Cambridge Assessment International Education

Cambridge IGCSE™

CHEMISTRY **0620/11**

Paper 1 Multiple Choice (Core) **October/November 2022**

45 minutes

You must answer on the multiple choice answer sheet.

You will need: Multiple choice answer sheet
Soft clean eraser
Soft pencil (type B or HB is recommended)

INSTRUCTIONS

- 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 multiple choice answer sheet.
- Follow the instructions on the multiple choice answer sheet.
- Write in soft pencil.
- Write your name, centre number and candidate number on the multiple choice answer sheet in the spaces provided unless this has been done for you.
- Do **not** use correction fluid.
- Do **not** write on any bar codes.
- You may use a calculator.

INFORMATION

- The total mark for this paper is 40.
- Each correct answer will score one mark.
- Any rough working should be done on this question paper.
- The Periodic Table is printed in the question paper.

This document has **16** pages. Any blank pages are indicated.

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1 Which row describes the spacing and arrangement of particles in a solid, a liquid and a gas?

	solid	liquid	gas
A	close together and randomly arranged	close together and regularly arranged	far apart and randomly arranged
B	close together and randomly arranged	far apart and randomly arranged	close together and randomly arranged
C	close together and regularly arranged	close together and randomly arranged	far apart and randomly arranged
D	close together and regularly arranged	close together and regularly arranged	close together and randomly arranged

2 Which piece of apparatus is used to measure exactly 25.0 cm^3 of hydrochloric acid?

A beaker

B burette

C conical flask

D test-tube

3 A mixture contains salt, sand and sulfur.

Salt dissolves in water but not in xylene.

Sulfur dissolves in xylene but not in water.

Sand does not dissolve in water or xylene.

What is the order of the processes used to separate the salt, the sand and the sulfur from the mixture?

A add water → filter → add xylene to the filtrate → filter

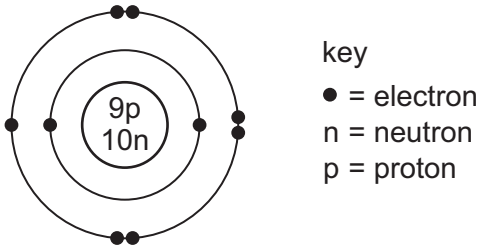
B add water → filter → add xylene to the residue → filter

C add xylene → filter → add water to the filtrate → filter

D add xylene → filter → add xylene to the residue → filter

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4 The structure of an atom is shown.



Which row shows the nucleon number and proton number of this atom?

	nucleon number	proton number
A	9	10
B	19	10
C	10	9
D	19	9

5 Which statement about an alloy is correct?

A It is a compound made of two or more elements, one of which is a metal.

B It is a layer of a metal plated onto another metal.

C It is a mixture of a metal with one or more other elements.

D It is a single element.

6 Which statements about potassium bromide are correct?

1 It has a high melting point.

2 It dissolves in water.

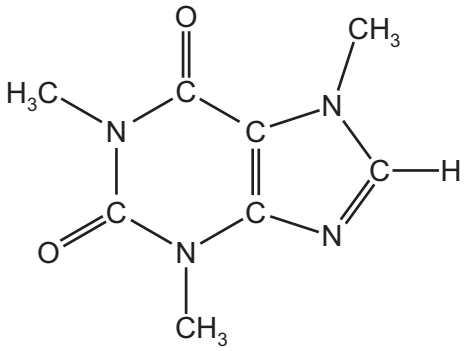
3 It conducts electricity when solid.

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

7 Which row describes the bonding in graphite and a use of graphite?

	bonding in graphite	a use of graphite
A	each atom is bonded covalently to three other atoms	in cutting tools
B	each atom is bonded covalently to three other atoms	as an electrical conductor
C	each atom is bonded covalently to four other atoms	in cutting tools
D	each atom is bonded covalently to four other atoms	as an electrical conductor

8 Caffeine is a stimulant found in coffee.



caffeine

Which formula represents caffeine?

A $C_7H_{10}N_4O_2$ **B** $C_8H_{10}N_3O_2$ **C** $C_8H_{10}N_4O_2$ **D** $C_8H_{11}N_4O_2$

9 The fuel ethane, C_2H_6, burns in air to form carbon dioxide and water.

$$2C_2H_6 + 7O_2 \rightarrow 4CO_2 + 6H_2O$$

Which statement about burning ethane is correct?

