UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
International General Certificate of Secondary Education

CHEMISTRY **0620/01**

Paper 1 Multiple Choice **May/June 2008**

45 Minutes

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

8469352397

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.

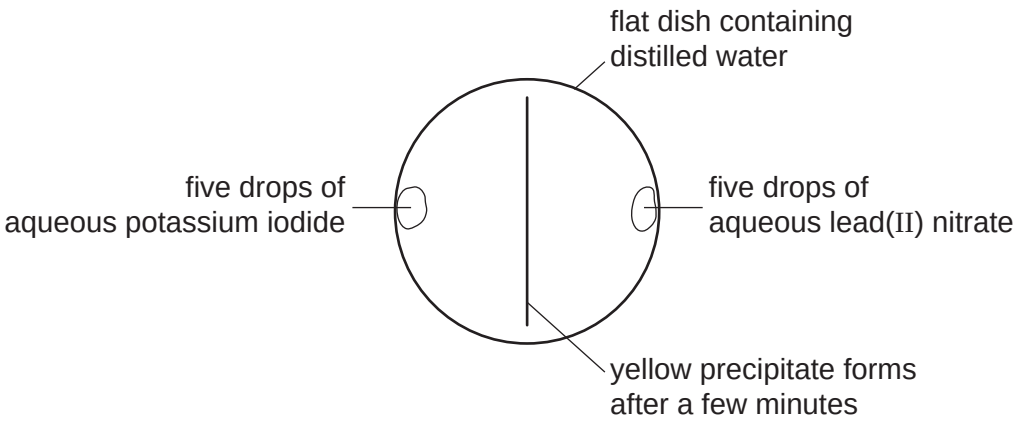
There are **forty** questions on this paper. Answer **all** questions. For each question there are four possible answers **A**, **B**, **C** and **D**.
Choose the **one** you consider correct and record your choice in **soft pencil** on the separate Answer Sheet.

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 A yellow precipitate is formed in the experiment shown.



How is the precipitate formed?

A Particles collide, diffuse and then react.

B Particles collide, react and then diffuse.

C Particles diffuse, collide and then react.

D Particles diffuse, react and then collide

2 A student is asked to measure the time taken for 4.00 g of magnesium carbonate to react completely with 25.0 cm^3 (an excess) of dilute hydrochloric acid.

Which pieces of apparatus does the student need?

A balance, clock, pipette

B balance, clock, thermometer

C balance, pipette, thermometer

D clock, pipette, thermometer

3 Chromatography and fractional distillation can be used to separate compounds.

In which type of separation is a thermometer needed for checking that complete separation has occurred?

A chromatographic separation of two colourless solids

B chromatographic separation of two solids of different colours

C fractional distillation of two colourless liquids

D fractional distillation of two liquids of different colours

4 The nucleon number and proton number of the lithium atom are shown by the symbol

What is the correct symbol for the lithium ion in lithium chloride?

A $^{6}_{2}Li^{-}$ **B** $^{6}_{3}Li^{+}$ **C** $^{7}_{3}Li^{+}$ **D** $^{7}_{3}Li^{-}$

5 The table shows the numbers of particles present in the nuclei of four atoms or ions.

	protons	neutrons	electron structure
1	18	22	2,8,8
2	19	20	2,8,8
3	19	21	2,8,8,1
4	20	20	2,8,8,2

Which two particles belong to the same element?

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

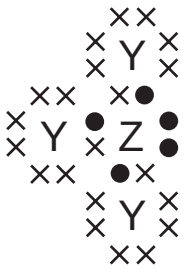
6 What are the nucleon numbers for carbon and magnesium?

	carbon	magnesium
A	6	12
B	6	24
C	12	12
D	12	24

7 Which of the following can be used as a lubricant?

	graphite	a liquid fraction from petroleum
A	✓	✓
B	✓	✗
C	✗	✓
D	✗	✗

8 The diagram shows the outer shell electron arrangement of compound J that [illegible] elements Y and Z.



What type of compound is J?

