Cambridge International Examinations
Cambridge International General Certificate of Secondary Education

CHEMISTRY **0620/11**

Paper 1 Multiple Choice (Core) **May/June 2018**

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.

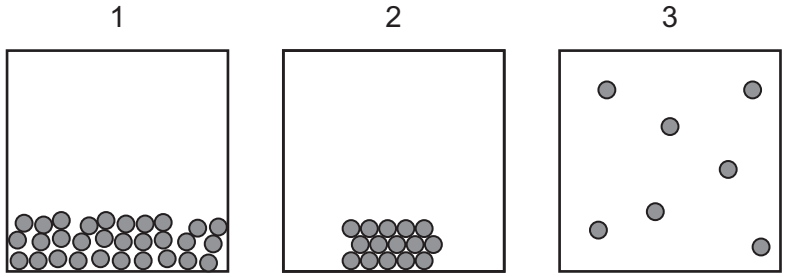
Read the instructions on the Answer Sheet very carefully.

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.

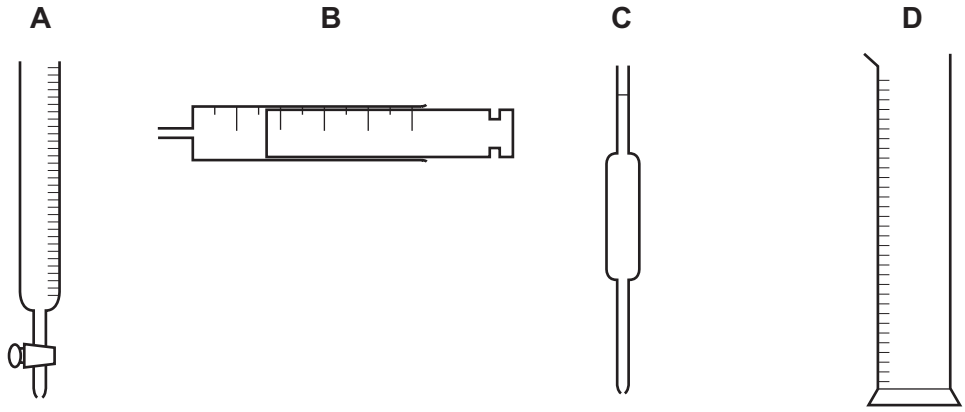
1 The diagrams show particles in a container.



Which two diagrams show the process of evaporation?

A $1 \rightarrow 2$ **B** $1 \rightarrow 3$ **C** $2 \rightarrow 3$ **D** $3 \rightarrow 1$

2 Which piece of apparatus is used to measure exactly 26.3 cm^3 of a liquid?



3 The melting points and boiling points of pure substances W, X and Y are shown.

	W	X	Y
melting point / °C	–114	115	–101
boiling point / °C	78	445	–34

The substances are chlorine, ethanol and sulfur.

Which row identifies W, X and Y?

	W	X	Y
A	chlorine	ethanol	sulfur
B	ethanol	sulfur	chlorine
C	sulfur	chlorine	ethanol
D	sulfur	ethanol	chlorine

4 In which atom is the number of protons equal to the number of neutrons?

A ^{40}Ar **B** ^{19}F **C** ^{23}Na **D** ^{16}O

5 Which row identifies an alloy, a pure metal and a non-metal?

	alloy	pure metal	non-metal
A	brass	carbon	copper
B	brass	copper	carbon
C	copper	brass	carbon
D	copper	carbon	brass

6 A covalent molecule Q contains exactly six shared electrons.

What is Q?

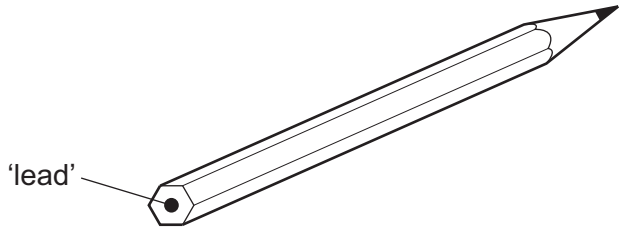
A ammonia, NH_3

B chlorine, Cl_2

C methane, CH_4

D water, H_2O

7 The 'lead' in a pencil is made of a mixture of graphite and clay.



When the percentage of graphite is increased, the pencil slides across the paper more easily.

