Cambridge International Examinations
Cambridge International General Certificate of Secondary Education

CHEMISTRY **0620/11**

Paper 1 Multiple Choice (Core) **May/June 2017**

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.

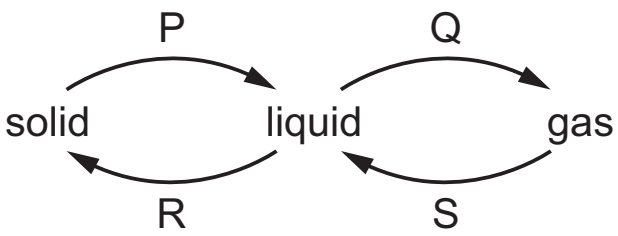
Each correct answer will score one mark. A mark will not be deducted for a wrong answer.
Any rough working should be done in this booklet.
A copy of the Periodic Table is printed on page 16.
Electronic calculators may be used.

The syllabus is approved for use in England, Wales and Northern Ireland as a Cambridge International Level1/Level 2 Certificate.

This document consists of **14** printed pages and **2** blank pages.

CAMBRIDGE International Examinations

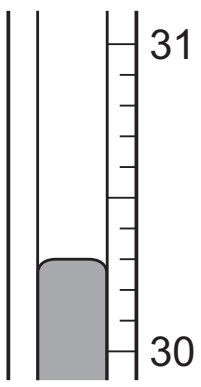
1 The diagram shows some changes of state.



Which words describe the changes of state, P, Q, R and S?

	P	Q	R	S
A	freezing	boiling	melting	evaporation
B	melting	evaporation	freezing	condensation
C	melting	sublimation	freezing	evaporation
D	sublimation	evaporation	melting	condensation

2 The diagram shows part of a thermometer.



What is the reading on the thermometer?

A 30.2 **B** 30.3 **C** 31.7 **D** 31.8

3 Pure water has a boiling point of 100 °C and a freezing point of 0 °C.

What is the boiling point and freezing point of a sample of aqueous sodium chloride?

	boiling point / °C	freezing point / °C
A	98	–2
B	98	2
C	102	–2
D	102	2

4 Pure copper(II) sulfate crystals can be made by adding copper(II) oxide to hot dilute sulfuric acid.

The copper(II) oxide is added until it .....1..... .

The solution is .....2..... and then .....3..... to obtain the pure crystals.

Which words complete gaps 1, 2 and 3?

	1	2	3
A	is in excess	cooled	filtered
B	is in excess	filtered	cooled
C	changes colour	cooled	filtered
D	changes colour	filtered	cooled

5 Which part of an atom has a relative mass of 1 and a relative charge of 0?

A electron

B neutron

C nucleus

D proton

6 Which molecule contains exactly two single covalent bonds?

A Cl_2 **B** CH_4 **C** H_2O **D** HCl

7 Sodium reacts with chlorine to form sodium chloride.

Which statements describe what happens to the sodium atoms in this reaction?

1 Sodium atoms form positive ions.

2 Sodium atoms form negative ions.

3 Sodium atoms gain electrons.

4 Sodium atoms lose electrons.

A 1 and 3 **B** 1 and 4 **C** 2 and 3 **D** 2 and 4

[Turn over

8 Diamond is extremely hard and does not conduct electricity.

Which statement explains these properties?

A It has a lattice of positive carbon ions in a ‘sea of electrons’.

B It has delocalised electrons and each carbon atom forms three covalent bonds with other carbon atoms.

C It has no delocalised electrons and each carbon atom forms four covalent bonds with other carbon atoms.

D It has strong ionic bonds between each carbon atom.

9 What is the relative formula mass of ammonium nitrate, NH_4NO_3?

A 80 **B** 108 **C** 122 **D** 150

10 Concentrated aqueous sodium chloride is electrolysed.

What is the main product formed at the positive electrode (anode)?

