UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
International General Certificate of Secondary Education

CHEMISTRY **0620/01**

Paper 1 Multiple Choice October/November 2007

45 minutes

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

7620553924

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 20.
You may use a calculator.

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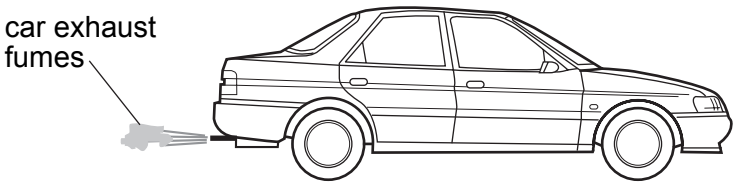
1 Oxides of nitrogen from car exhausts can spread through the atmosphere.



This occurs because gas molecules move from a region of ……1…… concentration to a region of ……2…… concentration by a process called ……3…… .

Which words correctly complete the gaps?

	1	2	3
A	high	low	diffusion
B	high	low	evaporation
C	low	high	diffusion
D	low	high	evaporation

2 Part of the instructions in an experiment reads as follows.

Quickly add 50 cm^3 of acid.

What is the best piece of apparatus to use?

A a burette

B a conical flask

C a measuring cylinder

D a pipette

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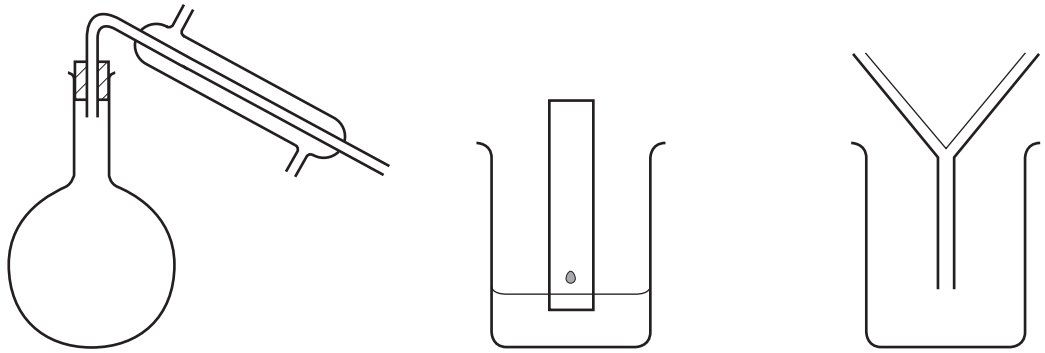
3 The outline diagrams show three methods of separation.

X Y Z



What are the three methods called?

	X	Y	Z
A	chromatography	distillation	filtration
B	distillation	chromatography	filtration
C	distillation	filtration	chromatography
D	filtration	chromatography	distillation

4 A sample of a drug is analysed by using a chemical test for aspirin and measuring its melting point.

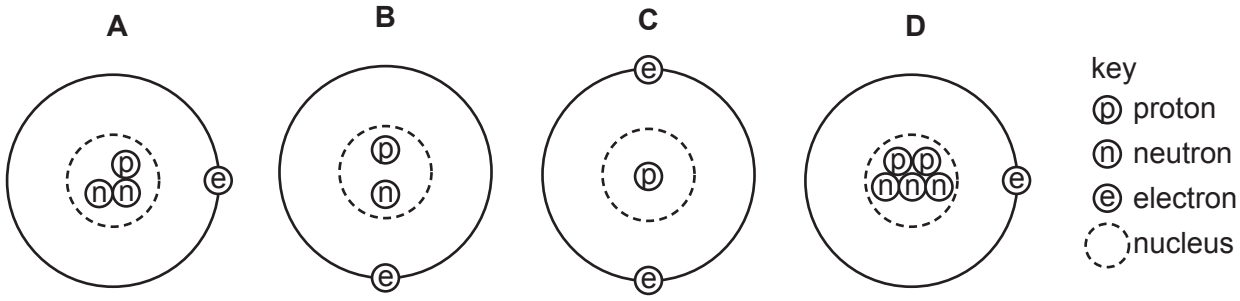
The chemical test is positive but the melting point is 130 °C not 135 °C as it should be.

What is correct?

	the sample contains aspirin	the sample has an impurity
A	✓	✓
B	✓	✗
C	✗	✓
D	✗	✗

5 Students are asked to draw a diagram of an atom with symbol $^{3}_{1}X$.

Which diagram is correct?