Which statement explains this observation?

A Graphite has a high melting point.

B Graphite is a form of carbon.

C Graphite is a lubricant.

D Graphite is a non-metal.

8 The equation for the reaction between magnesium and dilute sulfuric acid is shown.

The M_r of $MgSO_4$ is 120.

$$Mg + H_2SO_4 \rightarrow MgSO_4 + H_2$$

Which mass of magnesium sulfate is formed when 12 g of magnesium completely reacts with dilute sulfuric acid?

A 5 g **B** 10 g **C** 60 g **D** 120 g

9 What is observed at each electrode when molten lead(II) bromide is electrolysed using platinum electrodes?

	negative electrode	positive electrode
A	bubbles of a colourless gas	bubbles of a brown gas
B	bubbles of a colourless gas	bubbles of a colourless gas
C	shiny grey liquid	bubbles of a brown gas
D	shiny grey liquid	bubbles of a colourless gas

10 Which gas is used as a fuel?

A argon

B hydrogen

C nitrogen

D oxygen

11 Burning fuels is an exothermic reaction.

What is meant by the term *exothermic*?

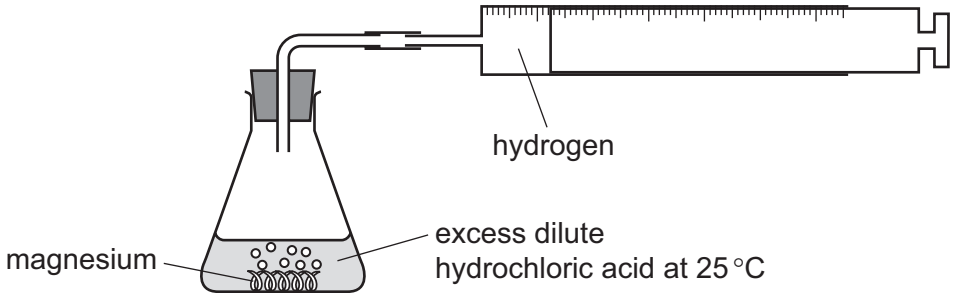
A A gas is produced.

B Energy is released.

C Heat is absorbed.

D The mass of the fuel decreases.

12 The diagram shows a rate of reaction experiment.



Increasing the concentration of the acid and increasing the temperature both affect the rate of reaction.

Which row is correct?

	increase the concentration of acid	increase the temperature
A	decrease rate of reaction	decrease rate of reaction
B	decrease rate of reaction	increase rate of reaction
C	increase rate of reaction	decrease rate of reaction
D	increase rate of reaction	increase rate of reaction

13 Water is added to anhydrous copper(II) sulfate.

What happens during the reaction?

A The copper(II) sulfate turns blue and the solution formed gets colder.

B The copper(II) sulfate turns blue and the solution formed gets hotter.

C The copper(II) sulfate turns white and the solution formed gets colder.

D The copper(II) sulfate turns white and the solution formed gets hotter.

14 Which equation shows an oxidation reaction?

A $C + O_2 \rightarrow CO_2$

B $CaCO_3 \rightarrow CaO + CO_2$

C $CaO + 2HCl \rightarrow CaCl_2 + H_2O$

D $N_2O_4 \rightarrow 2NO_2$

[Turn over

15 Dilute nitric acid is added to a solid, F.

A gas, G, is produced which is denser than air and extinguishes a burning splint.

What are F and G?

	solid F	gas G
A	calcium	hydrogen
B	calcium carbonate	carbon dioxide
C	calcium hydroxide	hydrogen
D	calcium oxide	carbon dioxide

16 Which statement about oxides is correct?

A A solution of magnesium oxide has a pH less than pH 7.

B A solution of sulfur dioxide has a pH greater than pH 7.

C Magnesium oxide reacts with nitric acid to make a salt.

D Sulfur dioxide reacts with hydrochloric acid to make a salt.

