



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)



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.

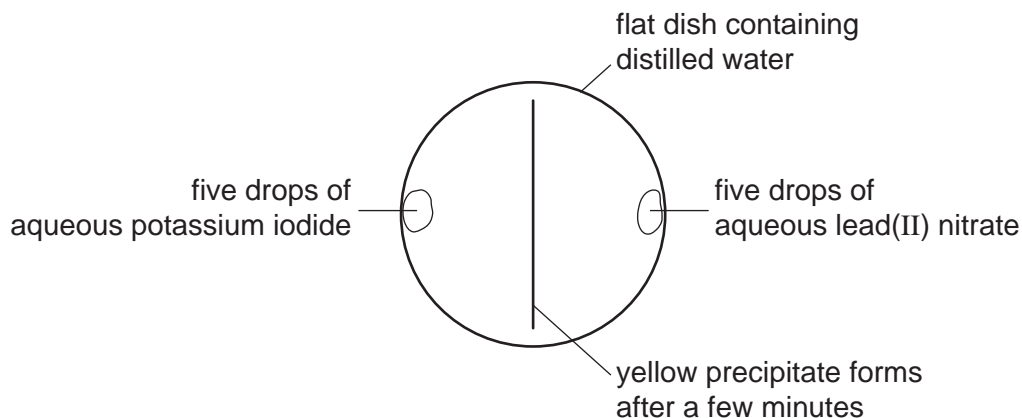
A copy of the Periodic Table is printed on page 16.

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 cm³ (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 ${}^7_3\text{Li}$.

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

- A ${}^6_2\text{Li}^-$ B ${}^6_3\text{Li}^+$ C ${}^7_3\text{Li}^+$ D ${}^7_3\text{Li}^-$

- 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?

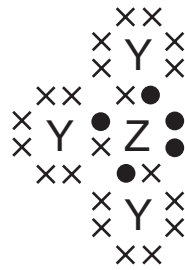
- A 1 and 2 B 1 and 4 C 2 and 3 D 2 and 4
- 6 What are the nucleon numbers for carbon and magnesium?

	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?

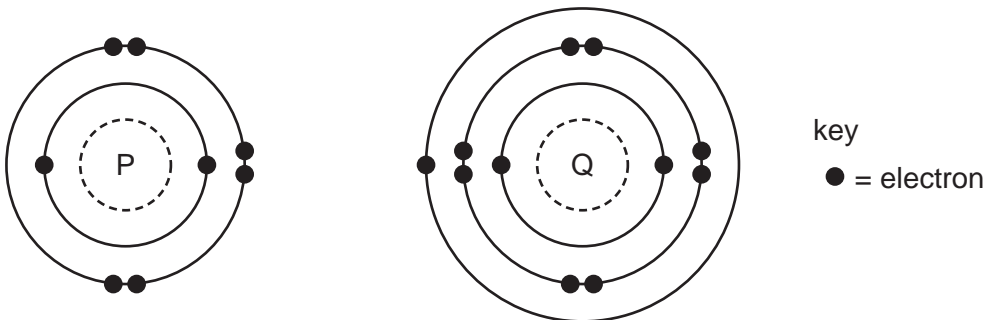
	graphite	a liquid fraction from petroleum
A	✓	✓
B	✓	x
C	x	✓
D	x	x

- 8 The diagram shows the outer shell electron arrangement of compound J that contains the 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.



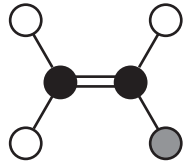
P and Q react to form an ionic compound.

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).



