



Cambridge Assessment International Education
Cambridge International General Certificate of Secondary Education

CHEMISTRY

0620/11

Paper 1 Multiple Choice (Core)

October/November 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.

bestexamhelp.com

This syllabus is regulated for use in England, Wales and Northern Ireland as a Cambridge International Level 1/Level 2 Certificate.

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

- 1 The diagram shows a cup of hot tea.



Which row describes the water particles in the air above the cup compared with the water particles in the cup?

	moving faster	closer together
A	✓	✗
B	✓	✓
C	✗	✗
D	✗	✓

- 2 A student is asked to measure the time taken for 0.4 g of magnesium carbonate to react completely with 25.0 cm³ of dilute hydrochloric acid.

Which pieces of apparatus does the student need?

- A** balance, stop-clock, pipette
B balance, stop-clock, thermometer
C balance, pipette, thermometer
D stop-clock, pipette, thermometer
- 3 A fractionating column is used to separate the hydrocarbon fractions in petroleum by fractional distillation.

Which row describes the properties of the fractions that condense at the top of the fractionating column?

	size of molecule	boiling point
A	large	high
B	large	low
C	small	high
D	small	low

4 Some information about solid silver chloride and solid sodium chloride is shown.

- Silver chloride and sodium chloride do not dissolve in kerosene.
- Silver chloride is insoluble in water but sodium chloride is soluble in water.
- The boiling point of silver chloride is 1547 °C and the boiling point of sodium chloride is 1413 °C.

Which processes are used to separate a mixture of solid silver chloride and solid sodium chloride?

- A Add kerosene, stir and then filter.
- B Add water, stir and then filter.
- C Add water, stir and then leave to crystallise.
- D Add water, stir and then perform fractional distillation.

5 A covalent molecule M contains four shared pairs of electrons.

What is M?

- A ammonia, NH₃
- B hydrogen chloride, HCl
- C methane, CH₄
- D water, H₂O

6 An isotope of chromium is represented by ${}_{24}^{52}\text{Cr}$.

Which statement about an atom of this isotope of chromium is correct?

- A It contains 24 electrons.
- B It contains 24 neutrons.
- C It contains 28 protons.
- D It contains 52 neutrons.

7 Substances P and Q both conduct electricity.

P is a mixture of two different types of atom.

Q is made of only one type of atom.

Which row describes P and Q?

	P	Q
A	alloy	element
B	alloy	compound
C	compound	alloy
D	compound	element

8 Graphite is a form of carbon.

Why can graphite be used as a lubricant?

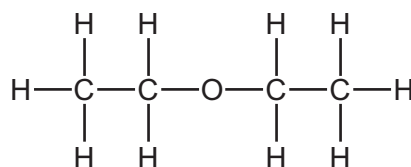
A Graphite contains unbonded electrons which move through the structure.

B Graphite contains weak covalent bonds so the atoms move easily.

C Graphite has a low melting point so it easily turns into a liquid.

D Graphite has weak attractive forces between layers so they can move.

9 The structure of a molecule is shown.



What is the formula of the molecule?

A CHO

B C₂H₅O

C C₄H₈O

D C₄H₁₀O

10 During the electrolysis of concentrated hydrochloric acid, gases are produced at both electrodes.

Which statement describes the test result for the gas collected at the negative electrode?

A It bleaches damp litmus paper.

B It burns with a 'pop'.

C It relights a glowing splint.

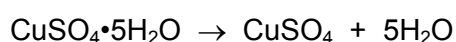
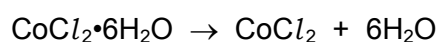
D It turns limewater milky.

11 Which statements about endothermic reactions are correct?

- 1 The energy of the products is greater than the energy of the reactants.
- 2 The energy of the reactants is greater than the energy of the products.
- 3 The temperature of the surroundings increases during the reaction.
- 4 The temperature of the surroundings decreases during the reaction.

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

12 Equations for the formation of anhydrous cobalt(II) chloride and anhydrous copper(II) sulfate are shown.



Which statement about the reactions is **not** correct?

- A Both reactions are exothermic.
- B Both reactions are reversible.
- C Hydrated cobalt(II) chloride changes colour from pink to blue.
- D Hydrated copper(II) sulfate changes colour from blue to white.

13 A method used to investigate the rate of reaction of calcium carbonate with dilute hydrochloric acid under different conditions is shown.

- Place 50 cm³ of dilute hydrochloric acid in a conical flask.
- Add a known volume of water to the conical flask.
- Heat the conical flask to the required temperature.
- Add 1.0 g of calcium carbonate to the conical flask.
- Measure the time taken for the reaction to finish.

