Cambridge Assessment International Education
Cambridge International General Certificate of Secondary Education

CHEMISTRY **0620/11**

Paper 1 Multiple Choice (Core) **May/June 2019**

45 minutes

Additional Materials: Multiple Choice Answer Sheet
Soft clean eraser
Soft pencil (type B or HB is recommended)

* 7 6 8 0 4 3 0 4 5 3 *

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.

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

This document consists of **15** printed pages and **1** blank page.

© UCLES 2019

1 Sodium chloride is a liquid at 900 °C.

How are the particles arranged and how do the particles move in sodium chloride at 900 °C?

	arrangement of particles	motion of particles
A	regular	vibrate about a fixed point
B	regular	move randomly
C	random	vibrate about a fixed point
D	random	move randomly

2 2.00 g of powdered calcium carbonate is added to 50.0 cm^3 of hydrochloric acid.

Which apparatus is used to measure the calcium carbonate and the hydrochloric acid?

	calcium carbonate	hydrochloric acid
A	balance	burette
B	balance	thermometer
C	pipette	burette
D	pipette	thermometer

3 Rock salt is a mixture of sand and sodium chloride.

Sodium chloride is soluble in water but not in hexane.

Sand is insoluble in both water and hexane.

What is required to separate the sand from the sodium chloride?

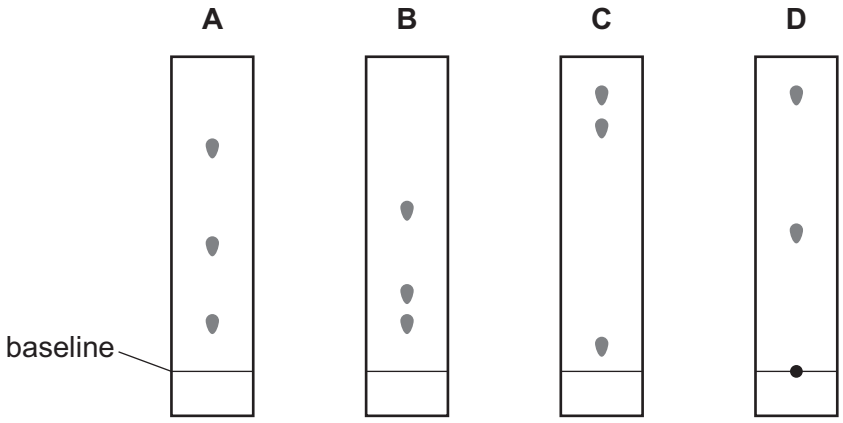
1 filter paper
2 fractionating column
3 hexane
4 water

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

© UCLES 2019

4 The colours in four dyes are separated using chromatography.

Which chromatogram shows an insoluble colour?



5 Which statement about an atom of fluorine, $^{19}_{9}F$, is correct?

A It contains more protons than neutrons.

B It contains a total of 28 protons, neutrons and electrons.

C Its isotopes contain different numbers of protons.

D Its nucleus contains 9 neutrons.

6 Calcium reacts with chlorine to produce calcium chloride.

What happens when a calcium ion forms during this reaction?

A The calcium atom gains one electron.

B The calcium atom gains two electrons.

C The calcium atom loses one electron.

D The calcium atom loses two electrons.

7 Which row describes the formation of single covalent bonds in methane?

A	atoms share a pair of electrons	both atoms gain a noble gas electronic structure
B	atoms share a pair of electrons	both atoms have the same number of electrons in their outer shell
C	electrons are transferred from one atom to another	both atoms gain a noble gas electronic structure
D	electrons are transferred from one atom to another	both atoms have the same number of electrons in their outer shell

© UCLES 2019

[Turn over

8 Diamond and graphite have giant covalent structures of carbon atoms.

Which statement describes graphite?

A It has a strong, rigid three-dimensional structure.

B It has four strong covalent bonds between each carbon atom.

C It has layers, which can slide over each other.

D It has no free electrons, so does not conduct electricity.