17 Which methods are suitable for preparing **both** zinc sulfate and copper(II) sulfate?

1 reacting the metal oxide with warm dilute aqueous sulfuric acid

2 reacting the metal with dilute aqueous sulfuric acid

3 reacting the metal carbonate with dilute aqueous sulfuric acid

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

18 Two salt solutions, X and Y, are tested.

The table shows the results.

test	X	Y
a few drops of aqueous sodium hydroxide are added	green precipitate formed	red-brown precipitate formed
a few drops of dilute nitric acid and a few drops of barium nitrate are added	no change seen	white precipitate formed
a few drops of dilute nitric acid and a few drops of silver nitrate are added	white precipitate formed	no change seen

What are X and Y?

	X	Y
A	iron(II) chloride	iron(III) sulfate
B	iron(III) chloride	iron(III) sulfate
C	iron(II) sulfate	iron(III) chloride
D	iron(III) sulfate	iron(III) chloride

19 Which element is in the same period of the Periodic Table as silicon?

A germanium

B scandium

C sodium

D strontium

20 Which statement about the halogens is correct?

A A sample of bromine reacts with potassium chloride solution.

B A sample of bromine reacts with potassium iodide solution.

C A sample of chlorine has a higher density than a sample of bromine.

D A sample of chlorine is a darker colour than a sample of bromine.

[Turn over

21 Which row shows the catalytic activity of transition elements and their compounds?

	catalytic activity of transition elements	catalytic activity of compounds of transition elements
A	good	good
B	good	poor
C	poor	good
D	poor	poor

22 Which statement about the noble gases is **not** correct?

A Noble gases are diatomic molecules.

B Noble gases are unreactive gases.

C Noble gases have full outer electron shells.

D The noble gas argon is used in lamps.

23 The following statements are made about the metals copper, iron, magnesium and zinc.

1 Their oxides are acidic.

2 They all conduct electricity in the solid state.

3 They all have high melting points.

4 They all react with dilute acids to form hydrogen.

Which statements are correct?

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

24 Three metals, X, Y and Z, were reacted with water.

The oxides of the same three metals were also heated strongly with carbon.

The results are shown.

metal	reaction of the metal with water	reaction of the metal oxide with carbon
X	vigorous reaction with cold water	no reaction
Y	no reaction	metal and carbon dioxide produced
Z	no reaction observed with cold water but reaction observed with steam	no reaction

What is a correct conclusion about X, Y and Z?

A X is sodium and Y is magnesium.

B X is the least reactive and Y is the most reactive.

C Z is less reactive than Y.

D Z is magnesium and Y is copper.

25 In a blast furnace, iron ore is mixed with coke and limestone, and heated in hot air.

Compound R is formed. Compound R then reduces the iron ore to iron.

Which equation shows the formation of compound R?

A $C + O_2 \rightarrow CO_2$

B $CO_2 + C \rightarrow 2CO$

C $CaCO_3 \rightarrow CaO + CO_2$

D $CaO + SiO_2 \rightarrow CaSiO_3$

26 Which statement explains why aluminium is used in the manufacture of aircraft?

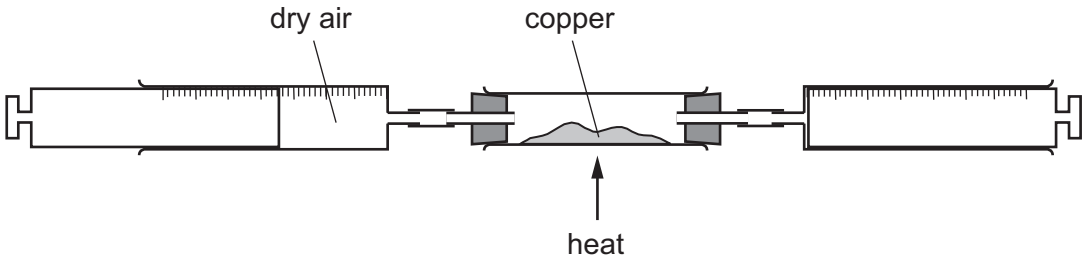
A It conducts heat well.

B It has a low density.

C It is a good conductor of electricity.

D It is easy to recycle.

27 Dry air is passed over hot copper until all the oxygen has reacted.



The volume of gas at the end of the reaction is 120 cm^3.

What is the starting volume of dry air?

A 132 cm^3 **B** 152 cm^3 **C** 180 cm^3 **D** 570 cm^3

28 A steel bicycle which had been left outdoors for several months was starting to rust.

What would **not** reduce the rate of corrosion?

A Remove the rust and paint the bicycle.