Which volume of water and which temperature gives the shortest time taken for the reaction to finish?

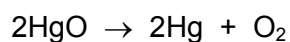
	volume of water added / cm ³	temperature / °C
A	10	30
B	10	50
C	40	30
D	40	50

14 Which is a chemical change?

- A boiling water
- B cooking an egg
- C dissolving sugar
- D melting ice cubes

15 Mercury(II) oxide, HgO , decomposes when heated.

The equation is shown.



Why is this a reduction reaction?

- A The products weigh less than the reactants.
- B There are fewer reactants than products.
- C There is a gain of oxygen.
- D There is a loss of oxygen.

16 Carbonic acid is a weak acid formed when carbon dioxide dissolves in water.

What is the pH of the solution?

- A 1 B 5 C 7 D 9

17 Solid X is tested as shown.

reaction with dilute aqueous sodium hydroxide	flame test	reaction with dilute hydrochloric acid
no reaction	red flame	gas produced which turned limewater milky

What is X?

- A copper(II) carbonate
- B lithium carbonate
- C potassium carbonate
- D sodium sulfate

18 Which oxide is basic?

- A carbon dioxide
- B sodium oxide
- C sulfur dioxide
- D water

19 A method used to make copper(II) sulfate crystals is shown.

- 1 Place dilute sulfuric acid in a beaker.
- 2 Warm the acid.
- 3 Add copper(II) oxide until it is in excess.
- 4 Filter the mixture.
- 5 Evaporate the filtrate until crystals start to form.
- 6 Leave the filtrate to cool.

What are the purposes of step 3 and step 4?

	step 3	step 4
A	to ensure all of the acid has reacted	to obtain solid copper(II) sulfate
B	to ensure all of the acid has reacted	to remove the excess of copper(II) oxide
C	to speed up the reaction	to obtain solid copper(II) sulfate
D	to speed up the reaction	to remove the excess of copper(II) oxide

20 Which set of elements shows the change from metallic to non-metallic character across a period of the Periodic Table?

- A beryllium → magnesium → calcium
- B fluorine → bromine → iodine
- C oxygen → boron → lithium
- D sodium → silicon → chlorine

21 Which pair of elements reacts together most violently?

- A chlorine and lithium
- B chlorine and potassium
- C iodine and lithium
- D iodine and potassium

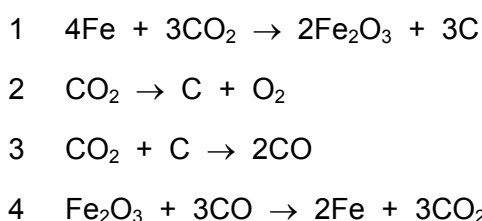
- 25 Four different metals are reacted with an equal volume of dilute hydrochloric acid. The results of the reactions are shown.

metal	rate of effervescence
calcium	very high
copper	none
iron	low
magnesium	high

What is the order of reactivity of the four metals starting with the most reactive?

- A** iron → magnesium → calcium → copper
B magnesium → calcium → copper → iron
C copper → iron → magnesium → calcium
D calcium → magnesium → iron → copper
- 26 Iron is extracted from its ore in a blast furnace.

The equations for four different reactions are shown.



Which equations represent reactions that occur in the blast furnace?

- A** 1 and 2 only **B** 1 and 3 only **C** 2 and 3 only **D** 3 and 4 only
- 27 Which statement is correct?
- A** Aluminium is used in the manufacture of aircraft because it has a high density.
B Copper is used for cooking utensils because it is a good conductor of heat.
C Mild steel is used for car bodies because it is resistant to corrosion.
D Stainless steel is used for cutlery because it is a conductor of electricity.

28 River water contains soluble impurities, insoluble impurities and bacteria.

River water is made safe to drink by filtration and chlorination.

Which statement is correct?

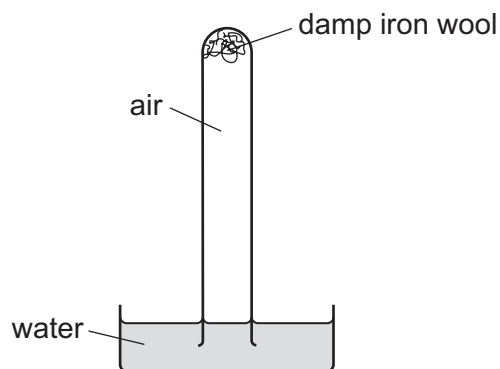
- A** Filtration removes bacteria and insoluble impurities, and chlorination removes soluble impurities.
- B** Filtration removes insoluble impurities, and chlorination kills the bacteria.
- C** Filtration removes soluble and insoluble impurities, and chlorination kills the bacteria.
- D** Filtration removes soluble impurities and bacteria, and chlorination removes insoluble impurities.

