UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
International General Certificate of Secondary Education

CHEMISTRY **0620/01**

Paper 1 Multiple Choice **October/November 2008**

45 Minutes

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

6400528663

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 In which substance are the particles furthest apart at room temperature?

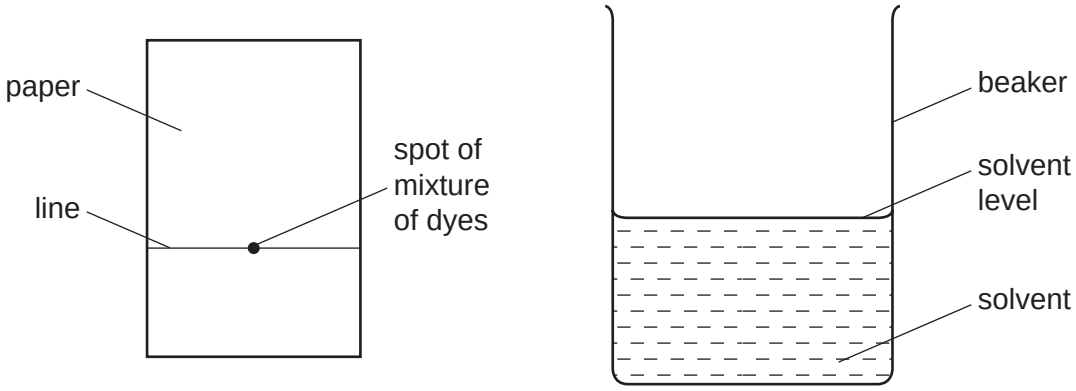
A ethanol

B methane

C salt

D sugar

2 An experiment is carried out to separate a mixture of two dyes. A line is drawn on a piece of chromatography paper and a spot of the dye mixture placed on it. The paper is dipped into a solvent and left for several minutes.



Which statement about this experiment is correct?

A The dyes must differ in their boiling points.

B The dyes must differ in their solubilities in the solvent.

C The line must be drawn in ink.

D The line must be placed below the level of the solvent.

3 An aqueous solution contains barium iodide.

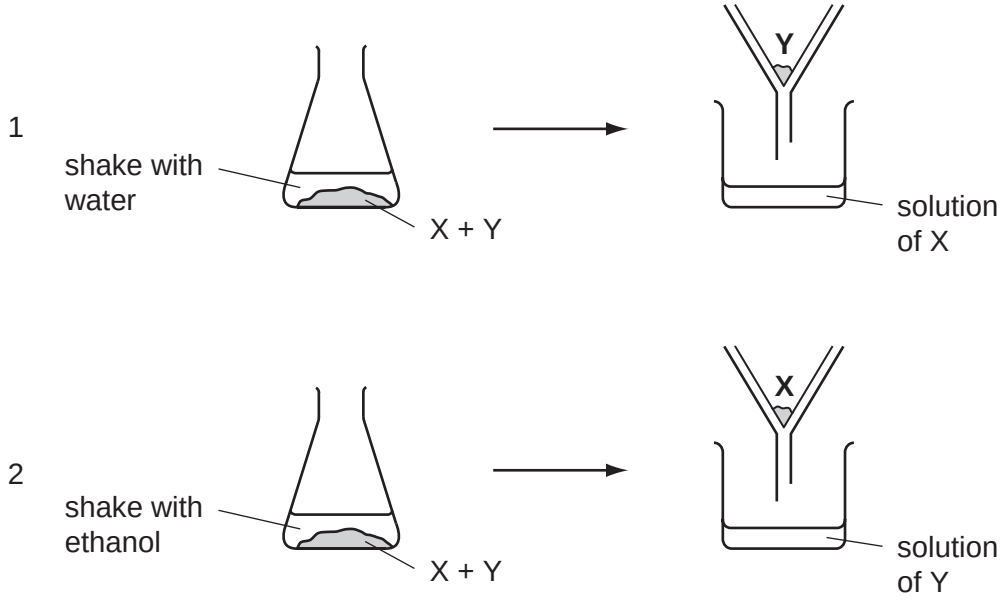
It is possible to obtain a solution that contains $Ba^{2+}(aq)$ but no $I^{-}(aq)$ by adding ……1…… until no more ……2…… precipitate forms.

