



UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS  
International General Certificate of Secondary Education

**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)



**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.

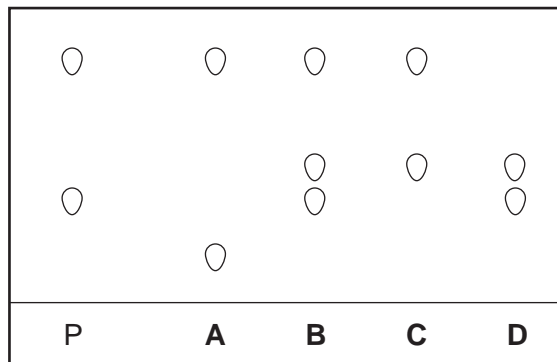


- 1 In which changes do the particles move further apart?



- 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 <sup>2+</sup>	X	24	12	12	10
F	9	19	9	Y	9
F <sup>-</sup>	9	19	9	10	Z

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

	W	X	Y	Z
<b>A</b>	10	10	9	9
<b>B</b>	10	12	10	9
<b>C</b>	12	10	9	10
<b>D</b>	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?

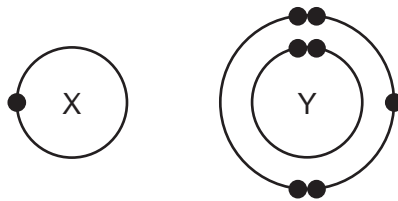
	${}^1_1\text{H}$	${}^2_1\text{H}$	key
<b>A</b>			⊖ = an electron
<b>B</b>			⊕ = a proton
<b>C</b>			⊙ = a neutron
<b>D</b>			⊘ = a nucleus

- 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
<b>A</b>	✓	✓
<b>B</b>	✓	x
<b>C</b>	x	✓
<b>D</b>	x	x

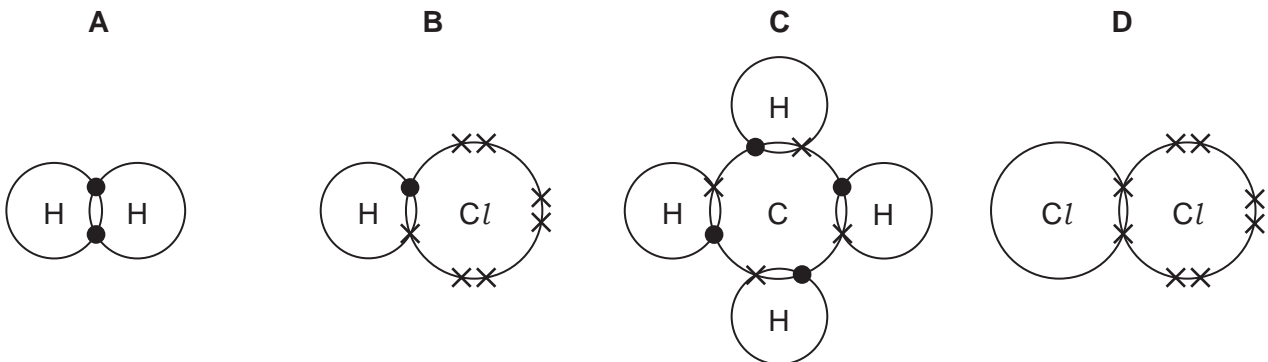
- 8 The electronic structures of atoms X and Y are shown.



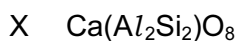
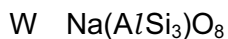
X and Y form a covalent compound.

What is its formula?

- A** XY<sub>5</sub>      **B** XY<sub>3</sub>      **C** XY      **D** X<sub>3</sub>Y
- 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.

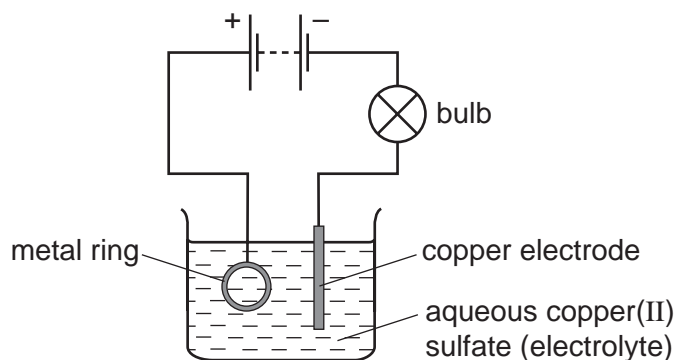


Which statements are correct?

- 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.

