

The Periodic Table of the Elements

1	2	3	4	5	6	7	0																																																																																									
7 Li lithium 3	9 Be beryllium 4	23 Na sodium 11	24 Mg magnesium 12	39 K potassium 19	40 Ca calcium 20	85 Rb rubidium 37	88 Sr strontium 38	133 Cs caesium 55	137 Ba barium 56	[223] Fr francium 87	[226] Ra radium 88	[227] Ac* actinium 89	[261] Rf rutherfordium 104	[262] Db dubnium 105	[266] Sg seaborgium 106	[264] Bh bohrium 107	[277] Hs hassium 108	[268] Mt meitnerium 109	[271] Ds darmstadtium 110	[272] Rg roentgenium 111	65 Zn zinc 30	63.5 Cu copper 29	59 Ni nickel 28	59 Co cobalt 27	56 Fe iron 26	55 Mn manganese 25	52 Cr chromium 24	51 V vanadium 23	48 Ti titanium 22	45 Sc scandium 21	45 Sc scandium 21	89 Y yttrium 39	91 Zr zirconium 40	93 Nb niobium 41	96 Mo molybdenum 42	[98] Tc technetium 43	101 Ru ruthenium 44	103 Rh rhodium 45	106 Pd palladium 46	112 Cd cadmium 48	108 Ag silver 47	115 In indium 49	119 Sn tin 50	122 Sb antimony 51	127 I iodine 53	131 Xe xenon 54	112 Cd cadmium 48	197 Au gold 79	195 Pt platinum 78	192 Ir iridium 77	190 Os osmium 76	186 Re rhenium 75	184 W tungsten 74	181 Ta tantalum 73	178 Hf hafnium 72	178 Hf hafnium 72	139 La* lanthanum 57	137 Ba barium 56	204 Tl thallium 81	201 Hg mercury 80	207 Pb lead 82	209 Bi bismuth 83	[209] Po polonium 84	[210] At astatine 85	[222] Rn radon 86	11 B boron 5	12 C carbon 6	14 N nitrogen 7	16 O oxygen 8	19 F fluorine 9	20 Ne neon 10	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	70 Ga gallium 31	73 Ge germanium 32	75 As arsenic 33	79 Se selenium 34	84 Kr krypton 36	115 In indium 49	119 Sn tin 50	122 Sb antimony 51	127 I iodine 53	131 Xe xenon 54	204 Tl thallium 81	201 Hg mercury 80	207 Pb lead 82	209 Bi bismuth 83	[209] Po polonium 84	[210] At astatine 85	[222] Rn radon 86	1 H hydrogen 1	4 He helium 2

Key
relative atomic mass
atomic symbol
name
atomic (proton) number

* The lanthanoids (atomic numbers 58-71) and the actinoids (atomic numbers 90-103) have been omitted.

The relative atomic masses of copper and chlorine have not been rounded to the nearest whole number.



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1. Use words from the box to complete the following sentences.
Each word may be used once, more than once, or not at all.

alloys compounds electrons malleable soft

- (a) Solids which are mixtures of metals are called (1)
- (b) Copper conducts electricity because the are free to move. (1)
- (c) Mild steel is able to be used to make car body parts of many different shapes because
it is (1)

(Total 3 marks)

Q1



2. David's gas barbecue uses propane as the fuel.



- (a) When propane burns, heat energy is released.
What type of reaction results in the release of heat energy?

.....
(1)

- (b) The table gives information about the first four alkanes.

Complete the table.

name	number of carbon atoms in one molecule	structure of a molecule
methane	1	$\begin{array}{c} \text{H} \\ \\ \text{H}-\text{C}-\text{H} \\ \\ \text{H} \end{array}$
.....	2	$\begin{array}{c} \text{H} \quad \text{H} \\ \quad \\ \text{H}-\text{C}-\text{C}-\text{H} \\ \quad \\ \text{H} \quad \text{H} \end{array}$
propane	$\begin{array}{c} \text{H} \quad \text{H} \quad \text{H} \\ \quad \quad \\ \text{H}-\text{C}-\text{C}-\text{C}-\text{H} \\ \quad \quad \\ \text{H} \quad \text{H} \quad \text{H} \end{array}$
butane	4

(3)



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(c) What type of bonding is in a propane molecule?

Put a cross (☒) in the box next to your answer.

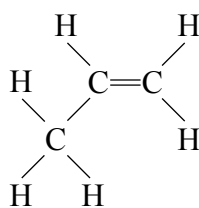
covalent

ionic

metallic

(1)

(d) Propene is an unsaturated hydrocarbon.



What feature of the propene molecule makes it **unsaturated**?