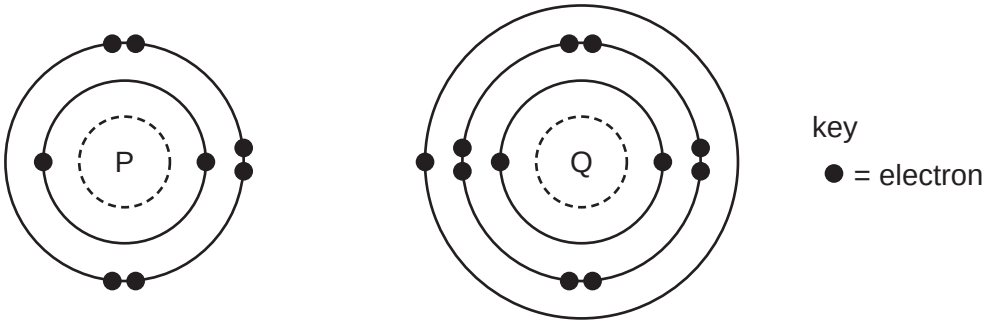
A an alloy

B a macromolecule

C covalent

D ionic

9 The electronic structures of atoms P and Q are shown.



P and Q react to form an ionic compound.

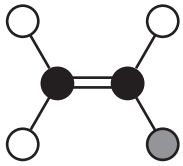
What is the formula of this compound?

A PQ_2 **B** P_2Q **C** P_2Q_6 **D** P_6Q_2

10 For which compound is the formula correct?

	compound	formula
A	ammonium chloride	NH_3Cl
B	copper(II) sulphide	CuS
C	iron(II) sulphide	Fe_3S
D	silver nitrate	Ag_2NO_3

