



Cambridge
IGCSE

Cambridge International Examinations
Cambridge International General Certificate of Secondary Education

CHEMISTRY (US)

0439/11

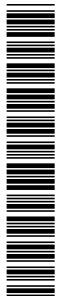
Paper 1 Multiple Choice

May/June 2014

45 Minutes

Additional Materials: Multiple Choice Answer Sheet
 Soft clean eraser
 Soft pencil (type B or HB is recommended)

* 2 4 0 1 8 0 3 5 8 8 *



READ THESE INSTRUCTIONS FIRST

Write in soft pencil.

Do not use staples, paper clips, glue or correction fluid.

Write your name, Center 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.

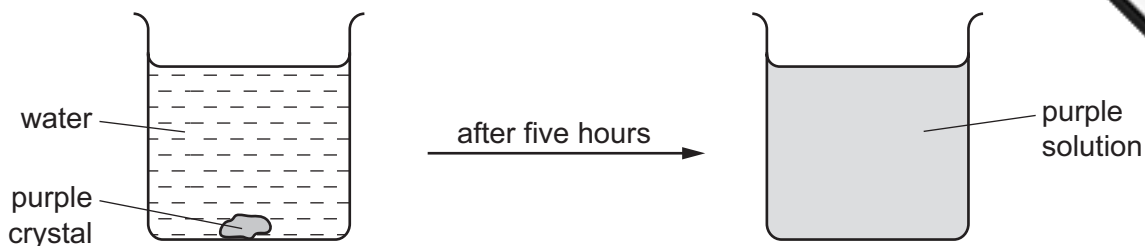
A copy of the Periodic Table is printed on page 16.

Electronic calculators may be used.

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

2

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



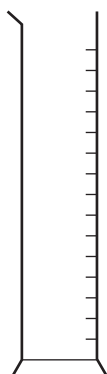
Which processes take place in this experiment?

	chemical reaction	diffusing	dissolving
A	✓	✓	✓
B	✓	x	✓
C	x	x	✓
D	x	✓	✓

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



buret



graduated cylinder



dropper



thermometer

Which statement about the apparatus is correct?

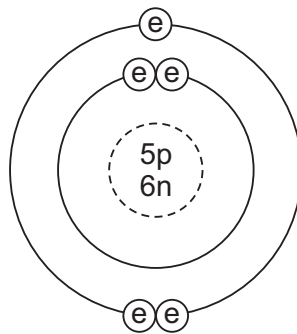
- A** The buret measures the volume of liquid added in a titration.
B The graduated cylinder measures the mass of a substance used in an experiment.
C The dropper measures the volume of gas given off in a reaction.
D The thermometer measures the density of a solution.

3

- 3 Alcohol and water are completely miscible. This means when mixed together they form a single liquid layer.

Which method is used to separate alcohol from water?

