



UNIVERSITY *of* CAMBRIDGE
International Examinations

Script B
Without Marks

Chemistry
0620/02

June 2003



UNIVERSITY *of* CAMBRIDGE
Local Examinations Syndicate

CAMBRIDGE INTERNATIONAL EXAMINATIONS
International General Certificate of Secondary Education

CHEMISTRY

0620/02

Paper 2

May/June 2003

1 hour

Candidates answer on the Question Paper.
No Additional Materials required

READ THESE INSTRUCTIONS FIRST

Write your name, centre number and candidate number in the spaces provided at the top of this page.
Write in dark blue or black pen in the spaces provided on the Question Paper.
You may use a pencil for any diagrams, graphs or rough working.
Do not use staples, paper clips, highlighters, glue or correction fluid.

Answer **all** questions.

The number of marks is given in brackets [] at the end of each question or part question.
A copy of the Periodic Table is printed on page 16.

If you have been given a label, look at the details. If any details are incorrect or missing, please fill in your correct details in the space given at the top of this page.

Stick your personal label here, if provided.

FOR EXAMINER'S USE

1	
2	
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TOTAL	

This document consists of **16** printed pages.

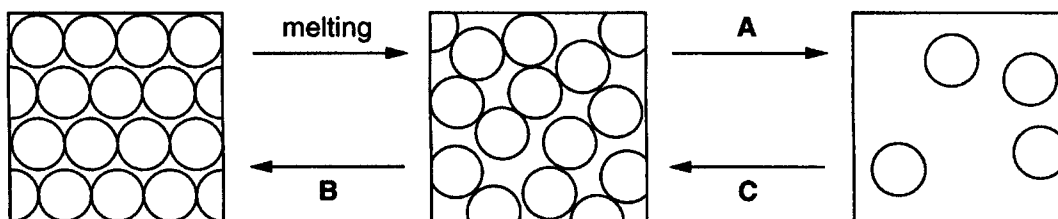
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[Turn over]

- 3 The states of matter are solid, liquid and gas.
The diagram below shows how the molecules are arranged in these three states.



- (a) State the name given to the change of state labelled

- (i) A Evaporation
 (ii) B Freezing
 (iii) C
 [3]

- (b) Which one of the following best describes the movement of molecules in the liquid state?

Tick **one** box.

The molecules are not moving from place to place.

☐

The molecules are sliding over each other.

☐

The molecules are moving freely.

☐

[1]

- (c) Which of the changes A, B or C, is endothermic?
Explain your answer.

A

 because endothermic heat is given out [2]

(d) Choose from the following list of substances to answer the questions below.

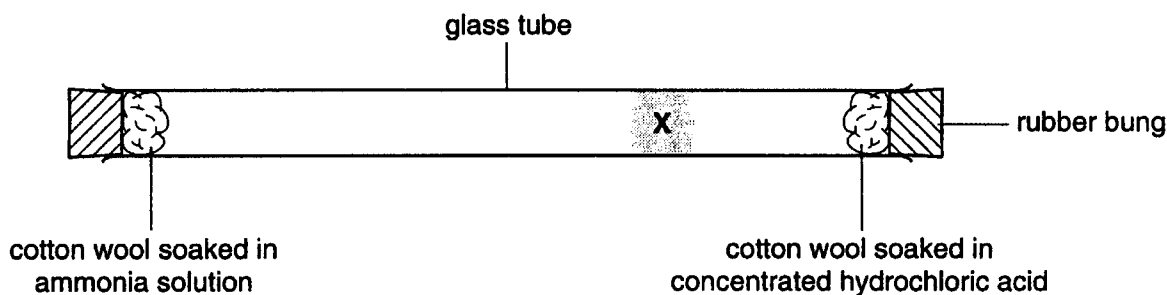
bromine
chlorine
iron
mercury
sodium chloride
sulphur

Name a substance which is

- (i) a gas at room temperature. Sulphur
- (ii) a non-metallic liquid at room temperature. Chlorine
- (iii) a compound which is a solid at room temperature. Sodium Chloride

[3]

(e) A student set up the apparatus shown in the diagram below.