6 The table describes the structures of four particles.

particle	number of protons	number of neutrons	number of electrons
O	8	8	8
O^{2-}	8	8	**X**
Na	11	**Y**	11
Na^{+}	11	12	**Z**

What are the correct values of **X**, **Y** and **Z**?

	X	**Y**	**Z**
A	9	11	10
B	9	11	11
C	10	12	10
D	10	12	11

7 The table shows the electronic structures of four atoms.

atom	electronic structure
W	2,8,1
X	2,8,4
Y	2,8,7
Z	2,8,8

Which two atoms combine to form a covalent compound?

A W and X **B** W and Y **C** X and Y **D** X and Z

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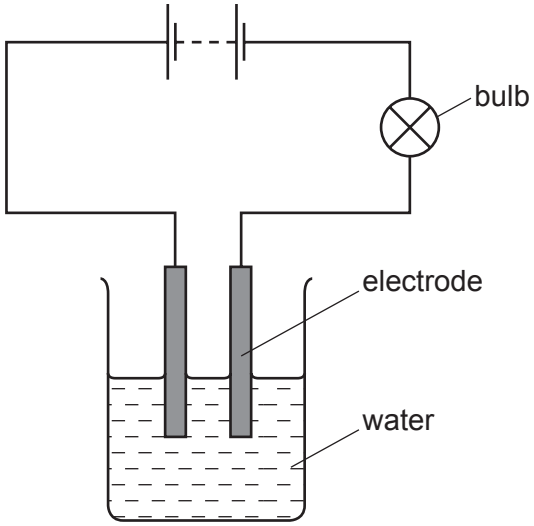
8 The following statement is about chemical bonds.

Covalent bonds are formed by the …1… of electrons. Covalent substances have …2… electrical conductivity.

Which words complete the statement?

	1	2
A	sharing	high
B	sharing	low
C	transfer	high
D	transfer	low

9 A student sets up the apparatus shown. The bulb does not light.



After the student adds substance **X** to the water, the bulb lights.

What could **X** be?

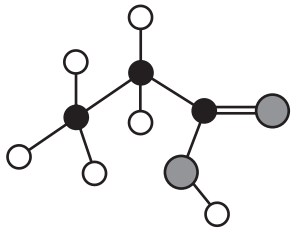
A barium sulphate

B carbon (or diamond)

C copper (or graphite)

D potassium sulphate

10 The diagram shows a model of a molecule of an organic acid.



What is the relative molecular mass of this acid?

A 11 **B** 40 **C** 58 **D** 74

11 For complete combustion, one molecule of an organic compound needs 8 molecules of oxygen.

What could the formula of this compound be?

A $C_5H_{11}OH$

B C_6H_9OH

C $C_6H_{11}OH$

D C_6H_{12}

12 What is the charge on an anode and the type of element formed at such an electrode?

	charge on anode	type of element formed
A	negative	metal
B	negative	non-metal
C	positive	metal
D	positive	non-metal

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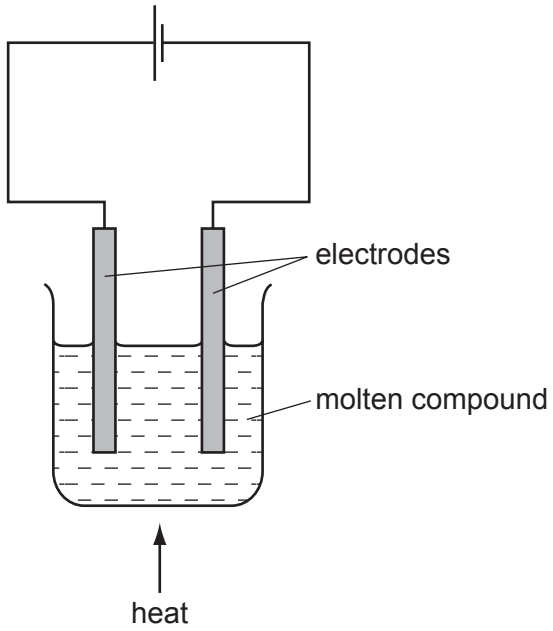
13 The diagram shows how to cause a chemical change in a molten compound.



What is this process used for?

