UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
International General Certificate of Secondary Education

CHEMISTRY **0620/01**

Paper 1 Multiple Choice

May/June 2005

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.

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1 In which of the following are the particles arranged in a regular pattern?

A a gas

B a liquid

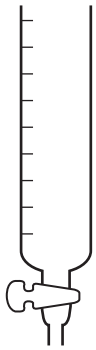
C a metal

D a solution

2 A student mixes 25 cm^3 samples of dilute hydrochloric acid with different volumes of aqueous sodium hydroxide. Each time, the student measures the change in temperature to test if the reaction is exothermic.

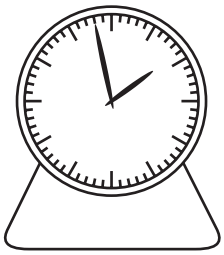
Which piece of apparatus is **not** needed?

A



burette

B

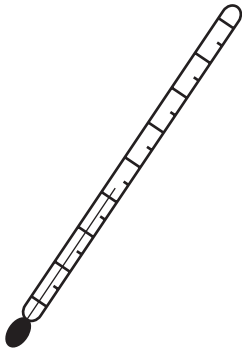


clock

C

pipette

D



thermometer

3 In an experiment, a student needs to measure out 36.50 cm^3 of a solution.

Which piece of apparatus would measure this volume most accurately?

A beaker

B burette

C measuring cylinder

D pipette

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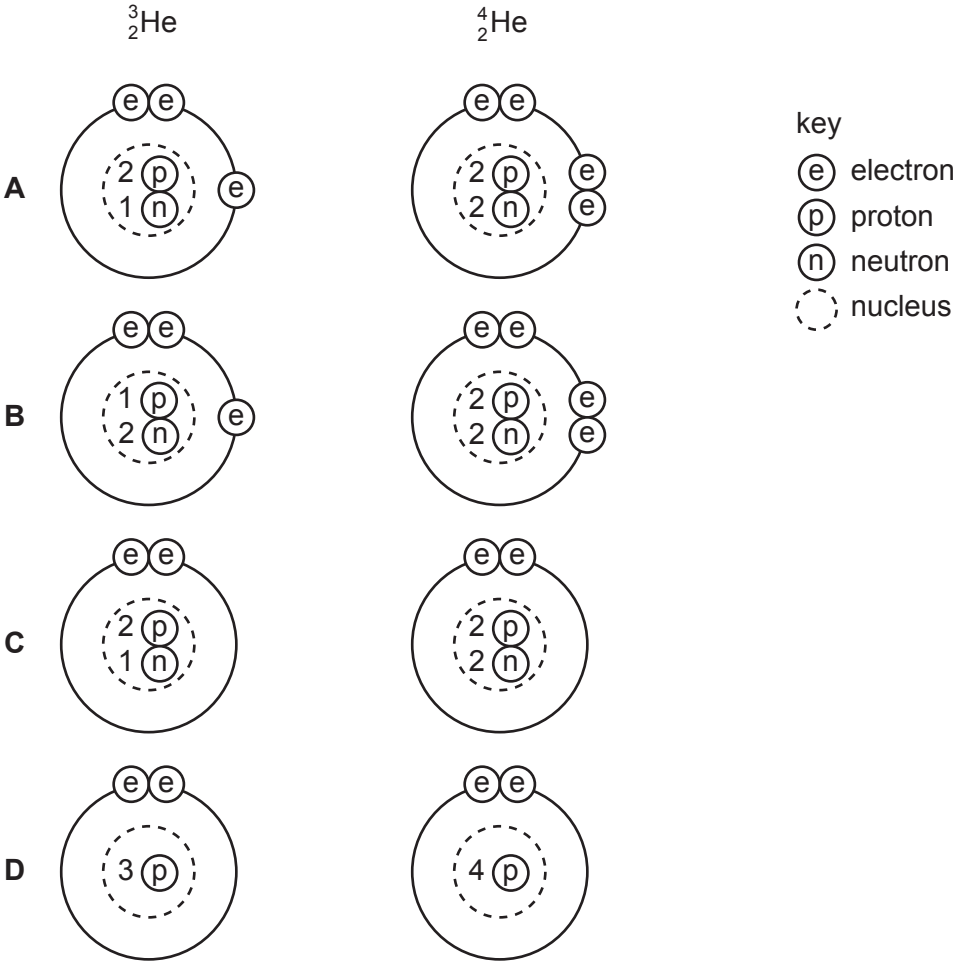
4 Two isotopes of helium are $^{3}_{2}He$ and $^{4}_{2}He$.