The white solid is formed because the molecules of hydrogen chloride gas and ammonia gas move at random throughout the tube and eventually react with each other.

- (i) State the name given to this random movement of molecules.
..... *br gas*
- (ii) State the name of the white solid formed at X.
..... ~~ammonia gas~~ *Ammonium*
- (iii) Suggest why the white solid is formed towards one end of the tube and not in the middle.
..... *because Ammonia more reactive than HCl*

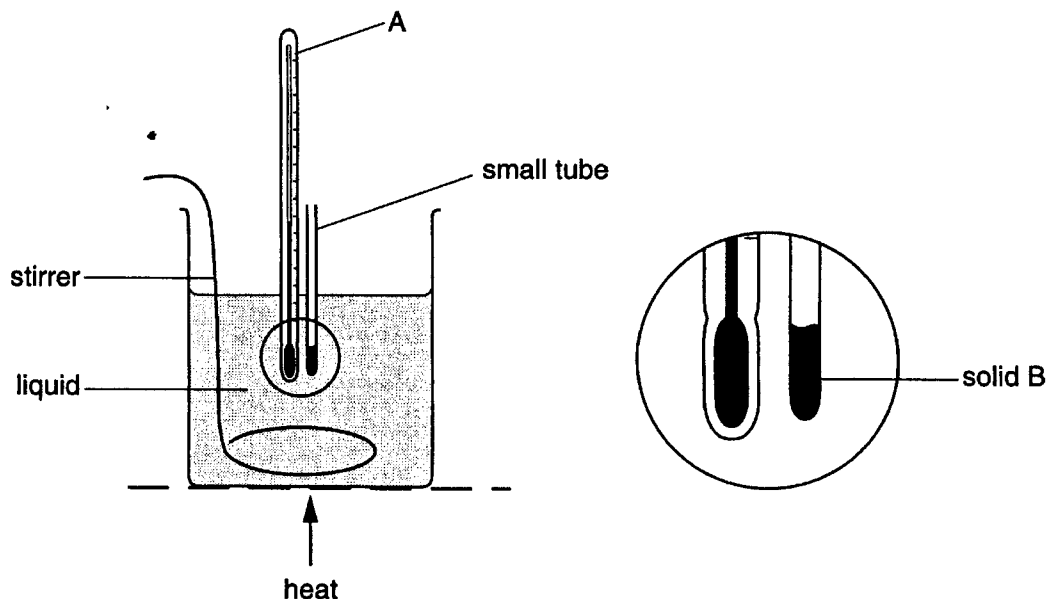
[3]

(f) What type of chemical reaction takes place when ammonia reacts with hydrochloric acid?

Addition

[1]

- (g) The diagram below shows a simple apparatus that can be used for measuring the melting point of a solid. The liquid in the beaker is heated slowly and the temperature at which the solid B melts is recorded.



- (i) State the name of the piece of apparatus labelled A.

Temperature meter

- (ii) Solid B melted at 155°C .

Why would water **not** be a suitable liquid to put in the beaker when using this apparatus to find the melting point of solid B?

because the boiling point of water is 100°C

which is below the melting point of solid B, therefore solid B can't be melt

- (iii) Suggest why the liquid needs to be kept stirred.

because if not the liquids will be boiled faster and blow-up

not evaporate.

[3]

- 6 This question is about different metals.

The list below shows part of the metal reactivity series .

potassium	more reactive
magnesium	
aluminium	
zinc	
iron	
copper	less reactive

- (a) From this list, choose a metal which is extracted using electrolysis.

.....Copper.....[1]

- (b) Two thousand years ago, people were able to extract iron and copper from their ores. They were not able to extract aluminium.

Suggest why they were not able to extract aluminium from its ore.

.....because Aluminium is more reactive.....[1]

- (c) Uranium is between magnesium and zinc in the reactivity series.

