



UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
International General Certificate of Secondary Education

CHEMISTRY

0620/11

Paper 1 Multiple Choice

May/June 2010

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, highlighters, 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.

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.

You may use a calculator.

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



- 1 The diagram shows a cup of 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	✓	x
C	x	✓
D	x	x

- 2 A fruit drink coloured orange contains a dissolved mixture of red and yellow colouring agents. One of these colouring agents is suspected of being illegal.

Which method could be used to show the presence of this illegal colouring agent?

- A** chromatography
 - B** distillation
 - C** evaporation
 - D** filtration
- 3 A student carries out an experiment to find how fast 3 cm pieces of magnesium ribbon dissolve in 10 cm³ samples of sulfuric acid at different temperatures.

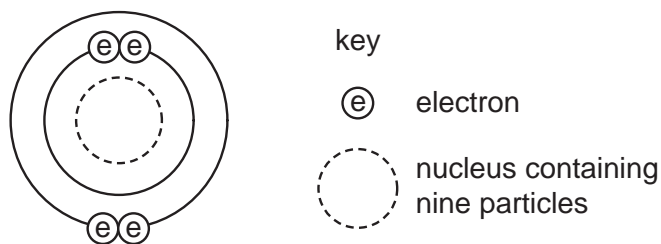
Which piece of apparatus does the student **not** need?

- A** balance
- B** measuring cylinder
- C** stop-clock
- D** thermometer

- 4 Which row shows the change that takes place when element X gains the new particle shown?

	particle gained	change
A	electron	an isotope of element X is formed
B	electron	the element one place to the right of X in the Periodic Table is formed
C	proton	an isotope of element X is formed
D	proton	the element one place to the right of X in the Periodic Table is formed

- 5 The diagram shows an atom.



What is the proton number and neutron number of the atom?

	proton number	neutron number
A	4	5
B	4	9
C	5	4
D	5	9

- 6 The symbols of two atoms may be written as shown.



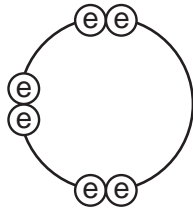
Which statement about these atoms is correct?

- A** They are different elements because they have different numbers of neutrons.
B They are different elements because they have different numbers of protons.
C They are isotopes of the same element because they have the same nucleon number.
D They are isotopes of the same element because they have the same proton number.

7 Which name is given to mixtures of metals?

- A alloys
- B compounds
- C ores
- D salts

8 Element X has six electrons in its outer shell.



key

⊕ = electron

How could the element react?

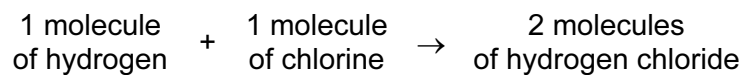
- A by gaining two electrons to form a positive ion
- B by losing six electrons to form a negative ion
- C by sharing two electrons with two electrons from another element to form two covalent bonds
- D by sharing two electrons with two electrons from another element to form four covalent bonds

9 In which compounds are pairs of electrons shared between atoms?

- 1 sodium chloride
- 2 methane
- 3 lead bromide

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

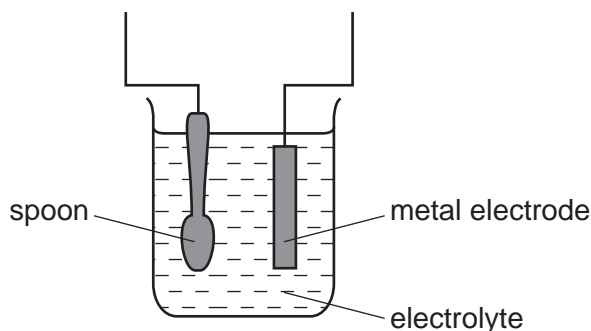
10 Hydrogen and chlorine react as shown.



What is the equation for this reaction?

- A $2\text{H} + 2\text{Cl} \rightarrow 2\text{HCl}$
- B $2\text{H} + 2\text{Cl} \rightarrow \text{H}_2\text{Cl}_2$
- C $\text{H}_2 + \text{Cl}_2 \rightarrow 2\text{HCl}$
- D $\text{H}_2 + \text{Cl}_2 \rightarrow \text{H}_2\text{Cl}_2$

11 The diagram shows apparatus for plating a spoon with silver.



Which statement is **not** correct?

