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)

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?

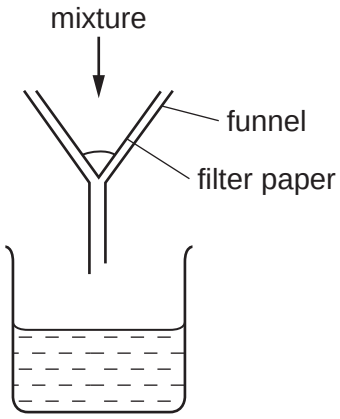
A A kitchen towel soaks up some spilt milk.

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

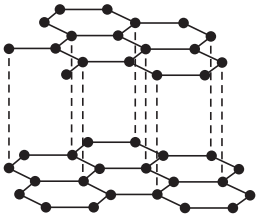
C number of electrons in the outer shell

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?

A



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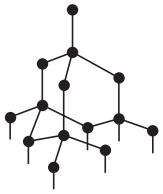

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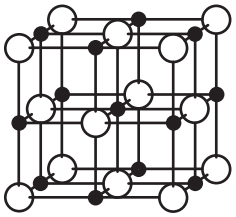

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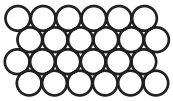


6 Sodium chloride is an ionic solid.

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.

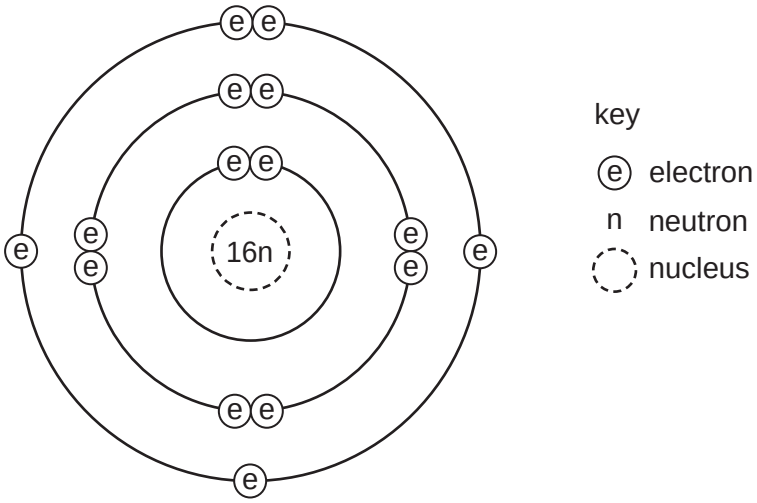
7 Caesium chloride and rubidium bromide are halide compounds of Group I elements.

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
A	CaC*l*	different from	ionic
B	CaC*l*	the same as	covalent
C	CsC*l*	different from	ionic
D	CsC*l*	the same as	covalent

8 Which element has the atomic structure shown?



A A*l* **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?

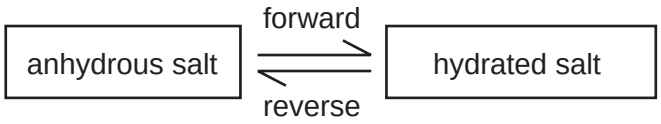
A carbon dioxide and hydrogen

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.

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
A	calcium hydroxide	12
B	lemon juice	4
C	milk	6
D	washing up liquid	8

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

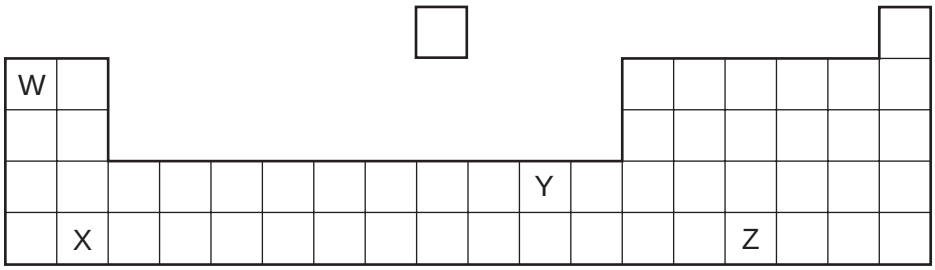
P $2\underline{NaNO_2} + O_2 \rightarrow 2NaNO_3$

Q $2\underline{HgO} \rightarrow 2Hg + O_2$

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

	P	Q
A	✓	✓
B	✓	✗
C	✗	✓
D	✗	✗

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



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

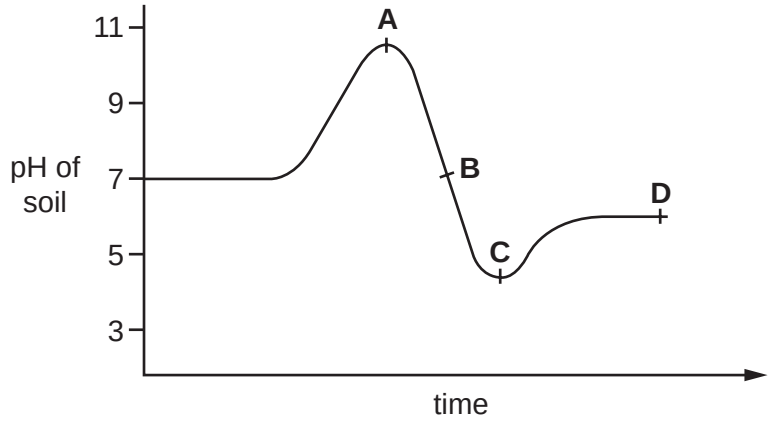
22 Elements in Group I of the Periodic Table react with water.

