Cambridge Assessment International Education

Cambridge IGCSE™

CHEMISTRY **0620/11**

Paper 1 Multiple Choice (Core) **October/November 2020**

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. A mark will not be deducted for a wrong answer.
- Any rough working should be done on this question paper.
- The Periodic Table is printed in the question paper.

This document has **16** pages. Blank pages are indicated.

[Turn over

1 'The movement of a substance **very slowly** from an area of high concentration to an area of low concentration.'

Which process is being described?

A a liquid being frozen

B a solid melting

C a substance diffusing through a liquid

D a substance diffusing through the air

2 What happens to the average speed of gas particles when pressure and temperature are increased?

	average speed of particles	
	pressure increases	temperature increases
A	faster	faster
B	unchanged	slower
C	slower	faster
D	unchanged	faster

3 Which piece of apparatus can only measure a single fixed volume?

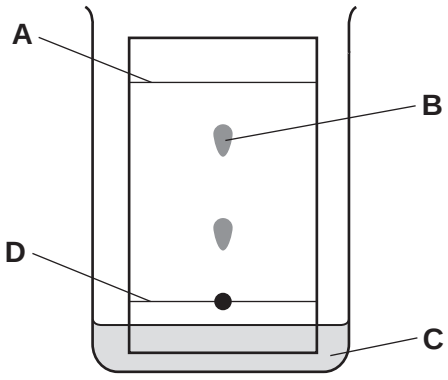
A 250 cm^3 beaker

B 50 cm^3 burette

C 100 cm^3 measuring cylinder

D 25 cm^3 pipette

4 In the chromatography experiment shown, which label represents the solvent front?



5 Which substances can be separated by filtration?

A insoluble liquid and water

B insoluble solid and water

C solution of soluble liquid in water

D solution of soluble solid in water

6 An atom of element R contains 15 protons, 16 neutrons and 15 electrons.

What is R?

A gallium

B phosphorus

C sulfur

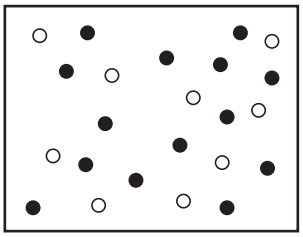
D zinc

7 Which row describes the properties of potassium iodide, KI?

	type of bonding	boiling point	solid conducts electricity	aqueous solution conducts electricity
A	covalent	low	no	no
B	covalent	high	no	yes
C	ionic	high	yes	yes
D	ionic	high	no	yes

8 Which diagram represents a mixture of compounds?

A



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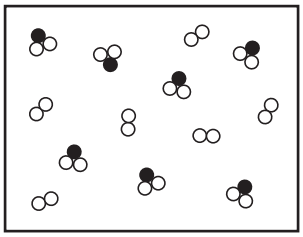

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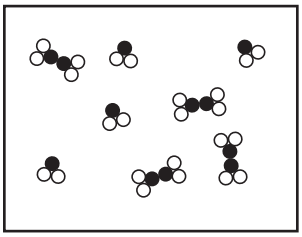

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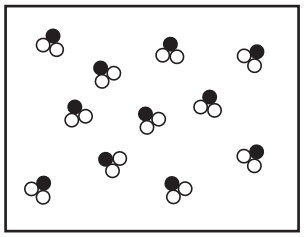


9 Rubidium is in Group I of the Periodic Table and bromine is in Group VII.

Rubidium reacts with bromine to form an ionic compound.

Which row shows the electron change taking place for rubidium and the correct formula of the rubidium ion?

	electron change	formula of ion formed
A	electron gained	Rb^+
B	electron gained	Rb^-
C	electron lost	Rb^+
D	electron lost	Rb^-

10 Which statement explains why graphite is used as a lubricant?

A All bonds between the atoms are weak.

B It conducts electricity.

C It has a low melting point.

D Layers in the structure can slide over each other.

11 The equation for burning propane in air is shown.

$$C_3H_8(g) + xO_2(g) \rightarrow 3CO_2(g) + yH_2O(g)$$

Which values of x and y balance the equation?

	x	y
A	3	4
B	4	8
C	5	4
D	10	8

12 The relative atomic mass of chlorine is 35.5.

When calculating relative atomic mass, which particle is the mass of a chlorine atom compared to?

A a neutron

B a proton

C an atom of carbon-12

D an atom of hydrogen-1

13 Concentrated aqueous sodium chloride is electrolysed using platinum electrodes.

What is the major product formed at each electrode?

	anode	cathode
A	chlorine	hydrogen
B	chlorine	sodium
C	oxygen	hydrogen
D	oxygen	sodium

14 Three substances are listed.

1 copper

2 dilute sulfuric acid

3 solid lead(II) bromide

Which substances conduct electricity?

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

15 Sodium nitrate is added to water in a beaker and stirred until it dissolves.

At the end of the experiment, the beaker feels cold.