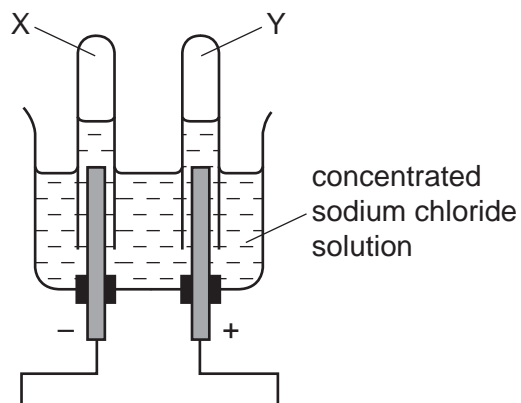


The experiment did not work.

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.

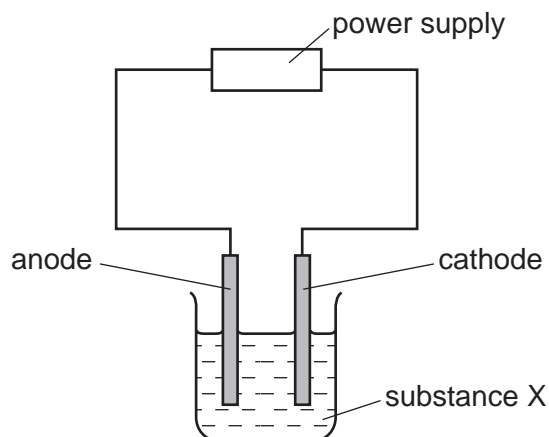


What are X and Y?

	X	Y
<b>A</b>	chlorine	hydrogen
<b>B</b>	hydrogen	chlorine
<b>C</b>	hydrogen	oxygen
<b>D</b>	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.



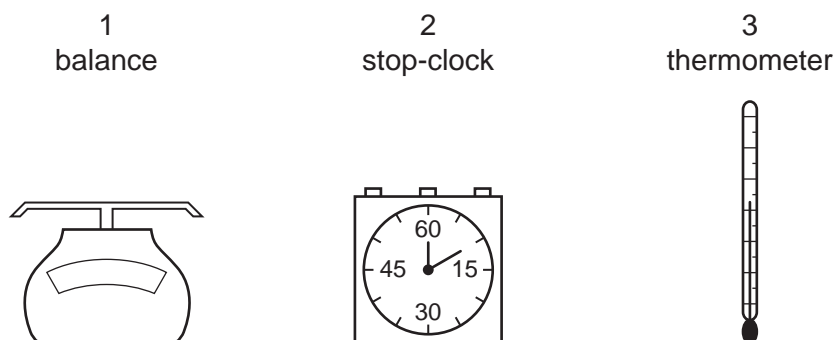
What is substance X?

- 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.

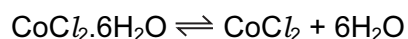
During the reaction, carbon dioxide gas was given off.

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

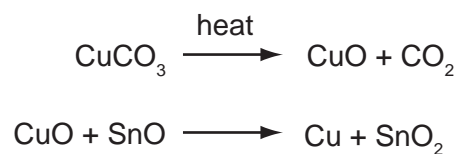
- 17 When pink crystals of cobalt(II) chloride are heated, steam is given off and the colour of the solid changes to blue.



What happens when water is added to the blue solid?

	colour	temperature
<b>A</b>	changes to pink	decreases
<b>B</b>	changes to pink	increases
<b>C</b>	remains blue	decreases
<b>D</b>	remains blue	increases

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



These equations show that .....1..... is oxidised and .....2..... is reduced.

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

	1	2
<b>A</b>	CO <sub>2</sub>	SnO <sub>2</sub>
<b>B</b>	CuCO <sub>3</sub>	CuO
<b>C</b>	CuO	SnO
<b>D</b>	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.

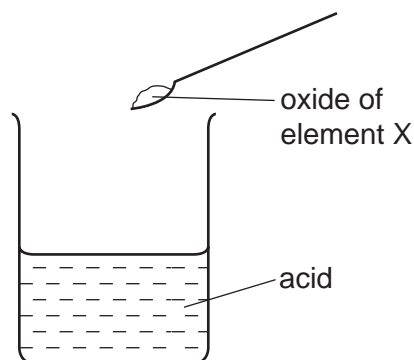
What are the colours of precipitates X and Y?