- A Silver would stick to the spoon because it is a very reactive metal.
- B The electrolyte would be a silver salt dissolved in water.
- C The metal electrode would be made from silver.
- D The spoon would be connected to the negative of the power supply.

12 Aqueous copper(II) sulfate solution is electrolysed using inert electrodes.

Copper(II) ions (Cu^{2+}), hydrogen ions (H^+), hydroxide ions (OH^-) and sulfate ions (SO_4^{2-}) are present in the solution.

To which electrodes are the ions attracted during this electrolysis?

	attracted to anode	attracted to cathode
A	Cu^{2+} and H^+	OH^- and SO_4^{2-}
B	Cu^{2+} and SO_4^{2-}	H^+ and OH^-
C	H^+ and OH^-	Cu^{2+} and SO_4^{2-}
D	OH^- and SO_4^{2-}	Cu^{2+} and H^+

13 Three electrolysis cells are set up. Each cell has inert electrodes.

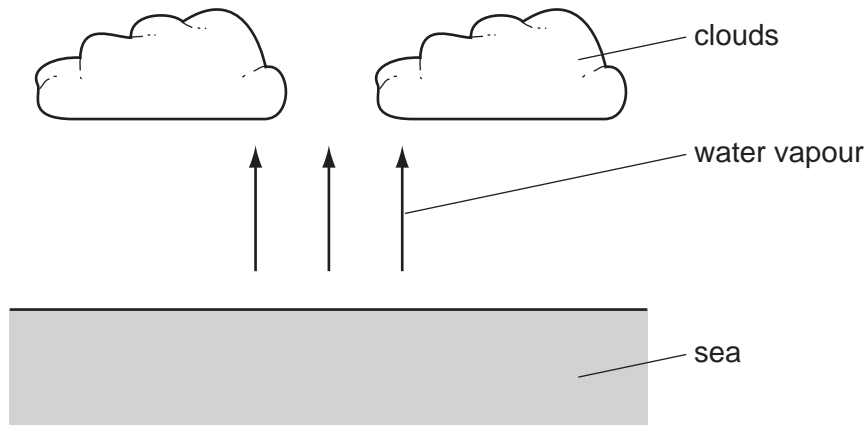
The electrolytes are listed below.

- cell 1 aqueous sodium chloride
- cell 2 concentrated hydrochloric acid
- cell 3 molten lead(II) bromide

In which cells is a gas formed at **both** electrodes?

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

14 Clouds are formed when water vapour evaporates from the sea.



What is the energy change and what name is given to the type of change when water evaporates?

	energy change	type of change
A	energy given out	endothermic
B	energy given out	exothermic
C	energy taken in	endothermic
D	energy taken in	exothermic

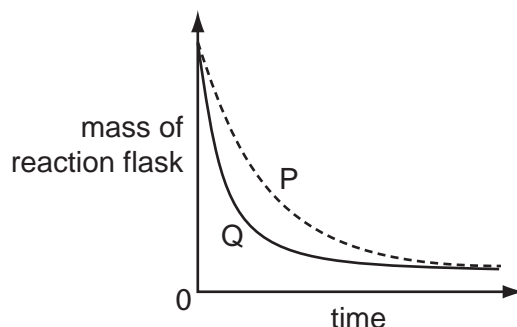
15 Which process is **not** exothermic?

- A** burning a fossil fuel
- B** obtaining lime from limestone
- C** radioactive decay of ^{235}U
- D** reacting hydrogen with oxygen

- 16 A student investigates the rate of reaction between marble chips and hydrochloric acid.

The loss in mass of the reaction flask is measured.

The graph shows the results of two experiments, P and Q.



Which change explains the difference between P and Q?

- A A catalyst is added in P.
 - B A higher temperature is used in P.
 - C Bigger marble chips are used in Q.
 - D Hydrochloric acid is more concentrated in Q.
- 17 When pink cobalt(II) sulfate crystals are heated, they form steam and a blue solid.