Equal sized strips of magnesium, uranium and zinc were placed in hydrochloric acid. The hydrochloric acid was the same concentration. The results are shown in the table.

- (i) Complete the result for uranium and hydrochloric acid.

metal	observations on adding to hydrochloric acid
magnesium	many bubbles of gas produced very rapidly and magnesium dissolves quickly
uranium	bubbles of gas produced rapidly and uranium dissolves
zinc	a few bubbles produced at a steady rate and zinc dissolves slowly

- (ii) Uranium has several isotopes which are radioactive. One of these isotopes is uranium – 235 (^{235}U).

What do you understand by the term *isotopes*?

.....atoms with same proton number but different ^{relative atomic} ~~mass~~ number.....

- (iii) State one use of uranium –235.

.....main source of energy.....[3]

- (d) Metals high in the reactivity series react readily with oxygen.
Name the compound formed when magnesium reacts with oxygen.

Magnesium Oxide

[1]

- (e) Copper is alloyed with tin to make bronze.

- (i) State what is meant by the term *alloy*.

Alloy : is a substance that is used as a layer to slow down
corrosion

- (ii) Suggest why metals are often used in the form of alloys.

because metals is very hard to get rusted (corrode)

[2]

- (f) Zinc can be extracted by heating zinc oxide with carbon.

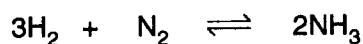


Explain why carbon is a reducing agent (reductant) in this reaction.

because it is being oxidise as it gained oxygen

[1]

- (g) Iron is used as a catalyst in the Haber Process for making ammonia.



- (i) What does the sign \rightleftharpoons mean?

it means the equation can be reversible

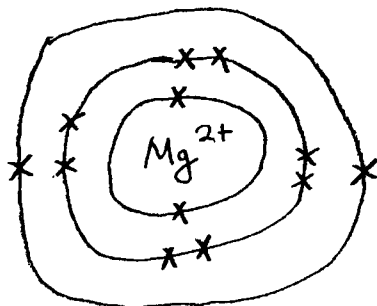
- (ii) What is the approximate percentage of nitrogen in the air?

79%

[2]

(h) Magnesium is in group II of the Periodic Table.

(i) Draw a diagram to show the electronic structure of magnesium.



(ii) Explain what happens to the magnesium atom when it reacts and forms a magnesium ion.

.....it gains 2 electrons.....[3]

DATA SHEET

The Periodic Table of the Elements

Group																		
I.	II											III	IV	V	VI	VII	0	
												1 H Hydrogen 1						4 He Helium 2
7 Li Lithium 3	9 Be Beryllium 4												11 B Boron 5	12 C Carbon 6	14 N Nitrogen 7	16 O Oxygen 8	19 F Fluorine 9	20 Ne Neon 10
23 Na Sodium 11	24 Mg Magnesium 12												27 Al Aluminium 13	28 Si Silicon 14	31 P Phosphorus 15	32 S Sulphur 16	35.5 Cl Chlorine 17	40 Ar Argon 18
39 K Potassium 19	40 Ca Calcium 20	45 Sc Scandium 21	48 Ti Titanium 22	51 V Vanadium 23	52 Cr Chromium 24	55 Mn Manganese 25	56 Fe Iron 26	59 Co Cobalt 27	59 Ni Nickel 28	64 Cu Copper 29	65 Zn Zinc 30	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	89 Y Yttrium 39	91 Zr Zirconium 40	93 Nb Niobium 41	96 Mo Molybdenum 42	Tc Technetium 43	101 Ru Ruthenium 44	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	139 La Lanthanum 57	178 Hf Hafnium 72	181 Ta Tantalum 73	184 W Tungsten 74	186 Re Rhenium 75	190 Os Osmium 76	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	
Fr Francium 87	Ra Radium 88	227 Ac Actinium 89																
*58-71 Lanthanoid series †90-103 Actinoid series																		
<div><div>a</div><div>X</div><div>b</div></div> <div>a = relative atomic mass X = atomic symbol b = proton (atomic) number</div>																		

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.).

