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Cambridge International Examinations
Cambridge International General Certificate of Secondary Education

CHEMISTRY **0620/12**

Paper 1 Multiple Choice **May/June 2015**

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, 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.
DO **NOT** WRITE IN ANY BARCODES.

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.
Electronic calculators may be used.

The syllabus is approved for use in England, Wales and Northern Ireland as a Cambridge International Level1/Level 2 Certificate.

This document consists of **15** printed pages and **1** blank page.

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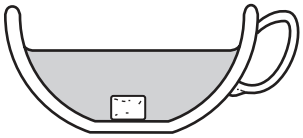
1 The diagram shows a sugar lump in a cup of tea.



Which two processes must happen to spread the sugar evenly in the tea?

	first process	second process
A	diffusion	dissolving
B	dissolving	diffusion
C	dissolving	melting
D	melting	diffusion

2 The results of some tests on a colourless liquid X are shown.

- Boiling point = 102 °C
- Universal Indicator turns green

What is X?

A ethanol

B hydrochloric acid

C pure water

D sodium chloride (salt) solution

3 The atomic structures of four particles are shown.

particle	electrons	neutrons	protons
W	8	9	8
X	7	9	7
Y	8	10	8
Z	9	10	9

Which two particles are isotopes?

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

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4 Q^+ is an ion of element Q.

What has the highest value in the ion?

A the nucleon number

B the number of electrons

C the number of neutrons

D the proton number

5 Which statements comparing the properties of electrons, neutrons and protons are correct?

	neutrons and protons are both heavier than electrons	only electrons and neutrons are charged
A	✓	✓
B	✓	✗
C	✗	✓
D	✗	✗

6 Graphite is a form of carbon.

Why can graphite be used as a lubricant?

A Graphite contains delocalised electrons which move throughout the structure.

B Graphite contains weak covalent bonds so the atoms move easily.

C Graphite has a low melting point so it easily turns into a liquid.

D Graphite has weak forces of attraction between layers so they can move.

7 In which compounds are pairs of electrons shared between atoms?

1 methane

2 lead bromide

3 sodium chloride

A 1 only **B** 2 only **C** 1 and 3 **D** 1, 2 and 3

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8 A molecule, Z, contains two atoms of oxygen, six atoms of hydrogen and three atoms of carbon.

What is the formula of Z?

A CH_3CH_2CHO

B CH_3COCH_3

C $C_2H_5CO_2H$

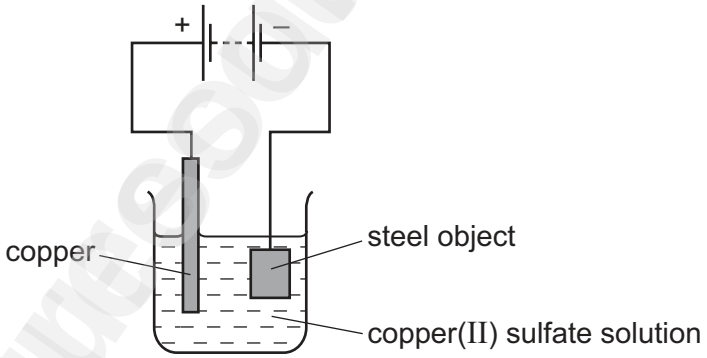
D $C_3H_6CO_2H$

9 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

10 The diagram shows the electroplating of a steel object.



A student made the following statements.

1 The object turns a reddish-brown colour.

2 The copper sulfate solution changes to a paler blue colour.

3 The copper electrode becomes smaller.

Which statements are correct?

A 1, 2 and 3 **B** 1 and 2 only **C** 1 and 3 only **D** 2 and 3 only

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11 The elements hydrogen and uranium are used as fuels.

The compound ethanol is also used as a fuel.