Which words correctly complete gaps 1 and 2?

	1	2
A	aqueous lead(II) nitrate	white
B	aqueous lead(II) nitrate	yellow
C	dilute sulphuric acid	white
D	dilute sulphuric acid	yellow

4 A solid mixture contains an ionic salt, X, and a covalent organic compound, Y.

Two students suggested methods of separating the mixture as shown.



Which methods of separation are likely to work?

	1	2
A	✓	✓
B	✓	✗
C	✗	✓
D	✗	✗

5 What do the nuclei in hydrogen molecules contain?

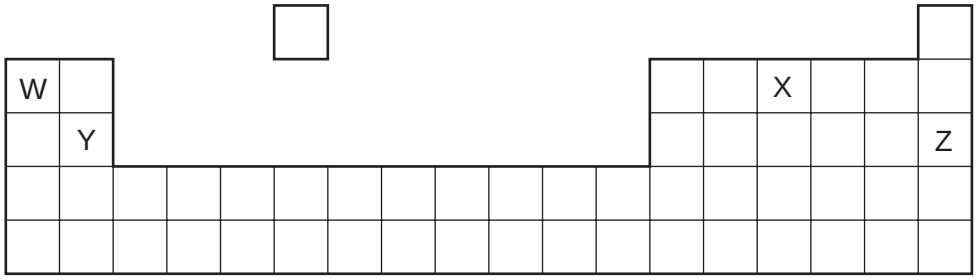
A electrons and neutrons

B electrons and protons

C neutrons only

D protons only

6 The diagram shows part of the Periodic Table.



Which element is correctly matched with its electronic structure?

	element	electronic structure
A	W	2,8,1
B	X	2,4
C	Y	2,8,2
D	Z	2,8

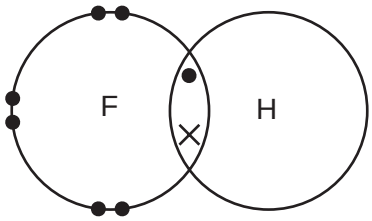
7 Which of the following compounds exist?

	RaAr	RbBr
A	✓	✓
B	✓	✗
C	✗	✓
D	✗	✗

8 Which particle is an ion?

	number of protons	number of neutrons	number of electrons
A	1	0	1
B	3	4	3
C	6	6	6
D	11	12	10

9 The diagram shows a molecule of hydrogen fluoride.



In the molecule hydrogen fluoride, HF,

A the hydrogen and fluorine share a pair of electrons.

B the hydrogen and fluorine share a pair of protons.

C the hydrogen gives the fluorine an electron.

D the hydrogen gives fluorine a proton.

10 Lead(II) nitrate can be decomposed as shown.

$$xPb(NO_3)_2 \rightarrow yPbO + zNO_2 + O_2$$

Which numbers x, y and z balance the equation?