Which row describes the reaction?

	temperature of solution	type of reaction
A	decreases	endothermic
B	decreases	exothermic
C	increases	endothermic
D	increases	exothermic

16 Which substance does **not** require oxygen in order to produce energy?

A coal

B hydrogen

C natural gas

D ^{235}U

17 Which process involves a physical change?

A heating calcium carbonate

B burning wood

C melting an ice cube

D mixing an acid and a base

18 A sign displayed in a flour mill is shown.

Which statement explains why there is a danger of explosion in a flour mill?

A Flour burns very quickly because it is a fine powder.

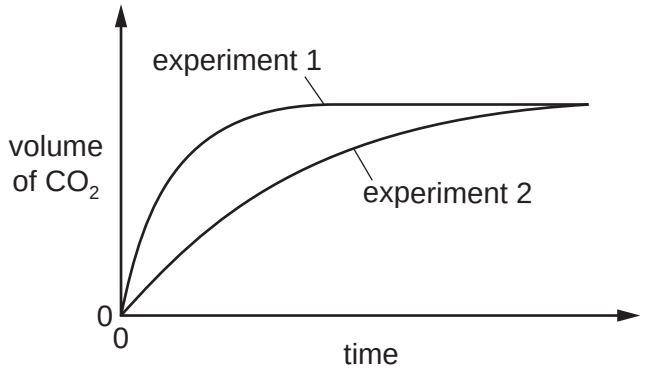
B Flour is a catalyst for combustion.

C Flour mills get hot and speed up the rate of combustion.

D The combustion of flour is exothermic.

19 The graph shows the results of two experiments investigating the rate of reaction between excess calcium carbonate and dilute hydrochloric acid.

In each experiment the volume of carbon dioxide produced is measured at fixed time intervals.



Which statement describes the difference in conditions between experiments 1 and 2?

A In experiment 2 a higher concentration of dilute hydrochloric acid is used.

B In experiment 2 a higher temperature is used.

C In experiment 2 the mass of calcium carbonate is greater.

D In experiment 2 the particle size of calcium carbonate is greater.

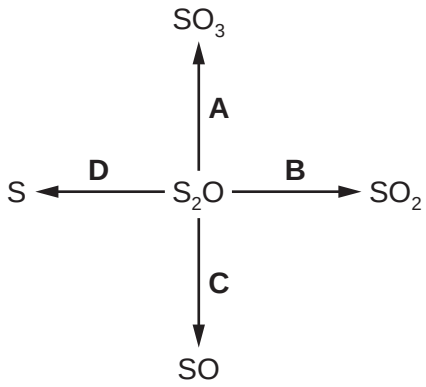
20 When pink crystals of cobalt(II) chloride are heated, steam is given off and the colour of the solid changes to blue.

$$CoCl_2 \cdot 6H_2O \rightleftharpoons CoCl_2 + 6H_2O$$

What happens when water is added to the blue solid?

	colour	temperature
A	changes to pink	decreases
B	changes to pink	increases
C	remains blue	decreases
D	remains blue	increases

21 In which change is the sulfur, S, in sulfur(I) oxide, S_2O, reduced?



22 What is a characteristic of acids?

A Acids turn methyl orange indicator yellow.

B Acids have a high pH value.

C Acids react with ammonium salts to give ammonia gas.

D Acids react with carbonates to produce salts.

23 Four different groups of oxides are shown.

1 MgO FeO CuO

2 CaO SO_2 TiO_2

3 PbO CaO Cl_2O

4 NO_2 Br_2O P_2O_5

Which statement about these oxides is correct?

A 1, 2 and 3 contain basic oxides only.

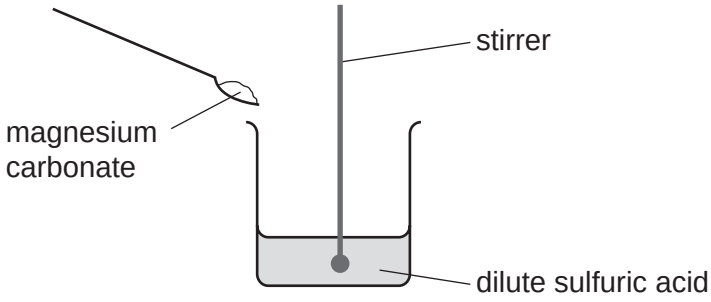
B 2, 3 and 4 contain basic oxides only.

C 1 contains basic oxides only and 4 contains acidic oxides only.

D 1 contains acidic oxides only and 4 contains basic oxides only.

24 A student carries out an experiment to prepare pure magnesium sulfate crystals.

The diagram shows the first stage of the preparation.



He adds magnesium carbonate until no more reacts.

Which process should he use for the next stage?

