



# THE PERIODIC TABLE

Group 1 2 3 4 5 6 7 0

Period

1																	4 He Helium 2															
2	7 Li Lithium 3	9 Be Beryllium 4															20 Ne Neon 10															
3	11 Na Sodium 11	12 Mg Magnesium 12															19 F Fluorine 9															
4	19 K Potassium 19	20 Ca Calcium 20	21 Sc Scandium 21	22 Ti Titanium 22	23 V Vanadium 23	24 Cr Chromium 24	25 Mn Manganese 25	26 Fe Iron 26	27 Co Cobalt 27	28 Ni Nickel 28	29 Cu Copper 29	30 Zn Zinc 30	31 Ga Gallium 31	32 Ge Germanium 32	33 As Arsenic 33	34 Se Selenium 34	35 Br Bromine 35	36 Kr Krypton 36														
5	37 Rb Rubidium 37	38 Sr Strontium 38	39 Y Yttrium 39	40 Zr Zirconium 40	41 Nb Niobium 41	42 Mo Molybdenum 42	43 Tc Technetium 43	44 Ru Ruthenium 44	45 Rh Rhodium 45	46 Pd Palladium 46	47 Ag Silver 47	48 Cd Cadmium 48	49 In Indium 49	50 Sn Tin 50	51 Sb Antimony 51	52 Te Tellurium 52	53 I Iodine 53	54 Xe Xenon 54														
6	55 Cs Caesium 55	56 Ba Barium 56	57 La Lanthanum 57	58 Ce Cerium 58	59 Pr Praseodymium 59	60 Nd Neodymium 60	61 Pm Promethium 61	62 Sm Samarium 62	63 Eu Europium 63	64 Gd Gadolinium 64	65 Tb Terbium 65	66 Dy Dysprosium 66	67 Ho Holmium 67	68 Er Erbium 68	69 Tm Thulium 69	70 Yb Ytterbium 70	71 Lu Lutetium 71	72 Hf Hafnium 72	73 Ta Tantalum 73	74 W Tungsten 74	75 Re Rhenium 75	76 Os Osmium 76	77 Ir Iridium 77	78 Pt Platinum 78	79 Au Gold 79	80 Hg Mercury 80	81 Tl Thallium 81	82 Pb Lead 82	83 Bi Bismuth 83	84 Po Polonium 84	85 At Astatine 85	86 Rn Radon 86
7	87 Fr Francium 87	88 Ra Radium 88	89 Ac Actinium 89																													

1	H Hydrogen 1
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4	He Helium 2
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Key

Relative atomic mass
Symbol
Name
Atomic number



**SECTION A**

**1.** Iron is a metal which can rust.

(a) Name the **two** substances that must be present for iron to rust.

1 .....

2 .....

**(2)**

(b) The table gives three methods of preventing rusting. Choose words from the box to complete the table. Each word may be used only once, or not at all.

<b>bicycle chain</b>	<b>bridge</b>
<b>bucket</b>	<b>car body</b>
<b>food can</b>	

<b>Method of preventing rusting</b>	<b>Example of where used</b>
galvanising	
oiling	
painting	

**(3)**

**Q1**

**(Total 5 marks)**



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2. (a) The table shows different methods of separating mixtures. Tick (✓) **one** box in each row to show the best method for each mixture.

<b>Method</b> <b>Mixture</b>	<b>Filtration</b>	<b>Distillation</b>	<b>Chromatography</b>	<b>Fractional distillation</b>
different coloured inks				
sand and water				
copper(II) sulphate and water				

(3)

- (b) State a simple physical test to show that a sample of water is pure. Give the result of the test.

Test .....

Result .....

