

CHEMISTRY

Paper 1 Multiple Choice

0620/13 May/June 2010

45 Minutes

Additional Materials:	Mul
	0.4

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
Α	\checkmark	1
в	\checkmark	x
С	×	1
D	x	x

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

	particle gained	change
Α	electron	an isotope of element X is formed
в	electron	the element one place to the right of X in the Periodic Table is formed
С	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

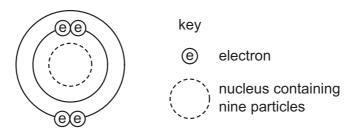
3 The symbols of two atoms may be written as shown.

 $^{52}_{23}X$ $^{52}_{24}Y$

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.

4 The diagram shows an atom.



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

	proton number	neutron number
Α	4	5
В	4	9
С	5	4
D	5	9

5 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
- 6 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

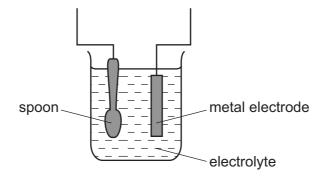
7 Three electrolysis cells are set up. Each cell has inert electrodes.

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
- 8 The diagram shows apparatus for plating a spoon with silver.



Which statement is **not** correct?

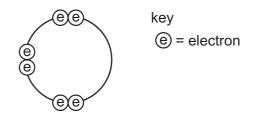
- A Silver would stick to the spoon because it is a very reactive metal.
- **B** The electrolyte would be a silver salt dissolved in water.
- **C** The metal electrode would be made from silver.
- **D** The spoon would be connected to the negative of the power supply.
- **9** Aqueous copper(II) sulfate solution is electrolysed using inert electrodes.

Copper(II) ions (Cu²⁺), hydrogen ions (H⁺), hydroxide ions (OH⁻) and sulfate ions (SO₄²⁻) are present in the solution.

To which electrodes are the ions attracted during this electrolysis?

	attracted to anode	attracted to cathode
Α	Cu^{2+} and H^+	OH^{-} and SO_4^{-2-}
в	Cu^{2+} and SO_4^{2-}	H [⁺] and OH [−]
с	H [⁺] and OH [−]	Cu^{2+} and SO_4^{2-}
D	OH^- and SO_4^{2-}	Cu^{2+} and H^+

- 10 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
- **11** Element X has six electrons in its outer shell.



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
- **12** Hydrogen and chlorine react as shown.

What is the equation for this reaction?

- **A** $2H + 2Cl \rightarrow 2HCl$
- **B** $2H + 2Cl \rightarrow H_2Cl_2$
- $\textbf{C} \quad H_2 + Cl_2 \rightarrow 2HCl$
- $\textbf{D} \quad H_2 + Cl_2 \rightarrow H_2 Cl_2$
- 13 Which name is given to mixtures of metals?
 - A alloys
 - B compounds
 - **C** ores
 - D salts

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

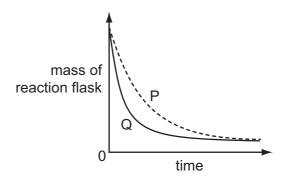
iron oxide + carbon monoxide \rightarrow iron + carbon dioxide

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

The loss in mass of the reaction flask is measured.

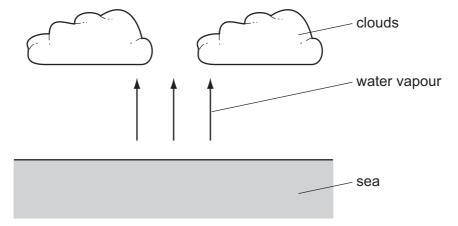
The graph shows the results of two experiments, P and Q.



Which change explains the difference between P and Q?

- A 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.

16 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		
Α	energy given out	endothermic		
в	energy given out	exothermic		
С	energy taken in	endothermic		
D	energy taken in	exothermic		

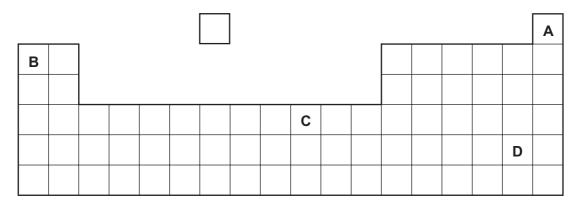
- 17 Which process is **not** exothermic?
 - A burning a fossil fuel
 - **B** obtaining lime from limestone
 - **C** radioactive decay of ²³⁵U
 - D reacting hydrogen with oxygen
- 18 When pink cobalt(II) sulfate crystals are heated, they form steam and a blue solid.

