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)

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.

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UNIVERSITY of CAMBRIDGE
International Examinations

[Turn over

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

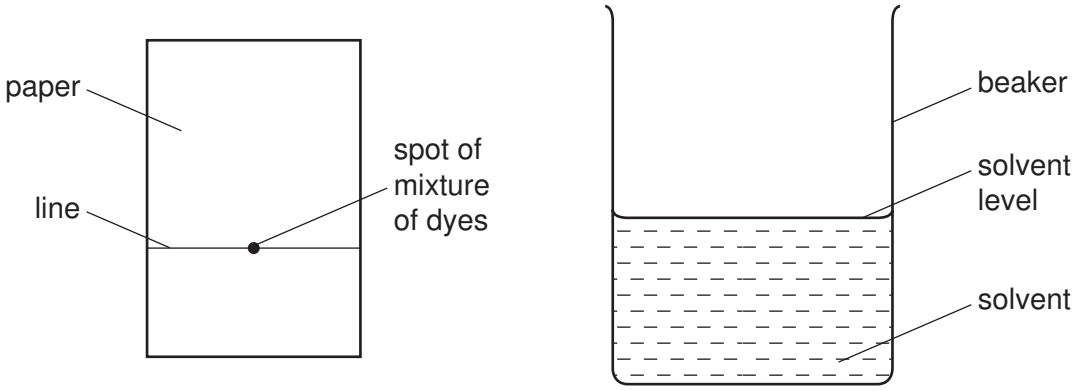
A ethanol

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.

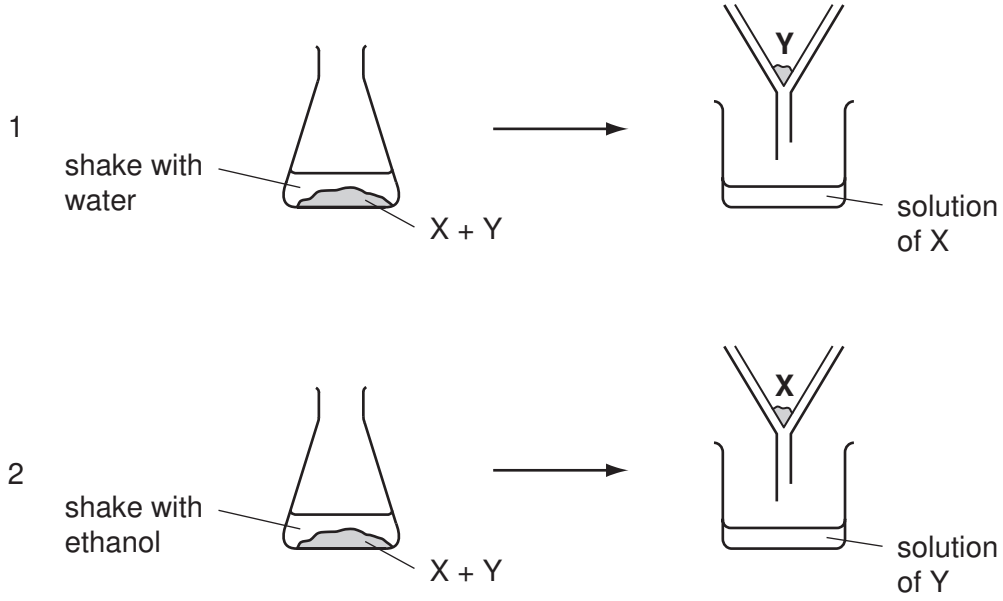
It is possible to obtain a solution that contains $Ba^{2+}(aq)$ but no $I^{-}(aq)$ by adding ……1…… until no more ……2…… precipitate forms.

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?

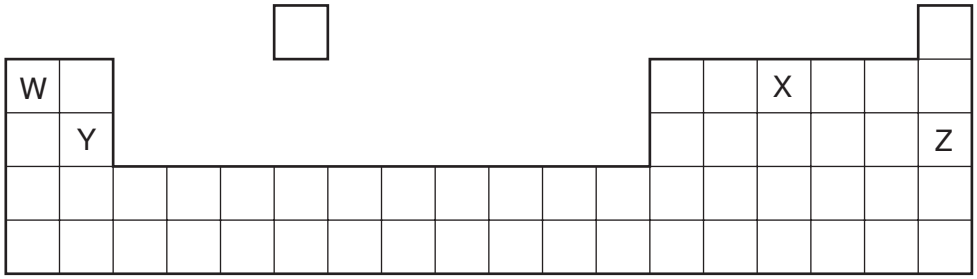
A electrons and neutrons

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

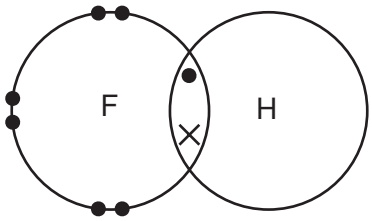
7 Which of the following compounds exist?

	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?