9 The compound magnesium nitrate has the formula $Mg(NO_3)_2$.

What is the relative formula mass of magnesium nitrate?

A 86 **B** 134 **C** 148 **D** 172

10 Four substances are electrolysed using inert electrodes.

Which row describes the electrode products?

	substance	anode product	cathode product
A	concentrated aqueous sodium chloride	hydrogen	chlorine
B	concentrated hydrochloric acid	chlorine	oxygen
C	dilute sulfuric acid	oxygen	hydrogen
D	molten lead bromide	lead	bromine

11 Dissolving ammonium chloride in water is an endothermic change.

Which row shows the energy change and temperature change of the mixture during the dissolving of ammonium chloride?

	energy change	temperature change
A	energy is absorbed	decrease
B	energy is absorbed	increase
C	energy is released	decrease
D	energy is released	increase

12 Which process is a physical change?

A burning wood

B cooking an egg

C melting an ice cube

D rusting iron

© UCLES 2019

13 Hydrogen peroxide solution decomposes very slowly at room temperature to produce oxygen gas. This gas forms a rising foam when liquid detergent is added.

Five test-tubes are half filled with hydrogen peroxide solution. A drop of liquid detergent is added to each one.

Different metal oxides are added to four of the test-tubes and the height of the foam formed after 1 minute is measured. The results are shown.

metal oxide	height of foam / cm
no metal oxide added	0.1
aluminium oxide	0.1
calcium oxide	0.2
copper(II) oxide	2.3
manganese(IV) oxide	5.4

Which conclusion can be drawn from these results?

A Metal oxides do not affect the rate of this reaction.

B All metal oxides increase the rate of this reaction and act as catalysts.

C Manganese(IV) oxide is the best catalyst of the four metal oxides tested.

D Only transition element oxides increase the rate of this reaction.

14 When blue-green crystals of nickel(II) sulfate are heated, water is produced and a yellow solid remains. When water is added to the yellow solid, the blue-green colour returns.

Which process describes these changes?

A combustion

B corrosion

C neutralisation

D reversible reaction

© UCLES 2019

[Turn over

15 In a blast furnace, iron is extracted when iron(III) oxide reacts with carbon monoxide.

The equation is shown.

$$Fe_2O_3 + 3CO \rightarrow 2Fe + 3CO_2$$

Which substance is oxidised and which is reduced?

	oxidised	reduced
A	CO	Fe_2O_3
B	CO_2	Fe
C	Fe	CO_2
D	Fe_2O_3	CO

16 Four different solutions are separately tested with blue litmus and with methyl orange. Each solution is known to be either acidic or alkaline. The results are shown.

solution	result with blue litmus	result with methyl orange
1	red	red
2	red	yellow
3	blue	yellow
4	blue	yellow

Which statement is correct?

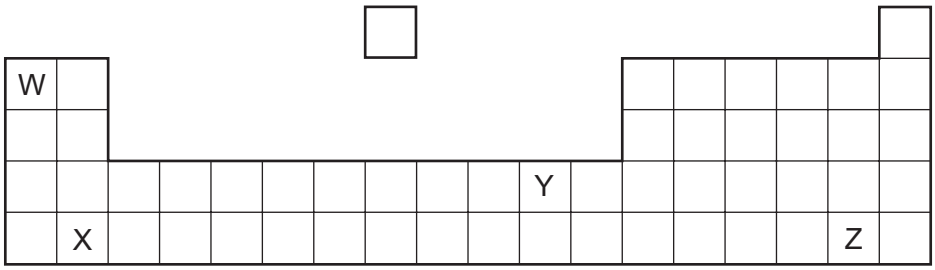
A Solutions 1 and 4 are acidic.

B Solutions 1 and 2 are alkaline.

C Solutions 3 and 4 are alkaline.

D Solutions 3 and 4 are acidic.