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



key

⊖ = electron

n = neutron

p = proton

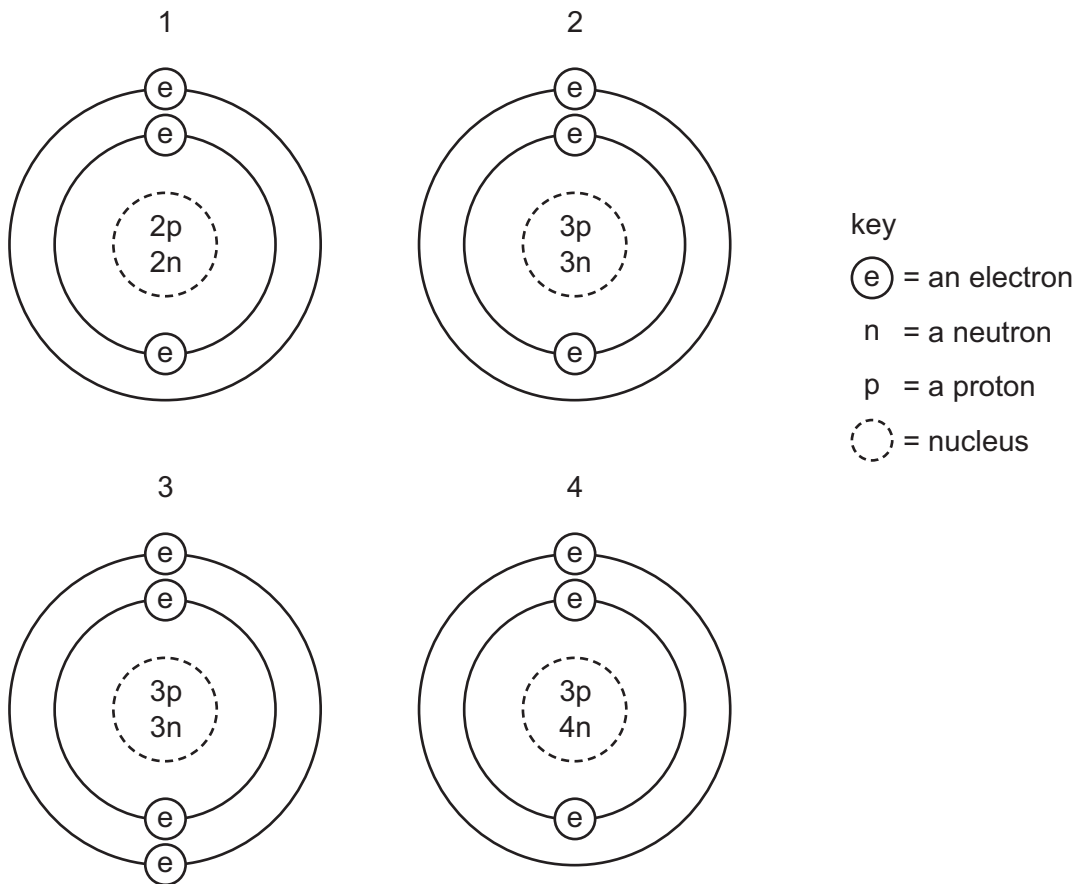
⊖ = nucleus

What is X?

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

4

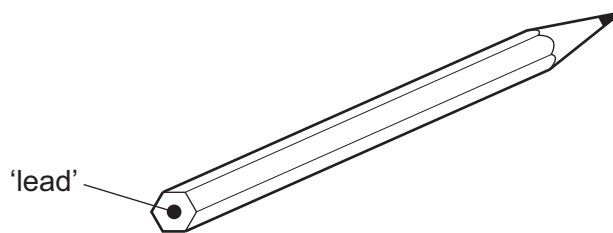
5 The diagrams show four particles.



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 nonmetal.

- 7 Element X is in Group I of the Periodic Table. X reacts with element Y to form an ionic compound.
- Which equation shows the process that takes place when X forms ions?
- A** $X + e^{-} \rightarrow X^{+}$
- B** $X - e^{-} \rightarrow X^{-}$
- C** $X + e^{-} \rightarrow X^{-}$
- D** $X - e^{-} \rightarrow X^{+}$
- 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 |
|----------|----------|--------|----------|
| A | diamond | $AgCl$ | covalent |
| B | diamond | $NaCl$ | ionic |
| C | graphite | $AgCl$ | ionic |
| D | graphite | $NaCl$ | 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** CaO_2H_2 **B** $HOCaOH$ **C** H_2CaO_2 **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** aluminum
- B** copper
- C** plastic
- D** steel

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

	anode (+)	cathode (-)
A	bromide ions	lead ions
B	bromine molecules	lead atoms
C	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
A	decreases	energy taken in
B	decreases	energy given out
C	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
A	given out	given out
B	given out	taken in
C	taken in	given out
D	taken in	taken in

- 15 Which equation shows an oxidation reaction?

- A** $C + O_2 \rightarrow CO_2$
- B** $CaCO_3 \rightarrow CaO + CO_2$
- C** $CaO + 2HCl \rightarrow CaCl_2 + H_2O$
- D** $N_2O_4 \rightarrow 2NO_2$

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

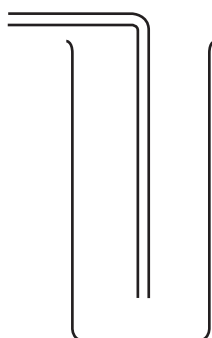
What are the effects of these changes on the rate of the reaction?

	catalyst added	temperature decreased
A	faster	faster
B	faster	slower
C	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.