	X	Y
<b>A</b>	white	white
<b>B</b>	white	yellow
<b>C</b>	yellow	white
<b>D</b>	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
<b>A</b>	greater than 7	metal
<b>B</b>	greater than 7	non-metal
<b>C</b>	less than 7	metal
<b>D</b>	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
<b>A</b>	catalytic activity	low	high
<b>B</b>	density	high	low
<b>C</b>	electrical conductivity	low	high
<b>D</b>	melting point	high	low

24 Which compound is likely to be coloured?

- A  $\text{KMnO}_4$       B  $\text{KNO}_3$       C  $\text{K}_2\text{CO}_3$       D  $\text{K}_2\text{SO}_4$

25 The diagram shows the positions of elements P, Q, R, S and T in the Periodic Table.

These letters are not the chemical symbols for the elements.

																		S	T
P																			
Q		R																	

Which statement about the properties of these elements is correct?

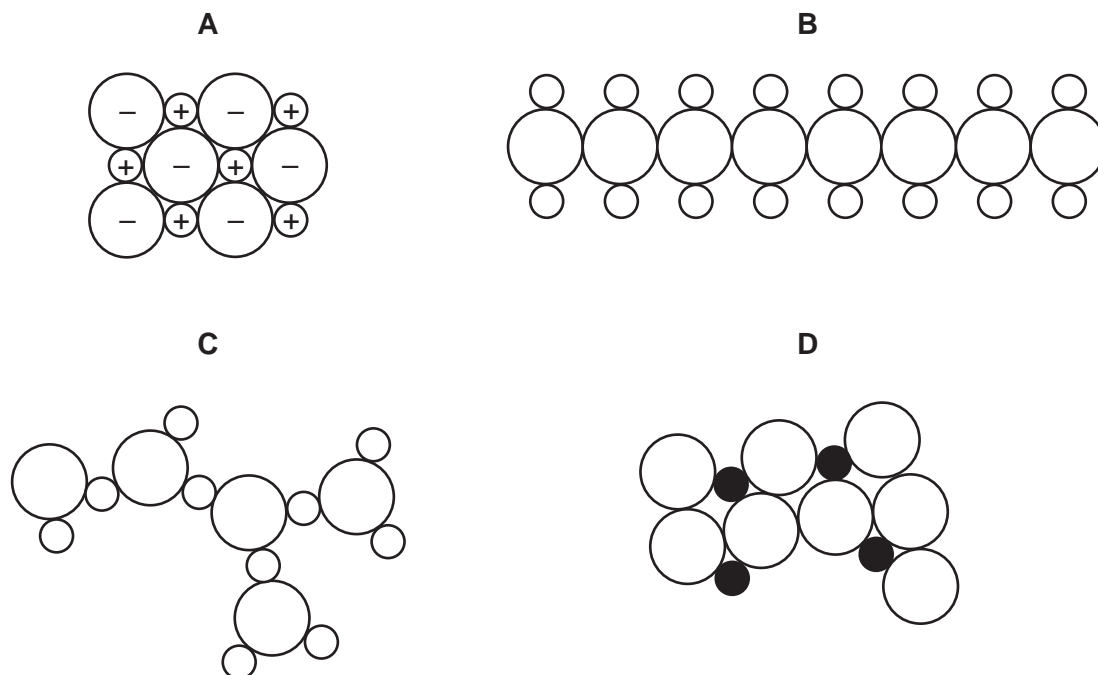
- A P reacts more vigorously with water than does Q.  
 B P, Q and R are all metals.  
 C T exists as diatomic molecules.  
 D T is more reactive than S.

26 The table shows some reactions of the halogens.

Which reaction is the most likely to be explosive?

reaction	chlorine gas	bromine gas	iodine gas
reaction with hydrogen	<b>A</b>	<b>B</b>	<b>C</b>
reaction with iron	very vigorous	less vigorous	<b>D</b>

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.

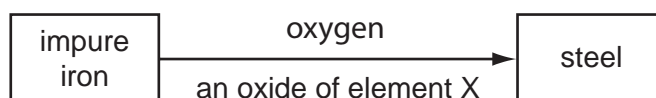
29 Some metals react readily with dilute hydrochloric acid.

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

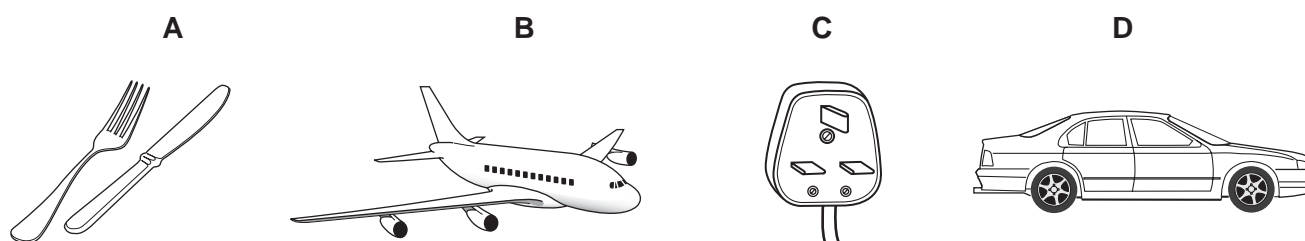
30 The diagram shows the materials used in the production of steel from impure iron.