Which two diagrams show the arrangement of particles in these two isotopes?



5 Which row gives the outer electronic shell of fluorine and of neon?

	$_{9}F$	$_{10}Ne$
A	7	8
B	7	10
C	9	8
D	9	10

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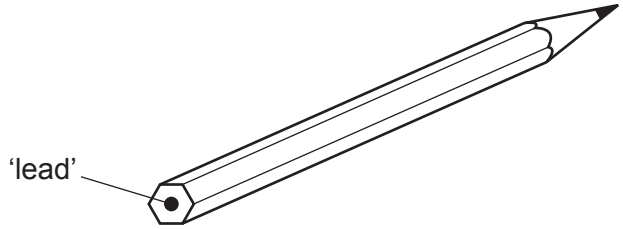
6 The electronic configuration of an ion is 2.8.8.

What could this ion be?

	S^{2-}	Ca^{2+}
A	✓	✓
B	✓	✗
C	✗	✓
D	✗	✗

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



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

Why is this?

A Graphite conducts electricity.

B Graphite is a form of carbon.

C Graphite is a lubricant.

D Graphite is a non-metal.

8 Which statement about gaseous hydrogen chloride and solid potassium chloride is correct?

A Hydrogen chloride is covalent but potassium chloride is ionic.

B Hydrogen chloride is ionic but potassium chloride is covalent.

C They are both covalent compounds.

D They are both ionic compounds.

9 Which two elements form an alloy when they are heated together?

A chlorine and hydrogen

B chlorine and zinc

C copper and hydrogen

D copper and zinc

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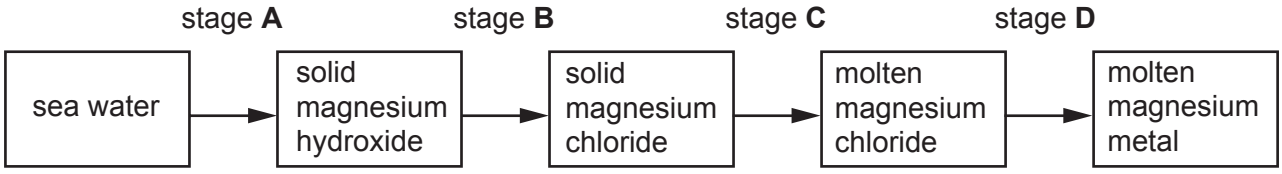
10 For which compound is the formula correct?

	compound	formula
A	ammonia	NH_4
B	carbon monoxide	CO_2
C	iron(III) oxide	Fe_3O_2
D	zinc hydroxide	$Zn(OH)_2$

11 At which stage in the manufacture of magnesium from sea-water can electrolysis be used?



12 Metallic and non-metallic elements can both be extracted by electrolysis.

Which element is produced at the negative electrode (cathode)?

A bromine

B chlorine

C hydrogen

D oxygen

13 Which product is manufactured by electrolysis?

A aluminium

B copper(II) sulphate

C sodium chloride

D steel

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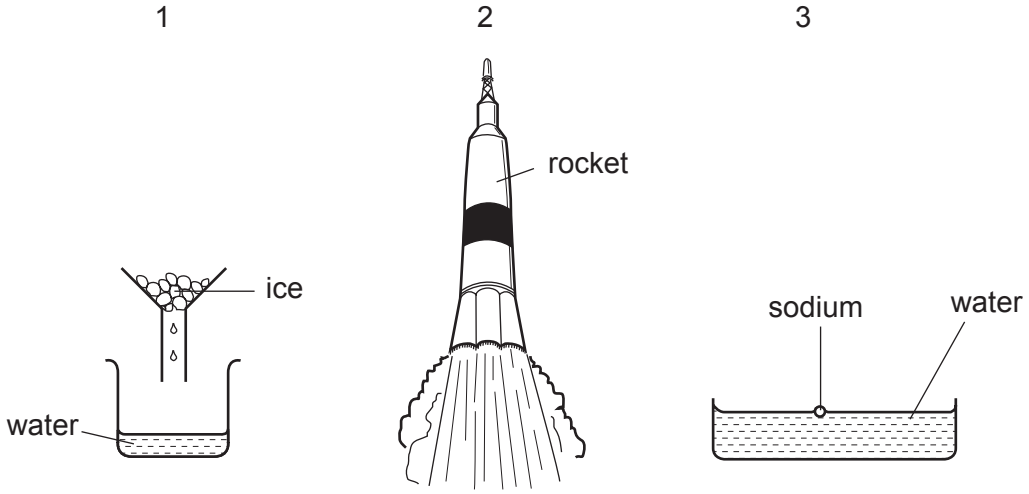
14 Which diagrams show a process in which an exothermic change is taking place?