29 Clean, dry air contains nitrogen, oxygen and small amounts of other gases. The noble gases have been left out of the table.

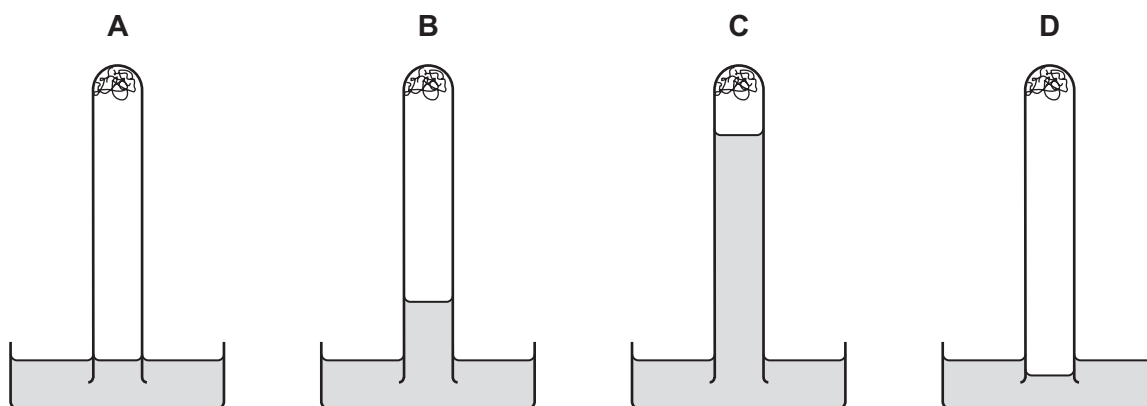
Which row shows the composition of clean, dry air?

	nitrogen / %	oxygen / %	other gases
A	21	78	small amount of carbon dioxide
B	21	78	small amount of carbon monoxide
C	78	21	small amount of carbon dioxide
D	78	21	small amount of carbon monoxide

30 The apparatus shown is set up and left for a week.



Which diagram shows the level of the water at the end of the week?



31 Farmers add calcium oxide (lime) and ammonium salts to their fields.

The compounds are not added at the same time because they react with each other.

Which gas is produced in this reaction?

- A ammonia
- B carbon dioxide
- C hydrogen
- D nitrogen

32 Which information about carbon dioxide and methane is correct?

		carbon dioxide	methane
A	formed when vegetation decomposes	✓	x
B	greenhouse gas	✓	✓
C	present in unpolluted air	x	x
D	produced during respiration	x	✓

key

✓ = true

x = false

33 What is **not** a use of sulfur dioxide?

- A as a bleach
- B as a food preservative
- C in the manufacture of wood pulp for paper
- D treating acidic soils

34 Which process is used to obtain lime from limestone?

- A cracking
- B fractional distillation
- C neutralisation
- D thermal decomposition

35 Petroleum is separated by fractional distillation.

Which statement about the fractions produced is correct?

- A Bottled gas for heating and cooking is obtained from the naphtha fraction.
- B Diesel oil is used as a fuel for jet aircraft.
- C Substances used to make polishes are obtained from the lubricating fraction.
- D The kerosene fraction contains many useful waxes.

36 Which compounds have similar chemical properties?

- A butanol and butanoic acid
- B ethane and ethene
- C methane and butane
- D propene and propanol

37 Which statement about a molecule of ethane is correct?

- A An ethane molecule has at least one double covalent bond.
- B It has C–H and C–O bonds.
- C An ethane molecule has seven covalent bonds.
- D Its bonds are formed by the transfer of electrons.

38 Which products are obtained by the cracking of an alkane?

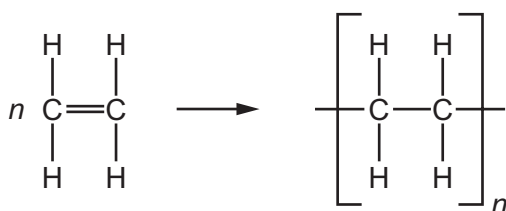
	alkene	hydrogen	water
A	✓	✓	✓
B	✓	✓	x
C	✓	x	✓
D	x	✓	✓

39 Which statements about aqueous ethanoic acid are correct?

- 1 It has a pH value of 10.
- 2 It reacts with metal carbonates to produce carbon dioxide gas.
- 3 It reacts with magnesium metal to produce hydrogen gas.

