



Cambridge International Examinations

Cambridge International General Certificate of Secondary Education

CHEMISTRY 0620/11

Paper 1 Multiple Choice May/June 2014

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.

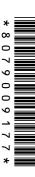
A copy of the Periodic Table is printed on page 16.

Electronic calculators may be used.

The syllabus is approved for use in England, Wales and Northern Ireland as a Cambridge International Level1/Level 2 Certificate.

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





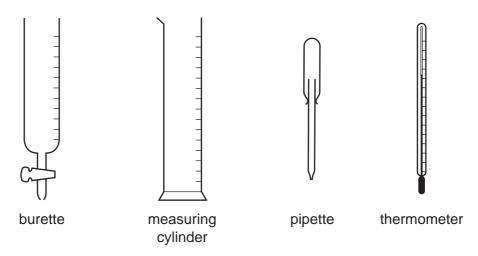
1 The diagram shows the result of dropping a purple crystal into water.



Which processes take place in this experiment?

	chemical reaction	diffusing	dissolving
Α	✓	✓	✓
В	✓	x	✓
С	x	x	✓
D	X	✓	✓

2 The four pieces of apparatus shown below are used in chemical experiments.



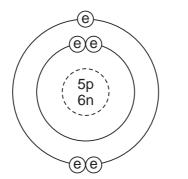
Which statement about the apparatus is correct?

- A The burette measures the volume of liquid added in a titration.
- **B** The measuring cylinder measures the mass of a substance used in an experiment.
- **C** The pipette measures the volume of gas given off in a reaction.
- **D** The thermometer measures the density of a solution.

3 Alcohol and water are completely miscible. This means when mixed together they form only one liquid layer.

Which method is used to separate alcohol from water?

- A crystallisation
- **B** filtration
- C fractional distillation
- **D** precipitation
- **4** The diagram shows the structure of an atom of element X.



key

e = electron

n = neutron

p = proton

e = nucleus

What is X?

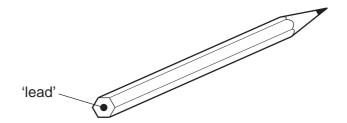
- **A** boron
- **B** carbon
- C sodium
- **D** sulfur

5 The diagrams show four particles.

Which two diagrams show atoms that are isotopes of each other?

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

6 The 'lead' in a pencil is made of a mixture of graphite and clay.



When the percentage of graphite is increased, the pencil slides across the paper more easily.

Which statement explains this observation?

- A Graphite has a high melting point.
- **B** Graphite is a form of carbon.
- C Graphite is a lubricant.
- **D** Graphite is a non-metal.

7	Element X is in	Group I of th	e Periodic	Table, X	reacts with	element Y	to form an	ionic compo	ound.
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Which equation shows the process that takes place when X forms ions?

A
$$X + e^{-} \rightarrow X^{+}$$

$$\mathbf{B} \quad \mathsf{X} \, - \, \mathsf{e}^{\scriptscriptstyle{-}} \, \to \, \mathsf{X}^{\scriptscriptstyle{-}}$$

$$\mathbf{C}$$
 X + \mathbf{e}^{-} \rightarrow X

$$\mathbf{D} \quad \mathbf{X} - \mathbf{e}^{-} \rightarrow \mathbf{X}^{+}$$

8 Solid F is an element.

Solid G is a compound.

Neither solid conducts electricity but G conducts electricity when dissolved in water.

These properties suggest that F is1..... and that G is2..... with3..... bonds.

Which words correctly complete gaps 1, 2 and 3?

	1	2	3
Α	diamond	AgC <i>l</i>	covalent
В	diamond	NaC1	ionic
С	graphite	AgC1	ionic
D	graphite	NaC1	covalent

9 A compound contains one atom of calcium, two atoms of hydrogen and two atoms of oxygen.

What is the correct chemical formula of the compound?

- A CaO₂H₂
- **B** HOCaOH
- C H₂CaO₂
- **D** $Ca(OH)_2$

10 In athletics, banned drugs such as nandrolone have been taken illegally to improve performance. Nandrolone has the molecular formula $C_{18}H_{26}O_2$.

What is the relative molecular mass, M_r , of nandrolone?