Which fuels require oxygen in order to produce heat energy?

	hydrogen	uranium	ethanol
A	✓	✓	✓
B	✓	✓	✗
C	✓	✗	✓
D	✗	✓	✓

12 In which equation does the oxidation of the underlined compound occur?

A $2CuO + C \rightarrow CO_2 + \underline{Cu}$

B $Fe_2O_3 + \underline{3CO} \rightarrow 2Fe + 3CO_2$

C $2Mg + O_2 \rightarrow \underline{2MgO}$

D $\underline{MnO_2} + 4HCl \rightarrow MnCl_2 + 2H_2O + Cl_2$

13 When pink crystals of cobalt(II) chloride are heated, steam is given off and the colour of the solid changes to blue.

$$CoCl_2.6H_2O \rightleftharpoons CoCl_2 + 6H_2O$$

What happens when water is added to the blue solid?

	colour	temperature
A	changes to pink	decreases
B	changes to pink	increases
C	remains blue	decreases
D	remains blue	increases

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14 A simple way of making bread includes

1 Mixing flour with a small amount of yeast and some water to make a 'dough'.

2 Leaving the dough in a warm place for the yeast to act on the dough to form carbon dioxide which increases the volume of the dough.

Which factors affecting a reaction rate are involved in bread making?

	temperature	use of an enzyme
A	✓	✓
B	✓	✗
C	✗	✓
D	✗	✗

15 Which statement is **not** correct?

A When a base reacts with an ammonium salt, ammonia is given off.

B When an acid reacts with a base, neutralisation takes place.

C When an acid reacts with a carbonate, carbon dioxide is given off.

D When the acidity of a solution increases, the pH increases.

16 Hydrochloric acid is used to clean metals.

The acid reacts with the oxide layer on the surface of the metal, forming a salt and water.

Which word describes the metal oxide?

A alloy

B base

C element

D indicator

17 Which method is used to make the salt copper sulfate?

A dilute acid + alkali

B dilute acid + carbonate

C dilute acid + metal

D dilute acid + non-metal oxide

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18 Two tests are carried out to identify an aqueous solution of X.

test 1 Aqueous sodium hydroxide is added and a blue precipitate is produced.

test 2 Dilute nitric acid is added followed by aqueous silver nitrate and a white precipitate is produced.

What is X?

A copper carbonate

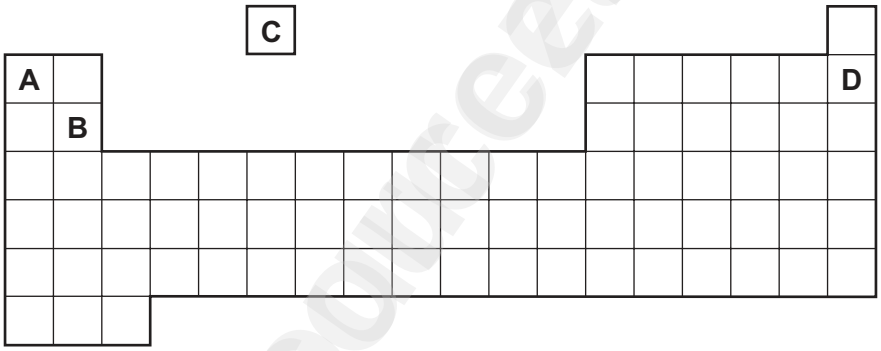
B copper chloride

C iron(III) carbonate

D iron(III) chloride

19 The positions of four elements in the Periodic Table are shown.

Which element does **not** form a compound with chlorine?



20 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	✗	✓	✓	✓

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21 The table shows some properties of the Group I metals.

metal	melting point / °C	hardness	reaction with water
lithium	181	moderately soft	steady effervescence
sodium	98	soft	vigorous effervescence
potassium	63	very soft	very vigorous effervescence
rubidium	?	?	?

What are the properties of rubidium?

