



UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
International General Certificate of Secondary Education

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CHEMISTRY

0620/11

Paper 1 Multiple Choice

October/November 2010

45 Minutes

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

* 5 0 6 0 5 8 1 7 0 2 *

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.

This document consists of **17** printed pages and **3** blank pages.



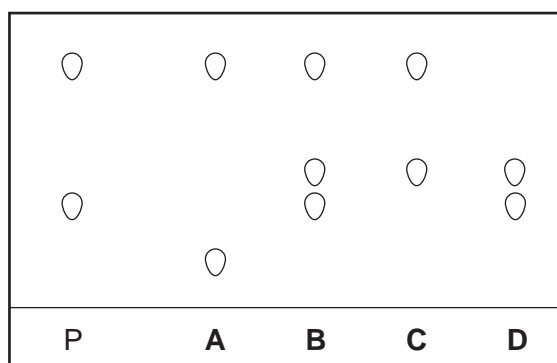
- 1 In which changes do the particles move further apart?



- A** W and X **B** W and Z **C** X and Y **D** Y and Z
- 2 Chromatography is used to find out if a banned dye, P, is present in foodstuffs.

The results are shown in the diagram.

Which foodstuff contains P?



- 3 A mixture of ethanol and methanol are separated by fractional distillation.

This method of separation depends on a difference in property X of these two alcohols.

What is property X?

- A** boiling point
B colour
C melting point
D solubility
- 4 Element X has a nucleon (mass) number of 19 and a proton (atomic) number of 9.

To which group in the Periodic Table does it belong?

- A** I **B** III **C** VII **D** 0

5 The table shows the structure of different atoms and ions.

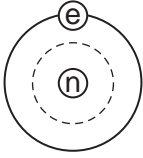
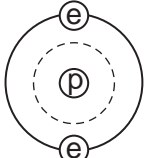
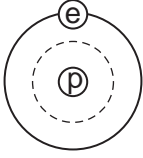
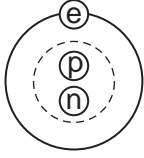
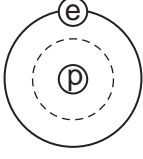
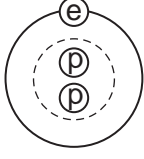
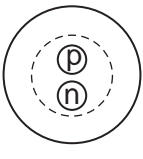
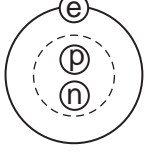
particle	proton number	nucleon number	number of protons	number of neutrons	number of electrons
Mg	12	24	12	W	12
Mg ²⁺	X	24	12	12	10
F	9	19	9	Y	9
F ⁻	9	19	9	10	Z

What are the values of W, X, Y and Z?

	W	X	Y	Z
A	10	10	9	9
B	10	12	10	9
C	12	10	9	10
D	12	12	10	10

6 Two isotopes of hydrogen are ${}^1_1\text{H}$ and ${}^2_1\text{H}$.

Which diagram shows the arrangement of particles in the two isotopes?

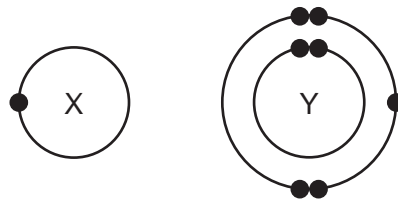
	${}^1_1\text{H}$	${}^2_1\text{H}$	key
A			⊖ = an electron ⊕ = a proton ⊘ = a neutron ○ = a nucleus
B			
C			
D			

- 7 Element X is shiny and can be formed into a sheet by hammering.