A chlorine

B hydrogen

C oxygen

D sodium

11 Some properties of four fuels are shown in the table.

Which fuel is a gas at room temperature and makes two products when it burns in a plentiful supply of air?

	fuel	formula	melting point / °C	boiling point / °C
A	hydrogen	H_2	–259	–253
B	methane	CH_4	–182	–164
C	octane	C_8H_{18}	–57	126
D	wax	$C_{31}H_{64}$	60	400

12 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

13 When sulfur is heated it undergoes a .....1..... change as it melts.

Further heating causes the sulfur to undergo a .....2..... change and form sulfur dioxide.

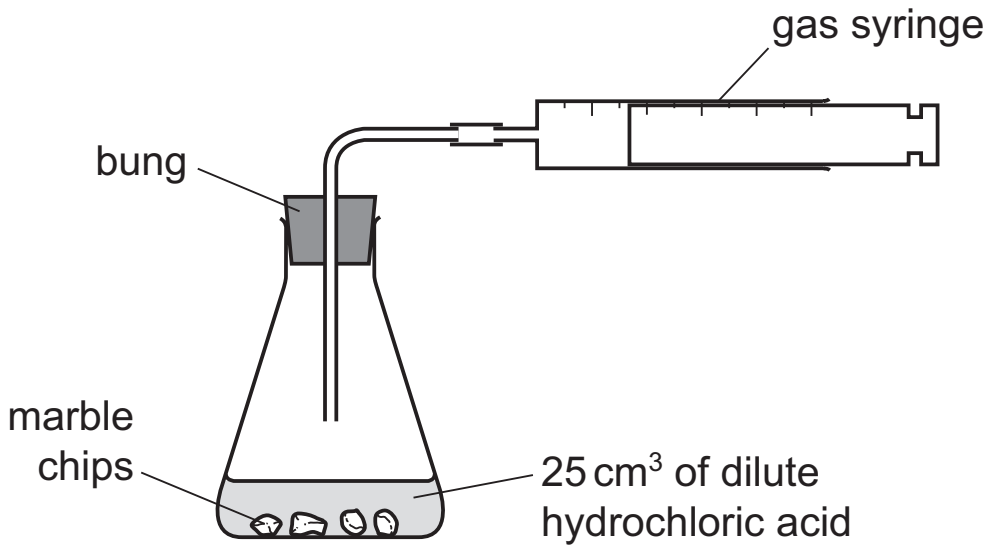
Which words complete gaps 1 and 2?

	1	2
A	chemical	chemical
B	chemical	physical
C	physical	chemical
D	physical	physical

14 Which row correctly matches the experiment and observations to the identity of the underlined substance?

	experiment and observations	identity of the underlined substance
A	<u>Blue crystals</u> are heated. The crystals turn white and steam is given off.	hydrated cobalt(II) chloride
B	<u>Pink crystals</u> are heated. The crystals turn blue and steam is given off.	anhydrous cobalt(II) chloride
C	Water is added to a <u>blue solid</u>. The blue solid turns pink.	hydrated copper(II) sulfate
D	Water is added to a <u>white solid</u>. The white solid turns blue.	anhydrous copper(II) sulfate

15 A student was investigating the reaction between marble chips and dilute hydrochloric acid.



Which changes slow down the rate of reaction?

	temperature of acid	concentration of acid	surface area of marble chips
A	decrease	decrease	decrease
B	decrease	decrease	increase
C	increase	decrease	decrease
D	increase	increase	increase

16 The reactions shown may occur in the air during a thunder-storm.

$$N_2 + O_2 \rightarrow 2NO$$

$$2NO + O_2 \rightarrow 2NO_2$$

$$NO + O_3 \rightarrow NO_2 + O_2$$

Which row shows what happens to the reactant molecules in each of these reactions?