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
Α	aqueous	irreversible
В	B aqueous revers	
С	hydrated	irreversible
D	hydrated	reversible

Where in the Periodic Table is this element found?



20 An excess of copper(II) oxide is added to dilute sulfuric acid to make crystals of hydrated copper(II) sulfate.

The processes listed may be used to obtain crystals of hydrated copper(II) sulfate.

- 1 concentrate the resulting solution
- 2 filter
- 3 heat the crystals
- 4 wash the crystals

Which processes are needed and in which order?

- A 1, 2, 3 and 4
- **B** 1, 2, 4 and 3
- **C** 2, 1, 2 and 3
- **D** 2, 1, 2 and 4
- 21 Which is **not** a property of Group I metals?
 - **A** They are soft and can be cut with a knife.
 - **B** They corrode rapidly when exposed to oxygen in the air.
 - **C** They produce an acidic solution when they react with water.
 - **D** They react rapidly with water producing hydrogen gas.

22 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 Fe²⁺
- **D** OH^- and Fe^{3+}
- 23 An aqueous solution of the organic compound methylamine has a pH greater than 7.

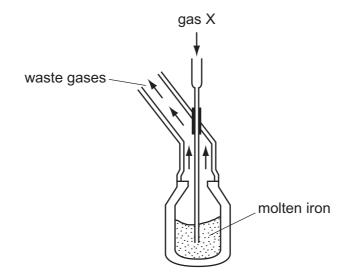
Which statement about methylamine is correct?

- **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.
- **24** The positions in the Periodic Table of four elements are shown.

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

Α															
	В														
														С	
															D

25 The diagram shows the manufacture of steel.



What is gas X?

- A carbon dioxide
- B chlorine
- C hydrogen
- D oxygen
- **26** A student added dilute hydrochloric acid to four metals and recorded the results. Not all of the results are correct.

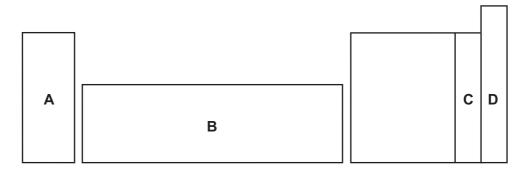
	results						
	metal	gas given off					
1	copper	yes					
2	iron	yes					
3	magnesium	no					
4	zinc	yes					

Which two results are correct?

Α	1 and 3	В	1 and 4	С	2 and 3	D	2 and 4
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27 An element does not conduct electricity and exists as diatomic molecules.

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



11

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

Which of these three metals are also used in alloys?

	copper	iron	zinc
Α	\checkmark	\checkmark	1
в	\checkmark	\checkmark	x
С	x	\checkmark	✓
D	x	x	\checkmark

29 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
- **30** Some properties of four elements are shown in the table.

Which element is a metal?

	melting point/°C	electrical conductivity when solid	
Α	-7	low	low
в	801	high	low
С	1535	high	high
D	3550	low	low

31 The diagram shows three types of item.



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
- 32 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

33 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	pr	oportion by ma	SS
Tertiliser	Ν	Р	К
Α	9	0	25
В	13	13	20
С	29	5	0
D	29	15	5

- 34 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

- 35 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.
- 36 Which compound in polluted air can damage stonework and kill trees?
 - A carbon dioxide
 - **B** carbon monoxide
 - **C** lead compounds
 - D sulfur dioxide
- 37 Diesel, petrol and bitumen are all
 - A fuels.
 - B hydrocarbons.
 - C lubricants.
 - D waxes.

