

Surname	Centre Number	Candidate Number
Other Names		0



GCSE

0236/01

**SCIENCE
FOUNDATION TIER
CHEMISTRY 1**

A.M. TUESDAY, 12 June 2012

45 minutes

For Examiner's use only		
Question	Maximum Mark	Mark Awarded
1.	8	
2.	6	
3.	4	
4.	7	
5.	7	
6.	3	
7.	7	
8.	8	
Total	50	

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ADDITIONAL MATERIALS

In addition to this paper you will need a calculator and a ruler.

INSTRUCTIONS TO CANDIDATES

Use black ink or black ball-point pen.
Do not use gel pen or correction fluid.

Write your name, centre number and candidate number in the spaces at the top of this page.

Answer **all** questions.

Write your answers in the spaces provided in this booklet.

If you run out of space, use the continuation page at the back of the booklet, taking care to number the question(s) correctly.

INFORMATION FOR CANDIDATES

The number of marks is given in brackets at the end of each question or part-question.

You are reminded of the necessity for good English and orderly presentation in your answers.

The Periodic Table is printed on the back cover of the examination paper and the formulae for some common ions on the inside of the back cover.



J U N 1 2 0 2 3 6 0 1 0 1

Answer all questions.

1. (a) The following box contains some information about chemical reactions. Read the information carefully and answer the questions that follow.

Chemical reactions involve converting reactants into products.

reactants \longrightarrow products

They are used in industry to produce new and useful materials from raw materials. Raw materials can be obtained from the earth, sea and air. Examples of raw materials include crude oil, nitrogen and metal ores.

Useful products include fuels, plastics, medicines, metals and fertilisers.

Use the information in the box above to help you answer parts (i)-(iv).

- (i) State what happens during a chemical reaction. [1]
.....
- (ii) State why chemical reactions are important in industry. [1]
.....
- (iii) Name a raw material obtained from
- I. the earth, [1]
- II. the air. [1]
- (iv) Name the raw material used to produce petrol. [1]
.....
- (b) Sulphuric acid, H_2SO_4 , is produced during the Contact Process. One stage of the process involves burning sulphur in air to produce sulphur dioxide, SO_2 .
- (i) Name the gas, found in the air, that reacts with sulphur to form sulphur dioxide. [1]
.....
- (ii) State how many atoms of sulphur are found in a molecule of sulphur dioxide, SO_2 . [1]
.....
- (iii) Give the **total** number of atoms found in a molecule of sulphuric acid, H_2SO_4 . [1]
.....



2. (a) The following table shows information about some ionic substances. There are **three** errors in the table.

Circle each of the **three** errors.

[3]

Name	Positive ion present	Negative ion present	Formula
sodium chloride	Na^+	Cl^-	NaCl
calcium chloride	Ca^{2+}	Cl^-	CaCl
magnesium oxide	Mg^{2+}	O^{2-}	MgO_2
potassium iodide	Li^+	I^-	KI

- (b) Ammonia, NH_3 , can be represented by the diagram shown below.



- (i) State why ammonia is a compound.

[1]

.....

.....

- (ii) I. Use the diagram of ammonia to complete the key shown below.

[1]

● =

● = carbon

○ =

○ = oxygen

- II. Use the key to draw a diagram that represents a molecule of methane, CH_4 .

[1]



3. Nano-silver particles have been widely used in recent years.

(a) Choose from the box below one use for nano-silver particles.

[1]

air freshener	deodorant	shampoo	window cleaner
----------------------	------------------	----------------	-----------------------

Use of nano-silver

(b) Choose from the box below a property of nano-silver that allows it to be used in this way.

[1]

anti-bacterial	low density	shiny	water repellent
-----------------------	--------------------	--------------	------------------------

Property of nano-silver

(c) Choose from the box below the size range of nano-silver particles.