	N_2	NO	O_3
A	oxidised	oxidised	oxidised
B	oxidised	oxidised	reduced
C	reduced	reduced	oxidised
D	reduced	reduced	reduced

17 Hydrochloric acid is added to magnesium metal and to sodium carbonate in separate tests.

Which row shows the observations?

	magnesium metal	sodium carbonate
A	effervescence	effervescence
B	effervescence	no reaction
C	no reaction	effervescence
D	no reaction	no reaction

18 Which oxide dissolves in water to form a basic solution?

A carbon dioxide

B nitrogen dioxide

C sodium oxide

D sulfur dioxide

19 Which salt preparation uses a burette and a pipette?

A calcium nitrate from calcium carbonate and nitric acid

B copper(II) sulfate from copper(II) hydroxide and sulfuric acid

C potassium chloride from potassium hydroxide and hydrochloric acid

D zinc chloride from zinc and hydrochloric acid

20 Substance X reacts with warm dilute hydrochloric acid to produce a gas which decolourises acidified aqueous potassium manganate(VII).

Substance X gives a yellow flame in a flame test.

What is X?

A potassium chloride

B potassium sulfite

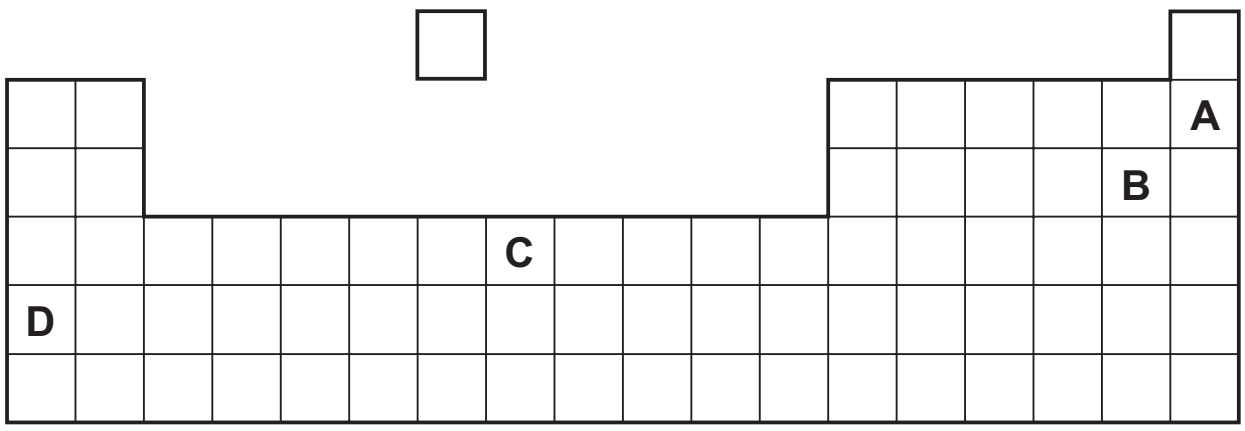
C sodium chloride

D sodium sulfite

[Turn over

21 Part of the Periodic Table is shown.

Which element is a soft solid that reacts violently with cold water?



22 Which element is less reactive than the other members of its group in the Periodic Table?

A astatine

B caesium

C fluorine

D rubidium

23 An element has the following properties.

- It forms coloured compounds.
- It acts as a catalyst.
- It melts at 1539 °C.

In which part of the Periodic Table is the element found?

A Group I

B Group VII

C Group VIII

D transition elements

24 Why are weather balloons sometimes filled with helium rather than hydrogen?

A Helium is found in air.

B Helium is less dense than hydrogen.

C Helium is more dense than hydrogen.

D Helium is unreactive.

25 Element E:

- forms an alloy
- has a basic oxide
- is below hydrogen in the reactivity series.

What is E?