A When one molecule of ethane burns, one molecule of water is formed.

B The number of atoms at the end of the reaction is the same as at the start.

C During the reaction there is a decrease in the number of molecules.

D The reaction is endothermic.

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10 Which statement about the electrolysis of concentrated aqueous sodium chloride is correct?

A Chlorine is produced at the positive electrode.

B Hydrogen is produced at the positive electrode.

C Oxygen is produced at the negative electrode.

D Sodium is produced at the negative electrode.

11 When an acid is added to an alkali, the temperature of the reaction mixture rises.

Which words describe this reaction?

A decomposition and endothermic

B decomposition and exothermic

C neutralisation and endothermic

D neutralisation and exothermic

12 Some properties of four fuels are shown.

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

13 Which process is a physical change?

A burning wood

B cooking an egg

C melting an ice cube

D rusting iron

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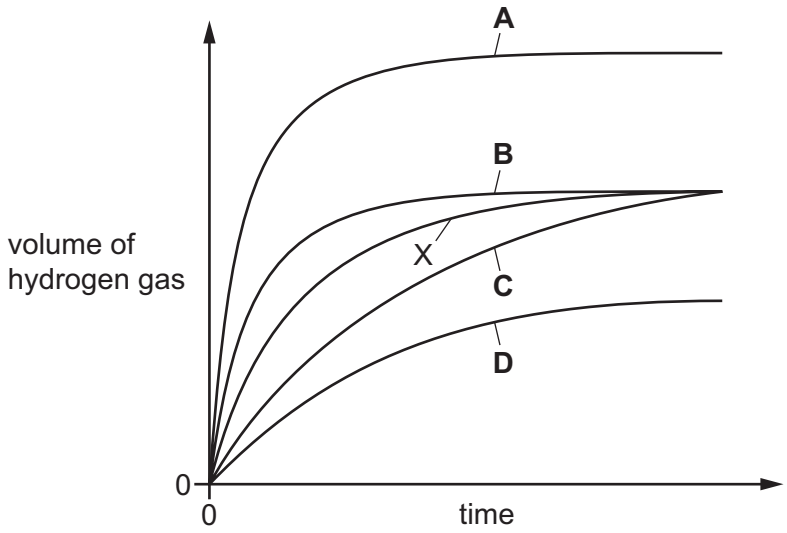
14 A student adds excess zinc to dilute hydrochloric acid at 25 °C.

The hydrogen gas produced is collected and measured at room temperature and pressure.

The results are plotted and labelled as curve X on the graph.

The experiment is repeated at 50 °C with all other conditions remaining the same.

Which graph shows the results at 50 °C?



15 Substance Y is a pink solid.

When substance Y is heated gently it becomes a blue solid.

When the blue solid is cooled down it remains blue.

When water is added to the blue solid it becomes pink.

What is substance Y?

A anhydrous cobalt(II) chloride

B anhydrous copper(II) sulfate

C hydrated cobalt(II) chloride

D hydrated copper(II) sulfate

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16 When magnesium is heated with zinc oxide a reaction occurs.

The equation is shown.

$$Mg + ZnO \rightarrow MgO + Zn$$

Which substance is oxidised?

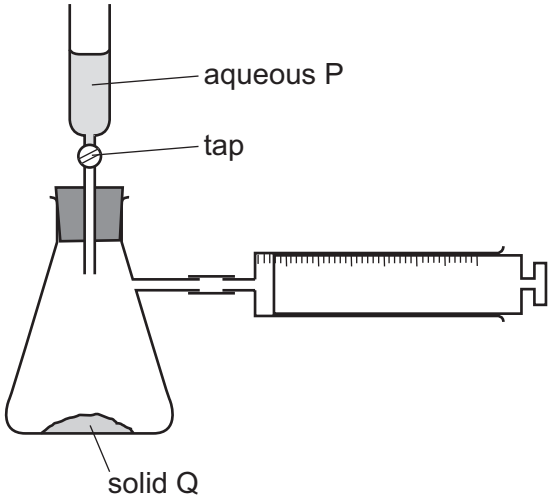
A magnesium

B magnesium oxide

C zinc

D zinc oxide

17 The diagram shows an experiment.



A small volume of aqueous P is poured on to solid Q and the tap of the funnel closed.