.....
(1)

(e) Propene molecules can be joined together in a chemical reaction to form poly(propene).

What type of compound is poly(propene)?

Put a cross (☒) in the box next to your answer.

alkene

polymer

polyunsaturated

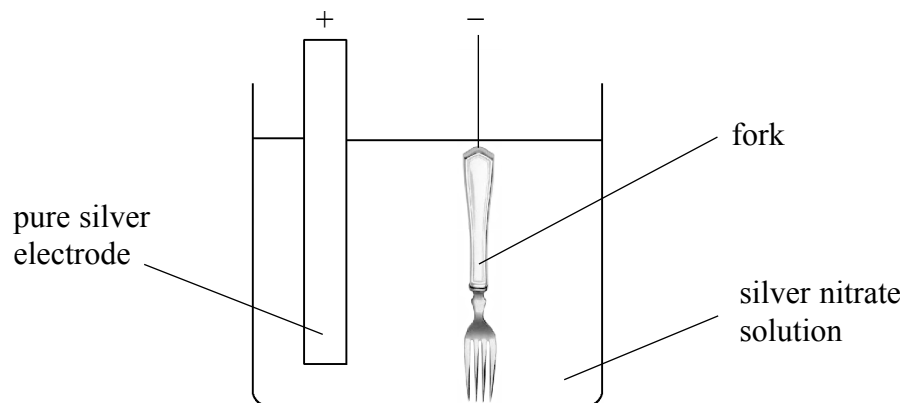
(1)

Q2

(Total 7 marks)



3. Cutlery can be plated with silver using the apparatus shown below.



(a) Name the process shown in the diagram.

..... (1)

(b) Silver nitrate solution contains silver ions, Ag^+ , and nitrate ions, NO_3^- .

(i) What is an ion?

..... (1)

(ii) Give the formula of silver nitrate.

..... (1)

(iii) Why do silver ions move to the fork?

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

(Total 4 marks)

Q3



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4. Ammonia is made in industry by the Haber process.



- (a) What does the symbol \rightleftharpoons tell you about the reaction?
Put a circle round the answer.

cracking endothermic polymerisation reversible **(1)**

- (b) The formula for ammonia is NH_3 .
Calculate the relative formula mass of ammonia.
(Relative atomic masses: H = 1, N = 14)

.....
(1)

- (c) The catalyst used in the Haber process is iron.
Why is a catalyst used?

.....
(1)

- (d) Most of the ammonia produced is used to make fertilisers.

- (i) Why do farmers add fertilisers to the soil?

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

- (ii) Describe one environmental problem caused by using too much fertiliser.

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

(Total 6 marks)

Q4



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5. Chemists produce many useful substances, including fuels and plastics, from crude oil. The amount of crude oil in the Earth's crust is limited.

(a)



(source: <http://www.castlereagh.gov.uk>)

Explain why burying plastic waste in landfill sites may cause a problem in years to come.

.....
.....
.....
.....

(2)

(b) What problems may occur when crude oil supplies begin to run out?

.....
.....
.....
.....

(2)

(Total 4 marks)

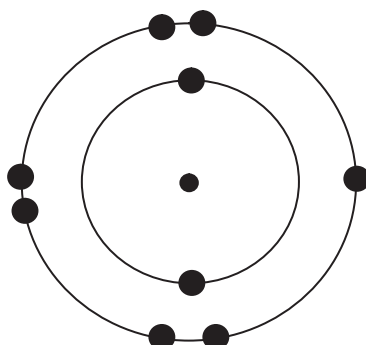
Q5



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6. (a) An atom consists of a nucleus with electrons in shells around the nucleus. A diagram of an atom of fluorine is shown.



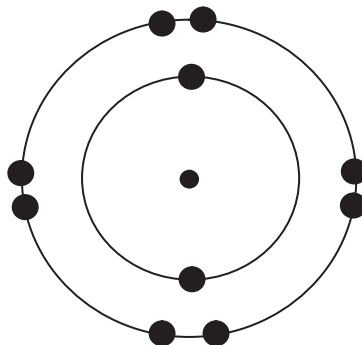
- (i) Write down the electronic configuration of an atom of **chlorine**.

..... (1)

- (ii) What evidence is there in the diagram and in your answer to (i) that both fluorine and chlorine are in the same group?

..... (1)

- (b) A diagram of an atom of neon is shown.



Use this diagram to explain why neon is very unreactive.

.....

 (2)



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blank

(c) An atom of an element has 24 electrons, 28 neutrons and 24 protons.

(i) What is the mass number of this atom?

.....
(1)

(ii) Use the periodic table to identify the element.

.....
(1)

(Total 6 marks)

Q6

TOTAL FOR PAPER: 30 MARKS

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