Which row correctly describes the properties of element X?

	conducts electricity	melts below 25 °C
A	✓	✓
B	✓	x
C	x	✓
D	x	x

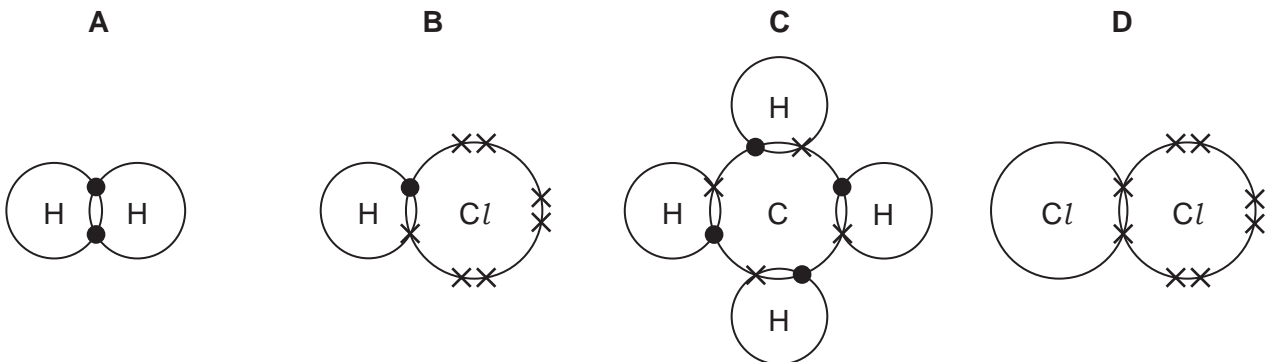
- 8 The electronic structures of atoms X and Y are shown.



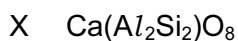
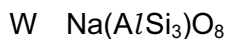
X and Y form a covalent compound.

What is its formula?

- A** XY_5 **B** XY_3 **C** XY **D** X_3Y
- 9 Which diagram does **not** show the outer shell electrons in the molecule correctly?



10 The chemical compositions of two substances, W and X, are given.

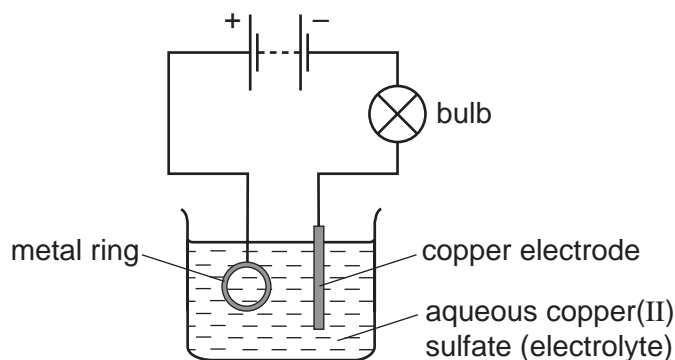


Which statements are correct?

- 1 W and X contain the same amount of oxygen.
- 2 W contains three times as much silicon as X.
- 3 X contains twice as much aluminium as W.

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

11 The diagram shows apparatus used in an attempt to electroplate a metal ring with copper.

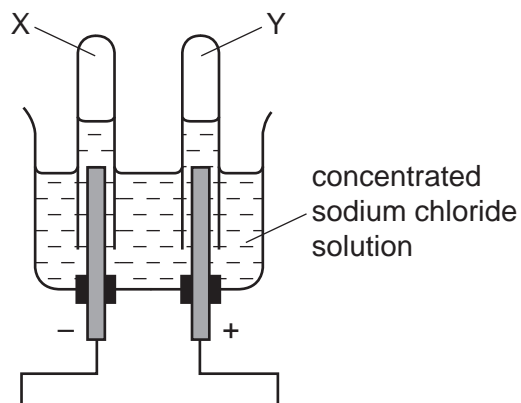


The experiment did not work.

What change is needed in the experiment to make it work?

- A** Add solid copper(II) sulfate to the electrolyte.
- B** Increase the temperature of the electrolyte.
- C** Replace the copper electrode by a carbon electrode.
- D** Reverse the connections to the battery.

- 12 When concentrated sodium chloride solution is electrolysed, elements X and Y are formed.