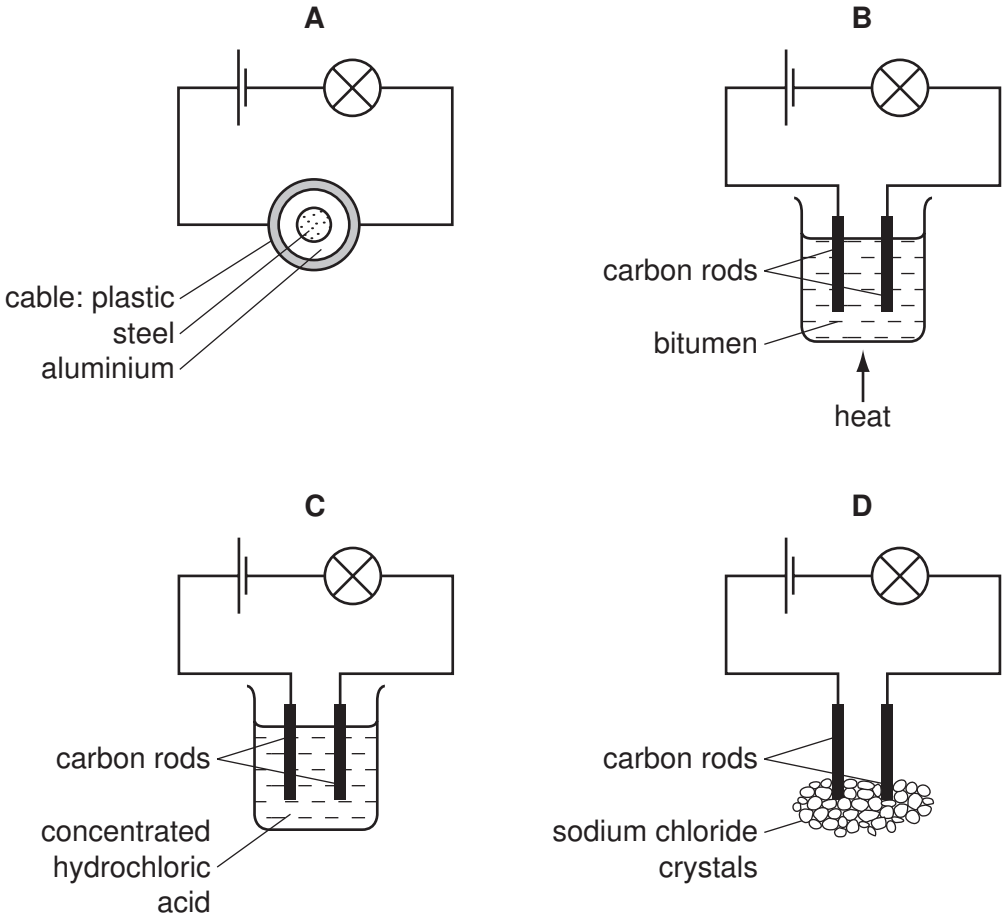
	x	y	z
A	2	2	2
B	2	2	4
C	2	4	4
D	4	4	2

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?

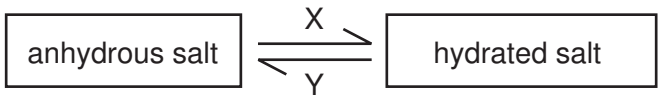
A burning the **wax** in a candle

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?