[1]

1-100 cm	1-100 m	1-100 mm	1-100 nm
-----------------	----------------	-----------------	-----------------

Size range of nano-silver

(d) Nano-silver particles could be absorbed through the skin. Suggest a reason why some people are concerned about this.

[1]

.....

.....



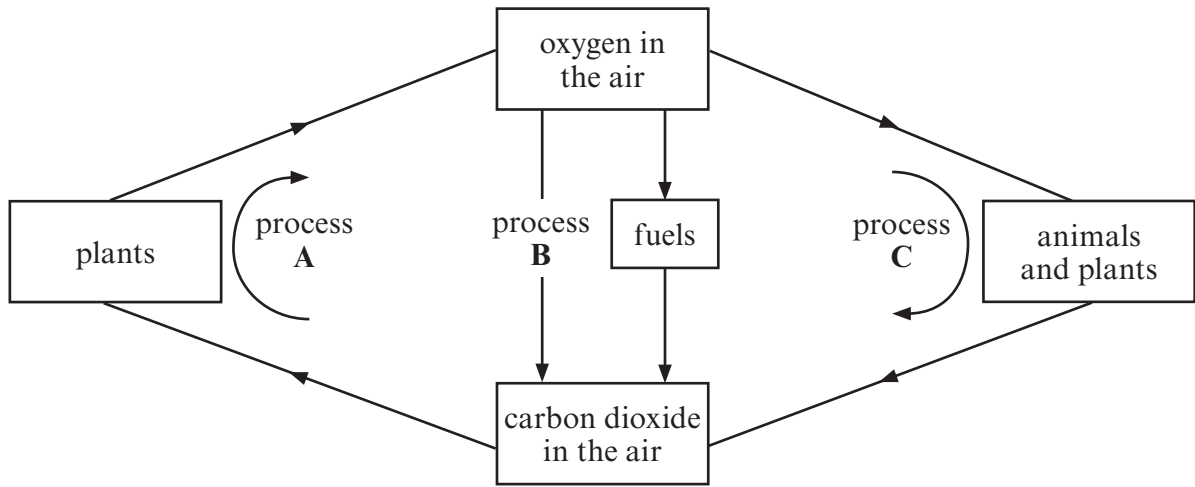
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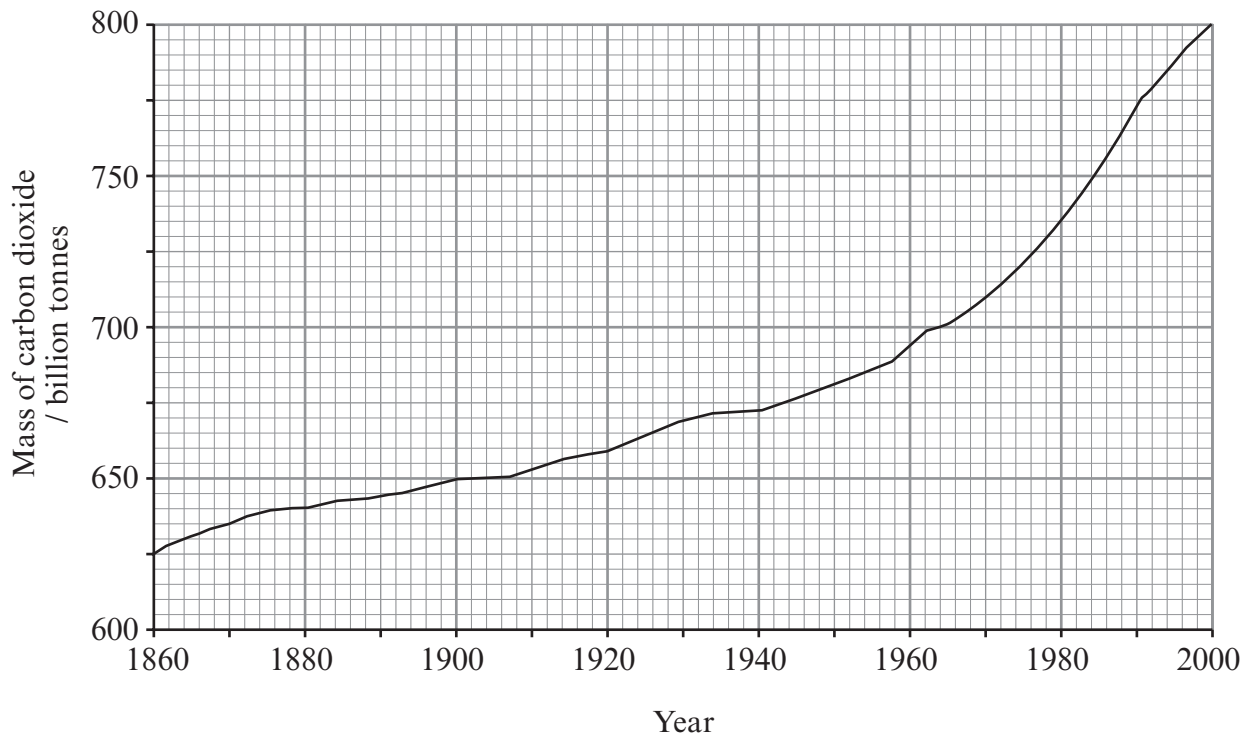


