Cambridge Assessment International Education
Cambridge International General Certificate of Secondary Education

CHEMISTRY **0620/12**

Paper 1 Multiple Choice (Core) **February/March 2019**

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.

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.

1 Four processes are listed.

1 Brownian motion

2 condensation

3 diffusion

4 evaporation

Which processes involve a change of state?

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

2 A student measures the time taken for 2.0 g of magnesium to dissolve in 50 cm^3 of dilute sulfuric acid.

Which apparatus is essential to complete the experiment?

1 stop-clock

2 measuring cylinder

3 thermometer

4 balance

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

3 Which method should be used to separate a mixture of two liquids?

A crystallisation

B electrolysis

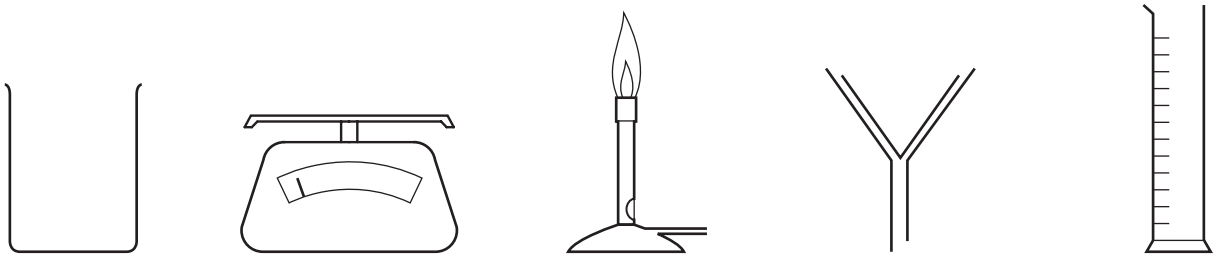
C filtration

D fractional distillation

4 Lead(II) iodide is insoluble in water.

Lead(II) iodide is made by adding aqueous lead(II) nitrate to aqueous potassium iodide.

Which pieces of apparatus are needed to obtain solid lead(II) iodide from 20 cm^3 of aqueous lead(II) nitrate?



1 2 3 4 5

A 1, 2 and 4 **B** 1, 3 and 5 **C** 1, 4 and 5 **D** 2, 4 and 5

5 Which row describes isotopes of the same element?

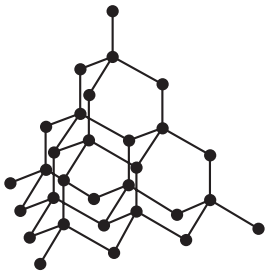
	number of protons	number of neutrons
A	different	different
B	different	same
C	same	different
D	same	same

6 Which row describes the structure of the positive ion in sodium chloride?

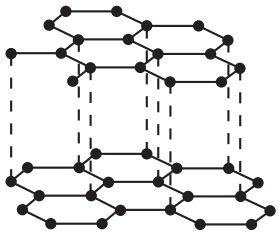
	protons	electrons	neutrons
A	11	11	12
B	11	10	12
C	17	17	18
D	17	18	18

[Turn over

7 Which pair of statements about diamond and graphite is correct?



diamond



graphite

A Diamond and graphite are both pure carbon. They are both macromolecules.

B Diamond and graphite can both be used as electrodes. Graphite is also used as a lubricant.

C Diamond has covalent bonds. Graphite has ionic bonds.

D Diamond is hard with a high melting point. Graphite is soft with a low melting point.