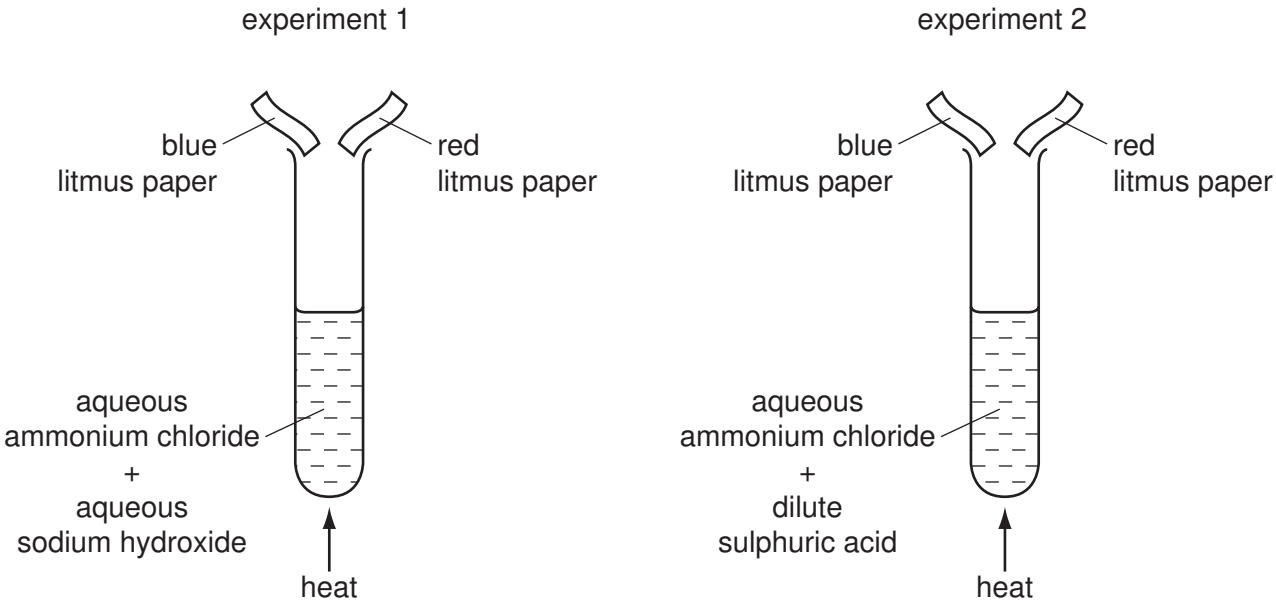
A aqueous sodium hydroxide

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.

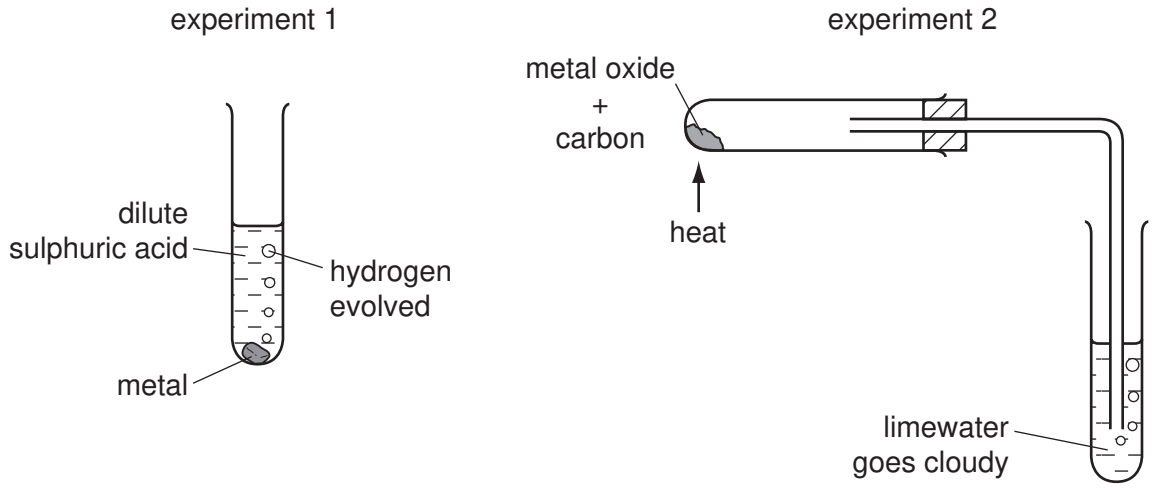
D The carbon stops the iron rusting.

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

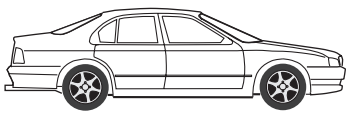
B carbon monoxide being formed from carbon and carbon dioxide

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

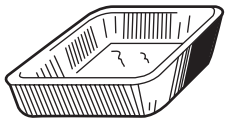


car body

B

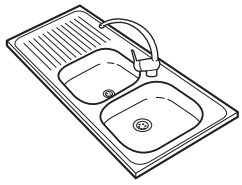
drinks can

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

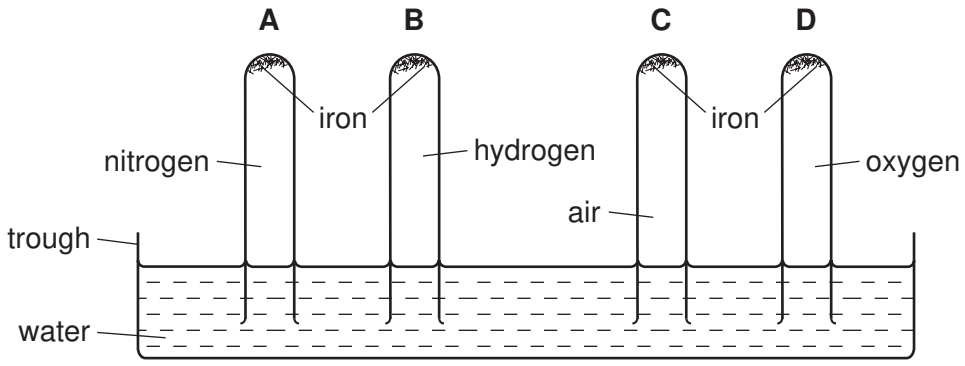
B carbon dioxide

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	Group II											Group III	Group IV	Group V	Group VI	Group VII	Group 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 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 = 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.).