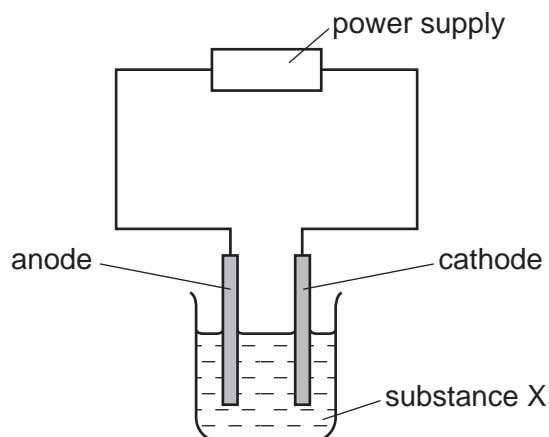


What are X and Y?

	X	Y
A	chlorine	hydrogen
B	hydrogen	chlorine
C	hydrogen	oxygen
D	oxygen	hydrogen

- 13 Substance X was electrolysed in an electrolytic cell.

A coloured gas was formed at the anode and a metal was formed at the cathode.

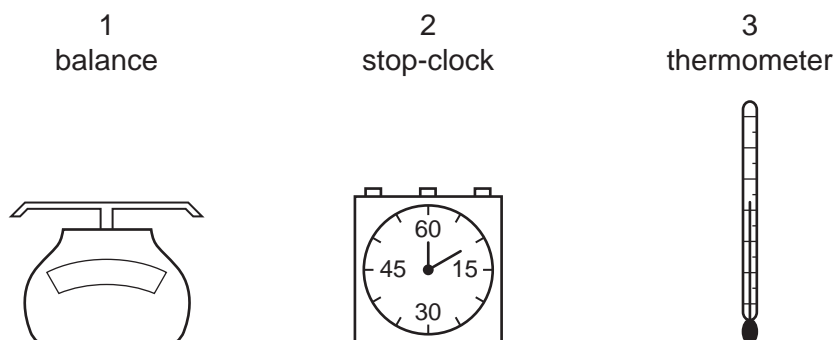


What is substance X?

- A** aqueous sodium chloride
- B** molten lead bromide
- C** molten zinc oxide
- D** solid sodium chloride

- 14 Which is an endothermic process?
- A burning hydrogen
 - B distilling petroleum
 - C reacting potassium with water
 - D using petrol in a motor car engine

- 15 The diagrams show some pieces of laboratory equipment.



Which equipment is needed to find out whether dissolving salt in water is an endothermic process?

- A 1 only B 1 and 3 C 2 and 3 D 3 only
- 16 Calcium carbonate was reacted with hydrochloric acid in a conical flask. The flask was placed on a balance and the mass of the flask and contents was recorded as the reaction proceeded.

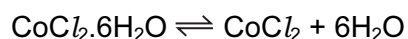
During the reaction, carbon dioxide gas was given off.

The reaction was carried out at two different temperatures.

Which row is correct?

	change in mass	temperature at which mass changed more quickly
A	decrease	higher temperature
B	decrease	lower temperature
C	increase	higher temperature
D	increase	lower temperature

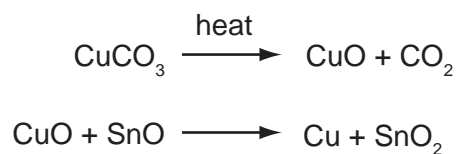
- 17 When pink crystals of cobalt(II) chloride are heated, steam is given off and the colour changes to blue.



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

- 18 The red colour in some pottery glazes may be formed as a result of the reactions shown.



These equations show that1..... is oxidised and2..... is reduced.

Which substances correctly complete gaps 1 and 2 in the above sentence?

	1	2
A	CO ₂	SnO ₂
B	CuCO ₃	CuO
C	CuO	SnO
D	SnO	CuO

19 Some barium iodide is dissolved in water.

Aqueous lead(II) nitrate is added to the solution until no more precipitate forms.