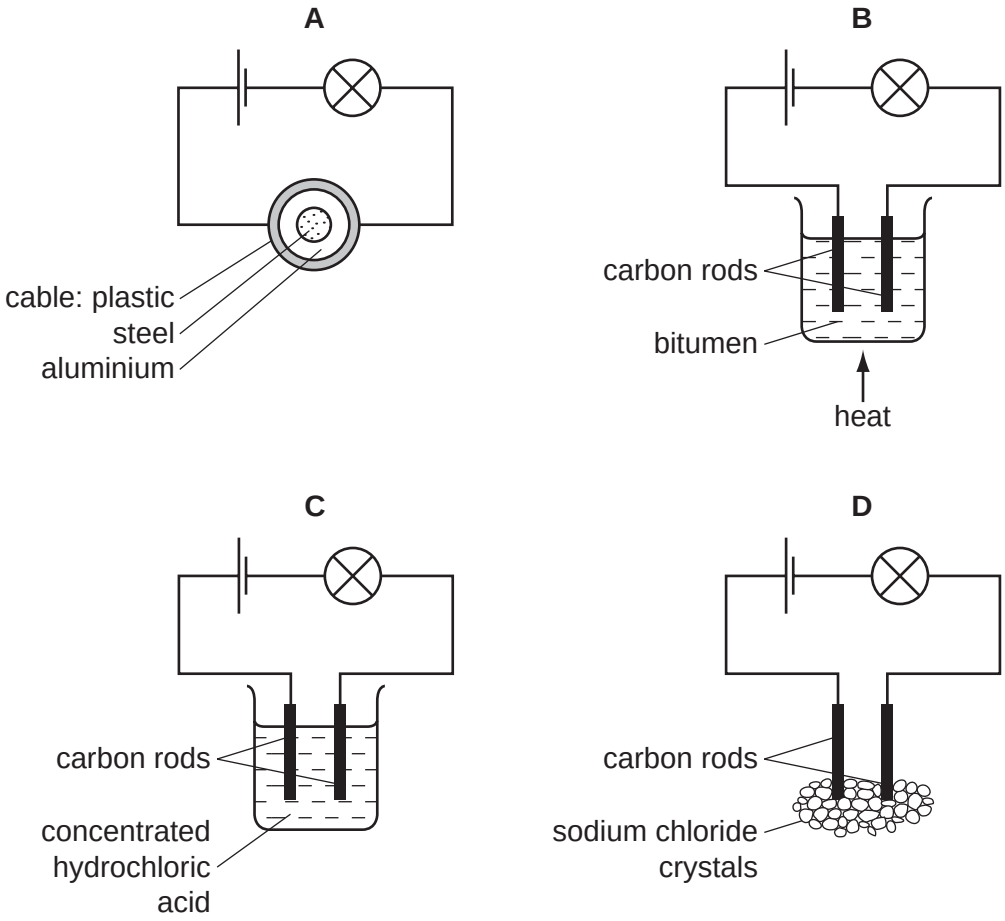
	x	y	z
A	2	2	2
B	2	2	4
C	2	4	4
D	4	4	2

11 Carbon and chlorine form a chloride.

What is the formula of this chloride?

A CCl_2 **B** CCl_4 **C** $CaCl_2$ **D** $CaCl_4$

12 Which diagram shows an experiment in which the bulb lights?



13 Metal X is low in the reactivity series and it is liberated by electrolysis of its bromide.

Metal X is ……1…… and the bromide is ……2…… .

Which words correctly complete gaps 1 and 2?

	1	2
A	lead	in solution
B	lead	molten
C	sodium	in solution
D	sodium	molten

14 Copper and hydrogen can each be formed by electrolysis.

At which electrodes are these elements formed?

	copper	hydrogen
A	anode	anode
B	anode	cathode
C	cathode	anode
D	cathode	cathode

15 When solid X is dissolved in water, an endothermic change takes place.

When 5 g of X are dissolved in 1000 cm^3 of water, a temperature change of 10 °C occurs.

Which temperature change occurs when 5 g of X are dissolved in 500 cm^3 of water?

A a decrease of 20 °C

B a decrease of 5 °C

C an increase of 20 °C

D an increase of 5 °C

16 The elements H_2 and ^{235}U are both used as fuels.

In these processes, the reactions are ……1…… and ……2…… oxidised.

Which words correctly complete gaps 1 and 2?