11 The diagram shows a molecule of vinyl chloride (used to make pvc).



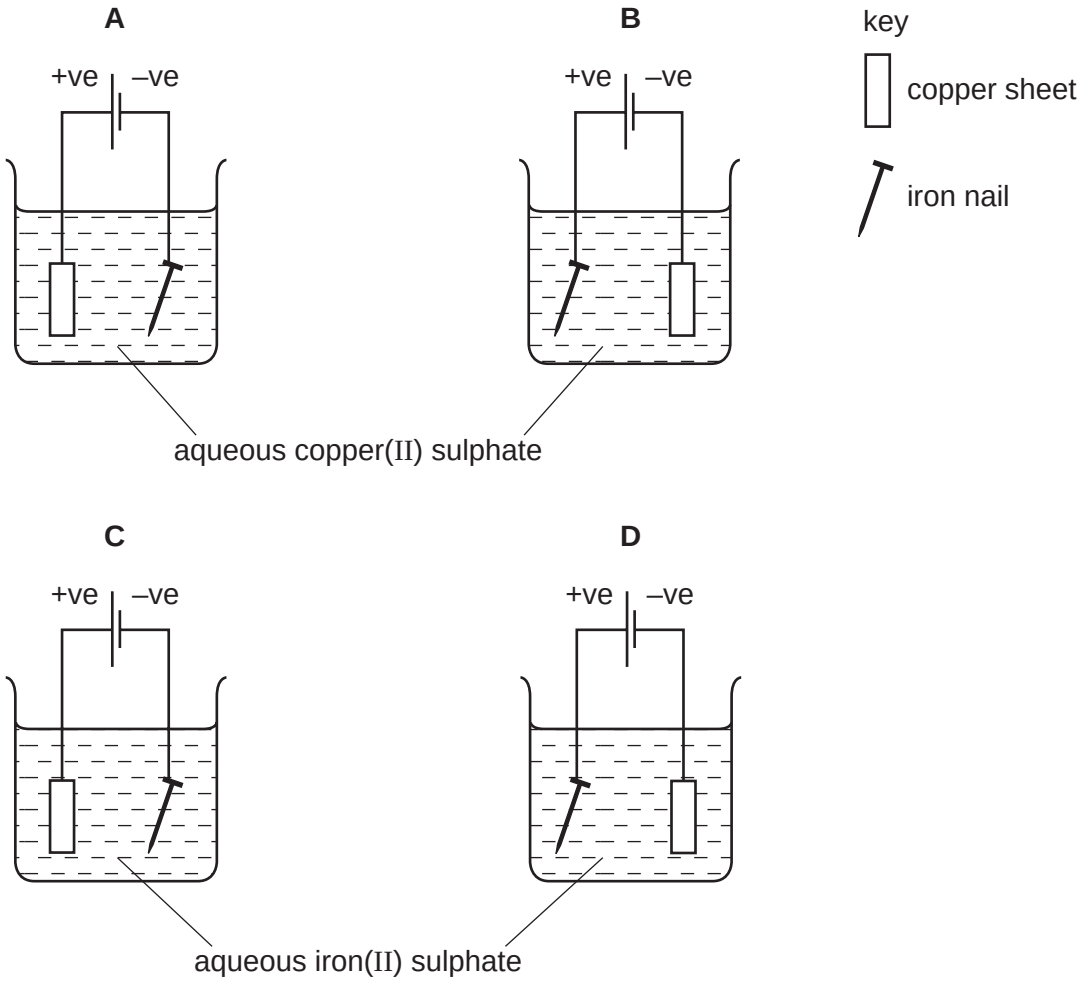
key

- a carbon atom
- a chlorine atom
- a hydrogen atom

What is the formula of vinyl chloride?

A CH_2Cl_3 **B** CH_3Cl_2 **C** C_2HCl_3 **D** C_2H_3Cl

12 Which apparatus could be used to electroplate an iron nail with copper?



13 Two elements X and Y form ionic compounds, XBr_2 and Y_2O_3. The compounds ar[illegible] melted and electricity is passed through the liquids.

What are the products at the cathodes?

A bromine and oxygen

B bromine and Y

C oxygen and X

D X and Y

14 Which change can take place during electrolysis?

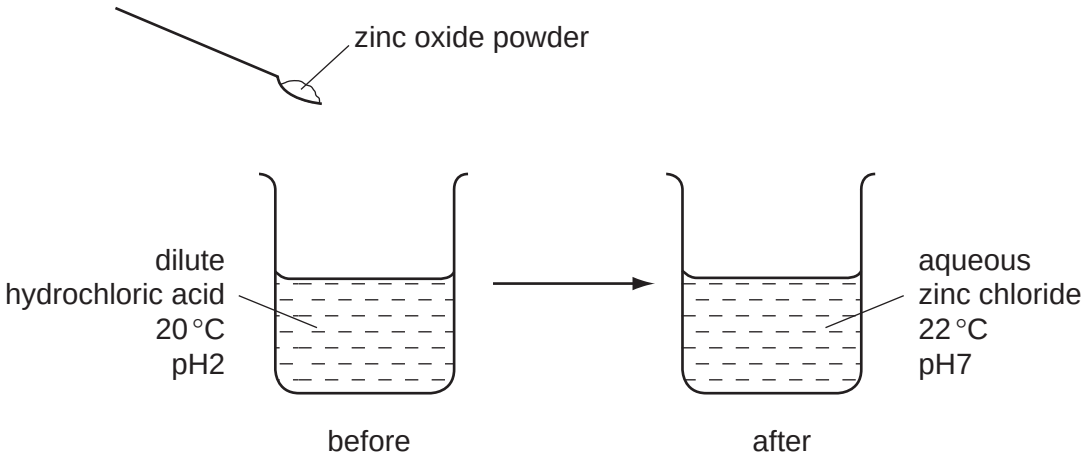
A lead(IV) oxide → lead(II) oxide + oxygen

B concentrated hydrochloric acid → hydrogen + chlorine

C sodium hydroxide + nitric acid → sodium nitrate + water

D lead(II) nitrate + sulphuric acid → lead(II) sulphate + nitric acid

15 The diagram shows an experiment.



Which terms describe the experiment?