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

	products	trend in reactivity
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	✓	✗
C	✗	✓
D	✗	✗

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?

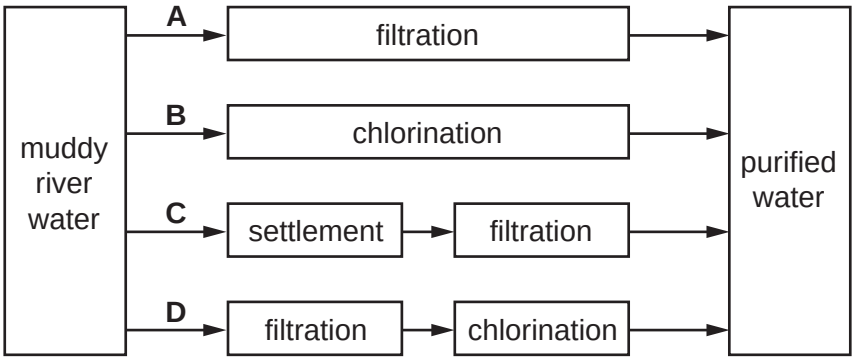
A It is a liquid produced by distilling petroleum.

B It is produced as vegetation decomposes.

C It is produced by animals, such as cows.

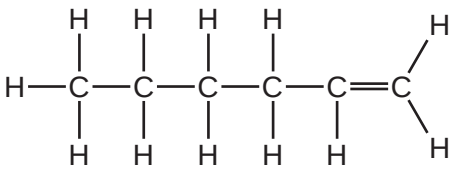
D It is used as a fuel.

35 Which method of purification would produce water **most** suitable for drinking?



36 Which molecular structure shows hexene?

A



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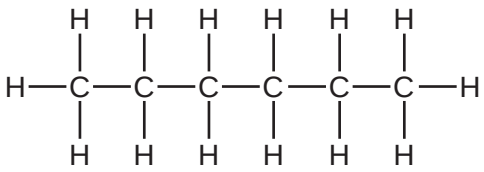

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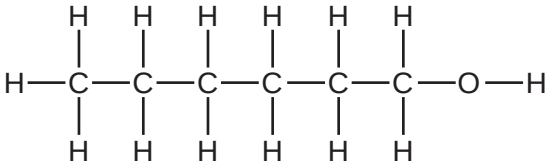

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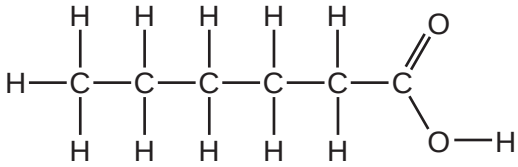


37 Increasing the number of atoms in one molecule of a hydrocarbon increases the amount of energy released when it burns.

What is the correct order?

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

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

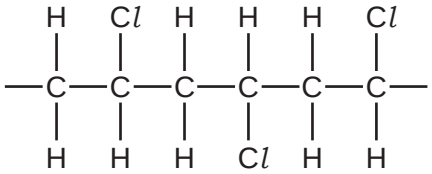
A The functional group is C=C.

B The structural difference between one member and the next is $-CH_3-$.

C They form a homologous series.

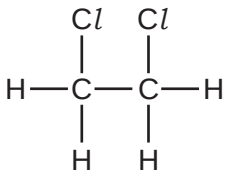
D They turn aqueous bromine from brown to colourless.

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

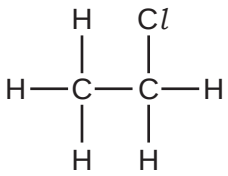


Which alkene monomer is used to make this polymer?

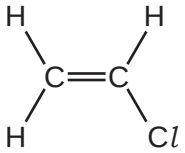
A



B



C



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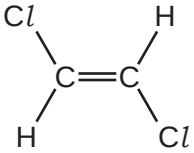
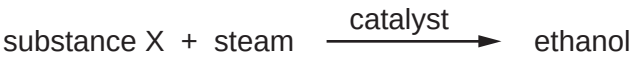


40 Ethanol can be manufactured from substance X.



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																	
I	II									III	IV	V	VI	VII	0
															4 He Helium 2
					1 H Hydrogen 1										
7 Li Lithium 3	9 Be Beryllium 4									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	Tc Technetium 43	101 Ru Ruthenium 44	103 Rh Rhodium 45	106 Pd Palladium 46	108 Ag Silver 47	112 Cd Cadmium 48	115 In Indium 49	119 Sn Tin 50	122 Sb Antimony 51	128 Te Tellurium 52	127 I Iodine 53	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	186 Re Rhenium 75	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	Po Polonium 84	At Astatine 85	Rn Radon 86
Fr Francium 87	226 Ra Radium 88	227 Ac Actinium 89 †															

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

Key: a = relative atomic mass; X = atomic symbol; b = proton (atomic) number

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