

## Core Worksheet – Chapter 4

**1** The diagram shows a periodic table with some elements missing:

H 1																	He 2
Li 3	Be 4												C 6	N 7	O 8	F 9	Ne 10
Na 11	Mg 12												Si 14	P 15		Cl 17	Ar 18
K 19	Ca 20	Sc 21	Ti 22	V 23		Mn 25	Fe 26	Co 27	Ni 28	Cu 29	Zn 30		Ge 32	As 33	Se 34	Br 35	Kr 36
Rb 37	Sr 38	Y 39	Zr 40	Nb 41	Mo 42	Tc 43	Ru 44	Rh 45		Ag 47	Cd 48		Sn 50	Sb 51	Te 52	I 53	
Cs 55		La 57	Hf 72	Ta 73	W 74	Re 75	Os 76	Ir 77	Pt 78	Au 79	Hg 80		Pb 82	Bi 83	Po 84	At 85	Rn 86

- a** Fill in the missing elements. [2]
  - b** Shade in red all the elements that are gases. [2]
  - c** All the elements in one vertical column were missing. What is the name for a vertical column in the periodic table? What do all these elements have in common? [3]
  - d** Explain why hydrogen has been placed in the same vertical column as lithium, sodium and potassium. Explain why it perhaps does not really belong there. [2]
  - e** How many elements (including the missing ones) in the periodic table shown above are usually classified as metals? [1]
- 2** Explain the following:
- a** Potassium has a lower first ionisation energy than lithium. [4]
  - b** Fluorine is the most electronegative element in the periodic table. [4]
  - c** A chlorine atom is smaller than a sodium atom. [4]
  - d** A chloride ion is larger than a sodium ion. [2]
- 3** Arrange the following in order of increasing size and explain the order:
- a** Ar     $\text{Cl}^-$      $\text{K}^+$  [4]
  - b**  $\text{Na}^+$      $\text{Al}^{3+}$      $\text{Mg}^{2+}$  [4]
  - c**  $\text{I}^-$     Cl     $\text{Cl}^-$  [3]

- 4 The melting points of the elements in period 3 are shown in the table:

	Na	Mg	Al	Si	P	S	Cl	Ar
Melting point / °C	98	649	660	1410	44	119	-101	-189

- a Plot these data on a graph. [2]
- b Explain the trends in the data in terms of structure and bonding. [9]
- 5 Complete and balance the following equations: [2]
- a  $\text{Na} + \text{H}_2\text{O} \rightarrow$  \_\_\_\_\_
- b  $\text{Cl}_2(\text{aq}) + \text{KBr}(\text{aq}) \rightarrow$  \_\_\_\_\_
- 6 a Give the formulas of the following oxides: [3]
- i sulfur(IV) oxide
- ii phosphorus(V) oxide
- iii chlorine(I) oxide
- b Give the names of the following oxides: [3]
- i  $\text{P}_4\text{O}_6$
- ii  $\text{SO}_3$
- iii  $\text{Cl}_2\text{O}_7$
- c State whether each of the following oxides has a giant or molecular structure: [5]
- i  $\text{MgO}$
- ii  $\text{SiO}_2$
- iii  $\text{SO}_3$
- iv  $\text{Al}_2\text{O}_3$
- v  $\text{P}_4\text{O}_6$
- d State whether each of the following oxides will conduct electricity when molten: [4]
- i  $\text{Na}_2\text{O}$
- ii  $\text{SiO}_2$
- iii  $\text{P}_4\text{O}_6$
- iv  $\text{MgO}$
- 7 Write equations for the reactions of the following oxides with water: [4]
- a sodium oxide
- b magnesium oxide
- c phosphorus(V) oxide
- d sulfur(VI) oxide
- 8 Explain, with the aid of an equation, why sodium oxide is classified as a basic oxide. [2]