When water is added to the blue solid, it turns pink and becomes hot.

Which terms describe the pink cobalt(II) sulfate crystals and the reactions?

	pink cobalt sulfate	reactions
A	aqueous	irreversible
B	aqueous	reversible
C	hydrated	irreversible
D	hydrated	reversible

- 18 Iron is extracted from iron oxide using carbon monoxide as shown in the equation.



What does the equation show?

- A Carbon monoxide is oxidised to carbon dioxide.
- B Carbon monoxide is reduced to carbon dioxide.
- C Iron is oxidised to iron oxide.
- D Iron oxide is oxidised to iron.

19 Aqueous sodium hydroxide is added to a solid, X, and the mixture is heated.

A green precipitate is formed and an alkaline gas is given off.

Which ions are present in X?

- A NH_4^+ and Fe^{2+}
- B NH_4^+ and Fe^{3+}
- C OH^- and Fe^{2+}
- D OH^- and Fe^{3+}

20 An aqueous solution of the organic compound methylamine has a pH greater than 7.

Which statement about methylamine is correct?

- A It neutralises an aqueous solution of sodium hydroxide.
- B It reacts with copper(II) carbonate to give carbon dioxide.
- C It reacts with hydrochloric acid to form a salt.
- D It turns blue litmus red.

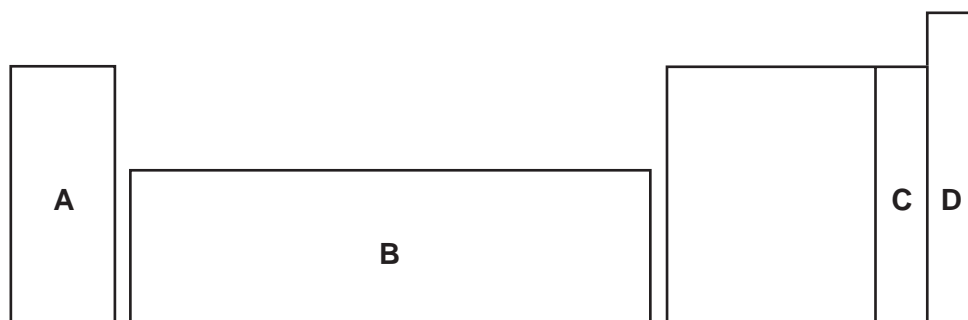
21 The positions in the Periodic Table of four elements are shown.

Which element is **most** likely to form an acidic oxide?

A																																					
	B																																				
																		C																			
																			D																		

25 An element does not conduct electricity and exists as diatomic molecules.

In which area of the Periodic Table is the element to be found?



26 Solutions of a halogen and a sodium halide are mixed.

Which mixture darkens in colour because a reaction occurs?

- A bromine and sodium chloride
- B bromine and sodium fluoride
- C chlorine and sodium fluoride
- D chlorine and sodium iodide

27 Copper, iron and zinc are all used as pure metals.

Which of these three metals are also used in alloys?

	copper	iron	zinc
A	✓	✓	✓
B	✓	✓	x
C	x	✓	✓
D	x	x	✓

28 Some properties of four elements are shown in the table.

Which element is a metal?

	melting point/°C	electrical conductivity when liquid	electrical conductivity when solid
A	-7	low	low
B	801	high	low
C	1535	high	high
D	3550	low	low

29 A student added dilute hydrochloric acid to four metals and recorded the results.

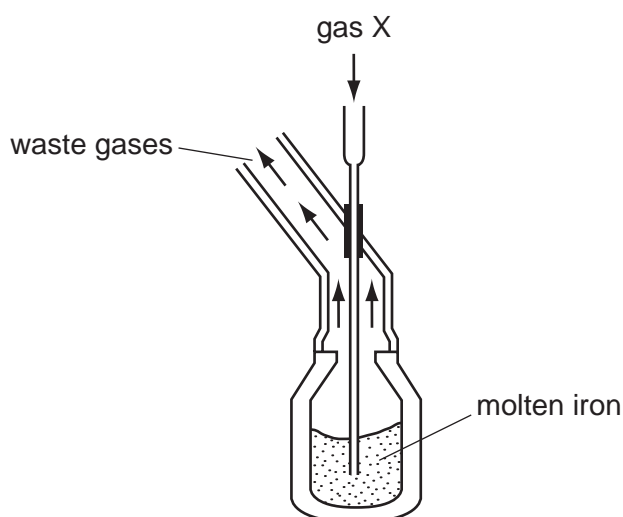
Not all of the results are correct.