8 What is the nucleon number of an atom?

A the number of neutrons

B the number of protons

C the total number of protons and neutrons

D the total number of protons and electrons

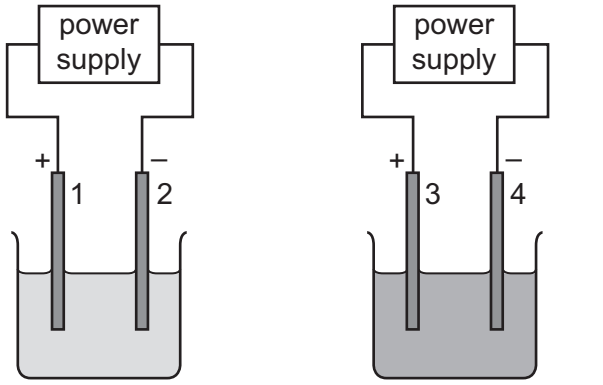
9 The relative formula mass, M_r, of calcium carbonate, $CaCO_3$, is 100.

What is the mass of carbon present in 100 g of calcium carbonate?

A 12 g **B** 36 g **C** 40 g **D** 60 g

10 Two electrolysis experiments were carried out as shown.

The graphite electrodes are labelled 1–4.



molten sodium chloride

concentrated aqueous sodium chloride

Which row describes the products at the electrodes in these experiments?

	electrode 1	electrode 2	electrode 3	electrode 4
A	chlorine	hydrogen	chlorine	hydrogen
B	chlorine	sodium	chlorine	hydrogen
C	chlorine	sodium	hydrogen	chlorine
D	sodium	chlorine	sodium	chlorine

11 10 g of ammonium nitrate is added to water at 25 °C and the mixture stirred.

The ammonium nitrate dissolves and, after one minute, the temperature of the solution is 10 °C.

Which word describes this change?

A endothermic

B exothermic

C neutralisation

D reduction

12 Which process involves a chemical change?

A dissolving copper(II) sulfate

B distilling ethanol

C freezing water

D neutralising copper(II) oxide

[Turn over

13 Lumps of limestone react with dilute hydrochloric acid according to the equation shown.

$$CaCO_3 + 2HCl \rightarrow CaCl_2 + H_2O + CO_2$$

Which change in conditions decreases the rate of the reaction?

A increase the concentration of the acid

B increase the volume of the acid

C increase the size of the lumps of limestone

D increase the temperature

14 Which reaction is reversible?

A $Cu + ZnSO_4 \rightarrow CuSO_4 + Zn$

B $CuO + H_2SO_4 \rightarrow CuSO_4 + H_2O$

C $CuO + H_2 \rightarrow Cu + H_2O$

D $CuSO_4 \bullet 5H_2O \rightarrow CuSO_4 + 5H_2O$

15 The reaction between magnesium and carbon dioxide is shown in the equation.

$$2Mg + CO_2 \rightarrow 2MgO + C$$

Which statement describes what happens in this reaction?

A Carbon is oxidised.

B Magnesium is reduced.

C Neither oxidation nor reduction happens.

D The carbon in carbon dioxide is reduced.

16 Barium hydroxide is an alkali. It reacts with hydrochloric acid.

How does the pH of the hydrochloric acid change as an excess of aqueous barium hydroxide is added?

A The pH decreases from pH 14 and becomes constant at pH 7.

B The pH decreases from pH 14 to about pH 1.

C The pH increases from pH 1 and becomes constant at pH 7.

D The pH increases from pH 1 to about pH 14.

17 Copper(II) sulfate crystals are blue. They are made by adding an excess of copper(II) oxide to sulfuric acid.

The mixture is heated and stirred.

It is then filtered and the filtrate is allowed to evaporate, leaving blue crystals.

Why is filtration necessary?

A to remove soluble properties

B to remove sulfuric acid

C to remove the blue crystals

D to remove unreacted copper(II) oxide

18 The results of two tests on an aqueous solution of X are shown.

test	observation
aqueous sodium hydroxide added	green precipitate formed
acidified aqueous silver nitrate added	yellow precipitate formed

What is X?