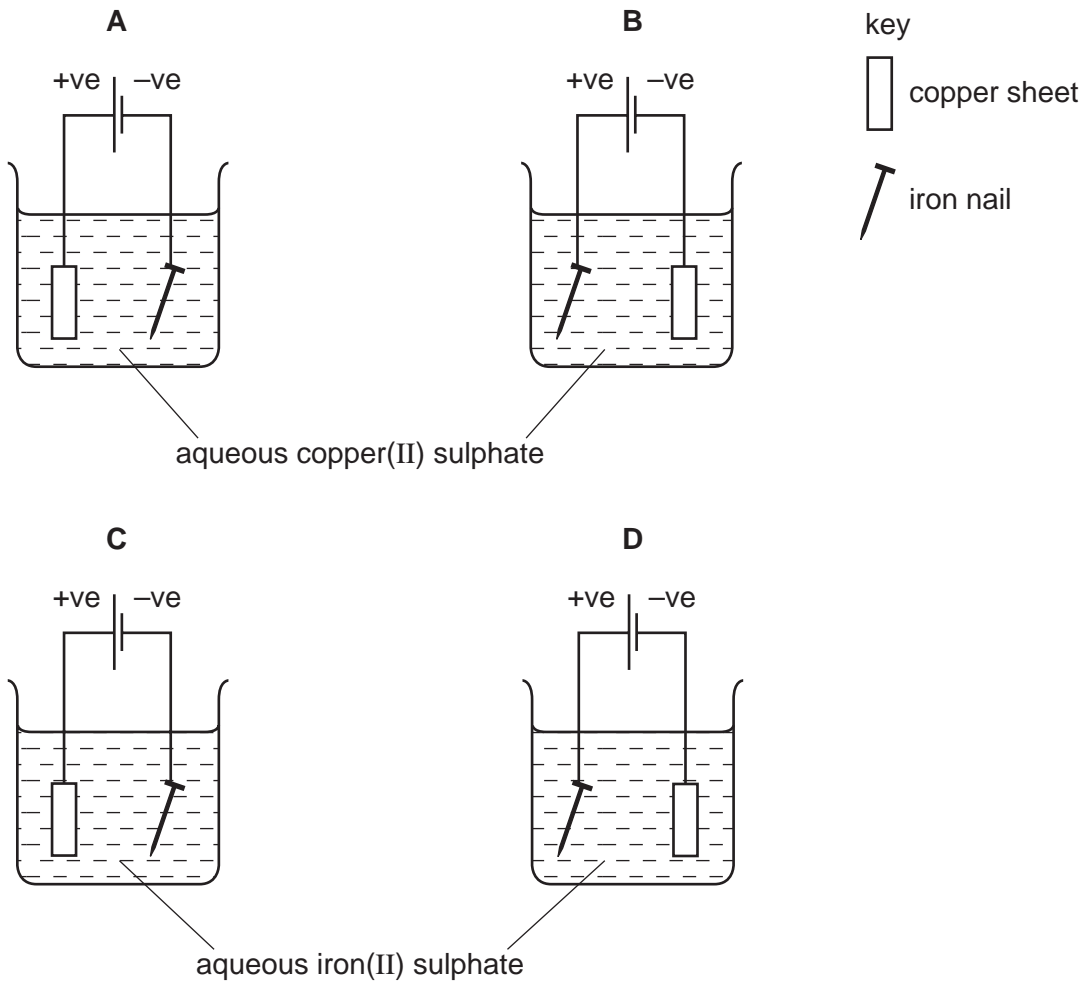
key

- 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 $\text{C}_2\text{H}_3\text{Cl}$

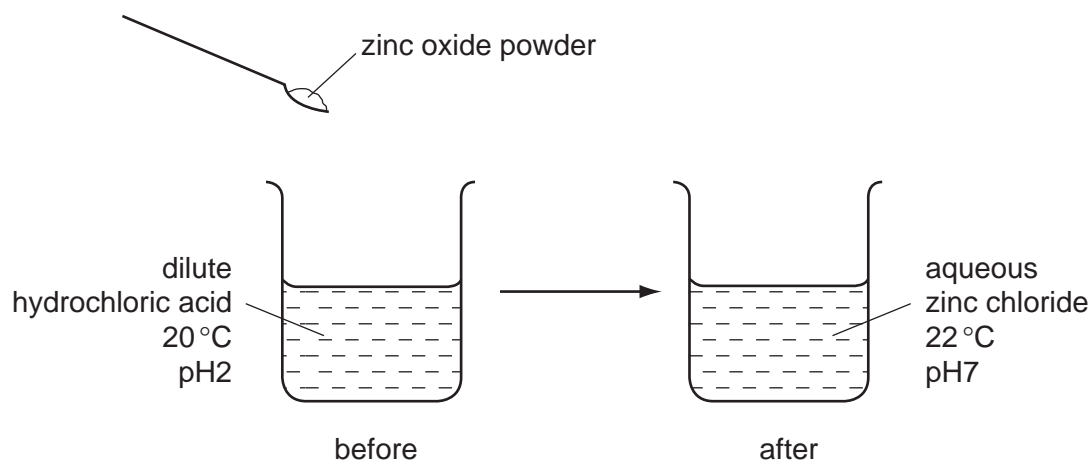
12 Which apparatus could be used to electroplate an iron nail with copper?