A carbon

B copper

C sulfur

D zinc

26 Some reactions of three metals and their oxides are shown.

metal	metal reacts with dilute hydrochloric acid	metal oxide reacts with carbon
S	no	yes
T	yes	no
U	yes	yes

What is the order of reactivity of the metals?

	least reactive →		most reactive
A	S	T	U
B	S	U	T
C	T	S	U
D	U	T	S

27 Which statement about the extraction of iron in a blast furnace is **not** correct?

A Calcium oxide reacts with acidic impurities.

B Iron(III) oxide is reduced to iron by carbon dioxide.

C Molten iron is formed at the base of the blast furnace.

D The raw materials are hematite, limestone and coke.

[Turn over

28 Stainless steel is an alloy of iron and other metals. It is strong and does not rust but it costs much more than normal steel.

What is **not** made from stainless steel?

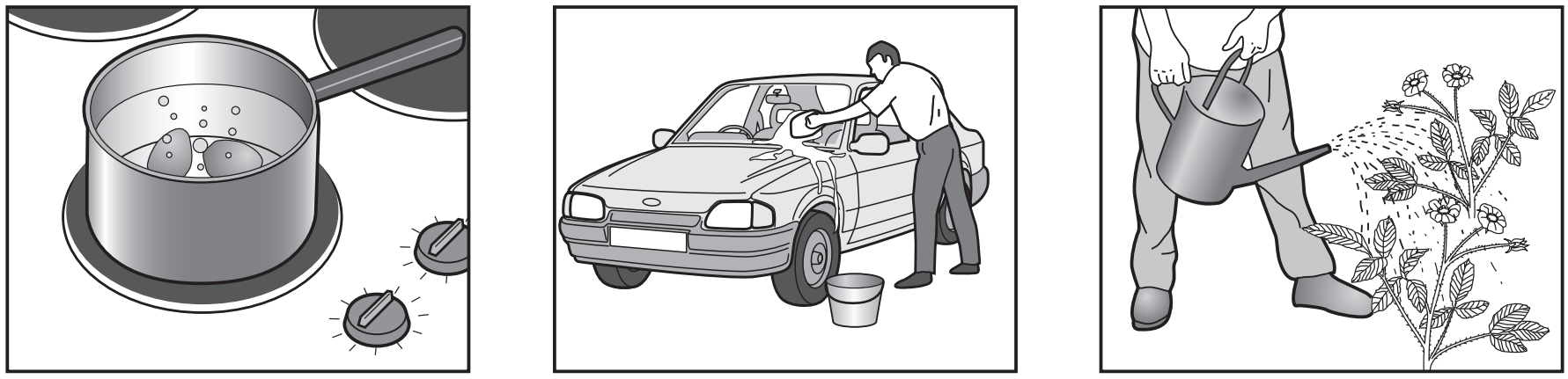
A cutlery

B pipes in a chemical factory

C railway lines

D saucepans

29 The diagram shows some uses of water in the home.



1 2 3

For which uses is it important for the water to have been treated?

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

30 Which gas is colourless and poisonous?

A carbon monoxide

B chlorine

C hydrogen

D nitrogen

31 Two experiments involving water are described.

1 Water turns purple when potassium manganate(VII) is added to it.

2 Adding water to sodium causes the temperature to increase.

Which row describes the role of water in 1 and 2?

	1	2
A	as a chemical reagent	as a chemical reagent
B	as a chemical reagent	as a solvent
C	as a solvent	as a chemical reagent
D	as a solvent	as a solvent