	1	2
A	endothermic	both elements are
B	endothermic	only hydrogen is
C	exothermic	both elements are
D	exothermic	only hydrogen is

17 In which of the following reactions is the substance printed in **bold** oxidised?

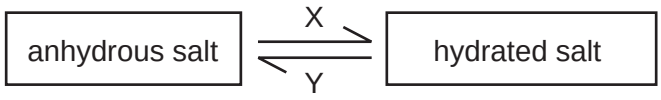
A burning the **wax** in a candle

B dissolving **hydrogen chloride** in water

C making glucose from **carbon dioxide** and water by photosynthesis

D reacting **sodium hydroxide** with sulphuric acid

18 The diagram shows the change from a salt to its hydrated form.



Which labels can be used for X and Y?

	X	Y
A	+ heat	+ water
B	+ heat	– water
C	+ water	+ heat
D	+ water	– heat

19 Oxygen is formed when manganese(IV) oxide is added to hydrogen peroxide, H_2O_2.

$$2H_2O_2 \rightarrow 2H_2O + O_2$$

In this reaction, the manganese(IV) oxide acts as

A an acid.

B a base.

C a catalyst.

D a drying agent.

20 Dilute hydrochloric acid is added to aqueous barium nitrate in a test-tube.

What happens?

	the pH of the liquid in the test-tube	a precipitate forms
A	decreases	yes
B	decreases	no
C	increases	yes
D	increases	no

21 A colourless liquid in an unlabelled bottle is tested as shown.

- Litmus paper turns red.
- Magnesium ribbon fizzed.
- Reaction with aqueous barium nitrate produced a white precipitate.

What is the colourless liquid?

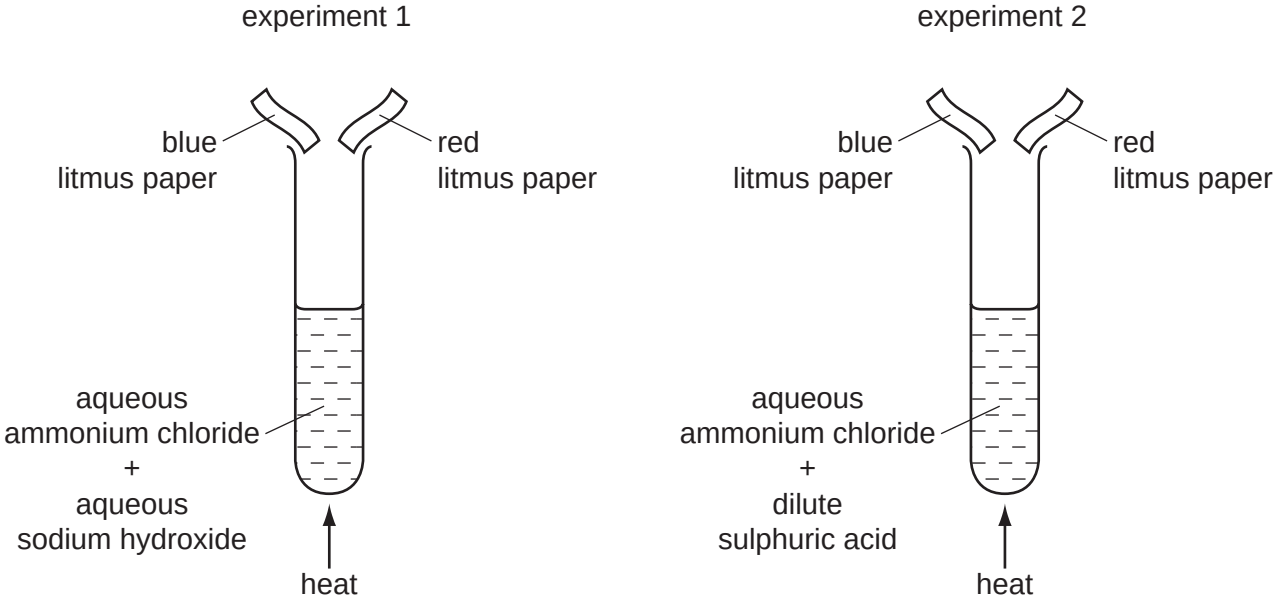
A aqueous sodium hydroxide

B aqueous sodium sulphate

C dilute hydrochloric acid

D dilute sulphuric acid

22 The diagrams show two experiments.



What happens to the pieces of litmus paper?