- 13 Two elements X and Y form ionic compounds, XBr_2 and Y_2O_3 . The compounds are separately 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 \rightarrow lead(II) oxide + oxygen
 B concentrated hydrochloric acid \rightarrow hydrogen + chlorine
 C sodium hydroxide + nitric acid \rightarrow sodium nitrate + water
 D lead(II) nitrate + sulphuric acid \rightarrow lead(II) sulphate + nitric acid
- 15 The diagram shows an experiment.



Which terms describe the experiment?

	endothermic	neutralisation
A	✓	✓
B	✓	x
C	x	✓
D	x	x

16 Charcoal and uranium are used as sources of energy.

Which of them are oxidised when used in this way?

	charcoal	uranium
A	✓	✓
B	✓	x
C	x	✓
D	x	x

17 Magnesium reacts with acids to produce hydrogen gas.

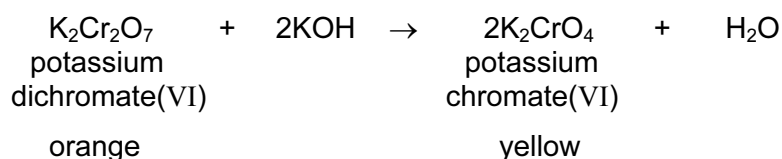
Under which set of conditions is hydrogen formed the most slowly?

	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 hydroxide is added to aqueous potassium dichromate(VI).



As a result of adding an excess of aqueous potassium hydroxide to aqueous 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?

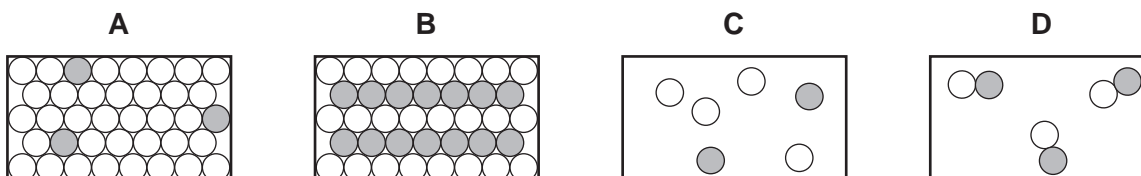
element	proton number
A	34
B	35
C	36
D	37

27 The table gives information about four elements.

Which element is a transition metal?

	electrical conductivity	density g/cm^3	melting point in $^{\circ}\text{C}$
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?



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

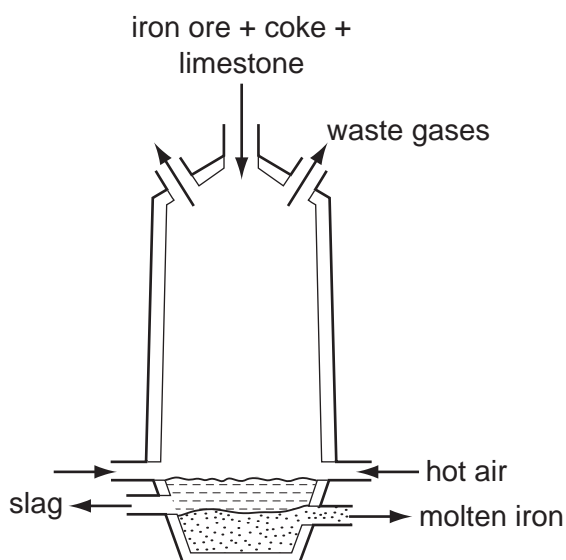
30 The position of metal X in the reactivity series is shown.