B Remove the rust and store the bicycle in a dry shed.

C Remove the rust and wipe the bicycle with a clean, damp cloth.

D Remove the rust and wipe the bicycle with an oily cloth.

29 Which statements about water are correct?

1 Household water contains dissolved salts.

2 Water for household use is filtered to remove soluble impurities.

3 Water is treated with chlorine to kill bacteria.

4 Water is used in industry for cooling.

A 1, 2, 3 and 4

B 1, 2 and 3 only

C 1, 3 and 4 only

D 2, 3 and 4 only

30 Farmers use fertilisers to replace minerals in the soil that have been removed by the crops they grow.

Which elements in the soil are replaced by adding fertilisers?

A Ca, P, O **B** K, O, S **C** N, K, P **D** N, O, S

31 Which statement is correct?

A Atmospheric carbon dioxide is not a cause of climate change.

B Atmospheric methane is produced by respiration.

C Burning natural gas decreases the level of carbon dioxide in the atmosphere.

D Decomposition of vegetation causes an increase in atmospheric methane.

32 Which statement about sulfur and its compounds is **not** correct?

A Sulfur dioxide is used as a food preservative.

B Sulfur dioxide turns acidified aqueous potassium manganate(VII) from purple to colourless.

C Sulfur forms a basic oxide.

D Sulfur is used in the manufacture of sulfuric acid.

33 Which process is used to convert limestone (calcium carbonate) into lime?

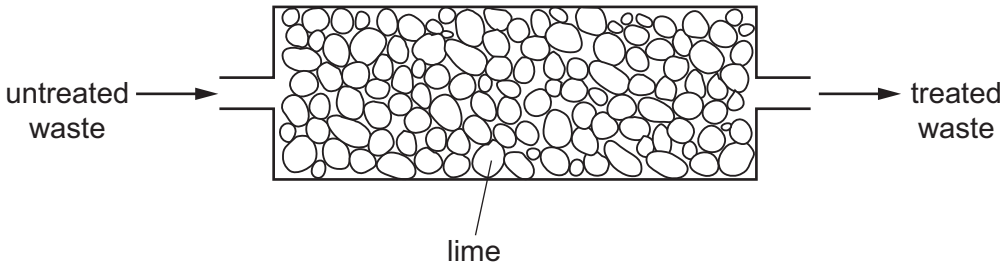
A electrolysis

B fractional distillation

C incomplete combustion

D thermal decomposition

34 Lime is used to treat an industrial waste.



Which change occurs in the treatment?

	untreated waste		treated waste
A	acidic	→	neutral
B	alkaline	→	acidic
C	alkaline	→	neutral
D	neutral	→	acidic

35 What is **not** the correct use of the fraction named?

	name of fraction	use
A	fuel oil	making waxes
B	gas oil	fuel in diesel engines
C	kerosene	jet fuel
D	naphtha	making chemicals

36 Four organic compounds are listed.

ethane

ethanoic acid

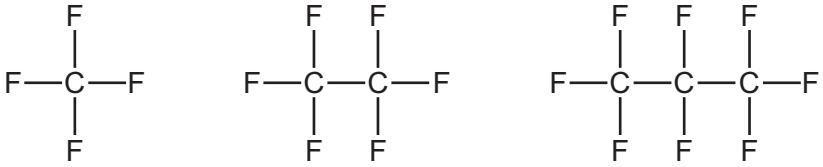
ethanol

ethene

Which bond do all four compounds contain?

A C–C **B** C–H **C** C–O **D** O–H

37 The first three members of a homologous series are shown.



Why do these molecules represent a homologous series?

A because they contain fluorine and carbon atoms

B because they have saturated bonds

C because they have the same functional group

D because they react differently from each other

38 Which substances can be obtained by cracking hydrocarbons?

A ethanol and ethene

B ethanol and hydrogen

C ethene and hydrogen

D ethene and poly(ethene)

39 Which reaction is used to make ethanol?

A adding steam to ethene

B addition polymerisation

C fractional distillation of petroleum

D reacting ethene with aqueous bromine

40 Polymers are long-chain molecules made from small molecules linked together.

Four polymers or types of polymer are listed.

1 carbohydrates

2 nylon

3 proteins

4 *Terylene*

Which of these polymers or types of polymer are synthetic?

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

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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.).