4. Levels of oxygen and carbon dioxide in the air are maintained by the processes shown in the following diagram.



- (a) Give the letter, **A**, **B** or **C** from the diagram, which represents the process of [2]
- respiration,
- photosynthesis,
- combustion.

- (b) The following graph shows how the mass of carbon dioxide in the atmosphere has changed since 1860.



(i) Give the mass of carbon dioxide in the atmosphere in 1900.

.....

[1]

(ii) Calculate the change in mass of carbon dioxide in the atmosphere between 1860 and 2000 and suggest a reason for this change.

[2]

Change billion tonnes

Reason

.....

(iii) Choose from the box below the effect most scientists believe this change in carbon dioxide levels has on the temperature of the Earth's atmosphere.

[1]

decreases	increases	stays the same
------------------	------------------	-----------------------

.....

(iv) Give the term used to describe this change.

[1]

.....

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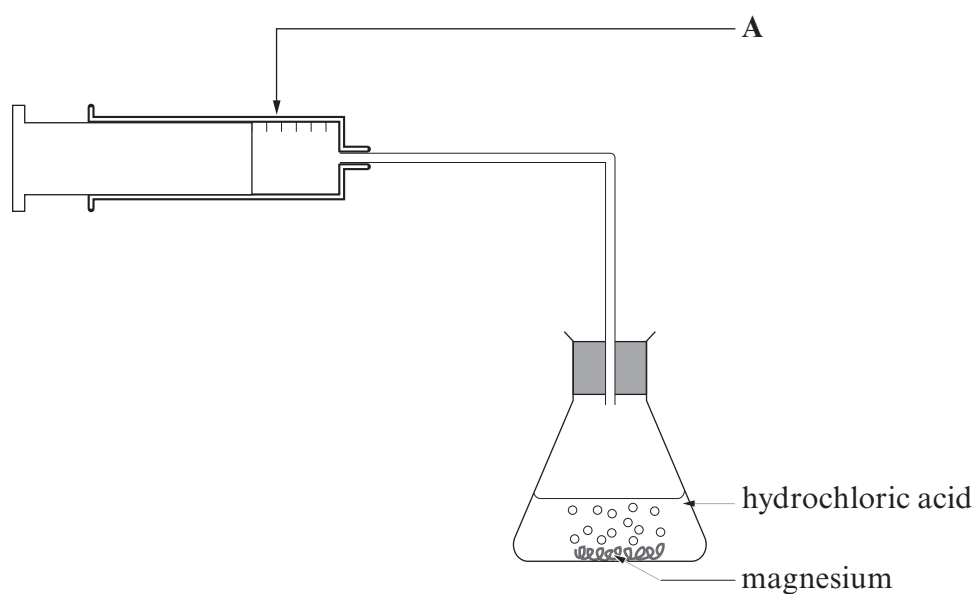


5. When magnesium ribbon is added to hydrochloric acid, magnesium chloride and hydrogen gas are produced.

(a) Write a **word** equation for the reaction taking place. [2]

..... + → +

(b) The rate of this reaction can be investigated using the apparatus shown below.