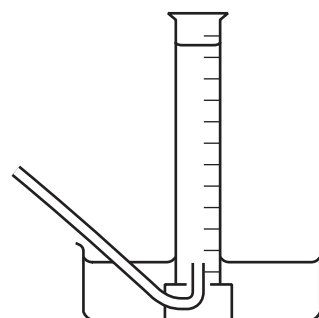
The diagram shows pieces of apparatus used to collect gases.



1
downward delivery



2
gas measuring
syringe

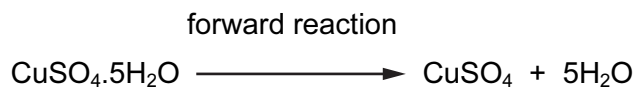


3
over water in
graduated tube

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.



How can the forward reaction be reversed?

	by adding water	by heating
A	✓	✓
B	✓	x
C	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
B	metal	basic
C	nonmetal	acidic
D	nonmetal	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 NH_4^+ and Fe^{3+}
- C OH^- and Fe^{2+}
- D OH^- and Fe^{3+}

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?

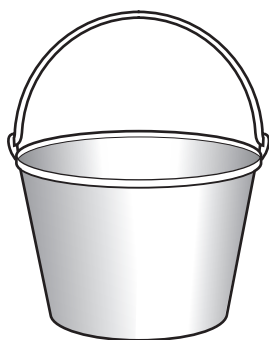
- A It conducts electricity.
- B It glows when heated.
- C It is less dense than air.
- D It is not reactive.

25 An element melts at 1455°C , has a density of 8.90 g/cm^3 and forms a green chloride.

Where in the Periodic Table is this element found?

The diagram shows a simplified periodic table grid. It consists of four rows and several columns. The first row has two columns on the left, a gap, and two columns on the right. The second row has two columns on the left and six columns on the right. The third and fourth rows each have eight columns. Labels are placed in specific cells: 'B' is in the top-left cell of the first row; 'C' is in the fifth column of the third row; 'D' is in the seventh column of the fourth row; and 'A' is in the top-right cell of the first row. There is also a small empty square box above the gap in the first row.

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



zinc plated bucket



brass door-knocker

In which is zinc used as an alloy?

	bucket	door-knocker
A	✓	✓
B	✓	x
C	x	✓
D	x	x

- 27 In an experiment, three test-tubes labeled 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?

	tube X	tube Y	tube Z
A	copper	zinc	iron
B	magnesium	iron	copper
C	zinc	magnesium	copper
D	zinc	magnesium	iron

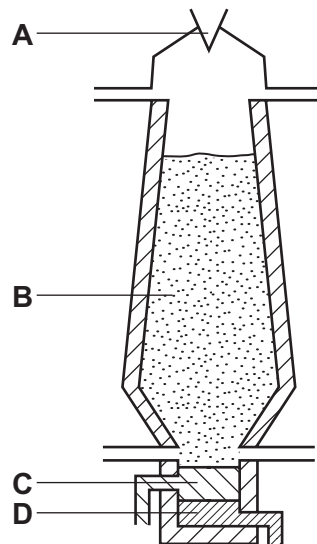
28 The table shows properties of four metals.

Which metal is the most suitable for aircraft construction?

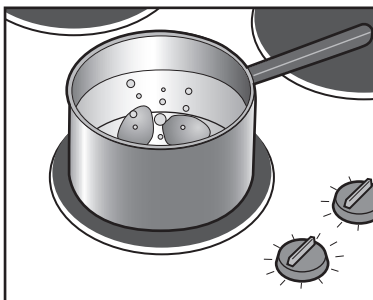
	density	strength	resistance to corrosion
A	high	high	low
B	high	low	low
C	low	high	high
D	low	low	high

29 The diagram shows a blast furnace.

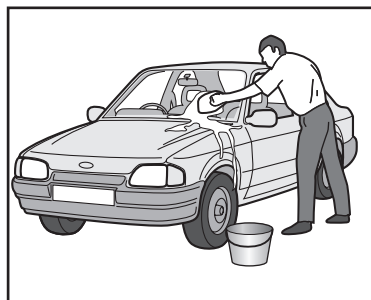
In which part is iron ore changed to iron?