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.

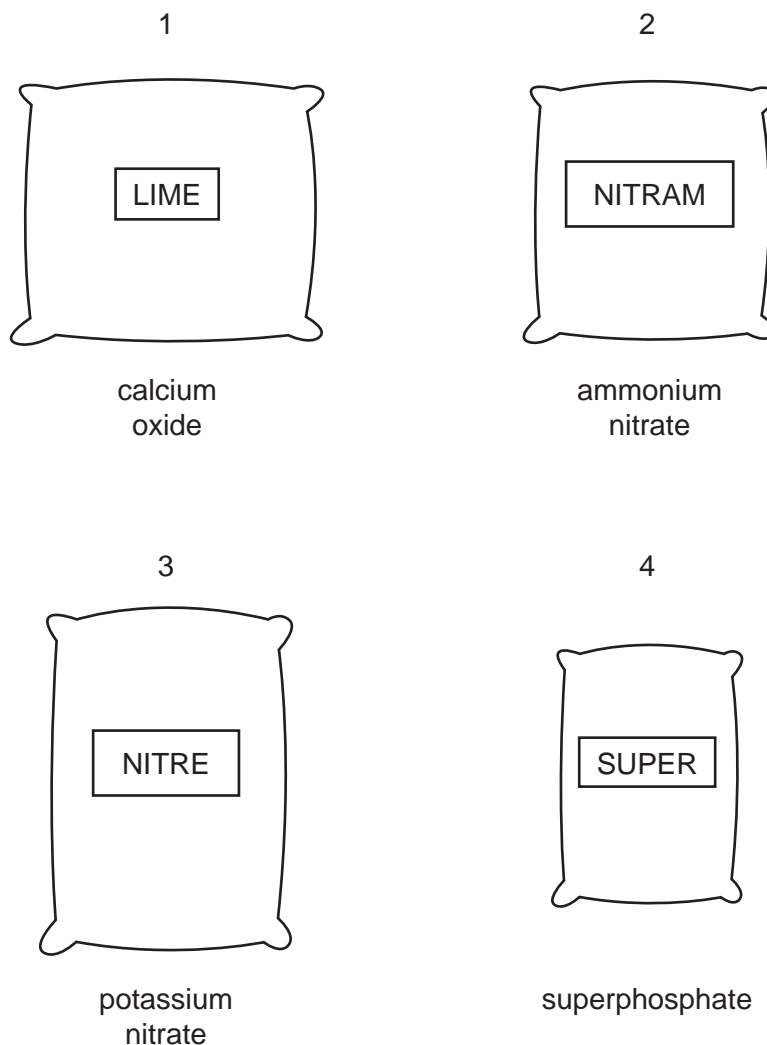
Two suggestions are

- 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	✓	x
C	x	✓
D	x	x

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



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

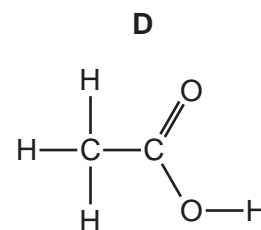
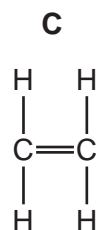
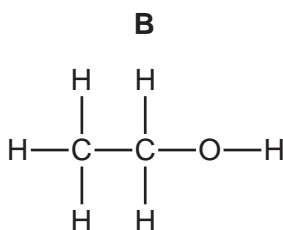
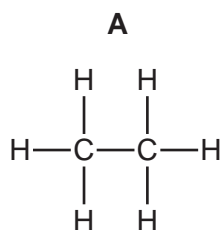
- A** 1 and 2 **B** 1 and 4 **C** 2 and 3 **D** 3 and 4

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.