(i) Name the apparatus **A**, shown in the diagram. [1]

.....

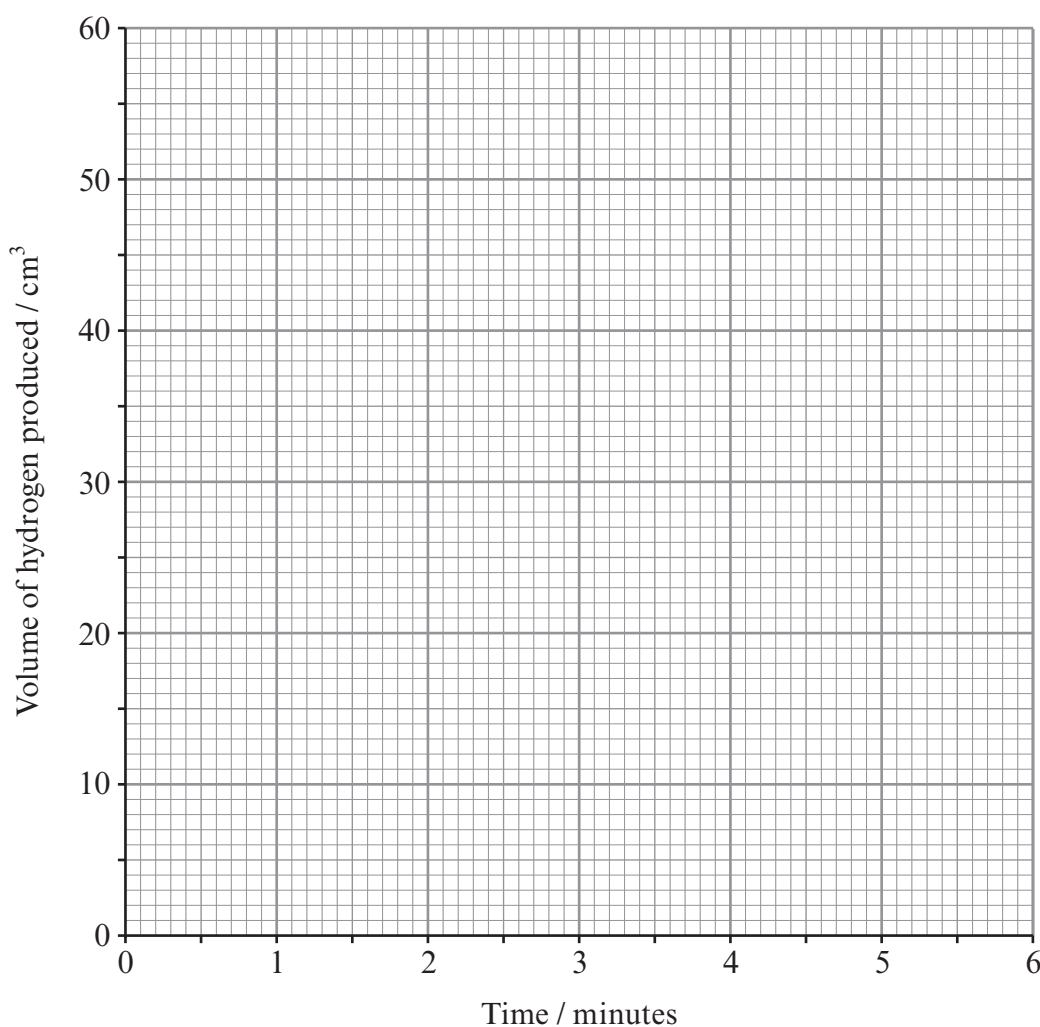


- (ii) John carried out an experiment using the apparatus shown opposite. He measured the volume of hydrogen every minute for 6 minutes. His results are shown in the table below.