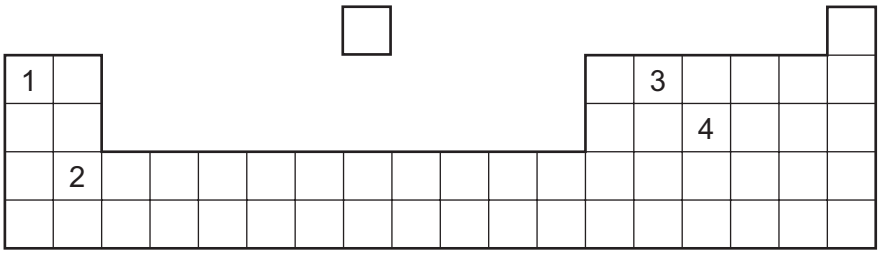
Which pairs of substances cause the syringe to fill with gas?

	HNO_3 and Mg	HCl and Cu	H_2SO_4 and Na_2CO_3
A	✓	✓	✓
B	✓	✓	✗
C	✓	✗	✓
D	✗	✓	✓

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[Turn over

18 Part of the Periodic Table is shown.



Which elements form basic oxides?

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

19 Aqueous ammonium sulfate is made by reacting aqueous ammonia with dilute sulfuric acid.

How is solid ammonium sulfate obtained from the resulting solution?

A crystallisation

B distillation

C filtration

D solvent extraction

20 Which statement about the Periodic Table is correct?

A Elements in the same group have the same number of electron shells.

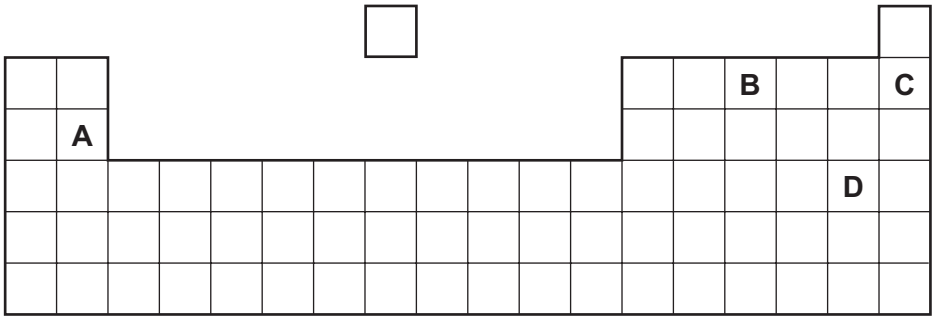
B Elements are arranged in order of increasing proton number.

C Metals are on the right and non-metals are on the left.

D The most reactive elements are at the bottom of every group.

21 Part of the Periodic Table is shown.

Which element conducts electricity?



22 Some information about properties of Group I elements is shown.

element	melting point / °C	density in g / cm^3
lithium	181	0.53
sodium	98	0.97
potassium	X	
rubidium	Y	Z

What are the values for X, Y and Z?

	X	Y	Z
A	63	252	0.26
B	63	39	0.26
C	39	63	1.53
D	63	39	1.53

23 Gas G has 10 electrons. Gas H has eight more electrons than gas G. Both gases are monoatomic.

Which statement about G and H is correct?

A Both gases are in the same group of the Periodic Table.

B Both gases are in the same period of the Periodic Table.

C Both gases are very reactive.

D Gas G has a higher atomic mass than gas H.

24 Metal M is placed between zinc and iron in the reactivity series.

Which row shows the reactions of M and its oxide?

	M can be extracted by heating its oxide with carbon	M reacts with dilute hydrochloric acid
A	no	no
B	no	yes
C	yes	no
D	yes	yes

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25 Which statement about sodium is correct?

A It is a reactive grey solid which does not conduct electricity.

B It is a very reactive element that forms ions with a single negative charge.

C It reacts slowly with water to form oxygen.

D It reacts rapidly with water to form its hydroxide.

26 Iron from a blast furnace can be converted to steel.

Which statements about steel are correct?