This precipitate, X, is filtered off.

Dilute sulfuric acid is added to the filtrate and another precipitate, Y, forms.

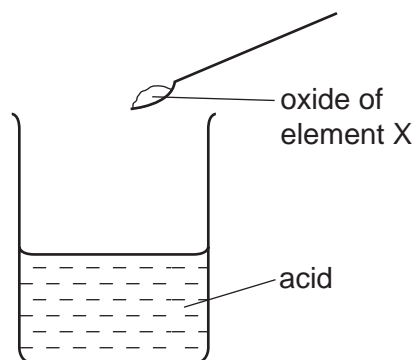
What are the colours of precipitates X and Y?

	X	Y
A	white	white
B	white	yellow
C	yellow	white
D	yellow	yellow

20 Which reaction will result in a decrease in pH?

- A** adding calcium hydroxide to acid soil
- B** adding citric acid to sodium hydrogen carbonate solution
- C** adding sodium chloride to silver nitrate solution
- D** adding sodium hydroxide to hydrochloric acid

- 21 The oxide of element X was added to an acid. It reacted to form a salt and water.



What is the pH of the acid before the reaction and what type of element is X?

	pH	type of element X
A	greater than 7	metal
B	greater than 7	non-metal
C	less than 7	metal
D	less than 7	non-metal

- 22 A salt is made by adding an excess of an insoluble metal oxide to an acid.

How can the excess metal oxide be removed?

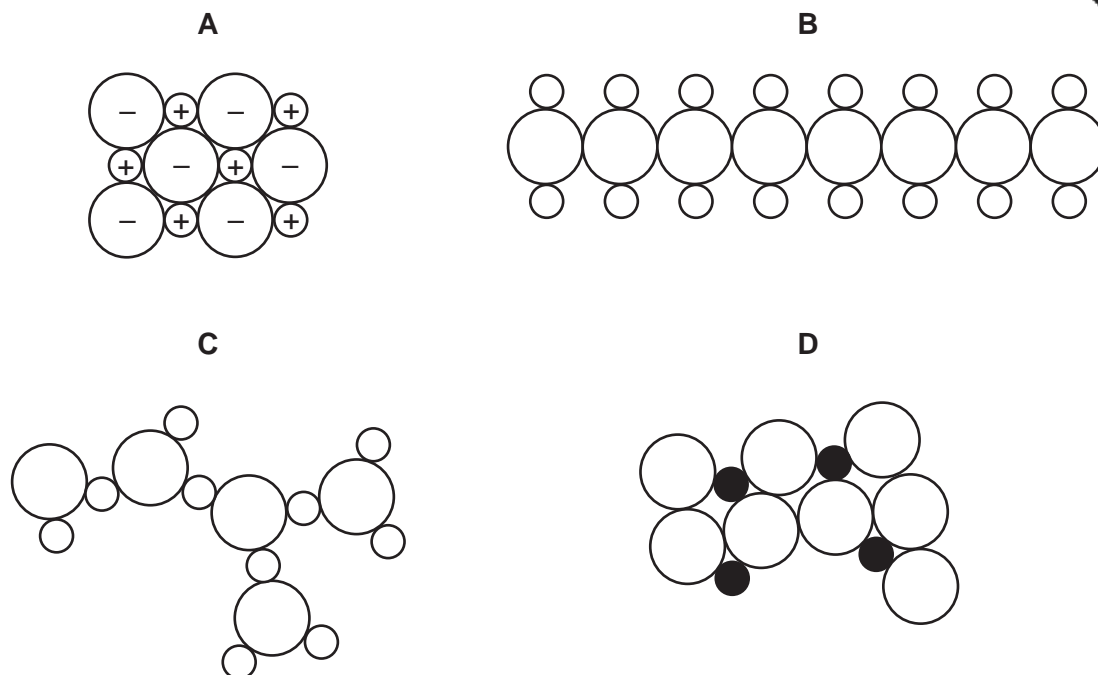
- A** chromatography
- B** crystallisation
- C** distillation
- D** filtration

- 23 The table compares the properties of Group I elements with those of transition elements.