Time / minutes	0	1	2	3	4	5	6
Volume of hydrogen produced / cm ³	0	20	34	42	48	50	50

Plot the results from the table on the grid below and draw a line of best fit. *Your line should go through the origin (0,0).*

[3]



- (iii) John used an *excess* of hydrochloric acid during the experiment. Give the reason why the reaction came to an end after 5 minutes. [1]

.....



6. In 1915 Alfred Wegener suggested that the Earth's continents were once joined and that they had drifted apart to their present positions.

Choose words from the box below to complete the following sentences, describing the evidence Wegener used to support his idea. [3]

animals	coastlines	countries	earthquakes	fossils
	mountains	plants	rocks	volcanoes

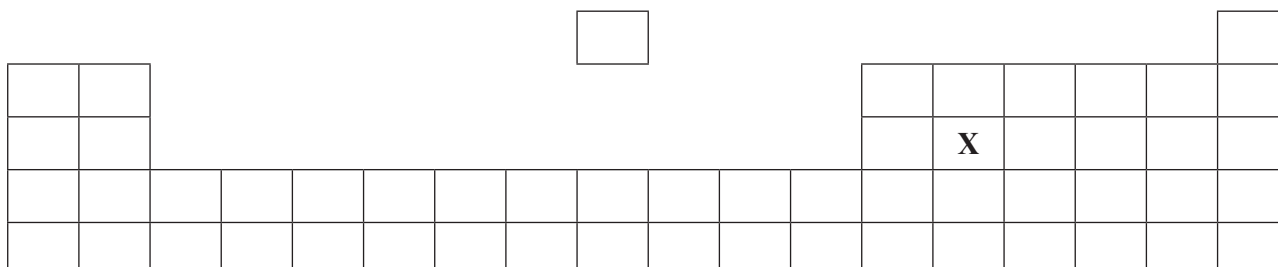
Wegener noticed that the of different continents appear to have shapes that would fit together like a jigsaw.

He also found that similar patterns of of the same age and similar exist on different continents, separated by huge oceans.



7. The following diagram shows an outline of the Periodic Table of Elements.

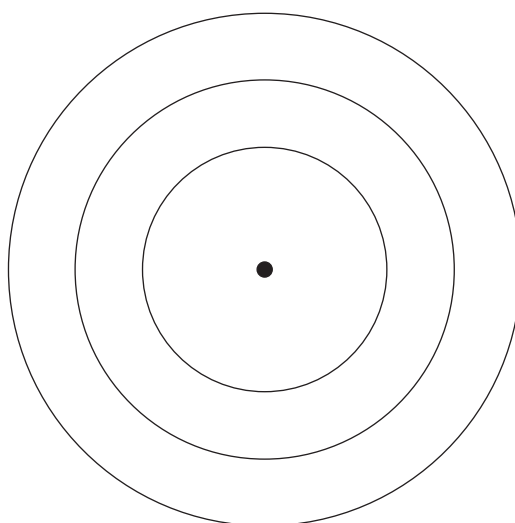
You may find the Periodic Table shown on the back page of this examination paper useful in answering this question.