(Relative atomic mass: H = 1; C = 12; O = 16)

- **A** 46
- **B** 150
- **C** 274
- **D** 306

11 Which substance will **not** conduct electricity?

- **A** aluminium
- **B** copper
- **C** plastic
- **D** steel

12 Which products are formed at the anode and cathode when electricity is passed through molten lead(II) bromide?

	anode (+)	cathode (-)
Α	bromide ions	lead ions
В	bromine molecules	lead atoms
С	lead atoms	bromine molecules
D	lead ions	bromide ions

13 Some reactions are endothermic.

How does the temperature and energy change in an endothermic reaction?

	temperature change	energy change
Α	decreases	energy taken in
В	decreases	energy given out
С	increases	energy taken in
D	increases	energy given out

14 Two chemical processes are described below.

- In the combustion of methane, energy is1......
- In the electrolysis of molten lead(II) bromide, energy is2......

Which words correctly complete gaps 1 and 2?

	1	2
Α	given out	given out
В	given out	taken in
С	taken in	given out
D	taken in	taken in

15 Which equation shows an oxidation reaction?

$$A \quad C \ + \ O_2 \ \rightarrow \ CO_2$$

$$\textbf{B} \quad \mathsf{CaCO}_3 \, \rightarrow \, \mathsf{CaO} \, + \, \mathsf{CO}_2$$

$$\textbf{C} \quad \text{CaO + 2HC} l \rightarrow \text{CaC} l_2 + \text{H}_2\text{O}$$

$$\textbf{D} \quad N_2O_4 \, \rightarrow \, 2NO_2$$

16 In separate experiments, a catalyst is added to a reaction mixture and the temperature of the mixture is decreased.

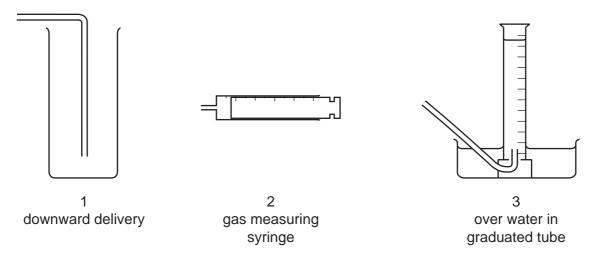
What are the effects of these changes on the rate of the reaction?

	catalyst added	temperature decreased
Α	faster	faster
В	faster	slower
С	slower	faster
D	slower	slower

17 An experiment is carried out to investigate the rate of reaction when calcium carbonate is reacted with hydrochloric acid.

The volume of carbon dioxide gas given off is measured at different intervals of time.

The diagram shows pieces of apparatus used to collect gases.



Which apparatus is suitable to collect and measure the volume of the carbon dioxide?

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

18 The equation shows a reaction that is reversed by changing the conditions.

forward reaction
$$CuSO_4.5H_2O \longrightarrow CuSO_4 + 5H_2O$$

How can the forward reaction be reversed?

	by adding water	by heating
Α	~	~
В	✓	X
С	x	✓
D	X	X

- 19 Which statements about alkalis are correct?
 - 1 When reacted with an acid, the pH of the alkali increases.
 - 2 When tested with litmus, the litmus turns blue.
 - 3 When warmed with an ammonium salt, ammonia gas is given off.
 - **A** 1, 2 and 3 **B** 1 and 2 only **C** 1 and 3 only **D** 2 and 3 only
- 20 Only two elements are liquid at 20 °C. One of these elements is shiny and conducts electricity.

This suggests that this element is a1..... and therefore its oxide is2......

Which words correctly complete gaps 1 and 2?

	1	2
A metal		acidic
В	metal	basic
С	non-metal	acidic
D	non-metal	basic

- 21 Which acid reacts with ammonia to produce the salt ammonium sulfate?
 - A hydrochloric
 - **B** nitric
 - C phosphoric
 - **D** sulfuric

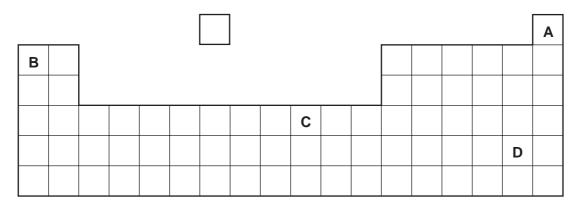
22 Aqueous sodium hydroxide is added to solid X and the mixture is heated.