	experiment 1	experiment 2
A	blue → red	both pieces bleached
B	blue → red	no change
C	red → blue	both pieces bleached
D	red → blue	no change

23 Which substances react with dilute sulphuric acid to form a salt?

	magnesium	magnesium oxide	magnesium carbonate	magnesium chloride
A	✓	✓	✓	✗
B	✓	✓	✗	✓
C	✓	✗	✓	✓
D	✗	✓	✓	✓

24 Which properties of the element titanium, Ti, can be predicted from its position in the Periodic Table?

	can be used as a catalyst	conducts electricity when solid	has low density	forms coloured compounds
A	✗	✓	✓	✓
B	✓	✗	✓	✓
C	✓	✓	✗	✓
D	✓	✓	✓	✗

25 The table gives information about four elements.

Which element could be in Group I of the Periodic Table?

	proton number	reaction with water
A	even	reacts
B	even	no reaction
C	odd	reacts
D	odd	no reaction

26 What is the formula of a strontium ion?

A Sr^{2+} **B** Sr^{+} **C** Sr^{-} **D** Sr^{2-}

27 Nichrome is an alloy of the two transition elements nickel and chromium. The alloy is used as the heating coil in electric fires and electric toasters.

Which properties of nichrome are important for these uses?

	high melting point	resistant to oxidation
A	✓	✓
B	✓	✗
C	✗	✓
D	✗	✗

28 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.

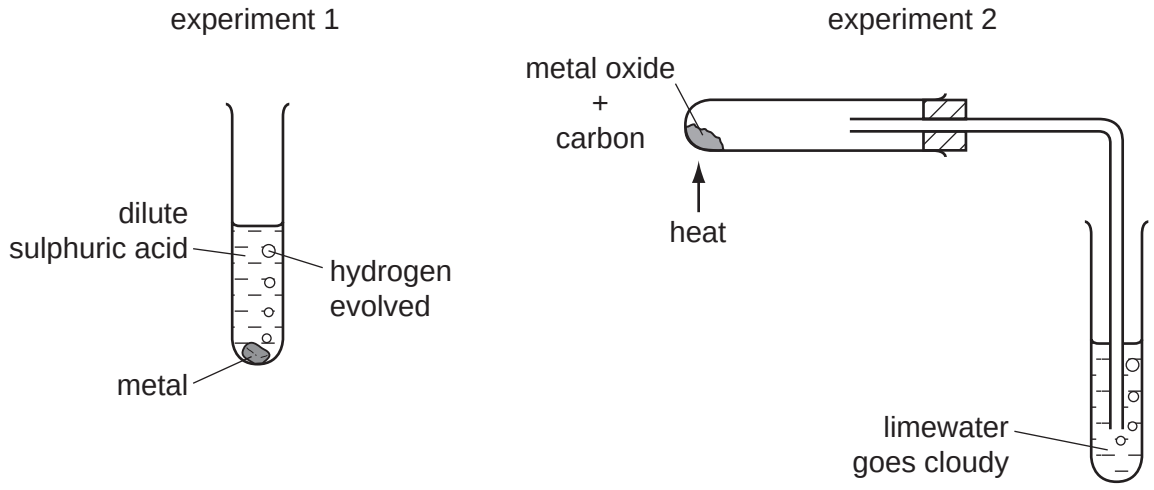
D The carbon stops the iron rusting.