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



1



2



3

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?

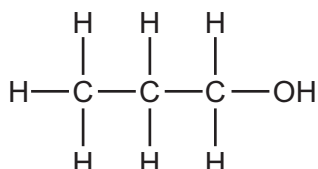
	X	Y
A	calcium carbonate	calcium oxide
B	copper carbonate	carbon
C	copper carbonate	copper oxide
D	copper sulfate	copper oxide

- 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

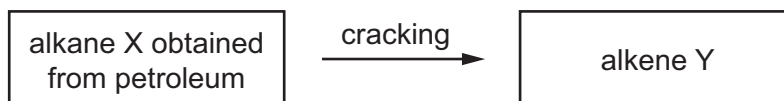
37 The table shows the composition of four different types of petroleum (crude oil).

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

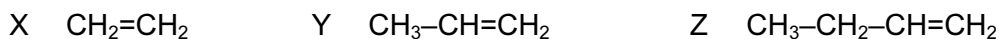
38 Alkenes are manufactured by cracking hydrocarbons obtained from petroleum.



Which row describes the process of cracking?

	size of X molecules	size of Y molecules	catalyst required	temperature required
A	large	small	no	low
B	large	small	yes	high
C	small	large	no	low
D	small	large	yes	high

39 X, Y and Z are three hydrocarbons.



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

DATA SHEET
The Periodic Table of the Elements

		Group																			
I	II	III	IV	V	VI	VII	0					0									
1 H Hydrogen 1											2 He Helium 2										
3 Li Lithium 4	9 Be Beryllium 4											10 Ne Neon 10									
11 Na Sodium 11	23 Na Sodium 11	13 Al Aluminum 13	14 Si Silicon 14	15 P Phosphorus 15	16 S Sulfur 16	17 Cl Chlorine 17	18 Ar Argon 18					36 Kr Krypton 36									
19 K Potassium 19	39 K Potassium 19	40 Ca Calcium 20	45 Sc Scandium 21	55 Mn Manganese 25	59 Co Cobalt 27	64 Cu Copper 29	73 Ge Germanium 32	75 As Arsenic 33	79 Se Selenium 34	80 Br Bromine 35	84 Kr Krypton 36	86 Rn Radon 86									
37 Rb Rubidium 37	85 Rb Rubidium 37	88 Sr Strontium 38	89 Y Yttrium 39	93 Nb Niobium 41	96 Mo Molybdenum 42	106 Pd Palladium 46	115 In Indium 49	122 Sb Antimony 51	128 Te Tellurium 52	127 I Iodine 53	131 Xe Xenon 54	85 At Astatine 85									
55 Cs Caesium 55	133 Cs Caesium 55	137 Ba Barium 56	139 La Lanthanum 57	181 Ta Tantalum 73	184 W Tungsten 74	195 Pt Platinum 78	204 Tl Thallium 81	209 Pb Lead 82	207 Pb Lead 82	209 Pb Lead 82	209 Pb Lead 82	209 Pb Lead 82									
87 Fr Francium 87	226 Ra Radium 88	227 Ac Actinium 89											88 Rn Radon 86								
*58-71 Lanthanoid series																					
†90-103 Actinoid series																					
<table border="0"> <tr> <td>a</td> <td>X</td> <td>a = relative atomic mass</td> </tr> <tr> <td>b</td> <td>X</td> <td>X = atomic symbol</td> </tr> <tr> <td></td> <td></td> <td>b = proton (atomic) number</td> </tr> </table>													a	X	a = relative atomic mass	b	X	X = atomic symbol			b = proton (atomic) number
a	X	a = relative atomic mass																			
b	X	X = atomic symbol																			
		b = proton (atomic) number																			
58 Ce Cerium 58	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									
90 Th Thorium 90	232 Th Thorium 90	91 Pa Protactinium 91	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									

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

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