Which entry in the table is correct?

	property	Group I elements	transition elements
A	catalytic activity	low	high
B	density	high	low
C	electrical conductivity	low	high
D	melting point	high	low

27 Which diagram could represent the structure of an alloy?



28 Which property do **all** metals have?

- A Their boiling points are low.
- B Their densities are low.
- C They conduct electricity.
- D They react with water.

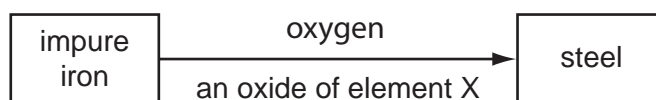
29 Some metals react readily with dilute hydrochloric acid.

Some metals can be extracted by heating their oxides with carbon.

For which metal are **both** statements correct?

- A calcium
- B copper
- C iron
- D magnesium

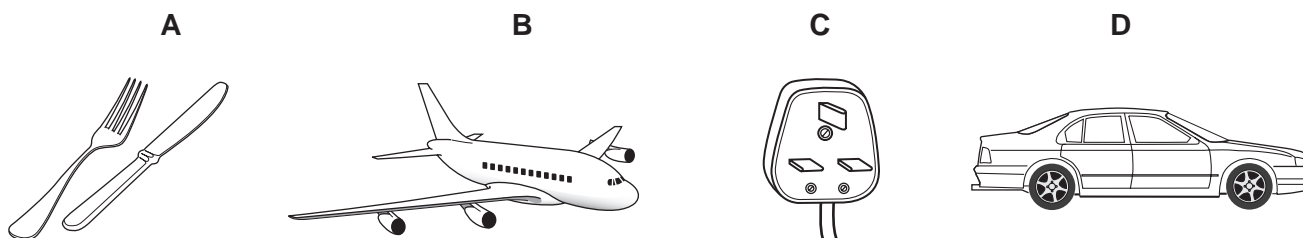
30 The diagram shows the materials used in the production of steel from impure iron.



What could element X be?

- A calcium
- B carbon
- C nitrogen
- D sulfur

31 Which diagram shows a common use of stainless steel?



32 Why is chlorination used in water treatment?

- A to kill bacteria in the water
- B to make the water neutral
- C to make the water taste better
- D to remove any salt in the water

33 Which pollutant, found in car exhaust fumes, does **not** come from the fuel?

- A carbon monoxide
- B hydrocarbons
- C lead compounds
- D nitrogen oxides

34 Which information about carbon dioxide and methane is correct?

		carbon dioxide	methane
A	formed when vegetation decomposes	✓	x
B	greenhouse gas	✓	✓
C	present in unpolluted air	x	x
D	produced during respiration	x	✓

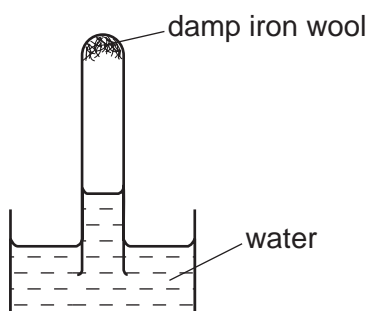
35 A bag of fertiliser 'Watch it grow' contains ammonium sulfate and potassium sulfate.

Which of the three elements N, P and K does 'Watch it grow' contain?

	N	P	K
A	✓	✓	x
B	✓	x	✓
C	x	✓	x
D	x	x	✓

36 A test-tube containing damp iron wool is inverted in water.

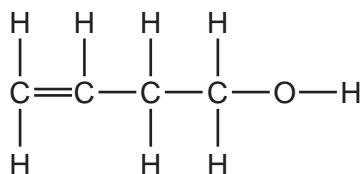
After three days, the water level inside the test-tube has risen.