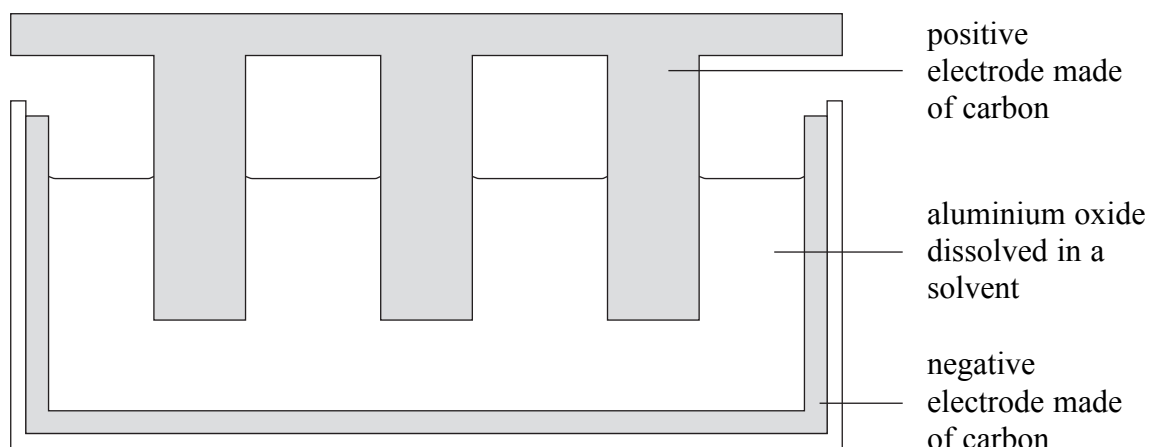
(2)

Q2

(Total 5 marks)



3. (a) Aluminium is extracted from aluminium oxide by electrolysis. The diagram shows a cross-section through an electrolysis cell.



(i) Name the solvent used.

..... (1)

(ii) The positive and negative electrodes are made of carbon. What property of carbon makes it suitable for this purpose?

..... (1)

(iii) The positive electrodes need to be replaced regularly. This is because they react with one of the products of the electrolysis.

Which product reacts with the positive electrodes?

.....

What substance is formed during this reaction?

..... (2)

(b) Give **one** large-scale use of aluminium.

..... (1)

(Total 5 marks)

Q3



4. This question is about atoms and the Periodic Table.

(a) In which part of an atom are protons and neutrons found?

.....  
(1)

(b) Which particle in an atom has a negative charge?

.....  
(1)

(c) Which particle in an atom has the lowest mass?

.....  
(1)

(d) (i) The table gives some information about different atoms. Complete the table.

Atom	Mass number	Atomic number	Number of protons	Number of neutrons	Number of electrons
W	35	17	17		17
X		11	11	12	11
Y	39		19	20	19
Z	37	17	17	20	

(4)

(ii) From the table select

- two atoms which are isotopes of the same element

.....

- two atoms of different elements which are in the same period.

.....

(2)



Leave  
blank

(iii) Give the electronic configuration of atom X.

.....  
(1)

(e) Bromine is in Group 7 of the Periodic Table. Each bromine atom has 7 electrons in its outer shell.

Iodine is directly below bromine in the Periodic Table. How many electrons does an atom of iodine have in its outer shell?

.....  
(1)

Q4

(Total 11 marks)

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Leave blank

5. (a) Crude oil is a mixture of many different compounds.

(i) Place ticks (✓) in the boxes next to the names of **three** substances that can be obtained **directly** from crude oil.

bitumen

ethanoic acid

ethanol

gasoline

graphite

kerosene

(3)

(ii) What process is used to separate the compounds in crude oil?

.....  
(2)

(b) Draw the displayed formula of ethene.

(1)

(c) When bromine water is added to ethene a reaction occurs. What colour change is seen?

.....  
.....  
(2)

(d) (i) Give the name of the polymer formed from ethene.

.....  
(1)

(ii) Give **one** use of this polymer.

.....  
(1)

Q5

(Total 10 marks)





**TURN OVER FOR QUESTION 6**



6. This question is about sulphuric acid and substances made using sulphuric acid.

(a) Place ticks (✓) in the boxes next to the **two** statements that are correct.

sulphuric acid has a pH value of more than 7

sulphuric acid has the formula H<sub>2</sub>SO<sub>4</sub>

sulphuric acid reacts with copper(II) carbonate to form hydrogen gas

sulphuric acid turns red litmus blue

sulphuric acid turns universal indicator red

(2)

(b) A teacher gives the following instructions for making hydrated copper(II) sulphate crystals.

*Place 50 cm<sup>3</sup> of dilute sulphuric acid in a beaker.  
Add a spatula full of copper(II) carbonate to the acid and stir.  
Continue to add copper(II) carbonate until all the acid has reacted.  
Filter the mixture into an evaporating dish.  
Evaporate the filtrate until the crystallisation point.  
Leave the evaporating dish to cool.  
Dry the crystals using filter paper.*

(i) How can you tell when all the acid has reacted?