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** NH₄⁺ and Fe³⁺
- C OH⁻ and Fe²⁺
- **D** OH⁻ and Fe³⁺
- 23 Which statement about the Periodic Table is correct?
 - **A** Elements in the same period have the same number of outer electrons.
 - **B** The elements on the left are usually gases.
 - **C** The most metallic elements are on the left.
 - **D** The relative atomic mass of the elements increases from right to left.
- 24 Why is argon gas used to fill electric lamps?
 - A It conducts electricity.
 - **B** It glows when heated.
 - C It is less dense than air.
 - **D** It is not reactive.
- **25** An element melts at 1455 °C, has a density of 8.90 g/cm³ and forms a green chloride.

Where in the Periodic Table is this element found?



26 The diagrams show two items that may be found in the home. Each item contains zinc.







brass door-knocker

In which is zinc used as an alloy?

	bucket	door-knocker
Α	✓	✓
В	✓	x
С	x	✓
D	X	X

27 In an experiment, three test-tubes labelled X, Y and Z were half-filled with dilute hydrochloric acid. A different metal was added to each test-tube. After a few minutes the following observations were made.

In tube X, bubbles slowly rose to the surface.

In tube Y, there was a rapid release of bubbles.

In tube Z, no bubbles were produced.

Which three metals match the observations?

	I		
	tube X	tube Y	tube Z
Α	copper	zinc	iron
В	magnesium	iron	copper
С	zinc	magnesium	copper
D	zinc	magnesium	iron

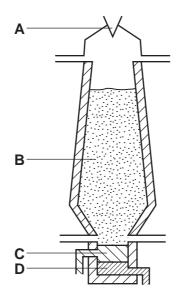
28 The table shows properties of four metals.

Which metal is the most suitable for aircraft construction?

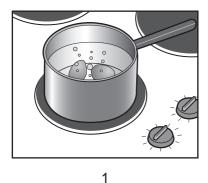
	density	strength	resistance to corrosion
Α	high	high	low
В	high	low	low
С	low	high	high
D	low	low	high

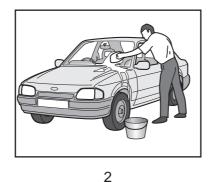
29 The diagram shows a blast furnace.

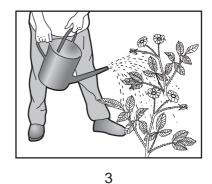
In which part is iron ore changed to iron?



30 The diagram shows some uses of water in the home.







For which uses is it important for the water to have been treated?

A 1 only

B 2 only

C 3 only

D 1, 2 and 3

31 Four steel paper clips are treated as described before being placed in a beaker of water.

Which paper clip rusts most quickly?

- A coated with grease
- B dipped in paint and allowed to dry
- **C** electroplated with zinc
- **D** washed with soap and rinsed
- 32 Which compound contains two of the three essential elements needed for a complete fertiliser?
 - A ammonium chloride
 - B ammonium nitrate
 - **C** ammonium phosphate
 - **D** ammonium sulfate
- **33** When compound X is heated, it changes colour from green to black. Compound Y is formed and a gas is given off which turns limewater milky.

What are X and Y?

	X	Υ
Α	calcium carbonate	calcium oxide
В	copper carbonate	carbon
С	copper carbonate	copper oxide
D	copper sulfate	copper oxide

34 Acid rain is formed when sulfur dioxide and oxides of nitrogen dissolve in rain water.

Which problem is **not** caused by acid rain?

- A breathing difficulties
- **B** dying trees
- C erosion of statues
- **D** lowered pH of lakes

- 35 Which pollutant gas is produced by the decomposition of vegetation?
 - A carbon monoxide
 - **B** methane
 - C nitrogen oxide
 - **D** sulfur dioxide
- **36** Which type of compound is shown?

- A alcohol
- **B** alkane
- C alkene
- D carboxylic acid
- 37 The table shows the composition of four different types of petroleum (crude oil).

fraction	Arabian Heavy /%	Arabian Light /%	Iranian Heavy /%	North Sea /%			
gasoline 18		21	21	23			
kerosene	11.5	13	13	15			
diesel oil	18	20	20	24			
fuel oil	52.5	46	46	38			

Which type of petroleum is best for the motor vehicle industry?