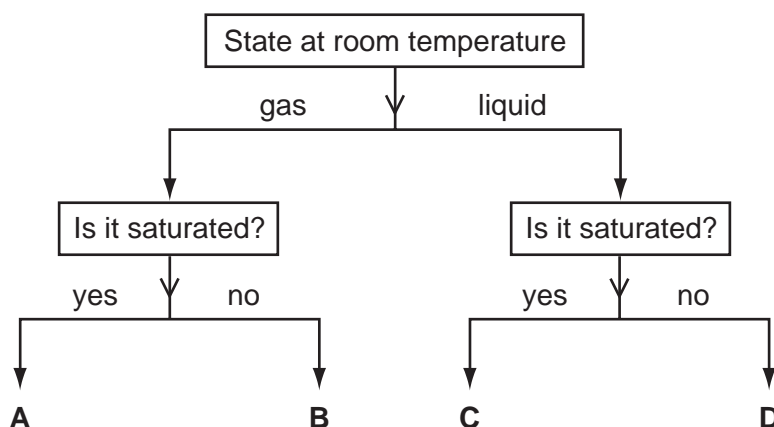
Its name indicates that it has the same functional group as



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	✓	x
C	x	✓
D	x	x

DATA SHEET
The Periodic Table of the Elements

		Group										
I	II	III	IV	V	VI	VII	0					0
		1 H Hydrogen 1										4 He Helium 2
7 Li Lithium 3	9 Be Beryllium 4											20 Ne Neon 10
23 Na Sodium 11	24 Mg Magnesium 12											35.5 Cl Chlorine 17
39 K Potassium 19	40 Ca Calcium 20											84 Kr Krypton 36
85 Rb Rubidium 37	88 Sr Strontium 38	65 Zn Zinc 30	73 Ge Germanium 32	75 As Arsenic 33	79 Se Selenium 34	80 Br Bromine 35	127 I Iodine 53	131 Xe Xenon 54				
133 Cs Caesium 55	137 Ba Barium 56	115 In Indium 49	119 Sn Tin 50	122 Sb Antimony 51	128 Te Tellurium 52	127 I Iodine 53	131 Xe Xenon 54					
226 Ra Radium 88	227 Ac Actinium 89	204 Tl Thallium 81	207 Pb Lead 82	209 Bi Bismuth 83	210 Po Polonium 84	210 Po Polonium 84	210 Po Polonium 84	210 Po Polonium 84	210 Po Polonium 84	210 Po Polonium 84	210 Po Polonium 84	210 Po Polonium 84
* 58-71 Lanthanoid series † 90-103 Actinoid series												
140 Ce Cerium 58	141 Pr Praseodymium 59	144 Nd Neodymium 60	146 Pm Promethium 61	150 Sm Samarium 62	152 Eu Europium 63	157 Gd Gadolinium 64	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 U Uranium 92	238 U Uranium 92	238 U Uranium 92	238 U Uranium 92	238 U Uranium 92	238 U Uranium 92	238 U Uranium 92	238 U Uranium 92	238 U Uranium 92	238 U Uranium 92	238 U Uranium 92	238 U Uranium 92
140 Ce Cerium 58	141 Pr Praseodymium 59	144 Nd Neodymium 60	146 Pm Promethium 61	150 Sm Samarium 62	152 Eu Europium 63	157 Gd Gadolinium 64	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 U Uranium 92	238 U Uranium 92	238 U Uranium 92	238 U Uranium 92	238 U Uranium 92	238 U Uranium 92	238 U Uranium 92	238 U Uranium 92	238 U Uranium 92	238 U Uranium 92	238 U Uranium 92	238 U Uranium 92
140 Ce Cerium 58	141 Pr Praseodymium 59	144 Nd Neodymium 60	146 Pm Promethium 61	150 Sm Samarium 62	152 Eu Europium 63	157 Gd Gadolinium 64	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 U Uranium 92	238 U Uranium 92	238 U Uranium 92	238 U Uranium 92	238 U Uranium 92	238 U Uranium 92	238 U Uranium 92	238 U Uranium 92	238 U Uranium 92	238 U Uranium 92	238 U Uranium 92	238 U Uranium 92

The volume of one mole of any gas is 24 dm³ at room temperature and pressure (r.t.p.).

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

Key

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