32 In which process is carbon dioxide **not** formed?

A burning of natural gas

B fermentation

C heating lime

D respiration

33 Which statement is **not** correct?

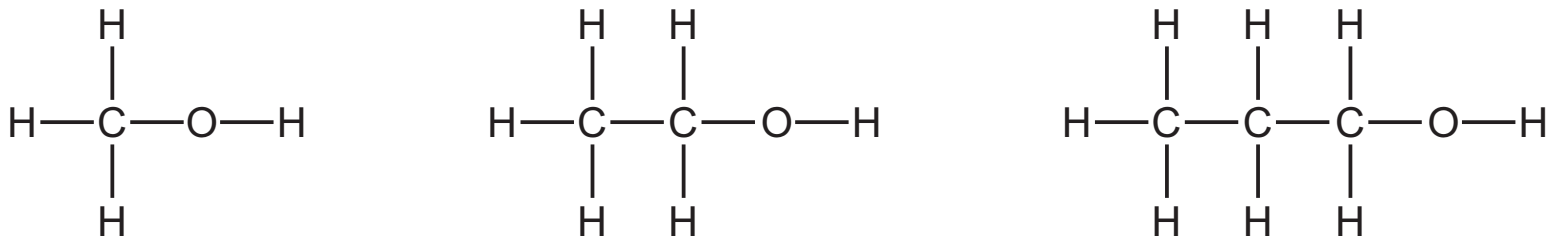
A Converting limestone into lime is a thermal decomposition reaction.

B Flue gas desulfurisation is a neutralisation reaction.

C In the extraction of iron, calcium carbonate is converted into calcium oxide.

D Slaked lime is added to soil as a fertiliser.

34 The structures of three substances are shown.



Why do these substances all belong to the same homologous series?

A They are all compounds.

B They are all saturated.

C They all contain oxygen.

D They all contain the same functional group.

[Turn over

35 Which fraction of petroleum is **not** matched to its correct use?

	fraction	use
A	bitumen	making roads
B	gasoline	fuel for cars
C	kerosene	fuel for ships
D	naphtha	chemical industry

36 Cracking is an important process in the petroleum industry.

The products of cracking include .....1..... and an .....2..... of .....3..... relative molecular mass than the .....4..... that was cracked.

Which words complete gaps 1, 2, 3 and 4?

	1	2	3	4
A	hydrogen	alkane	greater	alkene
B	hydrogen	alkene	smaller	alkane
C	steam	alkane	greater	alkene
D	steam	alkene	smaller	alkane

37 Which compound rapidly decolourises aqueous bromine?

A ethane

B ethanoic acid

C ethanol

D ethene

38 There are two methods for producing ethanol.

method 1 catalytic addition of steam to ethene

method 2 fermentation

Which statement is **not** correct?

A Method 1 produces carbon dioxide.

B Method 1 requires high temperature and pressure.

C Method 2 produces carbon dioxide.

D Method 2 requires a source of sugar.

39 Which statement about aqueous ethanoic acid is **not** correct?

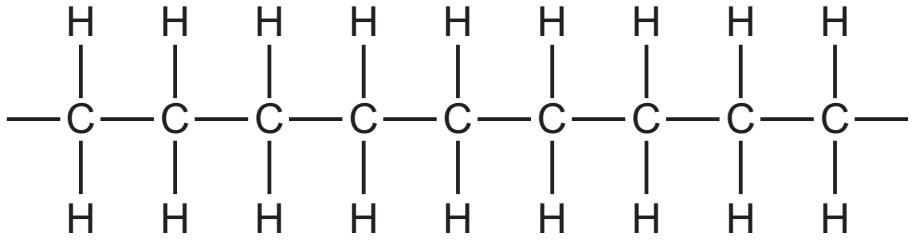
A It produces carbon dioxide when it reacts with magnesium carbonate.

B It produces hydrogen when it reacts with magnesium.

C It neutralises magnesium oxide.

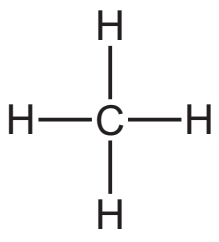
D It turns red litmus paper blue.

40 The diagram shows part of the molecule of a polymer.



Which diagram shows the monomer from which this polymer could be manufactured?