A 1 and 2 only

B 1 and 3 only

C 2 and 3 only

D 1, 2 and 3

15 Are hydrogen and uranium oxidised when used as a source of energy?

	hydrogen	uranium
A	✓	✓
B	✓	✗
C	✗	✓
D	✗	✗

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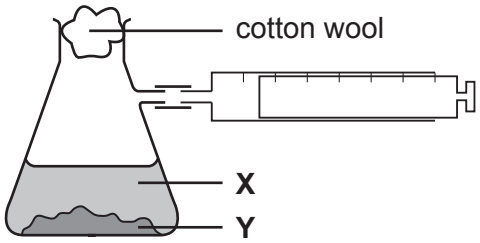
16 A liquid **X** reacts with solid **Y** to form a gas.

Which **two** diagrams show suitable methods for investigating the speed of the reaction?

1



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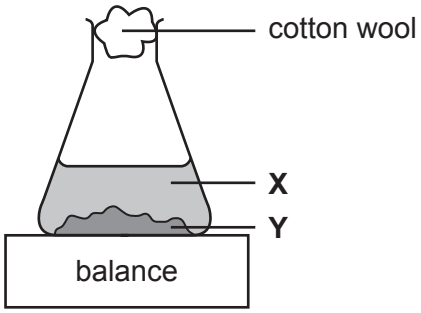

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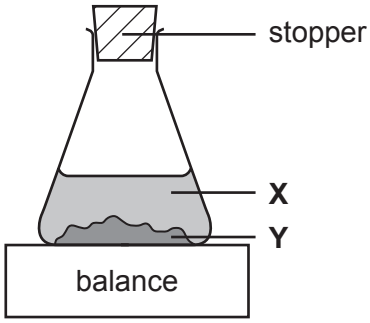

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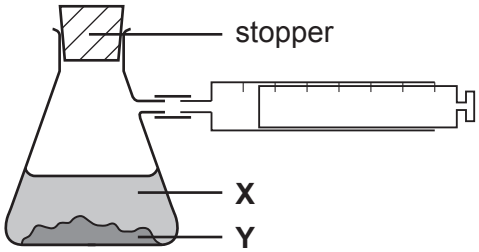
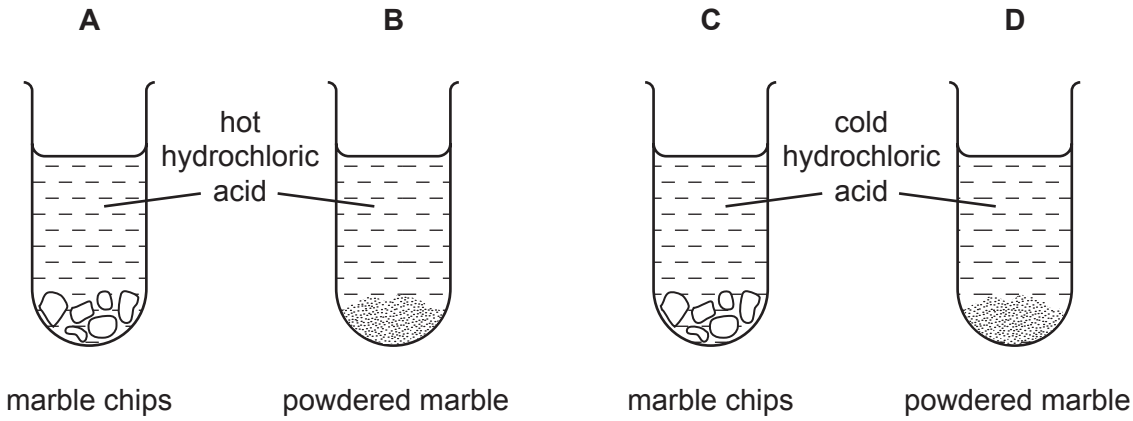


A 1 and 3 **B** 1 and 4 **C** 2 and 3 **D** 2 and 4

17 In different experiments, 2 g of marble are added to 10 cm^3 of hydrochloric acid.

In which tube is the reaction fastest?