A extraction of metal from its ore

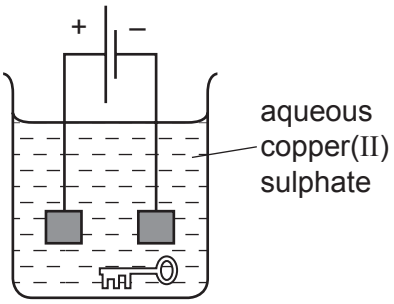
B neutralisation of industrial waste

C production of fertilisers

D removal of oxides from metals

14 In which set of apparatus is the metal key electroplated with copper?

A



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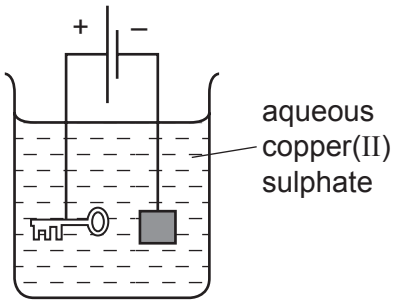
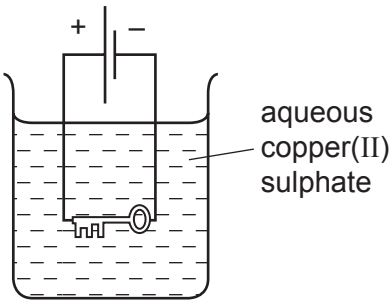


key

= piece of copper

= metal key

C



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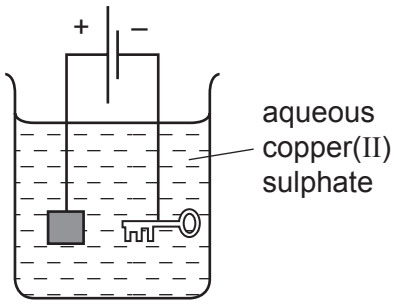


15 Which substance is **not** used as a fuel?

A ethanol

B methane

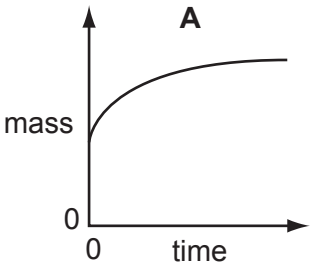
C oxygen

D uranium

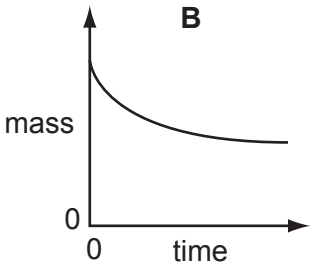
16 The mass of a beaker and its contents is plotted against time.

Which graph represents what happens when sodium carbonate reacts with an excess of dilute hydrochloric acid in an open beaker?

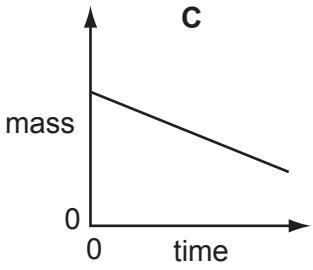
A



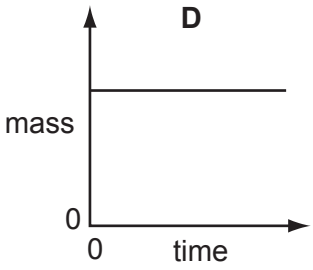
B



C



D



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17 Which changes of condition slow down the reaction between magnesium and air?

1 heating the magnesium to a higher temperature

2 using a higher proportion of oxygen in the air

3 using magnesium ribbon instead of powdered magnesium

A 1 only

B 2 only

C 3 only

D 1, 2 and 3

18 Dilute sulphuric acid is added to a mixture of copper, magnesium and zinc in a beaker. The beaker is left for about 10 minutes and its contents are then filtered.

What does the filtrate contain?

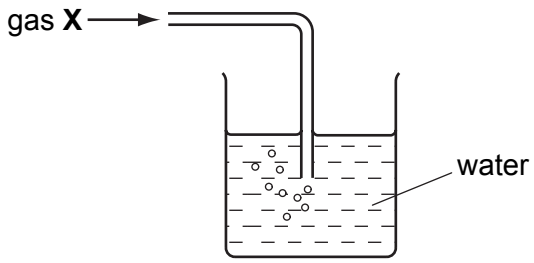
A copper(II) sulphate, magnesium sulphate and zinc sulphate

B copper(II) sulphate and zinc sulphate only

C magnesium sulphate and zinc sulphate only

D magnesium sulphate only

19 Gas **X** is passed into water as shown.



The pH of the water changes from 7 to 10.

What is gas **X**?