17 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

© UCLES 2019

18 How could crystals of a pure salt be prepared from dilute sulfuric acid?

A add an excess of aqueous sodium hydroxide, filter, evaporate the filtrate to crystallisation point

B add an excess of copper(II) carbonate, filter, evaporate the filtrate to dryness

C add an excess of copper metal, filter, evaporate the filtrate to crystallisation point

D add an excess of zinc oxide, filter, evaporate the filtrate to crystallisation point

19 The results of two tests on a solution of compound Q are shown.

test	observation
add ammonia solution	green precipitate formed
add dilute nitric acid followed by aqueous barium nitrate	white precipitate formed

What is Q?

A iron(II) chloride

B iron(II) sulfate

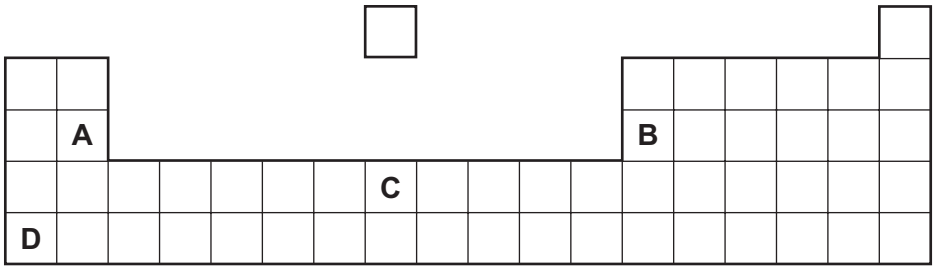
C iron(III) chloride

D iron(III) sulfate

20 The properties of an element are shown.

electrical conductivity	density	reaction with water
high	low	reacts violently with cold water

Which element has these properties?



21 Which statement about elements in Group I and Group VII of the Periodic Table is correct?

A Bromine reacts with potassium chloride to produce chlorine.

B Iodine is a monoatomic non-metal.

C Lithium has a higher melting point than potassium.

D Sodium is more reactive with water than potassium.

22 Which row describes the properties of a transition element?

	melting point	density	forms coloured compounds
A	high	low	no
B	high	high	yes
C	low	low	no
D	low	low	yes

23 Which statement about elements in Group VIII of the Periodic Table is correct?

A They all have a full outer shell of electrons.

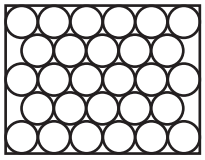
B They all react with Group I elements to form ionic compounds.

C They are all diatomic molecules.

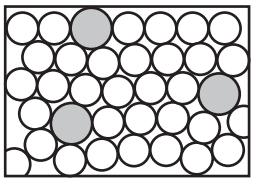
D They are all liquids at room temperature.

24 The diagrams show the structure of two substances used to make electrical conductors.

X



Y



Which statement correctly describes X and Y?

A X is a pure metal and Y is a compound.

B X is a pure metal and Y is an alloy.

C X is a solid and Y is a liquid.

D X is harder and stronger than Y.

© UCLES 2019

25 The reactions of three metals, P, Q and R, are shown.

	metal reacts with dilute hydrochloric acid	metal reacts with water
P	yes	no
Q	no	no
R	yes	yes

What is the order of reactivity of the metals?

	most reactive →		least reactive
A	P	Q	R
B	Q	R	P
C	R	Q	P
D	R	P	Q

26 Iron is extracted from its ore in a blast furnace.

Hematite, coke, limestone and hot air are added to the furnace.

Which explanation is **not** correct?

A Coke burns and produces a high temperature.

B Hematite is the ore containing the iron as iron(III) oxide.

C Hot air provides the oxygen for the burning.

D Limestone reduces the iron(III) oxide to iron.

27 Why is aluminium used to make containers for storing food?

A It conducts electricity.

B It has a high melting point.

C It is resistant to corrosion.

D It is strong.

© UCLES 2019

28 Water can be treated by filtration then chlorination.

Which uses do **not** need water of this quality?