(a) Using the letters **A-E**, show the position of the following elements on the diagram above. [5]

- A** – the most reactive alkali metal
- B** – the least reactive halogen
- C** – the gas used to fill weather balloons
- D** – the element that reacts with sodium to produce sodium chloride
- E** – the element with electronic structure 2,8,2

(b) Complete the diagram below to show the electronic structure of the element shown in position **X** in the table above. [1]



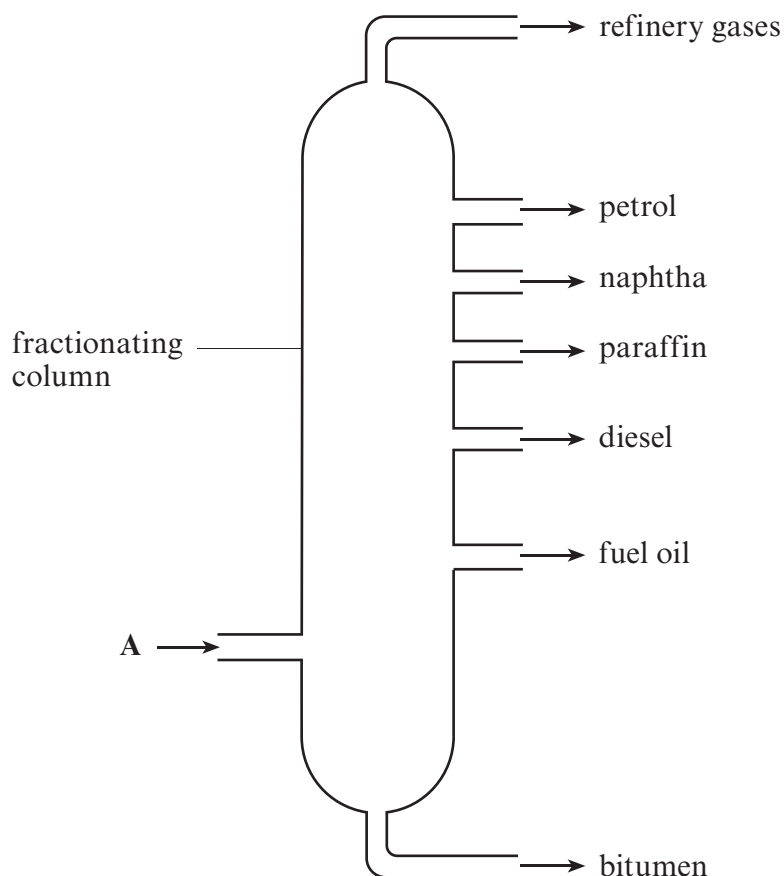
(c) State how the electronic structure can be used to determine an element's atomic number. [1]

.....

.....



8. (a) Crude oil is a mixture of compounds called hydrocarbons which can be separated into fractions in a fractionating column as shown below.



- (i) Name the elements present in all hydrocarbons. [1]
 and
- (ii) State what must happen [1]
 I. to the crude oil before it enters the column at point A,
 [1]
 II. in order to collect the fractions as liquids. [1]

- (iii) Give the name of this process. [1]



(iv) Explain why petrol is collected above diesel in the fractionating column. [2]

.....

.....

(b) The following graph shows how the average price of crude oil changed between 1998 and 2008.



(i) State the trend in oil price over this period. [1]

.....

(ii) Suggest a reason for this trend. [1]

.....

.....



FORMULAE FOR SOME COMMON IONS

POSITIVE IONS		NEGATIVE IONS	
Name	Formula	Name	Formula
Aluminium	Al^{3+}	Bromide	Br^-
Ammonium	NH_4^+	Carbonate	CO_3^{2-}
Barium	Ba^{2+}	Chloride	Cl^-
Calcium	Ca^{2+}	Fluoride	F^-
Copper(II)	Cu^{2+}	Hydroxide	OH^-
Hydrogen	H^+	Iodide	I^-
Iron(II)	Fe^{2+}	Nitrate	NO_3^-
Iron(III)	Fe^{3+}	Oxide	O^{2-}
Lithium	Li^+	Sulphate	SO_4^{2-}
Magnesium	Mg^{2+}		
Nickel	Ni^{2+}		
Potassium	K^+		
Silver	Ag^+		
Sodium	Na^+		