18 What is the colour of liquid bromine and of the aqueous bromide ion?

	bromine	bromide ion
A	red-brown	red-brown
B	red-brown	colourless
C	yellow-green	yellow-green
D	yellow-green	colourless

19 Which property does hydrochloric acid have?

A It gives a pale blue precipitate with aqueous copper(II) sulphate.

B It gives a white precipitate with aqueous barium nitrate.

C It releases ammonia from aqueous ammonium sulphate.

D It releases hydrogen with zinc powder.

20 Hydrochloric acid is used to clean a metal surface by removing the oxide layer on the metal.

This is because hydrochloric acid has a …..**X**….. pH and the metal oxide is …..**Y**…..

What are **X** and **Y**?

	X	**Y**
A	high	acidic
B	high	basic
C	low	acidic
D	low	basic

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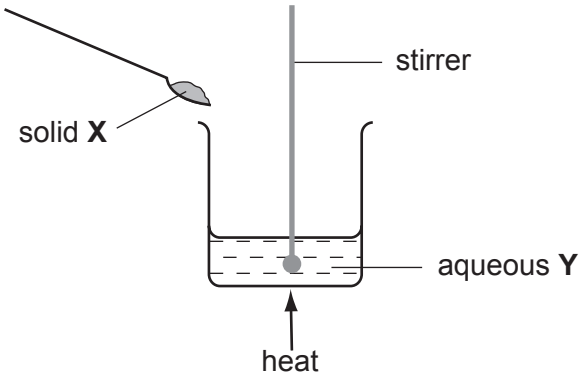
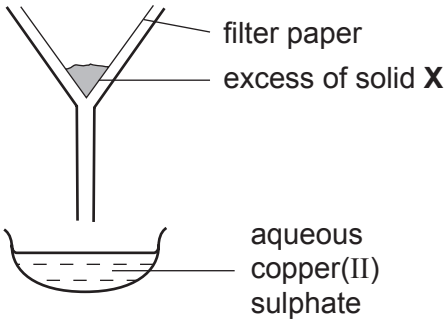
21 The apparatus shown can be used to prepare aqueous copper(II) sulphate.

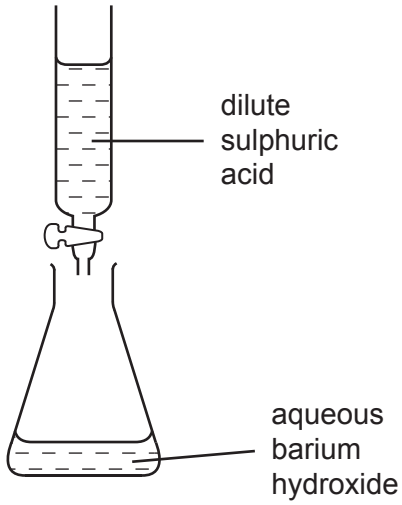




What are substances **X** and **Y**?

	substance **X**	substance **Y**
A	copper	iron(II) sulphate
B	copper(II) chloride	sulphuric acid
C	copper(II) oxide	sulphuric acid
D	sulphur	copper(II) chloride

22 In the experiment shown, the dilute sulphuric acid is run into the flask of aqueous barium hydroxide until the reaction is complete.



Which processes occur in this reaction?

	neutralisation	precipitation
A	✓	✓
B	✓	✗
C	✗	✓
D	✗	✗

23 The chemical properties of an element depend mainly on the number of

A electrons in the innermost shell.

B electrons in the outermost shell.

C fully occupied shells of electrons.

D partly occupied shells of electrons.

24 An element **X** is in Group III of the Periodic Table.

Which property of **X** can be predicted from this fact?

A the charge on an ion of **X**

B the colour of the ion of **X**

C the melting point of **X**

D the relative atomic mass, A_r, of **X**

25 The table compares the properties of Group I elements with those of transition elements.

Which entry in the table is correct?

	property	Group I elements	transition elements
A	catalytic activity	low	high
B	density	high	low
C	electrical conductivity	low	high
D	melting point	high	low

26 Caesium is near the bottom of Group I of the Periodic Table.

What is the correct description of caesium?

	state at room temperature	reaction with cold water
A	liquid	reacts quickly
B	liquid	reacts slowly
C	solid	reacts quickly
D	solid	reacts slowly

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27 Mild steel is an alloy of iron and carbon.

How does the carbon affect the properties of mild steel?

A The carbon makes the alloy a better conductor of electricity than iron.

B The carbon makes the alloy harder than the iron.

C The carbon makes the alloy softer than the iron.