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
<b>A</b>	formed when vegetation decomposes	✓	✗
<b>B</b>	greenhouse gas	✓	✓
<b>C</b>	present in unpolluted air	✗	✗
<b>D</b>	produced during respiration	✗	✓

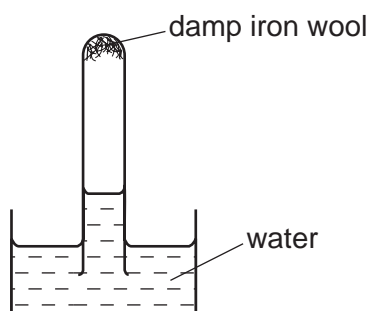
35 A bag of fertiliser 'Watch it grow' contains ammonium sulfate and potassium sulfate.

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

	N	P	K
<b>A</b>	✓	✓	✗
<b>B</b>	✓	✗	✓
<b>C</b>	✗	✓	✗
<b>D</b>	✗	✗	✓

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

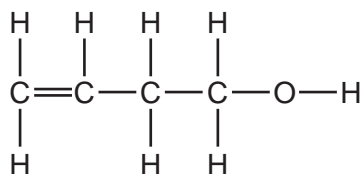
After three days, the water level inside the test-tube has risen.



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.

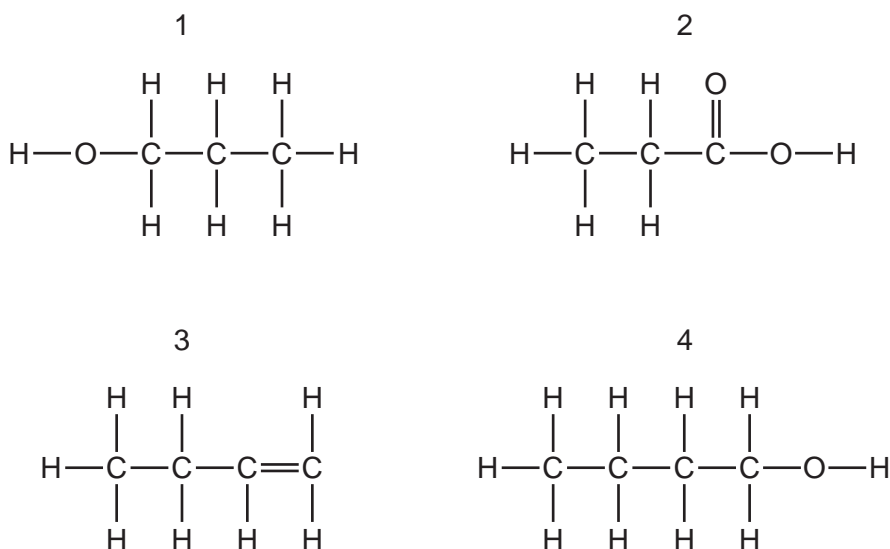
37 The diagram shows the structure of a compound.



To which classes of compound does this molecule belong?

	alkane	alkene	alcohol
<b>A</b>	no	no	no
<b>B</b>	no	yes	yes
<b>C</b>	yes	no	yes
<b>D</b>	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.

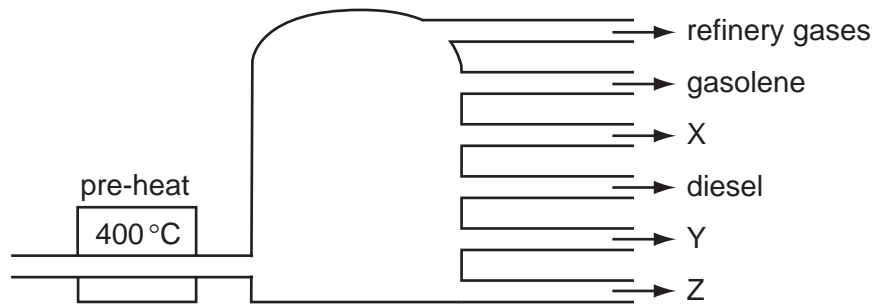


What is Y?