A



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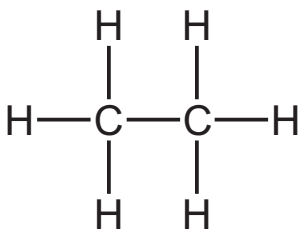
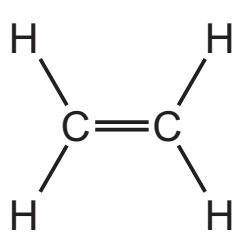
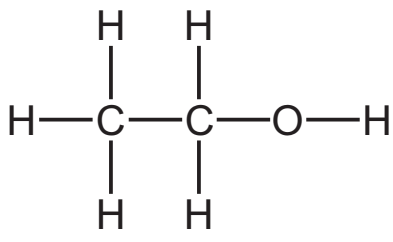


C



D



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The Periodic Table of Elements

Group																	
I	II											III	IV	V	VI	VII	VIII
							1 H hydrogen 1										2 He helium 4
3 Li lithium 7	4 Be beryllium 9											5 B boron 11	6 C carbon 12	7 N nitrogen 14	8 O oxygen 16	9 F fluorine 19	10 Ne neon 20
11 Na sodium 23	12 Mg magnesium 24											13 Al aluminium 27	14 Si silicon 28	15 P phosphorus 31	16 S sulfur 32	17 Cl chlorine 35.5	18 Ar argon 40
19 K potassium 39	20 Ca calcium 40	21 Sc scandium 45	22 Ti titanium 48	23 V vanadium 51	24 Cr chromium 52	25 Mn manganese 55	26 Fe iron 56	27 Co cobalt 59	28 Ni nickel 59	29 Cu copper 64	30 Zn zinc 65	31 Ga gallium 70	32 Ge germanium 73	33 As arsenic 75	34 Se selenium 79	35 Br bromine 80	36 Kr krypton 84
37 Rb rubidium 85	38 Sr strontium 88	39 Y yttrium 89	40 Zr zirconium 91	41 Nb niobium 93	42 Mo molybdenum 96	43 Tc technetium –	44 Ru ruthenium 101	45 Rh rhodium 103	46 Pd palladium 106	47 Ag silver 108	48 Cd cadmium 112	49 In indium 115	50 Sn tin 119	51 Sb antimony 122	52 Te tellurium 128	53 I iodine 127	54 Xe xenon 131
55 Cs caesium 133	56 Ba barium 137	57–71 lanthanoids	72 Hf hafnium 178	73 Ta tantalum 181	74 W tungsten 184	75 Re rhenium 186	76 Os osmium 190	77 Ir iridium 192	78 Pt platinum 195	79 Au gold 197	80 Hg mercury 201	81 Tl thallium 204	82 Pb lead 207	83 Bi bismuth 209	84 Po polonium –	85 At astatine –	86 Rn radon –
87 Fr francium –	88 Ra radium –	89–103 actinoids	104 Rf rutherfordium –	105 Db dubnium –	106 Sg seaborgium –	107 Bh bohrium –	108 Hs hassium –	109 Mt meitnerium –	110 Ds darmstadtium –	111 Rg roentgenium –	112 Cn copernicium –		114 Fl flerovium –		116 Lv livermorium –		

Key

atomic number
atomic symbol
name
relative atomic mass

lanthanoids	57 La lanthanum 139	58 Ce cerium 140	59 Pr praseodymium 141	60 Nd neodymium 144	61 Pm promethium –	62 Sm samarium 150	63 Eu europium 152	64 Gd gadolinium 157	65 Tb terbium 159	66 Dy dysprosium 163	67 Ho holmium 165	68 Er erbium 167	69 Tm thulium 169	70 Yb ytterbium 173	71 Lu lutetium 175
actinoids	89 Ac actinium –	90 Th thorium 232	91 Pa protactinium 231	92 U uranium 238	93 Np neptunium –	94 Pu plutonium –	95 Am americium –	96 Cm curium –	97 Bk berkelium –	98 Cf californium –	99 Es einsteinium –	100 Fm fermium –	101 Md mendelevium –	102 No nobelium –	103 Lr lawrencium –

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