1 Steel contains more carbon than the iron obtained from the blast furnace.

2 Steel is produced by blowing oxygen through the iron.

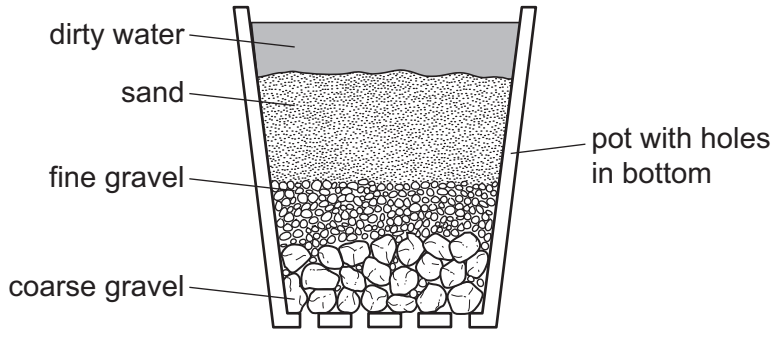
3 Calcium oxide is added to molten iron to remove basic oxides.

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

27 Which row links a property of aluminium to its stated use?

	property	use
A	high strength	food containers
B	resistance to corrosion	food containers
C	high density	manufacture of aircraft
D	good electrical conductivity	manufacture of aircraft

28 The diagram shows a stage in the purification of dirty water.



Which process does this apparatus show?

A chlorination

B condensation

C distillation

D filtration

29 Which substance in polluted air damages stonework and kills trees?

A carbon dioxide

B carbon monoxide

C lead compounds

D sulfur dioxide

30 Which reaction produces ammonia gas?

A warming ammonium chloride with dilute sodium hydroxide

B warming ammonium nitrate with dilute sulfuric acid

C warming ammonium phosphate with dilute sodium chloride

D warming ammonium sulfate with dilute nitric acid

31 Which reactions produce carbon dioxide?

1 addition of dilute nitric acid to copper(II) carbonate

2 heating zinc carbonate

3 combustion of methane

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

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

A helium

B hydrogen

C iron

D sulfur

33 Which substance gives off carbon dioxide on heating?

A lime

B limestone

C limewater

D slaked lime

34 Which formula represents ethanol?

A CH_3CH_3 **B** CH_2CH_2 **C** CH_3CH_2OH **D** CH_3COOH

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35 Fuel oil and naphtha are two fractions obtained from petroleum.

What are the major uses of these fractions?

	fuel oil	naphtha
A	jet fuel	making chemicals
B	jet fuel	making roads
C	ship fuel	making chemicals
D	ship fuel	making roads

36 Which compound is a member of the alkene homologous series?

A C_2H_6 **B** C_4H_{10} **C** C_6H_{12} **D** C_8H_{18}

37 Which type of covalent bond is found in both a molecule of methane and a molecule of ethane?

A a double bond between a carbon atom and a hydrogen atom

B a double bond between two carbon atoms

C a single bond between a carbon atom and a hydrogen atom

D a single bond between two carbon atoms

38 A large hydrocarbon undergoes cracking.

A smaller hydrocarbon, X, and a gas are the only two products.

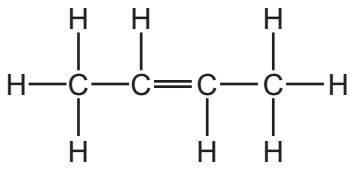
Which row identifies hydrocarbon X and the gas?

	hydrocarbon X	gas
A	saturated	carbon dioxide
B	saturated	hydrogen
C	unsaturated	carbon dioxide
D	unsaturated	hydrogen

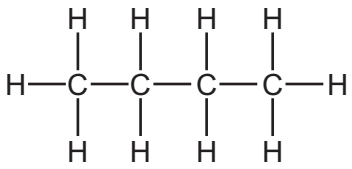
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39 The structures of two hydrocarbons, M and N, are shown.

M



N



Which statement is correct?

A M is an alkane and decolourises aqueous bromine.

B M is an alkene and decolourises aqueous bromine.

C N is an alkane and decolourises aqueous bromine.

D N is an alkene and decolourises aqueous bromine.

40 Some information about four substances, P, Q, R and S, is listed.

P is made by combining many small molecules together.

Molecules of Q are the largest molecules found in petroleum.

R is produced by cracking alkanes.

S is nylon.

Which substances are synthetic polymers?

A P and Q **B** P and S **C** Q and R **D** R and S

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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.).