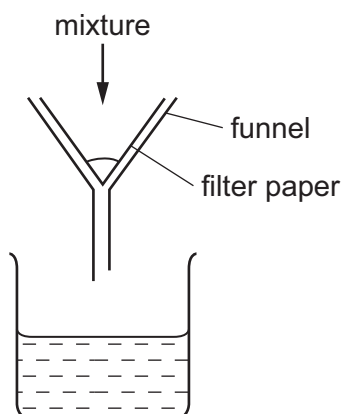
How is ethanol obtained from the fermentation mixture?

- 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.

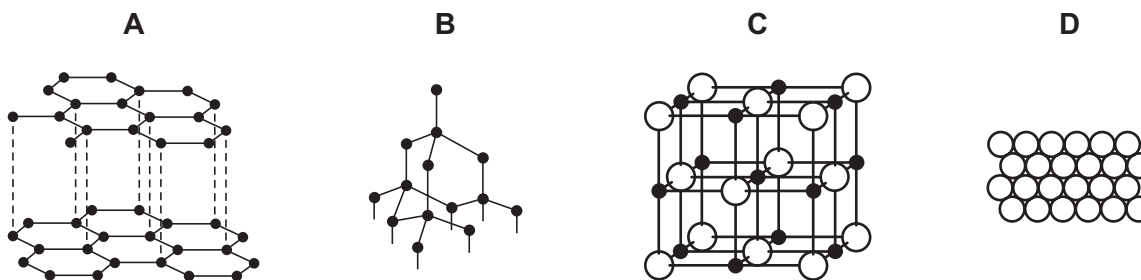


What is the mixture?

- 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?

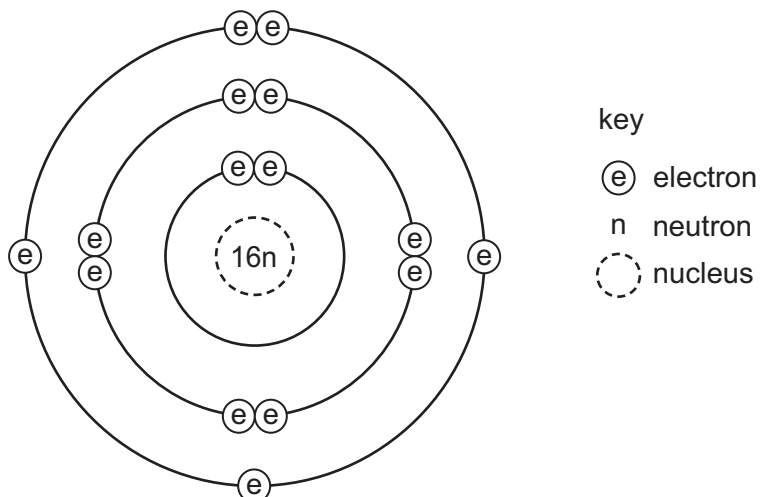
- A Ions are formed when atoms lose or gain electrons.
 B Ions in sodium chloride are strongly held together.
 C Ions with the same charge attract each other.
 D Sodium chloride solution can conduct electricity.
- 7 Caesium chloride and rubidium bromide are halide compounds of Group I elements.

Caesium chloride has the formula1....., a relative formula mass2..... that of rubidium bromide and bonds that are3..... .

Which words correctly complete gaps 1, 2 and 3?

| | 1 | 2 | 3 |
|----------|---------------|----------------|----------|
| A | CaCl | different from | ionic |
| B | CaCl | the same as | covalent |
| C | CsCl | different from | ionic |
| D | 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?

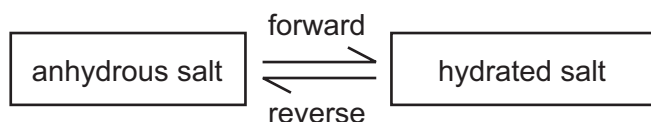
A carbon dioxide and hydrogen

B carbon dioxide and ^{235}U

C hydrogen and methane

D methane and ^{235}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

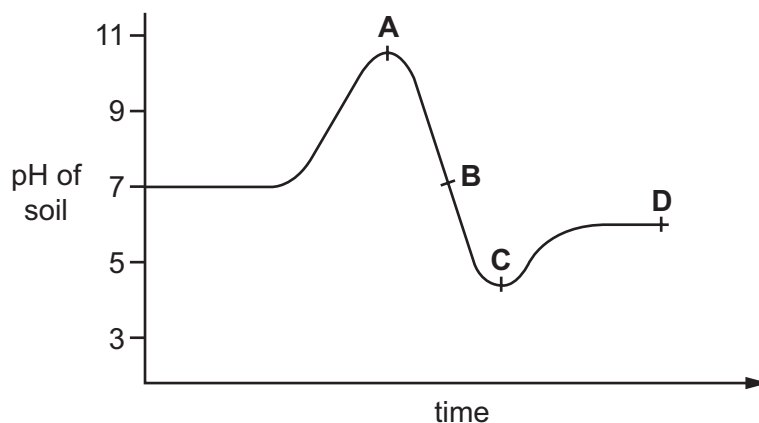
22 Elements in Group I of the Periodic Table react with water.

