GCSE Chemistry A (Gateway Science)

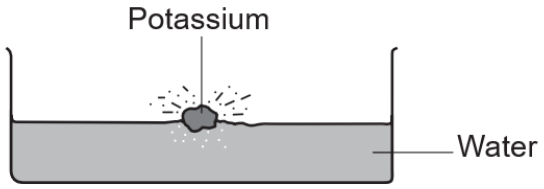
J248/04 Chemistry A C4-C6 and C7 (Higher Tier)

Question Set 8

1 This question is about the properties of elements in Groups 1, 7 and 0.

(a) Lithium, sodium and potassium are all Group 1 elements.

A teacher adds a small piece of potassium to a trough of water, as shown in the diagram.



The potassium fizzes and a gas is produced.

Describe what else you would observe. **[2]**

Lilac flames, and sparks as the metal moves around the surface.

(b) Reactivity **increases** going down Group 1 from lithium to potassium. Explain this trend in reactivity.

Use ideas about the electronic configurations of the atoms in your answer. **[2]**

as we move down the group, the atoms have more electron shells. So, the outer electron is less attracted to the nucleus, as it is further away and more shielded.
Thus, the electron is more easily lost to form an ion.

(c) Look at the table. It shows information about the Group 7 elements. Complete the table.

Element	Formula	Colour	State at room temperature
Fluorine	F_2	pale yellow	gas
Chlorine	Cl_2	pale green	gas
Bromine	Br_2	brown	liquid
Iodine	I_2	grey	solid

[3]

(d) The Group 7 elements exist as simple molecules. Fluorine boils at −188 °C.

Explain why fluorine has a low boiling point. **[2]**

weak intermolecular forces exist between F_2 molecules, and little energy is required to break them.

(e) The elements in Group 0 (the noble gases) are unreactive.

Explain why, in terms of their electronic configurations. **[2]**

they have a full outer shell already, so do not have to gain or lose electrons by reacting with other elements.

Total Marks for Question Set 8: 11

The Periodic Table of the Elements

(1)	(2)											(3)	(4)	(5)	(6)	(7)	(0)
1																	18
1 **H** hydrogen 1.0	2											13	14	15	16	17	2 **He** helium 4.0
3 **Li** lithium 6.9	4 **Be** beryllium 9.0											5 **B** boron 10.8	6 **C** carbon 12.0	7 **N** nitrogen 14.0	8 **O** oxygen 16.0	9 **F** fluorine 19.0	10 **Ne** neon 20.2
11 **Na** sodium 23.0	12 **Mg** magnesium 24.3	3	4	5	6	7	8	9	10	11	12	13 **Al** aluminium 27.0	14 **Si** silicon 28.1	15 **P** phosphorus 31.0	16 **S** sulfur 32.1	17 **Cl** chlorine 35.5	18 **Ar** argon 39.9
19 **K** potassium 39.1	20 **Ca** calcium 40.1	21 **Sc** scandium 45.0	22 **Ti** titanium 47.9	23 **V** vanadium 50.9	24 **Cr** chromium 52.0	25 **Mn** manganese 54.9	26 **Fe** iron 55.8	27 **Co** cobalt 58.9	28 **Ni** nickel 58.7	29 **Cu** copper 63.5	30 **Zn** zinc 65.4	31 **Ga** gallium 69.7	32 **Ge** germanium 72.6	33 **As** arsenic 74.9	34 **Se** selenium 79.0	35 **Br** bromine 79.9	36 **Kr** krypton 83.8
37 **Rb** rubidium 85.5	38 **Sr** strontium 87.6	39 **Y** yttrium 88.9	40 **Zr** zirconium 91.2	41 **Nb** niobium 92.9	42 **Mo** molybdenum 95.9	43 **Tc** technetium	44 **Ru** ruthenium 101.1	45 **Rh** rhodium 102.9	46 **Pd** palladium 106.4	47 **Ag** silver 107.9	48 **Cd** cadmium 112.4	49 **In** indium 114.8	50 **Sn** tin 118.7	51 **Sb** antimony 121.8	52 **Te** tellurium 127.6	53 **I** iodine 126.9	54 **Xe** xenon 131.3
55 **Cs** caesium 132.9	56 **Ba** barium 137.3	● 57–71 lanthanoids	72 **Hf** hafnium 178.5	73 **Ta** tantalum 180.9	74 **W** tungsten 183.8	75 **Re** rhenium 186.2	76 **Os** osmium 190.2	77 **Ir** iridium 192.2	78 **Pt** platinum 195.1	79 **Au** gold 197.0	80 **Hg** mercury 200.6	81 **Tl** thallium 204.4	82 **Pb** lead 207.2	83 **Bi** bismuth 209.0	84 **Po** polonium	85 **At** astatine	86 **Rn** radon
87 **Fr** francium	88 **Ra** radium	● 89–103 actinoids	104 **Rf** rutherfordium	105 **Db** dubnium	106 **Sg** seaborgium	107 **Bh** bohrium	108 **Hs** hassium	109 **Mt** meitnerium	110 **Ds** darmstadtium	111 **Rg** roentgenium	112 **Cn** copernicium		114 **Fl** flerovium		116 **Lv** livermorium		

Key
atomic number
Symbol
name
relative atomic mass