- 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
<b>A</b>	fuel oil	bitumen	paraffin (kerosene)
<b>B</b>	fuel oil	paraffin (kerosene)	bitumen
<b>C</b>	paraffin (kerosene)	bitumen	fuel oil
<b>D</b>	paraffin (kerosene)	fuel oil	bitumen









**DATA SHEET**  
**The Periodic Table of the Elements**

		Group																		
		I	II	III	IV	V	VI	VII	VIII	IX	X	O								
		1 <b>H</b> Hydrogen 1																		
7	9																			
<b>Li</b> Lithium 3	<b>Be</b> Beryllium 4																			
23	24																			
<b>Na</b> Sodium 11	<b>Mg</b> Magnesium 12																			
39	40																			
<b>K</b> Potassium 19	<b>Ca</b> Calcium 20	45	48	51	52	55	56	59	59	64	65	70								
		<b>Sc</b> Scandium 21	<b>Ti</b> Titanium 22	<b>V</b> Vanadium 23	<b>Cr</b> Chromium 24	<b>Mn</b> Manganese 25	<b>Fe</b> Iron 26	<b>Co</b> Cobalt 27	<b>Ni</b> Nickel 28	<b>Cu</b> Copper 29	<b>Zn</b> Zinc 30	<b>Ga</b> Gallium 31								
85	88	89	91	93	96	101	101	103	106	108	112	115								
<b>Rb</b> Rubidium 37	<b>Sr</b> Strontium 38	<b>Y</b> Yttrium 39	<b>Zr</b> Zirconium 40	<b>Nb</b> Niobium 41	<b>Mo</b> Molybdenum 42	<b>Ru</b> Ruthenium 44	<b>Rh</b> Rhodium 45	<b>Pd</b> Palladium 46	<b>Ag</b> Silver 47	<b>Cd</b> Cadmium 48	<b>In</b> Indium 49	<b>Sn</b> Tin 50								
133	137	139	178	181	184	190	190	192	195	197	201	204								
<b>Cs</b> Caesium 55	<b>Ba</b> Barium 56	<b>La</b> Lanthanum 57	<b>Hf</b> Hafnium 72	<b>Ta</b> Tantalum 73	<b>W</b> Tungsten 74	<b>Os</b> Osmium 76	<b>Ir</b> Iridium 77	<b>Pt</b> Platinum 78	<b>Au</b> Gold 79	<b>Hg</b> Mercury 80	<b>Tl</b> Thallium 81	<b>Pb</b> Lead 82								
226	227																			
<b>Fr</b> Francium 87	<b>Ra</b> Radium 88	<b>Ac</b> Actinium 89																		
*58-71 Lanthanoid series																				
†90-103 Actinoid series																				
<table style="width: 100%; border: none;"> <tr> <td style="border: none; padding-right: 10px;">a</td> <td style="border: none; padding-right: 10px;"><b>X</b></td> <td style="border: none; padding-right: 10px;">b</td> <td style="border: none;">a = relative atomic mass</td> <td style="border: none; padding-right: 10px;">X</td> <td style="border: none; padding-right: 10px;">b</td> <td style="border: none;">X = atomic symbol</td> <td style="border: none; padding-right: 10px;">number</td> </tr> </table>													a	<b>X</b>	b	a = relative atomic mass	X	b	X = atomic symbol	number
a	<b>X</b>	b	a = relative atomic mass	X	b	X = atomic symbol	number													
140	141	144	150	152	157	159	162	165	167	169	173	175								
<b>Ce</b> Cerium 58	<b>Pr</b> Praseodymium 59	<b>Nd</b> Neodymium 60	<b>Sm</b> Samarium 62	<b>Eu</b> Europium 63	<b>Gd</b> Gadolinium 64	<b>Tb</b> Terbium 65	<b>Dy</b> Dysprosium 66	<b>Ho</b> Holmium 67	<b>Er</b> Erbium 68	<b>Tm</b> Thulium 69	<b>Yb</b> Ytterbium 70	<b>Lu</b> Lutetium 71								
232	238	238	238	238	238	238	238	238	238	238	238	238								
<b>Th</b> Thorium 90	<b>Pa</b> Protactinium 91	<b>U</b> Uranium 92	<b>Np</b> Neptunium 93	<b>Am</b> Americium 95	<b>Cm</b> Curium 96	<b>Bk</b> Berkelium 97	<b>Cf</b> Californium 98	<b>Es</b> Einsteinium 99	<b>Fm</b> Fermium 100	<b>Md</b> Mendelevium 101	<b>No</b> Nobelium 102	<b>Lr</b> Lawrencium 103								

The volume of one mole of any gas is 24 dm<sup>3</sup> at room temperature and pressure (r.t.p.).

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