A copper(II) chloride

B copper(II) iodide

C iron(II) chloride

D iron(II) iodide

19 Information about the solubility in water of four oxides is shown.

Which oxide, when added to water, gives a solution with a pH less than pH 7?

	name of oxide	solubility in water
A	nitrogen dioxide	soluble
B	copper(II) oxide	insoluble
C	silicon(IV) oxide	insoluble
D	barium oxide	soluble

[Turn over

20 The elements sodium to argon form Period 3 of the Periodic Table.

Which row describes the trend across Period 3 from left to right?

	number of outer shell electrons	metallic character	group number
A	decreases	decreases	decreases
B	decreases	increases	decreases
C	increases	decreases	increases
D	increases	increases	increases

21 Astatine is below iodine in Group VII in the Periodic Table.

Which row describes the properties of astatine?

	state at room temperature	reactivity
A	gas	displaces chlorine, bromine and iodine
B	gas	displaces iodine but does not displace chlorine or bromine
C	solid	displaces iodine but does not displace chlorine or bromine
D	solid	does not displace chlorine, bromine or iodine

22 Which row describes a transition element?

	density in g/cm^3	colour of chloride
A	0.98	green
B	0.98	white
C	8.90	green
D	8.90	white

23 Which statement explains why elements in Group VIII of the Periodic Table are unreactive?

A They are monatomic gases.

B They form stable diatomic molecules.

C They have a full outer shell of electrons.

D They share electrons with each other.

24 The electrical conductivity of magnesium was tested.

Magnesium was then added to dilute sulfuric acid and a gas, Q, was produced.

Which row is correct?

	electrical conductivity of magnesium	gas Q
A	good	hydrogen
B	good	oxygen
C	poor	hydrogen
D	poor	oxygen

25 Four reactions that take place in the blast furnace to produce iron are shown.

Which reaction is used to keep the furnace hot?

A $C + O_2 \rightarrow CO_2$

B $CO_2 + C \rightarrow 2CO$

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

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

26 The list gives the order of some metals and hydrogen in the reactivity series.

Metal X is also included.

most reactive	K
	Mg
	Zn
	H
	X
least reactive	Cu

Which row correctly shows the properties of metal X?

	reacts with dilute acids	oxide reduced by carbon
A	no	no
B	no	yes
C	yes	no
D	yes	yes

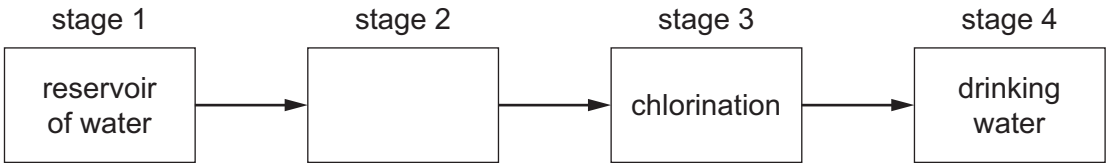
[Turn over

27 The properties of four elements are shown.

Which element is used to make aircraft bodies?

	density	brittle or malleable
A	high	brittle
B	high	malleable
C	low	brittle
D	low	malleable

28 The diagram shows how water is treated to make it suitable for drinking.



What happens in stage 2?

A condensation

B sublimation

C evaporation

D filtration

29 A farmer treats a field with calcium hydroxide to make it less acidic.

When the farmer adds ammonium nitrate fertiliser to the field immediately after the calcium hydroxide, they react.

Why does this reaction make the fertiliser less effective?

A It makes ammonia gas, so less nitrogen is absorbed by the soil.

B It makes an acid, making the soil acidic again.

C It makes nitrogen gas, so less nitrogen is absorbed by the soil.

D It makes the fertiliser too strong, stopping the plants growing so well.

30 Which row showing an air pollutant and its major source is **not** correct?

	pollutant	major source of pollutant
A	carbon monoxide	complete combustion of carbon fuels
B	lead compounds	leaded petrol
C	oxides of nitrogen	car engines
D	sulfur dioxide	fossil fuels containing sulfur

31 Which substances are needed for iron to rust?

A carbon dioxide and oxygen

B oxygen only

C water and carbon dioxide

D water and oxygen

32 Methane and carbon dioxide are both greenhouse gases.

Which row identifies a source of methane and a source of carbon dioxide?

	source of methane	source of carbon dioxide
A	decomposition of vegetation	hydrogen car exhausts
B	digestion in animals	diesel car exhausts
C	petrol car exhausts	decomposition of vegetation
D	respiration	petrol car exhausts

33 Which element has an oxide that is used as a food preservative?

A helium

B hydrogen

C iron

D sulfur

[Turn over

34 Lime is made by heating limestone.

Which equation represents this reaction?

