Group 2 (MCQ)

1. Which statement(s) for Group 2 elements is/are correct?

1 The 2nd ionisation energy of magnesium is greater than the 2nd ionisation energy of calcium.

2 A strontium ion, Sr^{2+}, contains a total of 6 electrons in s orbitals.

3 The equation for the reaction of barium with water is:
$2Ba + 2H_2O \rightarrow 2BaOH + H_2$.

A 1, 2 and 3
B Only 1 and 2
C Only 2 and 3
D Only 1

Your answer ☐ **[1]**

2. Which statement gives the numerical value of the Avogadro constant?

A The number of moles in 12 g of carbon-12.
B The number of electrons lost by 20.05 g of calcium when it reacts with oxygen.
C The number of molecules in 16.0 g of oxygen.
D The number of atoms in 1 mole of chlorine molecules.

Your answer ☐ **[1]**

3. Some Group 2 compounds can be used to neutralise acid soils and to treat acid indigestion.

Which Group 2 compound would **not** be suitable for either use?

A $BaSO_4$
B $CaCO_2$
C $Ca(OH)_2$
D $Mg(OH)_2$

Your answer ☐ **[1]**

4. Which statement is **not** correct for Group 2 hydroxides?

A $Mg(OH)_2$ can be used to treat indigestion.
B $Ca(OH)_2$ is used in agriculture to neutralise alkaline soils.
C The anion in $Sr(OH)_2$ contains 10 electrons.
D $Ba(OH)_2$ is a product from the reaction of barium and water.

Your answer ☐ **[1]**

5. 0.0200 mol of calcium oxide is reacted completely with 2.00 mol dm^{-3} HC*l*.
What is the volume, in cm^3, of 2.00 mol dm^{-3} HC*l* required for this reaction?

A 15
B 20
C 30
D 60

Your answer ☐ **[1]**

6. Which property is **not** correct for calcium?

A. It acts as an oxidising agent
B. It forms a basic oxide
C. It reacts with water to form hydrogen gas
D. Its hydroxide is more alkaline than magnesium hydroxide

Your answer ☐

[1]

7. The Group 2 elements react with water, forming a solution and a gas.

Which statement is correct?

A. The reactivity of the elements decreases down Group 2.
B. The pH of the solution formed increases down Group 2.
C. The reaction is a neutralisation.
D. The equation for the reaction of strontium with water is:

$$2Sr + 2H_2O \rightarrow 2SrOH + H_2$$

Your answer ☐

[1]

8. Which statement is **not** correct for Group 2 metals?

A. An unpaired electron is present in an s-orbital.
B. Chemical reactivity increases with increasing atomic number.
C. The first ionisation energy decreases with increasing atomic number.
D. Atomic radius increases with increasing atomic number.

Your answer ☐

[1]

9. Which row is correct?

	Highest pH when added to water	**Most reactive halogen**
A	MgO	F_2
B	MgO	I_2
C	BaO	F_2
D	BaO	I_2

Your answer ☐

[1]

END OF QUESTION PAPER

Mark scheme – Group 2 (MCQ)

Question			Answer/Indicative content	Marks	Guidance
1			**D**	1 (AO 1.2)	**ALLOW** 1 in the answer box
			Total	**1**	
2			**B**	1 (AO 1.2)	
			Total	**1**	
3			**A**	1 (AO1.1)	
			Total	**1**	
4			B	1 (AO 1.1)	**Examiner's Comments** This question was not well answered, with many candidates giving option C rather than the correct answer of B. Many candidates mis-read option B as acidic soil rather than alkaline soil, so thought that option B was correct, whereas in fact it was the only incorrect statement. Many candidates opted for option C, not realising the anion is OH^- which does have 10 electrons.
			Total	**1**	
5			**B**	1	**ALLOW** 20 in the box
			Total	**1**	
6			A	1	
			Total	**1**	
7			B	1	
			Total	**1**	
8			A	1	
			Total	**1**	
9			C	1	
			Total	**1**	