1 water for cooling in industry

2 water for washing clothes

3 water for drinking

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

29 Four sources of air pollution are listed.

1 burning fossil fuels containing sulfur

2 nitrogen reacting with oxygen in car engines

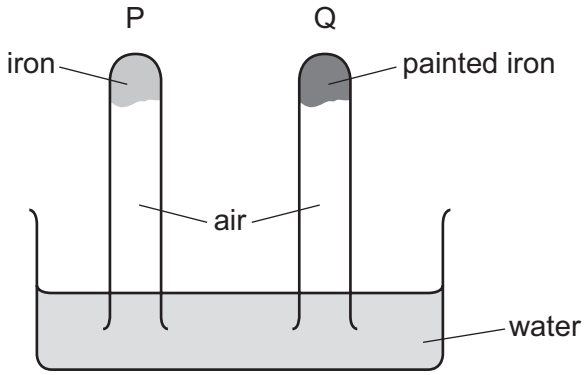
3 incomplete combustion of carbon fuels

4 adding lead compounds to petrol

Which sources produce acid rain?

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

30 The diagram shows an experiment to investigate how paint affects the rusting of iron.



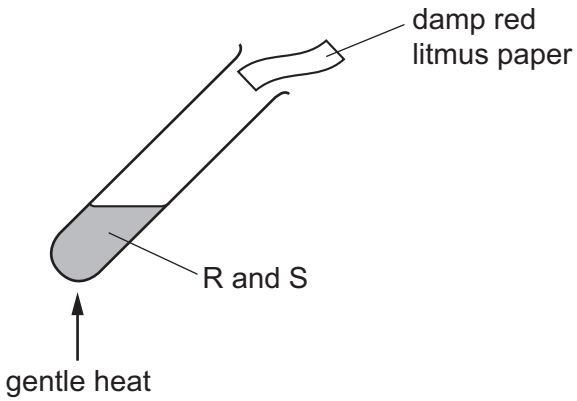
What happens to the water level in tubes P and Q?

	tube P	tube Q
A	falls	rises
B	no change	rises
C	rises	falls
D	rises	no change

© UCLES 2019

31 A mixture of two substances, R and S, is heated.

The damp red litmus paper turns blue.



What are R and S?

	R	S
A	a basic oxide	ammonium chloride
B	a basic oxide	sodium nitrate
C	an acidic oxide	ammonium chloride
D	an acidic oxide	sodium nitrate

32 Which statement describes a disadvantage of sulfur dioxide?

A It can be used as a bleach when making wood pulp.

B It can be used to kill bacteria in food.

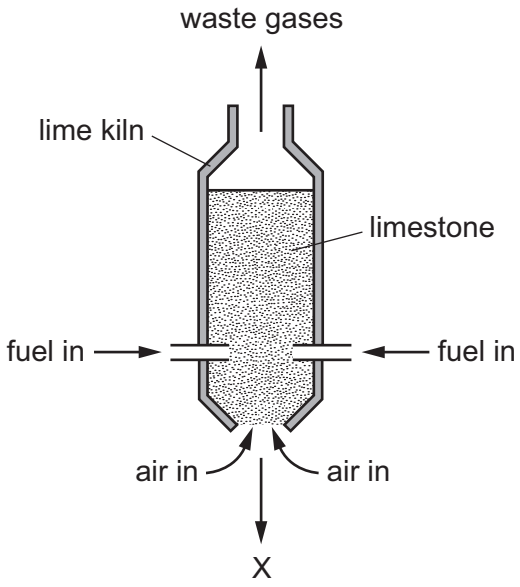
C It can be used to manufacture sulfuric acid.

D It dissolves in water to form acid rain.

© UCLES 2019

[Turn over

33 The diagram represents a lime kiln used to heat limestone to a very high temperature.



What leaves the kiln at X?