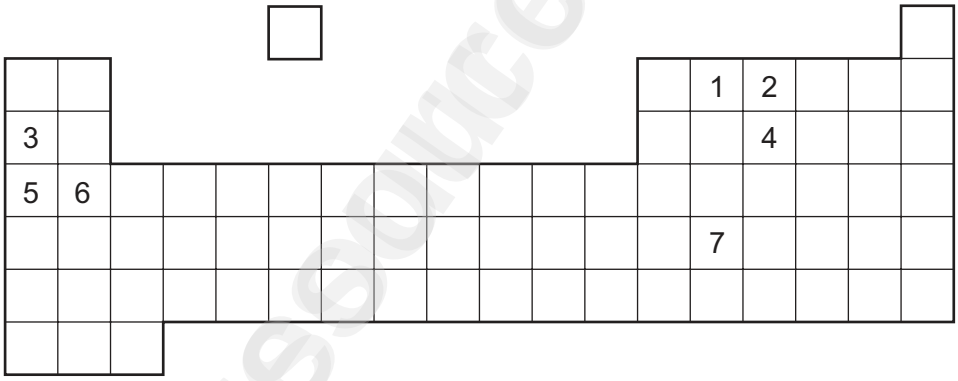
A melts below 63 °C, very soft, reacts explosively with water

B melts below 63 °C, very soft, reacts slowly with water

C melts above 181 °C, very soft, reacts explosively with water

D melts above 181 °C, very soft, reacts slowly with water

22 In the outline of the Periodic Table below, some elements are shown as numbers.



Which two numbers are **metals** in the same period?

A 1 and 2 **B** 1 and 7 **C** 3 and 5 **D** 5 and 6

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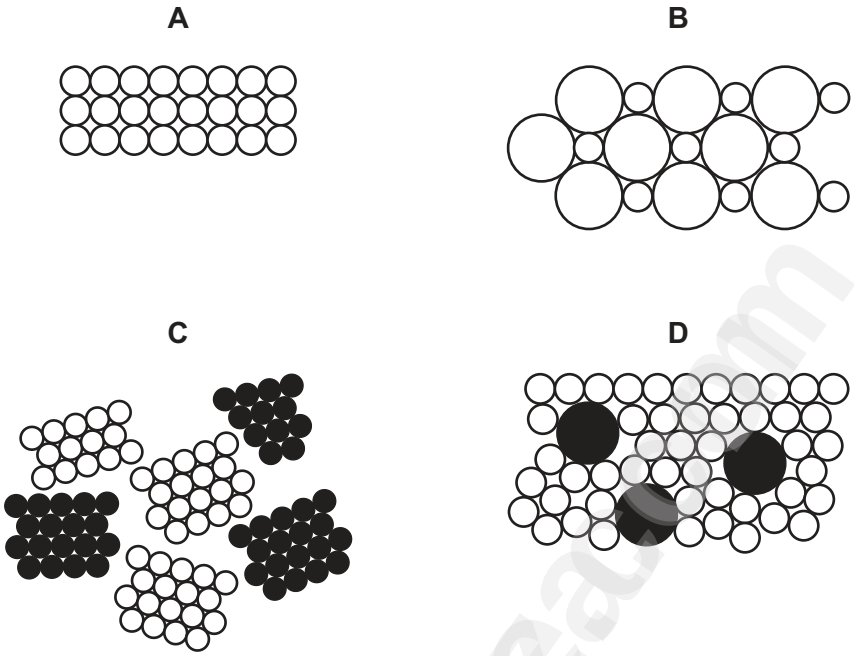
23 Which diagram represents an alloy?



24 Which statement is **not** correct?

A Aluminium is used in food containers because of its resistance to corrosion.

B Aluminium is used in the manufacture of aircraft because of its strength and low density.

C Mild steel is used in car bodies because of its strength and low density.

D Stainless steel is used in chemical plant because of its strength and resistance to corrosion.