1 6

PERIODIC TABLE OF ELEMENTS

1 2

Group

3 4 5 6 7 0



${}^7_3\text{Li}$ Lithium	${}^9_4\text{Be}$ Beryllium											${}^{19}_9\text{F}$ Fluorine	${}^{20}_{10}\text{Ne}$ Neon				
${}^{23}_{11}\text{Na}$ Sodium	${}^{24}_{12}\text{Mg}$ Magnesium											${}^{35}_{17}\text{Cl}$ Chlorine	${}^{40}_{18}\text{Ar}$ Argon				
${}^{39}_{19}\text{K}$ Potassium	${}^{40}_{20}\text{Ca}$ Calcium	${}^{45}_{21}\text{Sc}$ Scandium	${}^{48}_{22}\text{Ti}$ Titanium	${}^{51}_{23}\text{V}$ Vanadium	${}^{52}_{24}\text{Cr}$ Chromium	${}^{55}_{25}\text{Mn}$ Manganese	${}^{56}_{26}\text{Fe}$ Iron	${}^{59}_{27}\text{Co}$ Cobalt	${}^{59}_{28}\text{Ni}$ Nickel	${}^{64}_{29}\text{Cu}$ Copper	${}^{65}_{30}\text{Zn}$ Zinc	${}^{70}_{31}\text{Ga}$ Gallium	${}^{73}_{32}\text{Ge}$ Germanium	${}^{75}_{33}\text{As}$ Arsenic	${}^{79}_{34}\text{Se}$ Selenium	${}^{80}_{35}\text{Br}$ Bromine	${}^{84}_{36}\text{Kr}$ Krypton
${}^{86}_{37}\text{Rb}$ Rubidium	${}^{88}_{38}\text{Sr}$ Strontium	${}^{89}_{39}\text{Y}$ Yttrium	${}^{91}_{40}\text{Zr}$ Zirconium	${}^{93}_{41}\text{Nb}$ Niobium	${}^{96}_{42}\text{Mo}$ Molybdenum	${}^{99}_{43}\text{Tc}$ Technetium	${}^{101}_{44}\text{Ru}$ Ruthenium	${}^{103}_{45}\text{Rh}$ Rhodium	${}^{106}_{46}\text{Pd}$ Palladium	${}^{108}_{47}\text{Ag}$ Silver	${}^{112}_{48}\text{Cd}$ Cadmium	${}^{115}_{49}\text{In}$ Indium	${}^{119}_{50}\text{Sn}$ Tin	${}^{122}_{51}\text{Sb}$ Antimony	${}^{128}_{52}\text{Te}$ Tellurium	${}^{127}_{53}\text{I}$ Iodine	${}^{131}_{54}\text{Xe}$ Xenon
${}^{133}_{55}\text{Cs}$ Caesium	${}^{137}_{56}\text{Ba}$ Barium	${}^{139}_{57}\text{La}$ Lanthanum	${}^{179}_{72}\text{Hf}$ Hafnium	${}^{181}_{73}\text{Ta}$ Tantalum	${}^{184}_{74}\text{W}$ Tungsten	${}^{186}_{75}\text{Re}$ Rhenium	${}^{190}_{76}\text{Os}$ Osmium	${}^{192}_{77}\text{Ir}$ Iridium	${}^{195}_{78}\text{Pt}$ Platinum	${}^{197}_{79}\text{Au}$ Gold	${}^{201}_{80}\text{Hg}$ Mercury	${}^{204}_{81}\text{Tl}$ Thallium	${}^{207}_{82}\text{Pb}$ Lead	${}^{209}_{83}\text{Bi}$ Bismuth	${}^{210}_{84}\text{Po}$ Polonium	${}^{210}_{85}\text{At}$ Astatine	${}^{222}_{86}\text{Rn}$ Radon
${}^{223}_{87}\text{Fr}$ Francium	${}^{226}_{88}\text{Ra}$ Radium	${}^{227}_{89}\text{Ac}$ Actinium															

Key:

