**ATAR Chemistry 11 Unit 1 Task 2 NAME:\_Solutions\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Atomic Structure and Mass Spectrometry test**

(Total 42 marks)

1. a) State the two forces in the nucleus and which particles they act on. [ 2 marks]

*Electrostatic force, acts between the protons*

*Nuclear strong force acts between the neutrons and the protons*

1. explain how the nucleus stays together [ 2 marks]

*At close distances the nuclear strong force overcomes the repulsion between the protons*

c) Explain how the atom stays together [2 marks]

*The negative charge of the electrons attracts the negatively charged protons.*

2. {*Solutions in shaded boxes}* [11 marks]

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Name | Symbol | Atomic number | Mass number | Protons | Neutrons | Electrons |
| Oxygen 17 | 17O | 8 | 17 | 8 | 9 | 8 |
| Chlorine 35 | 35Cl | 17 | 35 | 17 | 18 | 17 |
| Sulphur 32 | S | 16 | 32 | 16 | 16 | 18 |
| Lead 207 | Pb | 82 | 207 | 82 | 125 | 82 |

3. Write the symbol for the following atoms. [ 8 marks]

a) lithium Li b) potassium K\_\_\_\_\_\_\_\_\_\_\_

c) Lead Pb\_\_\_\_\_\_\_\_\_\_ d) Silver Ag\_\_\_\_\_\_\_\_\_\_\_\_

e) Iron Fe\_\_\_\_\_\_\_\_ f) Barium Ba\_\_\_\_\_\_\_\_\_\_\_\_

g) Sodium Na\_\_\_\_\_\_\_\_\_g) Beryllium Be\_\_\_\_\_\_\_\_\_\_\_

4. Name the following: [ 6 marks]

a) Ca Calcium\_\_\_\_ b) Cr Chromium\_\_\_\_\_\_\_\_\_\_\_

c) Cu Copper \_\_\_\_\_\_\_\_ d) Alaluminium\_\_\_\_\_-

e) He Helium\_\_\_\_\_\_\_ h) Mn manganese

5.

a Mass/charge ratio, or m/z (1 mark)

b RAM = 0.6917 × 63 + 0.3083 × 65\*

RAM = 63.6166\* (3 marks)

6. Explain precisely what isotopes of an element are. [ 2 marks]

*Isotopes of an element have the same number of protons but different numbers of neutrons.*

7. Explain the function of the following parts of the mass spectrometer:

1. [ 4 marks]

Vaporisation: *Separates the sample into its component atoms.*

Electron scattering: *Ionises the sample so it is charged*

Electric field: *Accelerates the charged particle to high velocity.*

Magnetic field: *Curves the charged particle*

1. How is the mass determined? [1 marks]

*Different masses curve a different amount in the magnetic field.*