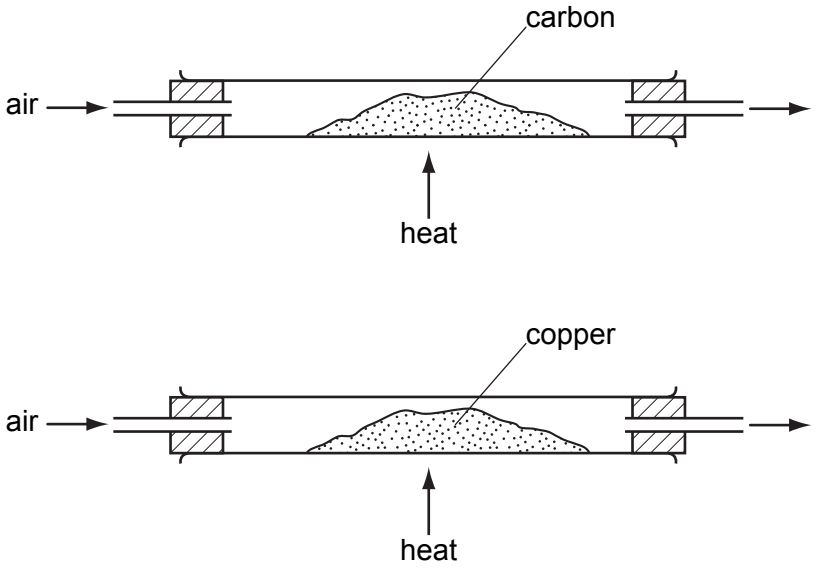
A ammonia

B carbon dioxide

C nitrogen

D sulphur dioxide

20 Powdered carbon and powdered copper are separately heated as shown.



Which changes in the masses of the powders occur?

	carbon	copper
A	decrease	decrease
B	decrease	increase
C	increase	decrease
D	increase	increase

21 Two tests are carried out on a solution containing both copper(II) sulphate and sodium chloride. A student records results as shown.

test	reagent	result
1	aqueous barium chloride	blue precipitate
2	aqueous silver nitrate	white precipitate

Which results are correctly recorded?

	1	2
A	✓	✓
B	✓	✗
C	✗	✓
D	✗	✗

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22 Aqueous solution **S** is added to aqueous ammonium chloride. The mixture is heated. Ammonia gas is given off.

What could solution **S** contain?

A aluminium

B ammonium sulphate

C sodium chloride

D sodium hydroxide

23 Rubidium is below potassium in Group I of the Periodic Table.

- The melting point of rubidium is ……1…... than that of potassium.
- The reaction of rubidium with water is ……2…… than that of potassium.

Which words correctly complete these statements?

	1	2
A	higher	faster
B	higher	slower
C	lower	faster
D	lower	slower

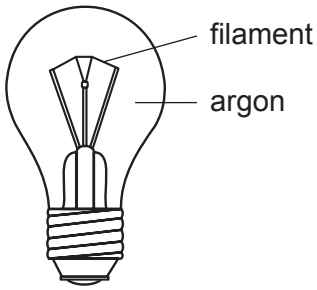
24 The equation shows the reaction between a halogen and the aqueous ions of another halogen.

$$X_2 + 2Y^- \rightarrow 2X^- + Y_2$$

What could X_2 and the colour of Y^- be?

	X_2	Y^-
A	chlorine	brown
B	chlorine	colourless
C	iodine	brown
D	iodine	colourless

25 The diagram shows a light bulb.



Why is argon used instead of air in the light bulb?

A Argon is a good conductor of electricity.

B Argon is more reactive than air.

C The filament glows more brightly.

D The filament lasts for a longer time.

26 Element **X** exists as diatomic molecules.

In which group of the Periodic Table is **X** placed?

A Group 0

B Group I

C Group II

D Group VII

27 Which statement is correct about **all** metals?

A They are attracted to a magnet.

B They are weak and brittle.

C They may be used to form alloys.

D They react with water.

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28 The table gives information about three different metals.

metal	metal oxide reduced when heated with carbon	reacts with dilute hydrochloric acid
X	✓	✗
Y	✗	✓
Z	✓	✓

What is the correct order of reactivity of these metals?

	most reactive ⟶		least reactive
A	X	Y	Z
B	Y	X	Z
C	Y	Z	X
D	Z	X	Y

29 The following statements are about alloys.

- Alloys are …X…. .
- …Y… alloys conduct electricity.

Which words complete the statements?

	X	Y
A	compounds	All
B	compounds	Some
C	mixtures	All
D	mixtures	Some

30 A piece of equipment needs to be made from a metal that is of low density, relatively strong and resistant to corrosion.