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

| | products | trend in reactivity |
|----------|------------------------------|------------------------------|
| A | metal hydroxide and hydrogen | less reactive down the group |
| B | metal hydroxide and hydrogen | more reactive down the group |
| C | metal oxide and hydrogen | less reactive down the group |
| D | 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 |
|----------|---|--------------------|
| A | 2 | single atoms |
| B | 2 | diatomic molecules |
| C | 8 | single atoms |
| D | 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 |
|----------|------------|------------|
| A | ✓ | ✓ |
| B | ✓ | x |
| C | x | ✓ |
| D | 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

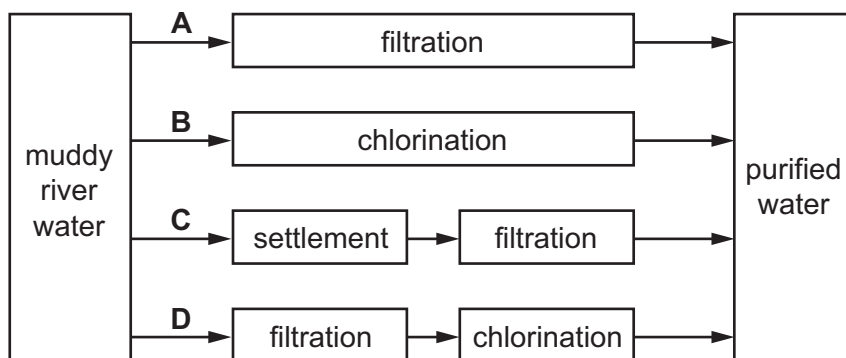
30 Which reaction involves oxidation?

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

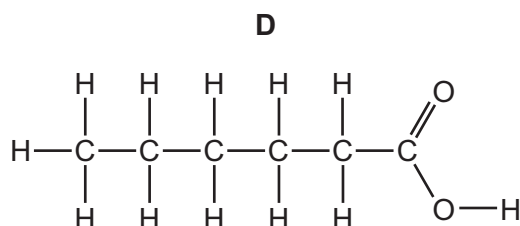
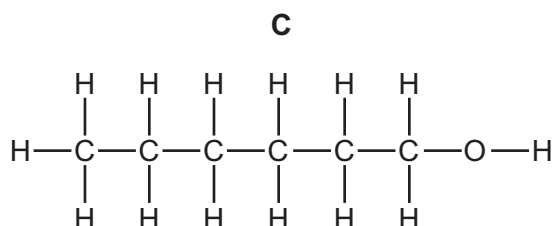
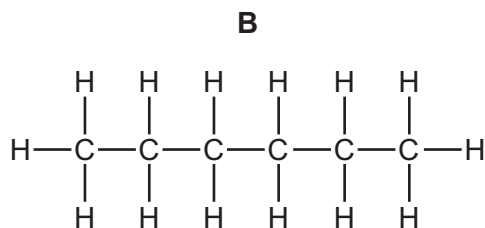
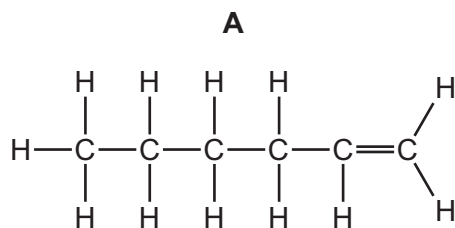
31 Which object is **least** likely to contain aluminium?

- 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.