Which statement explains this rise?

- A** Iron oxide has been formed.
- B** Iron wool has been reduced.
- C** Oxygen has been formed.
- D** The temperature of the water has risen.

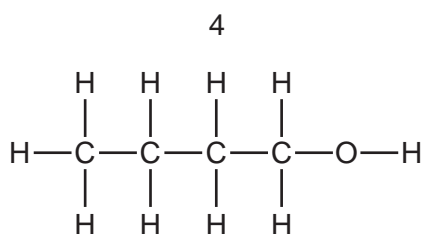
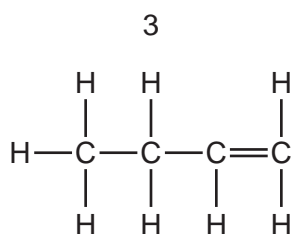
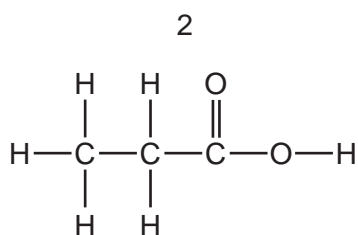
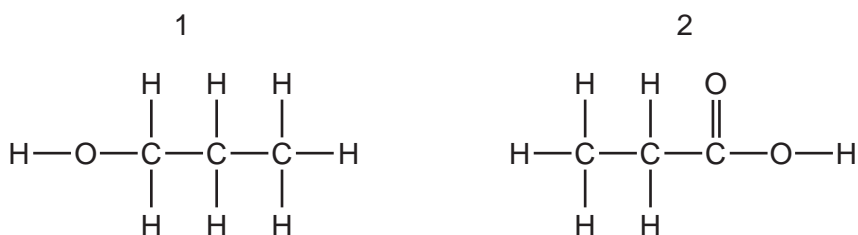
37 The diagram shows the structure of a compound.



To which classes of compound does this molecule belong?

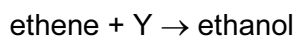
	alkane	alkene	alcohol
A	no	no	no
B	no	yes	yes
C	yes	no	yes
D	yes	yes	yes

38 Which structures show compounds that are members of the same homologous series?



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

39 Ethene reacts with Y to produce ethanol.

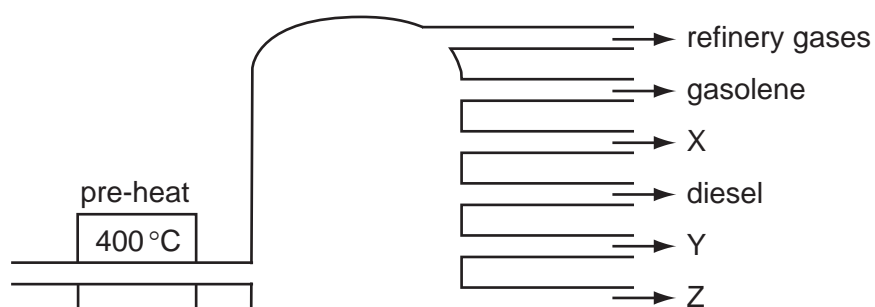


What is Y?

- A** hydrogen
B oxygen
C steam
D yeast

40 In an oil refinery, crude oil is separated into useful fractions.

The diagram shows some of these fractions.



What are fractions X, Y and Z?