25 Which row describes the conditions used to make steel from the iron produced by a blast furnace?

	calcium oxide (lime)	oxygen	heat
A	✓	✓	✓
B	✓	✓	✗
C	✗	✓	✓
D	✗	✓	✗

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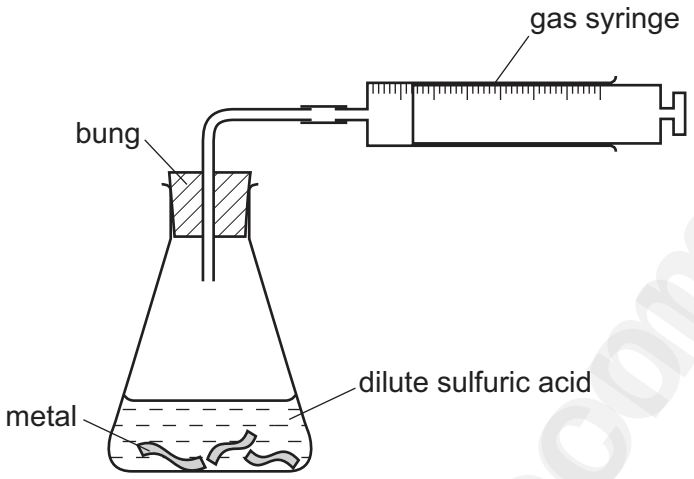
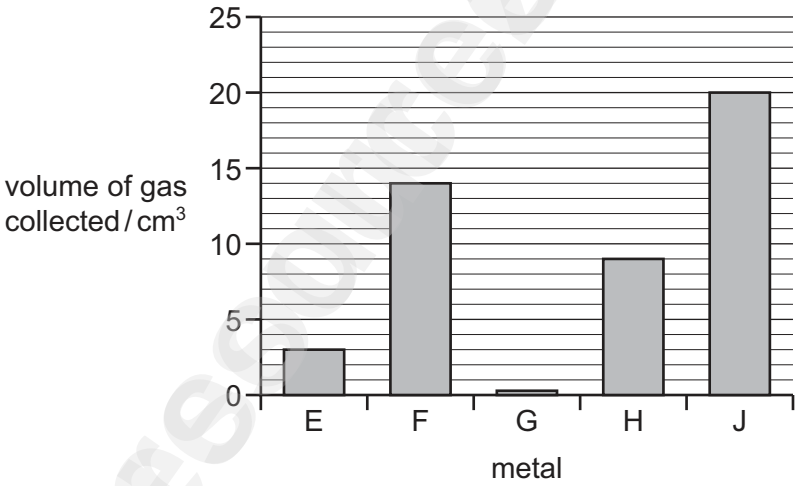
26 Samples of five different metals, E, F, G, H and J were reacted with dilute sulfuric acid using the apparatus shown.



The volume of hydrogen gas collected after one minute was measured.

The results are shown on the bar chart.



What is the order of reactivity of the metals (most reactive first)?

A E, F, G, H, J

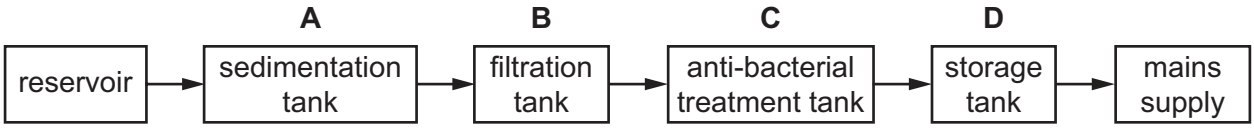
B G, E, H, F, J

C J, F, H, E, G

D J, H, G, F, E

27 The diagram shows stages in producing drinking water.

In which tank is chlorine added to the water?



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28 Which gas is **not** present in a sample of clean air?

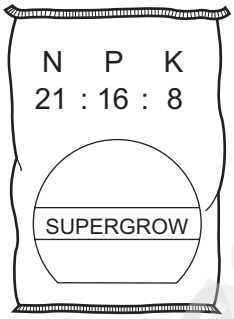
A carbon dioxide

B chlorine

C oxygen

D water vapour

29 Which combination of chemical compounds could be used to produce the fertiliser shown?



A $(NH_4)_3PO_4$, KCl

B NH_4NO_3, $Ca_3(PO_4)_2$

C NH_4NO_3, $CO(NH_2)_2$

D NH_4NO_3, K_2SO_4, $(NH_4)_2SO_4$

30 Carbon monoxide is given out from the exhaust of vehicles that burn fossil fuels.

Which row shows why carbon monoxide is a pollutant?

	acidic	toxic
A	no	no
B	no	yes
C	yes	no
D	yes	yes

31 A steel bicycle which had been left outdoors for several months was starting to rust.

What would **not** reduce the rate of corrosion?

