

**Section A [14 marks]**

Answer **all** the questions in the spaces provided.

- 1 The arrangement of electrons in the atoms of six different elements is shown in the table. The letters do **not** represent the chemical symbols of the elements.

element	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>E</b>	<b>F</b>
arrangement of electrons in the atoms	2,5	2,8,4	2,8,2	2,8,8	2,8,8,1	2,8,7

Use the letters, **A, B, C, D, E** and **F** to answer the following questions.

You may use the letters once, more than once or not at all.

- (a) Which element is a noble gas?

..... [1]

- (b) Which element is a soft metal with a low density?

..... [1]

- (c) Which **two** elements exist as a diatomic molecule?

..... and ..... [1]

- (d) Which **two** elements can each form an ionic compound with element **F**?

..... and ..... [1]

2 (a) What is the chemical formula of aluminium sulfate?

..... [1]

(b) Calculate the relative molecular mass,  $M_r$ , of aluminium sulfate.

relative molecular mass,  $M_r$  = ..... [1]

(c) Calculate the number of moles in 0.2052 kg of aluminium sulfate.

number of moles of aluminium sulfate = ..... [1]

(d) Suggest a reason why a mixture of aluminium sulfate and water cannot be separated by filtration.

.....

..... [1]

- 3 (a) Draw a 'dot-and-cross' diagram of a carbon dioxide molecule showing all the outer shell electrons.

[2]

- (b) Describe, in terms of electrons, how a sodium atom becomes a sodium ion.

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..... [1]

- (c) Explain why sodium chloride has a higher melting and boiling point than carbon dioxide.

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..... [3]