A $CaCO_3 \rightarrow Ca + O_2 + CO$

B $CaCO_3 \rightarrow CaO + CO_2$

C $CaCO_3 + H_2O \rightarrow CaO + H_2CO_3$

D $CaCO_3 + H_2O \rightarrow Ca(OH)_2 + CO_2$

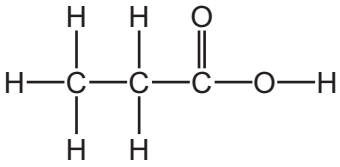
35 Most objects made from synthetic polymers last for many years.

Why do these polymers last for so long?

	chemically unreactive	biodegradable
A	no	no
B	no	yes
C	yes	no
D	yes	yes

36 The structure of a compound, G, is shown.

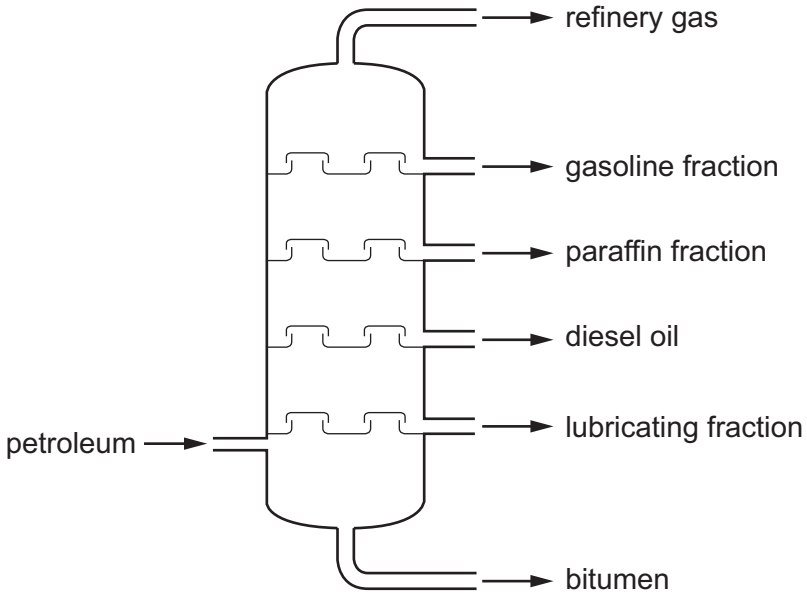
G is in the same homologous series as ethanoic acid.



Which row describes some of the properties of an aqueous solution of G?

	produces a gas with magnesium	turns methyl orange yellow
A	no	yes
B	no	no
C	yes	no
D	yes	yes

37 The fractional distillation of petroleum is shown.



Which fraction is the least volatile?

A bitumen

B diesel oil

C gasoline fraction

D refinery gas

38 Which row shows the properties of methane?

	soluble in water	state at room temperature	gives a positive test with aqueous bromine
A	no	gas	no
B	no	gas	yes
C	yes	liquid	no
D	yes	liquid	yes

[Turn over

39 The formulae of five compounds are listed.

1 C_4H_{10}

2 C_2H_5OH

3 C_4H_9OH

4 C_4H_9COOH

5 $C_5H_{11}OH$

Which compounds are in the same homologous series?

A 1, 3 and 4 only

B 2, 3 and 5 only

C 3 and 4 only

D 3 and 5 only

40 Which process is used to make an alkene from a long-chain alkane?

A combustion

B condensation

C cracking

D polymerisation

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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.).