A calcium carbonate

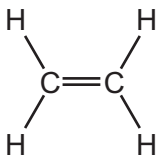
B calcium hydroxide

C calcium oxide

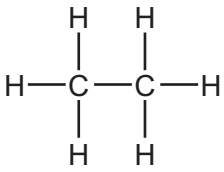
D calcium sulfate

34 What is the structure of ethanol?

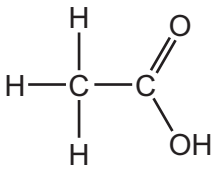
A



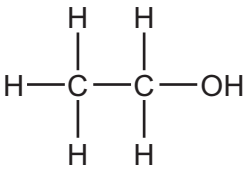
B



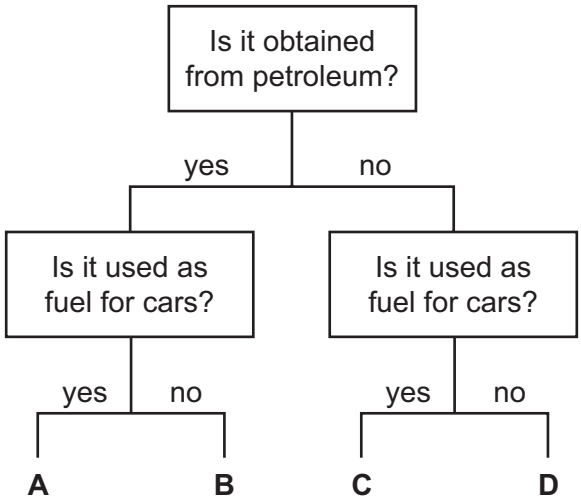
C



D



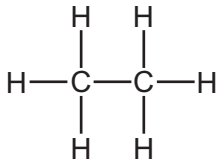
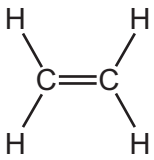
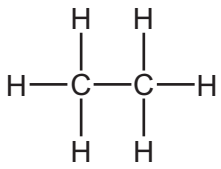
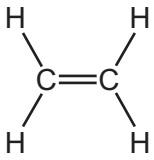
35 Which fuel could be gasoline?



36 A hydrocarbon W burns to form carbon dioxide and water.

W decolourises bromine water.

What is the name of W and what is its structure?

	name of W	structure of W
A	ethane	
B	ethane	
C	ethene	
D	ethene	

37 Why is ethanol a member of the homologous series of alcohols but propane is **not**?

A Ethanol has two carbon atoms per molecule but propane has three.

B Ethanol can be made from ethene but propane is obtained from petroleum.

C Ethanol is a liquid but propane is a gas.

D Ethanol contains the same functional group as other alcohols but propane does not.

38 Which statements about ethanol are correct?

1 It can be made by fermentation.

2 It is an unsaturated compound.

3 It burns in air and can be used as a fuel.

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

39 Which statements about aqueous ethanoic acid are correct?

1 Ethanoic acid contains the functional group –COOH.

2 Ethanoic acid reacts with carbonates to produce hydrogen.

3 Ethanoic acid turns Universal Indicator paper blue.

4 Ethanoic acid has a pH lower than pH 7.

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

40 Which naturally occurring polymers are found in foods?

1 complex carbohydrates

2 nylon

3 salts

4 proteins

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

© UCLES 2019

BLANK PAGE

Permission to reproduce items where third-party owned material protected by copyright is included has been sought and cleared where possible. Every reasonable effort has been made by the publisher (UCLES) to trace copyright holders, but if any items requiring clearance have unwittingly been included, the publisher will be pleased to make amends at the earliest possible opportunity.

To avoid the issue of disclosure of answer-related information to candidates, all copyright acknowledgements are reproduced online in the Cambridge Assessment International Education Copyright Acknowledgements Booklet. This is produced for each series of examinations and is freely available to download at www.cambridgeinternational.org after the live examination series.

Cambridge Assessment International Education is part of the Cambridge Assessment Group. Cambridge Assessment is the brand name of the University of Cambridge Local Examinations Syndicate (UCLES), which itself is a department of the University of Cambridge.

© UCLES 2019

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.).