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

40 The diagram shows the structure of a monomer and of the polymer made from it.



What are the monomer and polymer?

	monomer	polymer
A	ethane	poly(ethane)
B	ethane	poly(ethene)
C	ethene	poly(ethane)
D	ethene	poly(ethene)

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The Periodic Table of Elements

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3 Li lithium 7	4 Be beryllium 9	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 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 —	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 —	113 Nh nihonium —	114 Fl flerovium —	115 Lv livermorium —	116 Ts tennessine —	117 Og oganesson —	118 Uue unbinilium —	119 Uuh ununilium —	120 Uuq ununquadium —	121 Uub ununbium —	122 Uut ununtrium —	123 Uuq ununquadium —	124 Uub ununbium —	125 Uut ununtrium —	126 Uuq ununquadium —	127 Uub ununbium —	128 Uut ununtrium —	129 Uuq ununquadium —	130 Uub ununbium —	131 Uut ununtrium —	132 Uuq 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ununtrium —	378 Uuq ununquadium —	379 Uub ununbium —	380 Uut ununtrium —	381 Uuq ununquadium —	382 Uub ununbium —	383 Uut ununtrium —	384 Uuq ununquadium —	385 Uub ununbium —	386 Uut ununtrium —	387 Uuq ununquadium —	388 Uub ununbium —	389 Uut ununtrium —	390 Uuq ununquadium —	391 Uub ununbium —	392 Uut ununtrium —	393 Uuq ununquadium —	394 Uub ununbium —	395 Uut ununtrium —	396 Uuq ununquadium —	397 Uub ununbium —	398 Uut ununtrium —	399 Uuq ununquadium —	400 Uub ununbium —	401 Uut ununtrium —	402 Uuq ununquadium —	403 Uub ununbium —	404 Uut ununtrium —	405 Uuq ununquadium —	406 Uub ununbium —	407 Uut ununtrium —	408 Uuq ununquadium —	409 Uub ununbium —	410 Uut ununtrium —	411 Uuq ununquadium —	412 Uub ununbium —	413 Uut ununtrium —	414 Uuq ununquadium —	415 Uub ununbium —	416 Uut ununtrium —	417 Uuq ununquadium —	418 Uub ununbium —	419 Uut ununtrium —	420 Uuq ununquadium —	421 Uub ununbium —	422 Uut ununtrium —	423 Uuq ununquadium —	424 Uub ununbium —	425 Uut ununtrium —	426 Uuq ununquadium —	427 Uub ununbium —	428 Uut ununtrium —	429 Uuq ununquadium —	430 Uub ununbium —	431 Uut ununtrium —	432 Uuq ununquadium —	433 Uub ununbium —	434 Uut ununtrium —	435 Uuq ununquadium —	436 Uub ununbium —	437 Uut ununtrium —	438 Uuq ununquadium —	439 Uub ununbium —	440 Uut ununtrium —	441 Uuq ununquadium —	442 Uub ununbium —	443 Uut ununtrium —	444 Uuq ununquadium —	445 Uub ununbium —	446 Uut ununtrium —	447 Uuq ununquadium —	448 Uub ununbium —	449 Uut ununtrium —	450 Uuq ununquadium —	451 Uub ununbium —	452 Uut ununtrium —	453 Uuq ununquadium —	454 Uub ununbium —	455 Uut ununtrium —	456 Uuq ununquadium —	457 Uub ununbium —	458 Uut ununtrium —	459 Uuq ununquadium —	460 Uub ununbium —	461 Uut ununtrium —	462 Uuq ununquadium —	463 Uub ununbium —	464 Uut ununtrium —	465 Uuq ununquadium —	466 Uub ununbium —	467 Uut ununtrium —	468 Uuq ununquadium —	469 Uub ununbium —	470 Uut ununtrium —	471 Uuq ununquadium —	472 Uub ununbium —	473 Uut ununtrium —	474 Uuq ununquadium —	475 Uub ununbium —	476 Uut ununtrium —	477 Uuq ununquadium —	478 Uub ununbium —	479 Uut ununtrium —	480 Uuq ununquadium —	481 Uub ununbium —	482 Uut ununtrium —	483 Uuq ununquadium —	484 Uub ununbium —	485 Uut ununtrium —	486 Uuq ununquadium —	487 Uub ununbium —	488 Uut ununtrium —	489 Uuq ununquadium —	490 Uub ununbium —	491 Uut ununtrium —	492 Uuq ununquadium —	493 Uub ununbium —	494 Uut ununtrium —	495 Uuq ununquadium —	496 Uub ununbium —	497 Uut ununtrium —	498 Uuq ununquadium —	499 Uub ununbium —	500 Uut ununtrium —

Key
 atomic number
 atomic symbol
 name
 relative atomic mass

1
H
hydrogen
1

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 dm³ at room temperature and pressure (r.t.p.).