	results	
	metal	gas given off
1	copper	yes
2	iron	yes
3	magnesium	no
4	zinc	yes

Which two results are correct?

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

30 The diagram shows the manufacture of steel.



What is gas X?

- A** carbon dioxide
B chlorine
C hydrogen
D oxygen

31 Aluminium is an important metal with many uses.

Some of its properties are listed.

- 1 It is a good conductor of heat.
- 2 It is a reactive metal.
- 3 It has a low density.
- 4 It has an oxide layer that prevents corrosion.

Which set of properties help to explain the use of aluminium for cooking and storing food?

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

32 Which statements about water are correct?

- 1 Water is treated with chlorine to kill bacteria.
- 2 Household water may contain salts in solution.
- 3 Water is used in industry for cooling.
- 4 Water for household use is filtered to remove soluble impurities.

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

33 Which compound in polluted air can damage stonework and kill trees?

- A** carbon dioxide
B carbon monoxide
C lead compounds
D sulfur dioxide

34 Which statement about methane is **not** correct?

- A** It is a liquid produced by distilling petroleum.
B It is produced as vegetation decomposes.
C It is produced by animals such as cows.
D It is used as a fuel.

35 To grow roses, a fertiliser containing nitrogen, phosphorus and potassium is needed.

For the best flowers, the fertiliser should contain a high proportion of potassium.

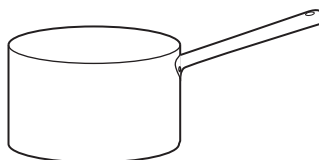
Which fertiliser is best for roses?

fertiliser	proportion by mass		
	N	P	K
A	9	0	25
B	13	13	20
C	29	5	0
D	29	15	5

36 The diagram shows three types of item.



cutlery



cooking pan

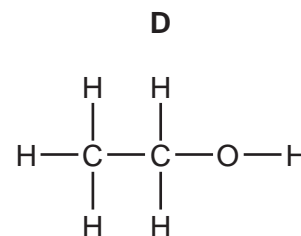
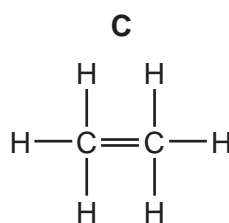
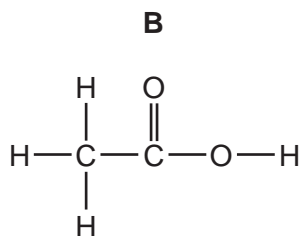
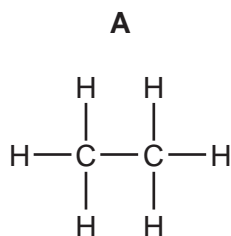


instruments used
in hospitals

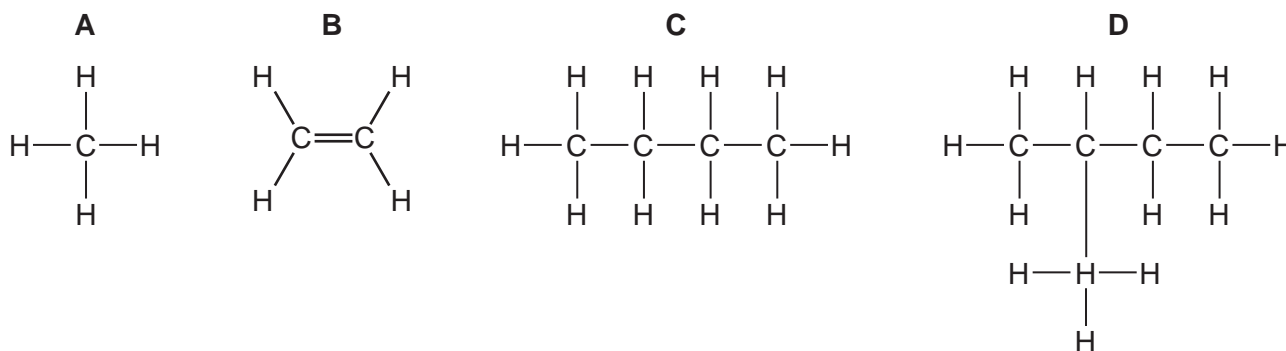
Which method of rust prevention can be used for all three types of item?