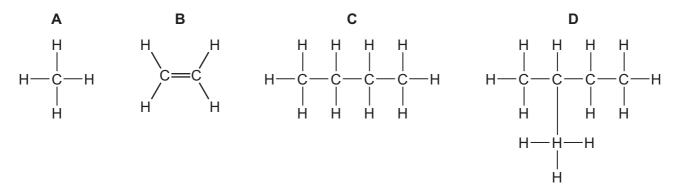
38 A macromolecule is a very large molecule.

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

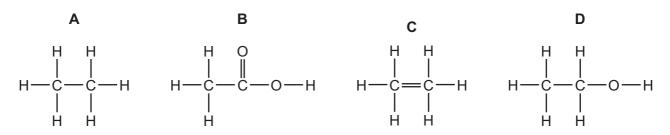
Which row in the table describes the formation of a polymer?

	monomer	polymer
Α	ethane	poly(ethane)
в	ethene	poly(ethene)
С	ethane	poly(ethene)
D	ethene	poly(ethane)

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



40 Which structure is incorrect?



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15

							5	Group								
											≡	≥	>	⋝	=	0
						- 1										⁴ He
						Hydrogen 1										Helium 2
											1	12	14	16	19	20
Be											B	ပ	z	0	ш	Ne
Beryllium											Boron 5	Carbon 6	Nitrogen 7	Oxygen 8	Fluorine 9	Neon 10
24											27	28	31	32	35.5	40
Mg											٩l	Si	٩	S	CI	Ar
Magnesium 12	5										Aluminium 13	Silicon 14	Phosphorus 15	Sulfur 16	Chlorine 17	Argon 18
40	45	48	51	52	55	56	59	59	64	65	20	73	75	62	80	84
Ca	Sc	i	>	ŗ	Mn	Fe	ပိ	ï	Cu	Zn	Ga	ge	As	Se	Br	Кr
Calcium	Scandium 21	Titanium 22	Vanadium 23	Chromium 24	Manganese 25	lron 26	Cobalt 27	Nickel 28	Copper 29	Zinc 30	Gallium 31	Germanium 32	Arsenic 33	Selenium 34	Bromine 35	Krypton 36
88	89	91	93	96		101	103	106	108	112	115	119	122	128	127	131
S		Zr	ЧN	Mo	ц	Ru	Rh	Pd	Ag	ဗ	In	Sn	Sb	Te	Ι	Xe
Strontium 3	Yttrium 39	Zirconium 40	Niobium 41	Molybdenum 42	Technetium 43	Ruthenium 44	Rhodium 45	Palladium 46	Silver 47	Cadmium 48	Indium 49	Tin 50	Antimony 51	Tellurium 52	lodine 53	Xenon 54
137		178	181	184	186	190	192	195	197	201	204	207	209			
Ba	La	Ħ	Ta	8	Re	os	Ir	Ł	Au	Hg	Τl	Pb	Bi	Ро	At	Rn
Barium	Lanthanum 57 *	Hafnium 72	Tantalum 73	Tungsten 74	Rhenium 75	Osmium 76	Iridium 77	Platinum 78	Gold 79	Mercury 80	Thallium 81	Lead 82	Bismuth 83	Polonium 84	Astatine 85	Radon 86
226	227															
Ra	Ac															
Radium	Actinium 89 †															
	*58-71 Lanthanoid series		140	141	144		150	152	157	159	162	165	167	169	173	175
2.10	ton-103 Actinoid series		с С	Pr	Nd	Pm	Sm	Eu	Бd	Tb	Q	Р	ш	Ta	٩Y	Ľ
÷ i	00100		Cerium 58	Praseodymium 59	Neodymium 60	Promethium 61	Samarium 62	Europium 63	Gadolinium 64	Terbium 65	Dysprosium 66	Holmium 67	Erbium 68	Thulium 69	Ytterbium 70	Lutetium 71
	a = relative atomic mass	lic mass	232		238											
	X = atomic symbol	loc	Ч	Ра		dN		Am	Cm	BĶ	ç	Es	Fm	Md	٥N	۲
	b = proton (atomic) number	ic) number	Thorium	Protactinium	Uranium	Neptunium	Plutonium	Americium	Curium	Berkelium	Californium	Einsteinium	Fermium	Mendelevium	Nobelium	Lawrencium

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DATA SHEET Periodic Table of the

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