A crystallisation

B evaporation

C filtration

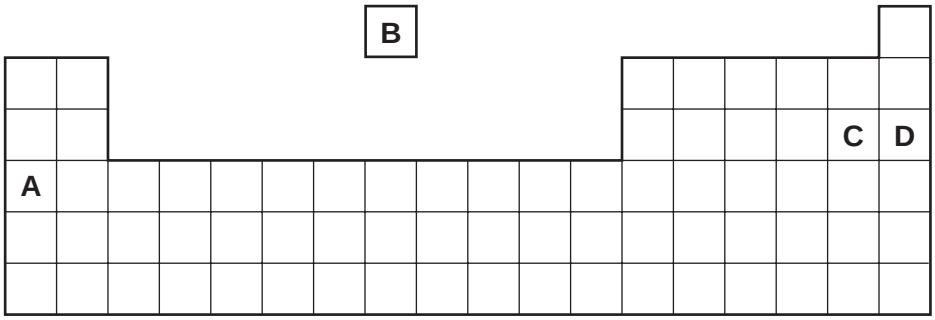
D neutralisation

25 Which ion produces a green precipitate when aqueous sodium hydroxide is added?

A Cu^{2+} **B** Fe^{2+} **C** Fe^{3+} **D** Zn^{2+}

26 The positions of four elements in the Periodic Table are shown.

Which element is a gas that displaces iodine from sodium iodide?



27 A flammable gas needs to be removed from a tank at an industrial plant.

For safety reasons, an inert gas is used.

Which gas is suitable?

A argon

B hydrogen

C methane

D oxygen

28 A substance, X, has the following properties.

1 It has a high melting point.

2 It conducts electricity in the solid and liquid states.

3 It is malleable.

4 It has a high density.

What is X?

A a ceramic

B copper

C graphite

D sodium chloride

29 A reactivity series is shown.

sodium

calcium

magnesium

carbon

zinc

iron

hydrogen

copper

Which statement is correct?

A All the metals above carbon are extracted by electrolysis.

B Iron can only be extracted by electrolysis.

C Calcium can be extracted by heating calcium oxide with carbon.

D Copper can only be extracted by passing hydrogen over heated copper(II) oxide.

30 What is the symbol of the metal used in the manufacture of aircraft because of its strength and low density?

A A*l* **B** Cu **C** Fe **D** Zn

31 Oxides of nitrogen are given out from car exhausts.

Which row best shows why oxides of nitrogen are unwanted in the atmosphere?

	acidic	toxic
A	no	no
B	no	yes
C	yes	no
D	yes	yes

32 Two reactions, M and N, both form carbon dioxide.

$$CaCO_3 \xrightarrow{M} CO_2 \xleftarrow{N} CH_4$$

Which types of reaction are M and N?

	M	N
A	thermal decomposition	thermal decomposition
B	thermal decomposition	combustion
C	combustion	thermal decomposition
D	combustion	combustion

33 Which row describes two uses of sulfur dioxide?

	use 1	use 2
A	bleaching paper pulp	neutralising acidic industrial waste
B	bleaching paper pulp	preserving food and drink
C	extracting iron from hematite	neutralising acidic industrial waste
D	extracting iron from hematite	preserving food and drink

34 Which statement about lime and limestone is correct?

A Calcium oxide is formed from limestone in a displacement reaction.

B Lime is used to treat alkaline soils.

C Limestone is a waste material in the manufacture of iron.

D Slaked lime is used in the process of flue gas desulfurisation.

35 Which compound has a chemical name ending in *–ol*?

A C_2H_5OH **B** C_2H_6 **C** CH_3COOH **D** C_2H_4

36 Petroleum is separated into fractions by fractional distillation.

Separation occurs in a fractionating column.

Some properties of three of these fractions are shown.

fraction	boiling point range / °C	number of carbon atoms in the molecules
1		5 – 10
2	320–350	16–24
3	120–210	

Which statement is correct?

A Fraction 1 has a higher boiling point range than fraction 2.

B Fraction 2 is removed from a higher point in the fractionating column than fraction 1.

C Molecules in fraction 3 have shorter chains than those in fraction 2.

D None of the fractions are liquid at room temperature.

37 Which statement about alkenes is correct?

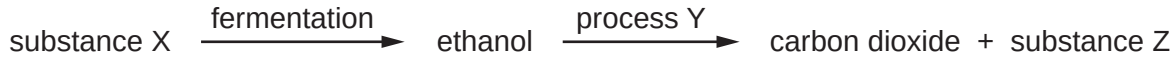
A Alkenes are saturated hydrocarbons.

B Alkenes can be made by cracking other hydrocarbon compounds.

C Alkenes change bromine water from colourless to brown.

D Alkene molecules contain double bonds between carbon atoms and hydrogen atoms.

38 The flow chart shows the preparation of ethanol and some important chemistry of ethanol.



What are X, Y and Z?

	X	Y	Z
A	yeast	combustion	oxygen
B	glucose	combustion	steam
C	glucose	polymerisation	water
D	yeast	fermentation	glucose

39 Which statements about aqueous ethanoic acid are correct?

1 It is an alkane.

2 It reacts with sodium carbonate to form carbon dioxide.

3 It changes the colour of litmus solution from blue to red.

4 It is a hydrocarbon.

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

40 Which substance is a polymer?

A diamond

B graphite

C nylon

D sodium chloride

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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.).