	X	Y	Z
A	fuel oil	bitumen	paraffin (kerosene)
B	fuel oil	paraffin (kerosene)	bitumen
C	paraffin (kerosene)	bitumen	fuel oil
D	paraffin (kerosene)	fuel oil	bitumen

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	11 B Boron 5	12 C Carbon 6	14 N Nitrogen 7	16 O Oxygen 8	19 F Fluorine 9					35.5 Cl Chlorine 17																																																																																						
39 K Potassium 19	40 Ca Calcium 20	27 Al Aluminium 13	28 Si Silicon 14	31 P Phosphorus 15	32 S Sulfur 16	79 Se Selenium 34					84 Kr Krypton 36																																																																																						
85 Rb Rubidium 37	88 Sr Strontium 38	70 Ga Gallium 31	73 Ge Germanium 32	75 As Arsenic 33	80 Br Bromine 35					127 I Iodine 53																																																																																							
133 Cs Caesium 55	137 Ba Barium 56	65 Zn Zinc 30	64 Cu Copper 29	66 Ni Nickel 28	68 Co Cobalt 27	106 Pd Palladium 46	108 Ag Silver 47	112 Cd Cadmium 48	115 In Indium 49	119 Sn Tin 50	122 Sb Antimony 51																																																																																						
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 At Astatine 85																																																																																							
*58-71 Lanthanoid series													175 Lu Lutetium 71																																																																																				
†90-103 Actinoid series													102 No Nobelium 102																																																																																				
<table border="0" style="width: 100%;"> <tr> <td style="text-align: center;">a</td> <td style="text-align: center;">X</td> <td style="text-align: center;">b</td> </tr> <tr> <td style="text-align: center;">Key</td> <td style="text-align: center;">a = relative atomic mass</td> <td style="text-align: center;">X = atomic symbol</td> </tr> <tr> <td></td> <td></td> <td style="text-align: center;">b = proton (atomic) number</td> </tr> </table>													a	X	b	Key	a = relative atomic mass	X = atomic symbol			b = proton (atomic) number	169 Tm Thulium 69	167 Er Erbium 68	169 Fm Fermium 100	165 Ho Holmium 67	162 Dy Dysprosium 66	159 Tb Terbium 65	157 Gd Gadolinium 64	152 Eu Europium 63	150 Sm Samarium 62	144 Nd Neodymium 60	141 Pr Praseodymium 59	140 Ce Cerium 58	238 U Uranium 92	232 Th Thorium 90	99 Es Einsteinium 99	98 Cf Californium 98	97 Bk Berkelium 97	96 Cm Curium 96	95 Am Americium 95	94 Pu Plutonium 94	93 Np Neptunium 93	91 Pa Protactinium 91	78 Pt Platinum 78	77 Ir Iridium 77	76 Os Osmium 76	75 Re Rhenium 75	74 W Tungsten 74	73 Ta Tantalum 73	72 Hf Hafnium 72	71 Y Yttrium 39	70 Zr Zirconium 40	69 Nb Niobium 41	68 Mo Molybdenum 42	67 Tc Technetium 43	66 Ru Ruthenium 44	65 Rh Rhodium 45	64 Pd Palladium 46	63 Ag Silver 47	62 Cd Cadmium 48	61 Hg Mercury 80	60 Au Gold 79	59 Cu Copper 29	58 Zn Zinc 30	57 Ga Gallium 31	56 Fe Iron 26	55 Mn Manganese 25	54 Cr Chromium 24	53 V Vanadium 23	52 Ti Titanium 22	51 Sc Scandium 21	50 Ca Calcium 20	49 K Potassium 19	48 Sr Strontium 38	47 Rb Rubidium 37	46 Y Yttrium 39	45 Zr Zirconium 40	44 Nb Niobium 41	43 Mo Molybdenum 42	42 Tc Technetium 43	41 Ru Ruthenium 44	40 Rh Rhodium 45	39 Pd Palladium 46	38 Ag Silver 47	37 Cd Cadmium 48	36 Hg Mercury 80	35 Au Gold 79	34 Cu Copper 29	33 Zn Zinc 30	32 Ga Gallium 31	31 Ge Germanium 32	30 As Arsenic 33	29 Se Selenium 34	28 Br Bromine 35	27 Kr Krypton 36	26 Xe Xenon 54	25 Rn Radon 86
a	X	b																																																																																															
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		b = proton (atomic) number																																																																																															

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