D The carbon stops the iron rusting.

28 Which metal reacts quickly with cold water only when it is finely powdered?

A calcium

B copper

C sodium

D magnesium

29 Which of the oxides CaO, CuO and Na_2O can be reduced by heating with carbon?

A CaO only

B CuO only

C Na_2O only

D CaO, CuO and Na_2O

30 Three stages in making steel from iron ore are listed.

X carbon dioxide reacts with carbon

Y basic oxides and oxygen are added

Z hematite is reduced

In which order do these stages occur?

A $X \rightarrow Y \rightarrow Z$

B $X \rightarrow Z \rightarrow Y$

C $Y \rightarrow X \rightarrow Z$

D $Z \rightarrow Y \rightarrow X$

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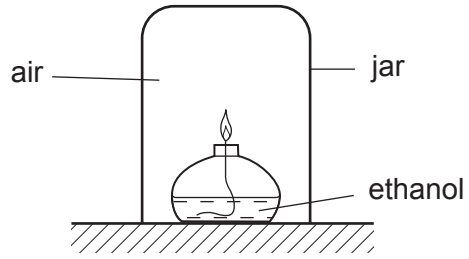
31 The diagram shows ethanol burning inside a sealed jar.



The mass of one gas in the jar does not change.

Which gas is this?

A carbon dioxide

B nitrogen

C oxygen

D water vapour

32 Which methods prevent rusting of iron?

	coating with zinc	painting	washing with distilled water
A	✓	✓	✓
B	✗	✓	✓
C	✓	✓	✗
D	✓	✗	✗

33 Which processes do **not** use oxygen?

1 burning natural gas

2 heating a room with an electric fire

3 welding apparatus

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

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34 The presence of nitrates in soil can be shown by warming the soil with aqueous sodium hydroxide and aluminium foil.

Which gas is given off?

A ammonia

B carbon dioxide

C nitrogen

D nitrogen dioxide

35 Dolomite is a rock that contains magnesium carbonate.

A piece of dolomite is heated strongly in air.

Which word equation correctly describes the reaction that takes place?

A magnesium carbonate + water → magnesium hydroxide + carbon dioxide

B magnesium carbonate + oxygen → magnesium oxide + carbon dioxide + water

C magnesium carbonate + oxygen → magnesium oxide + water

D magnesium carbonate → magnesium oxide + carbon dioxide

36 Which two compounds have molecules in which there is a double bond?

A ethane and ethanoic acid

B ethane and ethanol

C ethene and ethanoic acid

D ethene and ethanol

37 Which substance is found in crude oil?

A bitumen

B ethanol

C ethanoic acid

D poly(ethene)

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38 Which statement about a family of organic compounds describes an homologous series?

All compounds in the family have the same

A functional group.

B physical properties.

C relative molecular mass.

D structural formula.

39 Which column describes ethane and which column describes ethene?

	hydrocarbon			
	1	**2**	**3**	**4**
state at room temperature	gas	gas	liquid	liquid
reaction with oxygen	burns	burns	burns	burns
reaction with aqueous bromine	no reaction	decolourises bromine	no reaction	decolourises bromine

A **1** (ethane) and **2** (ethene)

B **1** (ethane) and **3** (ethene)

C **2** (ethene) and **3** (ethane)

D **3** (ethane) and **4** (ethene)

40 Which of the products $C_{12}H_{24}$ and H_2 could be formed by cracking dodecane, $C_{12}H_{26}$?

	$C_{12}H_{24}$	H_2
A	✗	✗
B	✗	✓
C	✓	✗
D	✓	✓

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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	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	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	Po Polonium 84	At Astatine 85	Rn Radon 86
Fr Francium 87	226 Ra Radius 88	227 Ac Actinium 89															

140 Ce Cerium 58	141 Pr Praseodymium 59	144 Nd Neodymium 60	Pm Promethium 61	150 Sm Samarium 62	152 Eu Europium 63	157 Gd Gadolinium 64	159 Tb Terbium 65	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	Pa Protactinium 91	238 U Uranium 92	Np Neptunium 93	Pu Plutonium 94	Am Americium 95	Cm Curium 96	Bk Berkelium 97	Cf Californium 98	Es Einsteinium 99	Fm Fermium 100	Md Mendelevium 101	No Nobelium 102	Lr Lawrencium 103

*58-71 Lanthanoid series
90-103 Actinoid series

Key: a / X / b

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

The volume of one mole of any gas is 24 dm^3 at room temperature and pressure (r.t.p.).