..... (1)

(ii) Why is the mixture filtered?

..... (1)

(iii) Give the names of the **two** substances in the filtrate.

1 .....

2 .....

(2)



Leave  
blank

(c) A student follows the instructions but heats the evaporating dish until all the water has gone. He has made anhydrous copper(II) sulphate. His teacher tells him to add water to the anhydrous solid to make hydrated copper(II) sulphate.

(i) What colour change does he see as he adds the water?

.....  
.....

(2)

(ii) What is the name given to reactions which can go in either direction?

.....

(1)

(Total 9 marks)

Q6

**TOTAL FOR SECTION A: 45 MARKS**



**SECTION B**

7. (a) In industry, chlorine and sodium hydroxide are manufactured from brine.

(i) Name the compound in brine that is the source of chlorine.

.....  
(1)

(ii) What method is used to obtain chlorine and sodium hydroxide from brine?

.....  
(1)

(iii) State **one** large-scale use of sodium hydroxide.

.....  
.....  
(1)

(b) What colour is chlorine gas?

.....  
(1)

(c) Damp red litmus paper changes colour when placed in separate samples of chlorine and sodium hydroxide.

(i) State the colour of red litmus paper in chlorine gas.

.....  
(1)

(ii) What property of chlorine is shown by this colour change?

.....  
(1)

(iii) State the colour of red litmus paper in sodium hydroxide solution.

.....  
(1)

(iv) What property of sodium hydroxide is shown by this colour change?

.....  
(1)

**(Total 8 marks)**

Q7



8. The formulae  $\text{CH}_4$  and  $\text{C}_4\text{H}_{10}$  represent two organic compounds.

(a) State why these compounds are described as

(i) saturated.....  
.....  
(1)

(ii) hydrocarbons.....  
.....  
(1)

(b)  $\text{CH}_4$  and  $\text{C}_4\text{H}_{10}$  are members of the same homologous series. All members of the same homologous series can be represented by a general formula.

(i) What is the general formula of this homologous series?  
.....  
(1)

(ii) To which homologous series do  $\text{CH}_4$  and  $\text{C}_4\text{H}_{10}$  belong?  
.....  
(1)

(iii) Give **two** other features of members of the same homologous series.  
1 .....  
2 .....  
(2)

(c) The compound  $\text{C}_4\text{H}_{10}$  exists as isomers. What is meant by the term **isomers**?  
.....  
.....  
(2)

(Total 8 marks)

Q8



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9. The Periodic Table on page 2 may be useful in answering parts of this question.

The symbols of some atoms and ions are shown below.

Al      Cl<sup>-</sup>      Mg      Mg<sup>2+</sup>      Na<sup>+</sup>      O<sup>2-</sup>

(a) Which **one** of these is formed by the loss of one electron from an atom?

.....  
(1)

(b) Which **one** of these is formed by the gain of two electrons by an atom?

.....  
(1)

(c) Which **one** of these has the same electronic configuration as an atom of argon?

.....  
(1)

(d) Which **one** of these has an electronic configuration of 2.8.2?

.....  
(1)

(e) Which **three** of these have the same electronic configuration?

.....  
(1)

(Total 5 marks)

Q9



10. The equation shows the formation of hydrogen chloride.



(a) (i) What does the symbol  $\Delta H$  represent?

.....  
(1)

(ii)  $\Delta H$  is negative for this reaction. What does this indicate?

.....  
(1)

(b) Draw a dot and cross diagram to show the bonding in  $\text{H}_2$ .

(1)

(c)  $\text{H}_2$  molecules contain strong bonds. Explain why the boiling point of  $\text{H}_2$  is low.

.....  
.....  
(2)

(d) A student carries out a test to show that a solution of hydrogen chloride contains chloride ions. First she adds dilute nitric acid.

(i) Name the other solution she adds.

.....  
(1)

(ii) Describe what she observes.

.....  
(1)

(iii) Complete the equation to show the reaction that occurs.

..... +  $\text{HCl}$   $\rightarrow$  ..... + .....

(2) Q10

(Total 9 marks)

TOTAL FOR SECTION B: 30 MARKS

TOTAL FOR PAPER: 75 MARKS

END

Q10



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