	endothermic	neutralisation
A	✓	✓
B	✓	✗
C	✗	✓
D	✗	✗

16 Charcoal and uranium are used as sources of energy.

Which of them are oxidised when used in this way?

	charcoal	uranium
A	✓	✓
B	✓	✗
C	✗	✓
D	✗	✗

17 Magnesium reacts with acids to produce hydrogen gas.

Under which set of conditions is hydrogen formed the most slowly?

	magnesium	acid	temperature / °C
A	ribbon	concentrated	40
B	ribbon	dilute	20
C	powder	concentrated	40
D	powder	dilute	20

18 When written as formulae, which compound has the greatest number of oxygen atoms?

A calcium oxide

B copper(II) oxide

C iron(III) oxide

D potassium oxide

19 The equation explains the colour change that occurs when aqueous potassium [illegible] added to aqueous potassium dichromate(VI).

$$\underset{\substack{\text{potassium}\\\text{dichromate(VI)}\\\text{orange}}}{K_2Cr_2O_7} + 2KOH \rightarrow \underset{\substack{\text{potassium}\\\text{chromate(VI)}\\\text{yellow}}}{2K_2CrO_4} + H_2O$$

As a result of adding an excess of aqueous potassium hydroxide to aqeous potassium dichromate(VI), what happens to the oxidation state of the chromium and the pH of the reaction mixture?

	oxidation state of the chromium	pH of the mixture
A	decreases	decreases
B	decreases	increases
C	stays the same	decreases
D	stays the same	increases

20 An oxide of element X dissolves in water to form a solution of pH 5.

Which line in the table is correct?

	type of element	type of oxide
A	metallic	acidic
B	metallic	basic
C	non-metallic	acidic
D	non-metallic	basic

21 Which statement describes a test for carbon dioxide gas?

A It bleaches damp litmus paper.

B It relights a glowing splint.

C It turns cobalt(II) chloride paper pink.

D It turns limewater cloudy.

22 A solution of zinc sulphate can be made by adding an excess **either** of zinc carbonate or of zinc hydroxide to dilute sulphuric acid.

In which forms are these zinc compounds added to the acid?

	zinc carbonate	zinc hydroxide
A	aqueous	aqueous
B	aqueous	solid
C	solid	aqueous
D	solid	solid

23 Which aqueous ion causes a white precipitate to form when acidified aqueous silver nitrate is added to it?

A chloride

B iodide

C nitrate

D sulphate

24 What is the colour of gaseous chlorine and of solid sodium chloride?

	chlorine	sodium chloride
A	colourless	yellow-green
B	colourless	white
C	yellow-green	yellow-green
D	yellow-green	white

25 The Group I elements lithium and potassium are tested.

Which element has the higher melting point and which element reacts more vigorously with water?

	higher melting point	more vigorous reaction with water
A	lithium	lithium
B	lithium	potassium
C	potassium	lithium
D	potassium	potassium

26 The proton numbers of four elements are shown.

Which element forms a singly charged positive ion in its salts?

element	proton number
A	34
B	35
C	36
D	37

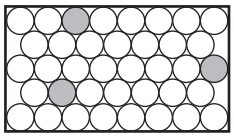
27 The table gives information about four elements.

Which element is a transition metal?

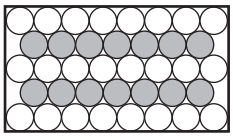
	electrical conductivity	density g/cm^3	melting point in °C
A	good	0.97	98
B	good	7.86	1535
C	poor	2.33	1410
D	poor	3.12	–7

28 Which diagram best represents the structure of a solid alloy?

A



B



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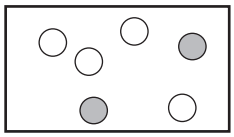
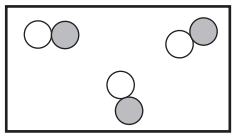


D



29 Element E

- forms an alloy;
- has a basic oxide;
- is below hydrogen in the reactivity series.

What is element E?

A carbon

B copper

C sulphur

D zinc

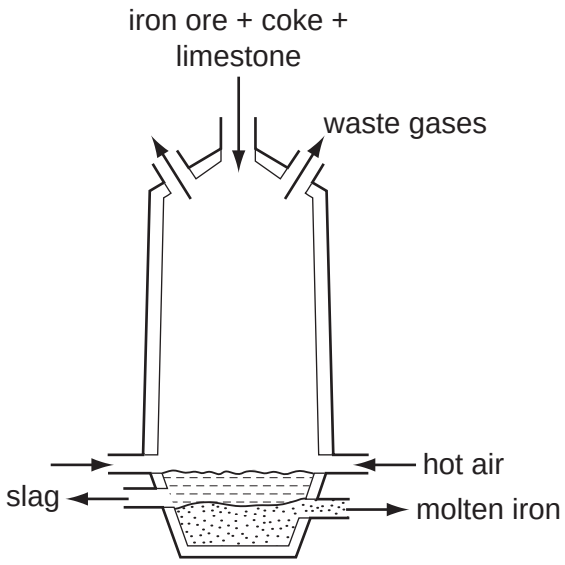
30 The position of metal X in the reactivity series is shown.

K Na Mg Fe (H) X

Which statements about X and its oxide are correct?

	reaction of X with dilute hydrochloric acid	reaction of oxide of X with carbon
A	hydrogen formed	no reaction
B	hydrogen formed	oxide reduced
C	no reaction	no reaction
D	no reaction	oxide reduced

31 The diagram shows a blast furnace used to extract iron from iron ore.



Why is limestone added to the furnace?

A to cause the furnace to heat up

B to change the ore into iron

C to convert impurities in the ore into slag

D to produce oxygen for the coke to burn

32 Which uses of the metals shown are both correct?

	aluminium	stainless steel
A	aircraft bodies	car bodies
B	car bodies	aircraft bodies
C	chemical plant	food containers
D	food containers	chemical plant

33 In which industrial process is water essential?

A the production of aluminium from bauxite

B the production of calcium oxide from limestone

C the production of ethanol from ethene

D the production of petrol from crude oil

34 Some students are asked to suggest why acetylene, rather than ethanol, is the fuel used for welding metals.

Two suggestions are

1 acetylene is a gas but ethanol is a liquid;

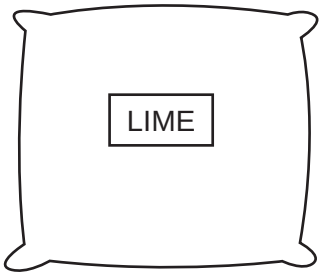
2 acetylene burns with a hotter flame.

Which suggestions are correct?

	1	2
A	✓	✓
B	✓	✗
C	✗	✓
D	✗	✗

35 The diagrams show four sacks which a farmer has in his barn.

1

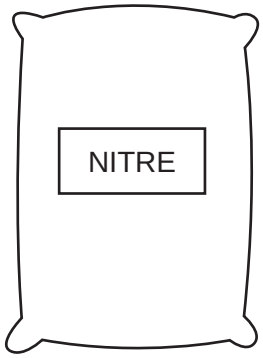


calcium oxide

2

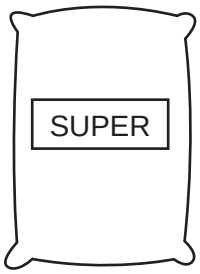
ammonium nitrate

3



potassium nitrate

4



superphosphate

Which sacks should be mixed to make a complete fertiliser, containing all the essential elements needed by plants?

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

36 Which of the following does **not** produce carbon dioxide?

A adding hydrochloric acid to carbon

B adding hydrochloric acid to potassium carbonate

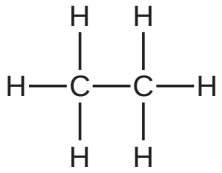
C burning coke

D burning petrol

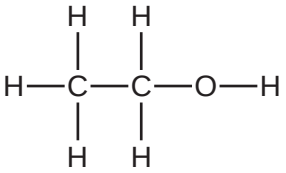
37 Cholesterol occurs naturally in the body.

Its name indicates that it has the same functional group as

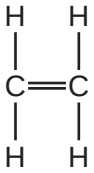
A



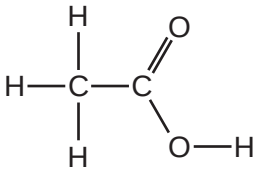
B



C



D



38 Which fuel is a mixture of hydrocarbons?

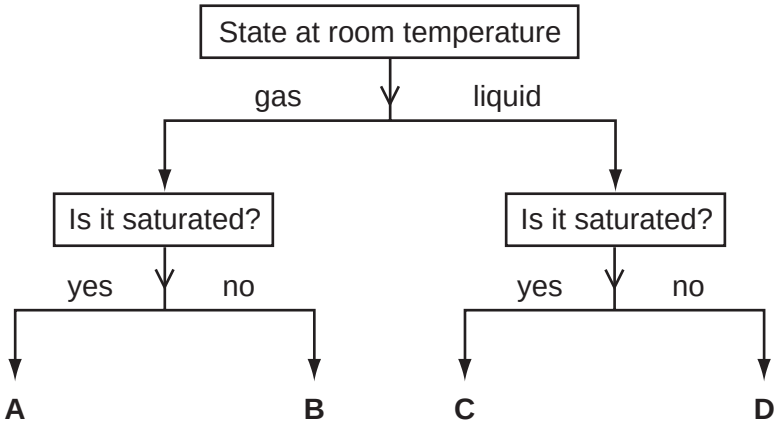
A coal

B methane

C petroleum

D wood

39 In the diagram, which substance could be ethene?



40 Which properties do butane, propene and ethanol **all** have?

	burn	polymerise
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
															4 He Helium 2
					1 H Hydrogen 1										
										11 B Boron 5	12 C Carbon 6	14 N Nitrogen 7	16 O Oxygen 8	19 F Fluorine 9	20 Ne Neon 10
										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
7 Li Lithium 3	9 Be Beryllium 4									70 Ga Gallium 31	73 Ge Germanium 32	75 As Arsenic 33	79 Se Selenium 34	80 Br Bromine 35	84 Kr Krypton 36
23 Na Sodium 11	24 Mg Magnesium 12									115 In Indium 49	119 Sn Tin 50	122 Sb Antimony 51	128 Te Tellurium 52	127 I Iodine 53	131 Xe Xenon 54
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	112 Cd Cadmium 48	119 Sn Tin 50	207 Pb Lead 82	209 Bi Bismuth 83	209 Po Polonium 84	209 At Astatine 85	209 Rn Radon 86
85 Rb Rubidium 37	88 Sr Strontium 38	89 Y Yttrium 39	91 Zr Zirconium 40	93 Nb Niobium 41	96 Mo Molybdenum 42	101 Tc Technetium 43	101 Ru Ruthenium 44	103 Rh Rhodium 45	106 Pd Palladium 46	108 Ag Silver 47	112 Cd Cadmium 48	201 Hg Mercury 80	204 Tl Thallium 81	207 Pb Lead 82	209 Bi Bismuth 83	209 Po Polonium 84	209 At Astatine 85	209 Rn Radon 86
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	209 Po Polonium 84	209 At Astatine 85	209 Rn Radon 86	
	226 Ra Radium 88	227 Ac Actinium 89 †																

140 Ce Cerium 58	141 Pr Praseodymium 59	144 Nd Neodymium 60	144 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	238 Pa Protactinium 91	238 U Uranium 92	238 Np Neptunium 93	238 Pu Plutonium 94	238 Am Americium 95	238 Cm Curium 96	238 Bk Berkelium 97	238 Cf Californium 98	238 Es Einsteinium 99	238 Fm Fermium 100	238 Md Mendelevium 101	238 No Nobelium 102	238 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.).