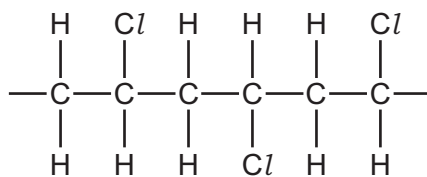
What is the correct order?

| | less energy released | → | more energy released |
|----------|----------------------|---|----------------------|
| A | ethene | | ethane |
| B | ethene | | methane |
| C | methane | | ethane |
| D | methane | | ethene |

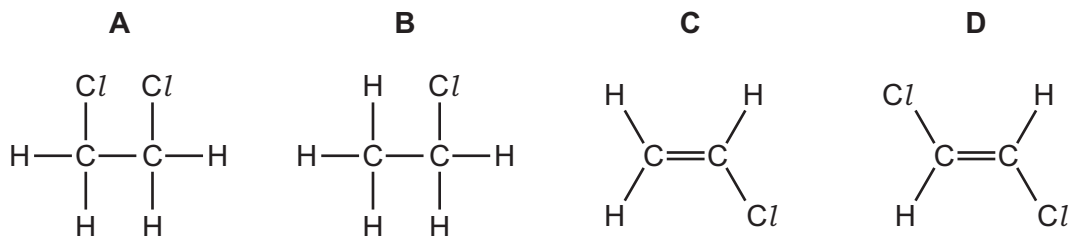
38 Which statement about alkenes is **not** correct?

- 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.

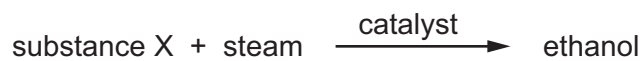
39 The diagram shows three repeat units in the structure of an addition polymer.



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

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DATA SHEET
The Periodic Table of the Elements

| | | Group | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| I | II | III | IV | V | VI | VII | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 7 Li Lithium 3 | 9 Be Beryllium 4 | 1 H Hydrogen 1 | 11 B Boron 5 | 12 C Carbon 6 | 14 N Nitrogen 7 | 16 O Oxygen 8 | 19 F Fluorine 9 | 20 Ne Neon 10 | 23 Na Sodium 11 | 24 Mg Magnesium 12 | 27 Al Aluminium 13 | 28 Si Silicon 14 | 31 P Phosphorus 15 | 32 S Sulfur 16 | 35.5 Cl Chlorine 17 | 40 Ar Argon 18 | 39 K Potassium 19 | 40 Ca Calcium 20 | 45 Sc Scandium 21 | 48 Ti Titanium 22 | 51 V Vanadium 23 | 52 Cr Chromium 24 | 55 Mn Manganese 25 | 56 Fe Iron 26 | 59 Co Cobalt 27 | 59 Ni Nickel 28 | 64 Cu Copper 29 | 65 Zn Zinc 30 | 70 Ga Gallium 31 | 73 Ge Germanium 32 | 75 As Arsenic 33 | 79 Se Selenium 34 | 80 Br Bromine 35 | 84 Kr Krypton 36 | 85 Rb Rubidium 37 | 88 Sr Strontium 38 | 89 Y Yttrium 39 | 91 Zr Zirconium 40 | 93 Nb Niobium 41 | 96 Mo Molybdenum 42 | 101 Ru Ruthenium 44 | 106 Pd Palladium 46 | 112 Cd Cadmium 48 | 115 In Indium 49 | 119 Sn Tin 50 | 122 Sb Antimony 51 | 128 Te Tellurium 52 | 131 Xe Xenon 54 | 133 Cs Caesium 55 | 137 Ba Barium 56 | 139 La Lanthanum 57 | 178 Hf Hafnium 72 | 181 Ta Tantalum 73 | 184 W Tungsten 74 | 190 Os Osmium 76 | 192 Ir Iridium 77 | 195 Pt Platinum 78 | 197 Au Gold 79 | 201 Hg Mercury 80 | 204 Tl Thallium 81 | 207 Pb Lead 82 | 209 Bi Bismuth 83 | 210 Po Polonium 84 | 210 At Astatine 85 | 226 Ra Radium 88 | 227 Ac Actinium 89 | 232 Th Thorium 90 | 238 U Uranium 92 | 238 Np Neptunium 93 | 238 Pu Plutonium 94 | 238 Am Americium 95 | 238 Cm Curium 96 | 238 Bk Berkelium 97 | 238 Cf Californium 98 | 238 Es Einsteinium 99 | 238 Fm Fermium 100 | 238 Md Mendelevium 101 | 238 No Nobelium 102 | 238 Lr Lawrencium 103 | 140 Ce Cerium 58 | 141 Pr Praseodymium 59 | 144 Nd Neodymium 60 | 150 Sm Samarium 62 | 152 Eu Europium 63 | 157 Gd Gadolinium 64 | 162 Dy Dysprosium 66 | 165 Ho Holmium 67 | 167 Er Erbium 68 | 169 Tm Thulium 69 | 173 Yb Ytterbium 70 | 175 Lu Lutetium 71 |

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

| | | |
|---|---|----------------------------|
| a | X | a = relative atomic mass |
| b | X | X = atomic symbol |
| | | b = proton (atomic) number |

The volume of one mole of any gas is 24 dm³ at room temperature and pressure (r.t.p.).

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