A Remove the rust and paint the bicycle.

B Remove the rust and store the bicycle in a dry shed.

C Remove the rust and wipe the bicycle with a clean damp cloth.

D Remove the rust and wipe the bicycle with an oily cloth.

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32 Carbon dioxide and methane are 'greenhouse gases' which contribute to global warming.

Which process does **not** increase global warming?

A burning fossil fuels

B decay of organic waste

C farming cattle for beef

D growing crops such as sugar cane

33 A zinc compound forms carbon dioxide in two different reactions.

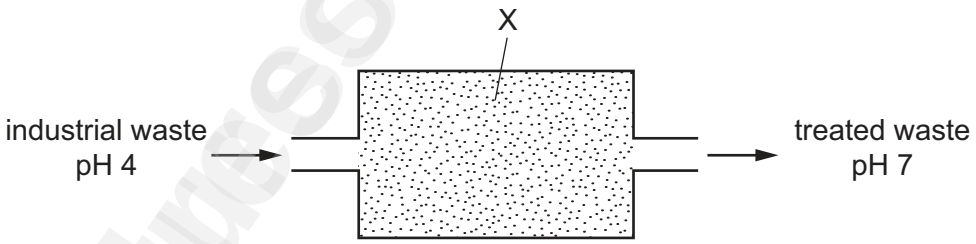
1 It is heated strongly.

2 It is added to hydrochloric acid.

Which type of reaction occurs in 1 and 2?

	1	2
A	combustion	neutralisation
B	combustion	oxidation
C	thermal decomposition	neutralisation
D	thermal decomposition	oxidation

34 Substance X is used to treat industrial waste.



What is X and which type of reaction occurs during the treatment?

	X	type of reaction
A	calcium oxide (lime)	neutralisation
B	calcium oxide (lime)	redox
C	carbon	neutralisation
D	carbon	redox

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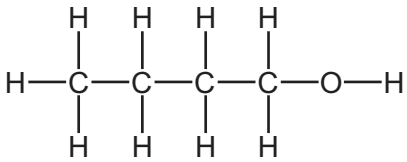
35 An organic compound has the molecular structure shown.



Which type of organic compound is this?

A alcohol

B alkane

C alkene

D carboxylic acid

36 Which statement about petroleum is **not** correct?

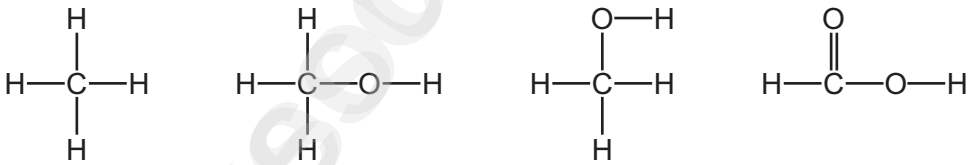
A It can be separated into useful substances by fractional distillation.

B It consists mainly of hydrocarbons.

C It is found underground in many parts of the world.

D Its main use is for making lubricants and polishes.

37 The structures of four different organic compounds are shown.



How many different homologous series are represented by these compounds?

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

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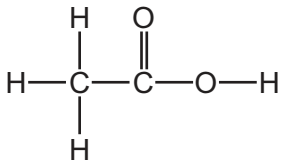
38 The structure of a compound, Y, is shown.



Which row describes some of the physical properties of Y?

	colourless	characteristic smell	dissolves in water
A	no	no	no
B	no	no	yes
C	yes	yes	no
D	yes	yes	yes

39 A hydrocarbon A is cracked to make B and hydrogen.

Compound C is formed by the addition polymerisation of B.

To which homologous series do A, B and C belong?

	alkene	alkane
A	A	B and C
B	B	A and C
C	C	A and B
D	–	A and C

40 Which row correctly describes the production of ethanol and its properties?

	can be made from glucose	can be made from ethene	is used as a fuel	is used as a solvent
A	✓	✓	✓	✓
B	✓	✗	✓	✓
C	✗	✓	✓	✗
D	✗	✓	✗	✓

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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 Sulfur 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 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.).

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