29 A new isotope of a divalent metal is discovered. Some students are asked to predict its properties.

Which student's predictions are correct?

student	number of electrons in outer shell	bonding in the oxide
A	2	covalent
B	2	ionic
C	6	covalent
D	6	ionic

30 The diagrams show two experiments to investigate metal reactivity.



In which of these experiments could the metal be copper?

	experiment 1	experiment 2
A	✓	✓
B	✓	✗
C	✗	✓
D	✗	✗

31 Which reaction is **not** a step in the production of iron from hematite in the Blast Furnace?

A carbon (coke) burning in air to produce carbon dioxide

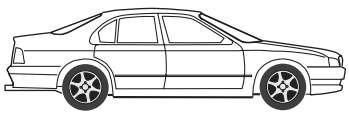
B carbon monoxide being formed from carbon and carbon dioxide

C iron oxide reacting with carbon monoxide to form iron

D iron reacting with limestone to produce slag

32 Which item is sometimes made from stainless steel?

A

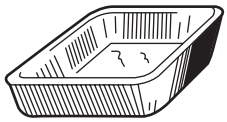


car body

B

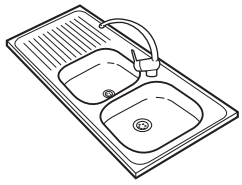
drinks can

C



food container

D



kitchen sink

33 Some pollutant gases are present in the atmosphere because of the combustion of fossil fuels.

For which gases is this statement correct?

	CO	NO_2	SO_2
A	✓	✓	✓
B	✓	✓	✗
C	✓	✗	✓
D	✗	✓	✓

34 Air is a mixture of gases.

Which gas is present in the largest amount?

A argon

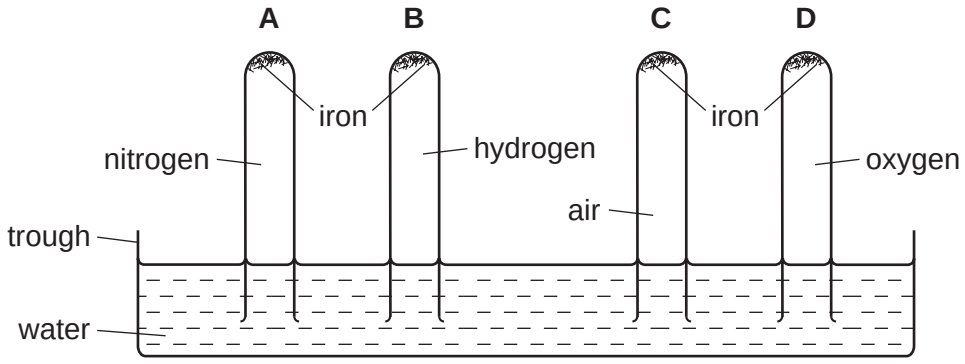
B carbon dioxide

C nitrogen

D oxygen

35 The experiment shown in the diagram was set up.

Which tube had the highest water level after one month?



36 An excess of fertiliser on a field can be dissolved by rain water and washed into streams and rivers. Fertiliser can then find its way into water supplies.

Which process at the water works, if any, would remove this fertiliser?

	filtration	chlorination
A	no	no
B	no	yes
C	yes	no
D	yes	yes

37 When added in turn to four solutions, aqueous sodium carbonate gives the following results.

Which solution is acidic?

solution	result
A	a blue precipitate forms
B	a white precipitate forms
C	bubbles of gas form
D	no visible reaction occurs

38 Which products are obtained by the cracking of an alkane?

	alkene	hydrogen	water
A	✓	✓	✓
B	✓	✓	✗
C	✓	✗	✓
D	✗	✓	✓

39 A compound takes part in an addition reaction.

How does its name end?

A …..ane

B …..ene

C …..ol

D …..oic acid

40 When glucose is fermented, ethanol is formed together with

A carbon dioxide.

B ethene.

C methane.

D oxygen.

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DATA SHEET
The Periodic Table of the Elements

Group																		
I	II										III	IV	V	VI	VII	0
																4 **He** Helium 2
					1 **H** Hydrogen 1											
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	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	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** Radium 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.).