- A Arabian Heavy
- **B** Arabian Light
- C Iranian Heavy
- **D** North Sea

38 Alkenes are manufactured by cracking hydrocarbons obtained from petroleum.

alkane X obtained from petroleum	cracking	alkene Y
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Which row describes the process of cracking?

	size of X molecules	size of Y molecules	catalyst required	temperature required
Α	large	small	no	low
В	large	small	yes	high
С	small	large	no	low
D	small	large	yes	high

39 X, Y and Z are three hydrocarbons.

 $X CH_2=CH_2$ $Y CH_3-CH=CH_2$ $Z CH_3-CH_2-CH=CH_2$

What do compounds X, Y and Z have in common?

- 1 They are all alkenes.
- 2 They are all part of the same homologous series.
- 3 They all have the same boiling point.
- **A** 1, 2 and 3 **B** 1 and 2 only **C** 1 and 3 only **D** 2 and 3 only
- **40** Which statements about ethanol are correct?
 - 1 It can be made by fermentation.
 - 2 It is an unsaturated compound.
 - 3 It burns in air and can be used as a fuel.
 - **A** 1, 2 and 3 **B** 1 and 2 only **C** 1 and 3 only **D** 2 and 3 only

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DATA SHEET
The Periodic Table of the Elements

	0	4 He Helium	20 Neon 10 A	Argon	8 7	Krypton 36	131	Xe	Xenon 54		Ru	Radon 86		Lu Lu	71	-	Lawrencium	103
	IIΛ		19 Fluorine		∞ ਯ	Bromine 35	127	_	lodine 53		¥	Astatine 85		173 Yb		4		102
	I		c	Sulfur 16	Se 39	Selenium 34	128	<u>e</u>	Tellurium 52			Polonium 84		169 Tm		7		101
	>		14 Nitrogen 7	Phosphorus	75 As	Arsenic 33	122	Sb	Antimony 51	209	Ξ	Bismuth 83		167 Er	89	j		100
	ΛΙ	:	12 Carbon 6	Silicon	де 9	Germanium 32		Sn		207	Pb	Lead 82		165 H	67	Ĺ		66
	III		11 Boron 5	Aluminium 13	og Ga	Gallium 31	115	_	Indium 49	204	<i>1</i> L	Thallium 81		162 Dy	66	č	Californium	98
					65 Zn	Zinc 30	112	ဦ	Cadmium 48	201	БĤ	Mercury 80		159 Tb	65	Ġ	Berkelium	26
					64 Cu	Copper 29	108	Ag		197	Αn	Gold 79		157 Gd	64	Ç	Surium Curium	
Group				_	2 E	Nickel 28	106	Pd	Palladium 46	195	Ŧ	Platinum 78		152 Eu	63	1	Americium	95
ອັ					ී දි	Cobalt 27	103	R	Rhodium 45	192	_	Iridium 77		Samarium	62	ä	Plutonium	94
		T Hydrogen			56 Fe	Iron 26	101	Ru	Ruthenium 44	190	Os	Osmium 76			61		Neptunium	93
					Mn Mn	Manganese 25		ဥ	Technetium 43	186	Re	Rhenium 75		Nacdomina	90	238	Uranium	92
				_	జ రే	Chromium 24	96	٩	Molybdenum 42	184	>	Tungsten 74		Prasandumium	59		Protactinium	91
					5 >	Vanadium 23	63	g R	Niobium 41	181	Та	Tantalum 73		140 Ce	28	232	Thorium	06
					88 	Titanium 22	91	Zr	Zirconium 40	178	Ξ	Hafnium 72				mic mass		nic) number
					S C 45	Scandium 21	88	>	Yttrium 39	139	La	Lanthanum 57 *	AC Actinium t	d series series		a = relative atomic mass	A = atofflic symbol	b = proton (atomic) number
	=		Beryllium 4	Magnesium 12	⁶ В	Calcium 20	88	Š	Strontium 38	137	Ва	Barium 56	226 Rad ium Radium	*58-71 Lanthanoid series 190-103 Actinoid series			<	
	_		7 Lithium 3	Sodium Sodium	® ⊀	Potassium 19	85	Rb	Rubidium 37	133	S	Caesium 55	Fr Francium 87	*58-71 L	L		vey	٩

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

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