- A** coating with plastic
- B** covering with grease
- C** galvanising
- D** using stainless steel

37 Which structure is **incorrect**?



38 Which structure shows a compound that belongs to a **different** homologous series to propane?



39 A macromolecule is a very large molecule.

Macromolecules can be made by joining smaller molecules together. This is called polymerisation.

Which row in the table describes the formation of a polymer?

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

40 Diesel, petrol and bitumen are all

- A** fuels.
- B** hydrocarbons.
- C** lubricants.
- D** waxes.

DATA SHEET
The Periodic Table of the Elements

		Group												
I	II	III	IV	V	VI	VII	O					O		
7 Li Lithium 3	9 Be Beryllium 4	1 H Hydrogen 1											4 He Helium 2	
23 Na Sodium 11	24 Mg Magnesium 12	11 B Boron 5	12 C Carbon 6	14 N Nitrogen 7	16 O Oxygen 8	19 F Fluorine 9	20 Ne Neon 10	27 Al Aluminium 13	28 Si Silicon 14	31 P Phosphorus 15	32 S Sulfur 16	35.5 Cl Chlorine 17	40 Ar Argon 18	
39 K Potassium 19	40 Ca Calcium 20	56 Fe Iron 26	55 Mn Manganese 25	59 Co Cobalt 27	58 Ni Nickel 28	64 Cu Copper 29	65 Zn Zinc 30	70 Ga Gallium 31	73 Ge Germanium 32	75 As Arsenic 33	79 Se Selenium 34	80 Br Bromine 35	84 Kr Krypton 36	
85 Rb Rubidium 37	88 Sr Strontium 38	101 Ru Ruthenium 44	100 Tc Technetium 43	103 Rh Rhodium 45	106 Pd Palladium 46	108 Ag Silver 47	112 Cd Cadmium 48	115 In Indium 49	119 Sn Tin 50	122 Sb Antimony 51	128 Te Tellurium 52	127 I Iodine 53	131 Xe Xenon 54	
133 Cs Caesium 55	137 Ba Barium 56	190 Os Osmium 76	186 Re Rhenium 75	192 Ir Iridium 77	195 Pt Platinum 78	197 Au Gold 79	201 Hg Mercury 80	204 Tl Thallium 81	207 Pb Lead 82	209 Bi Bismuth 83	210 Po Polonium 84	210 At Astatine 85	210 Rn Radon 86	
87 Fr Francium	88 Ra Radium	226 Ra Radium	227 Ac Actinium											87
		140 Ce Cerium 58	141 Pr Praseodymium 59	144 Nd Neodymium 60	150 Sm Samarium 62	152 Eu Europium 63	157 Gd Gadolinium 64	162 Dy Dysprosium 66	165 Ho Holmium 67	167 Er Erbium 68	169 Tm Thulium 69	173 Yb Ytterbium 70	175 Lu Lutetium 71	
		232 Th Thorium 90	238 U Uranium 92	238 U Uranium 92	94 Pu Plutonium 94	95 Am Americium 95	96 Cm Curium 96	98 Cf Californium 98	99 Es Einsteinium 99	100 Fm Fermium 100	101 Md Mendelevium 101	102 No Nobelium 102	103 Lr Lawrencium 103	

* 58-71 Lanthanoid series
† 90-103 Actinoid series

a	X	b
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Key
a = relative atomic mass
X = atomic symbol
b = proton (atomic) number

The volume of one mole of any gas is 24 dm³ at room temperature and pressure (r.t.p.).

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