Which metal is best suited for this?

A aluminium

B copper

C iron

D silver

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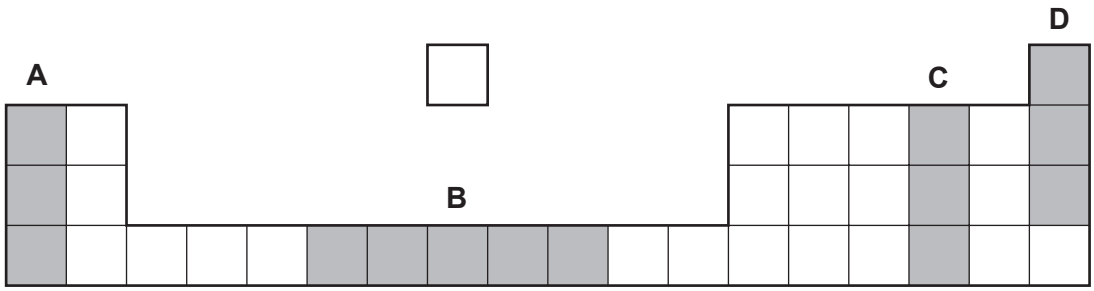
31 Some elements of the Periodic Table are shown shaded.

Which set of shaded elements could be used with iron to make different types of steel?



32 Which of the following do **not** use oxygen?

1 breathing apparatus in a hospital

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

33 Possible methods to prevent the rusting of iron are

- coat with grease,
- plate the iron with zinc,
- paint the iron.

Which of these methods can easily be used to prevent the rusting of an iron girder of a bridge?

	coating with grease	plating with zinc	painting
A	✓	✓	✓
B	✓	✓	✗
C	✗	✓	✓
D	✗	✗	✓

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34 To grow roses, a fertiliser containing nitrogen, phosphorus and potassium is needed. For a good yield, the fertiliser should contain a high proportion of potassium.

Which fertiliser is best for roses?

fertiliser	proportion by mass		
	N	P	K
A	29	5	0
B	29	15	5
C	13	13	20
D	9	0	25

35 A label on a bottle of spring water gives the following information.

Contents per litre	
Calcium	25.0 mg
Magnesium	4.5 mg
Potassium	1.0 mg
Sodium	6.5 mg
Hydrogencarbonate	103 mg
Sulphate	10.5 mg
Nitrate	7.0 mg
Chloride	5.5 mg

What is the total mass of singly charged positive ions in the water?

A 7.5 mg **B** 12.5 mg **C** 29.5 mg **D** 115.5 mg

36 When calcium carbonate is heated, compound **X** and a gas are formed.

What is the name of **X** and what is its use?

	name of **X**	use of **X**
A	lime	to neutralise acid soil
B	lime	to provide nutrients for crop growth
C	slaked lime	to neutralise acid soil
D	slaked lime	to provide nutrients for crop growth

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37 Which statements about **all** polymers are correct?

1 They are compounds containing only carbon and hydrogen.

2 They are large molecules made from many smaller molecules.

3 They occur in nature.

	1	2	3
A	✓	✓	✓
B	✓	✓	✗
C	✗	✓	✗
D	✗	✗	✓

38 Properties of some organic compounds include:

1 they burn;

2 they dissolve in water;

3 they polymerise.

Which of these properties does ethanol have?

	1	2	3
A	✓	✗	✓
B	✓	✓	✗
C	✗	✓	✓
D	✗	✗	✓

39 Which two molecules contain the same number of hydrogen atoms?

A ethane and ethanoic acid

B ethane and ethene

C ethanoic acid and ethanol

D ethanoic acid and ethene

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40 The structures of two compounds are shown.

P Q

Which line in the table is correct?

	polymerises	reacts readily with bromine
A	P	P
B	P	Q
C	Q	P
D	Q	Q

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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
	7 Li Lithium 3	9 Be Beryllium 4									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
	23 Na Sodium 11	24 Mg Magnesium 12									70 Ga Gallium 31	73 Ge Germanium 32	75 As Arsenic 33	79 Se Selenium 34	80 Br Bromine 35	84 Kr Krypton 36
	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	115 In Indium 49	119 Sn Tin 50	122 Sb Antimony 51	128 Te Tellurium 52	127 I Iodine 53	131 Xe Xenon 54
	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 †															

*58-71 Lanthanoid series	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
†90-103 Actinoid series	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

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.).

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