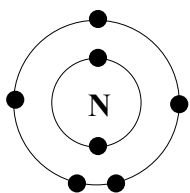
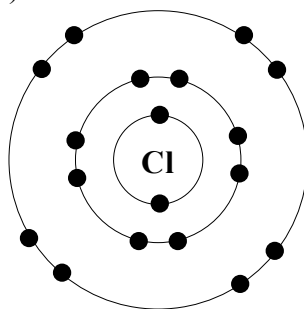


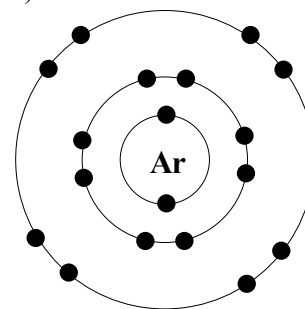
1. (i) N



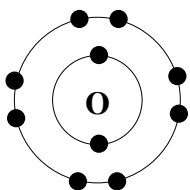
(ii) Cl<sup>-</sup>



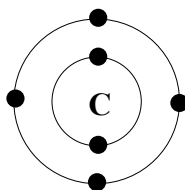
(iii) Ar



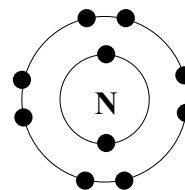
(iv) O<sup>2-</sup>



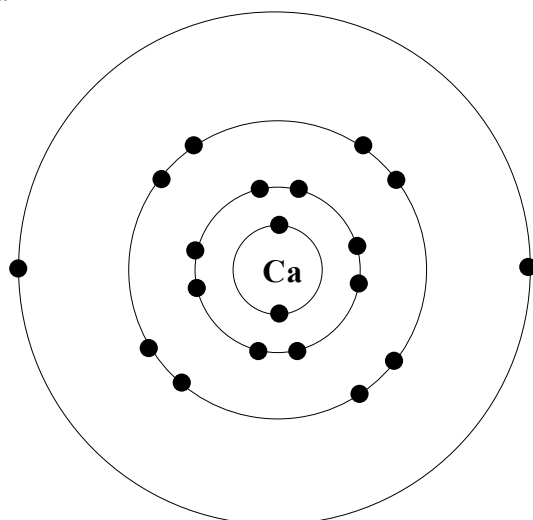
(v) C



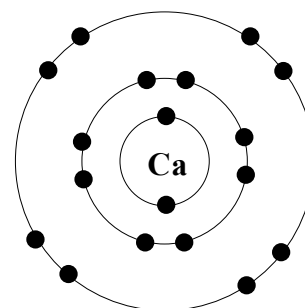
(vi) N<sup>3-</sup>



(vii) Ca



(viii) Ca<sup>2+</sup>



2. **Metals are located on the left hand side of the periodic table with few electrons in their outer shell which are easily lost.**

(a) An element that has 2 electrons in the  $n = 3$  level as its outer shell.  
**Metal – few electrons in outer shell (magnesium)**

(b) An element that has an outer shell of 5 electrons in the  $n = 3$  level.  
**Non-metal – outer shell over half filled (phosphorus)**

(c) An element that has only 2 electrons.  
**Non-metal - completely filled outer shell (helium)**

(d) An element that has 17 electrons.  
**Non-metal – almost completely filled outer shell (chlorine)**

- |    |        |                                |                                    |                           |
|----|--------|--------------------------------|------------------------------------|---------------------------|
| 3. | (i)    | magnesium and oxygen           | <b>MgO</b>                         | <b>magnesium oxide</b>    |
|    | (ii)   | barium and bromine             | <b>BaBr<sub>2</sub></b>            | <b>barium bromide</b>     |
|    | (iii)  | sodium and nitrogen            | <b>Na<sub>3</sub>N</b>             | <b>sodium nitride</b>     |
|    | (iv)   | potassium and oxygen           | <b>K<sub>2</sub>O</b>              | <b>potassium oxide</b>    |
|    | (v)    | aluminium and sulfur           | <b>Al<sub>2</sub>S<sub>3</sub></b> | <b>aluminium sulfide</b>  |
|    | (vi)   | lithium and iodine             | <b>LiI</b>                         | <b>lithium iodide</b>     |
|    | (vii)  | caesium and chlorine           | <b>CsCl</b>                        | <b>caesium chloride</b>   |
|    | (viii) | strontium and nitrogen         | <b>Sr<sub>3</sub>N<sub>2</sub></b> | <b>strontium nitride</b>  |
| 4. | (i)    | MgCl <sub>2</sub>              |                                    | <b>magnesium chloride</b> |
|    | (ii)   | CuO                            |                                    | <b>copper(II) oxide</b>   |
|    | (iii)  | Cu <sub>2</sub> O              |                                    | <b>copper(I) oxide</b>    |
|    | (iv)   | AlBr <sub>3</sub>              |                                    | <b>aluminium bromide</b>  |
|    | (v)    | Fe <sub>2</sub> O <sub>3</sub> |                                    | <b>iron(III) oxide</b>    |
|    | (vi)   | FeCl <sub>2</sub>              |                                    | <b>iron(II) chloride</b>  |
|    | (vii)  | Bi <sub>2</sub> S <sub>3</sub> |                                    | <b>bismuth sulfide</b>    |
|    | (viii) | SnCl <sub>2</sub>              |                                    | <b>tin(II) chloride</b>   |

**Note that (i) there is a space between the cation and the anion and (ii) there is *no* space between an element and its oxidation state so the cations, for example, written as “copper(II)” and “copper(I)”.**

**You need to follow these rules which make it easy to work out what the cation and anion are.**

5. **Ionic bonding results from electrostatic attraction between oppositely charged ions and depends on the magnitude and separation of the charge – not the relative position of the ions. The arrangement of ions in a crystal lattice is determined by the ratio of ions and their relative sizes.**
6.
  - (a) **When an ionic solid is melted, heat is provided to break the long range ionic bonds.**
  - (b) **When an ionic solid is dissolved, the bonds formed between the ions and the solvent (the *hydration energy* for dissolving in water) are stronger than those in the solid.**
7. **In an ionic lattice, the ions (such as Na<sup>+</sup> and Cl<sup>-</sup>) are fixed and move little relative to one another; when melted the force of attraction between the ions is overcome, they can move freely.**

**The melt conducts electricity through the movement of these charge ions.**

- |    |     |                    |                                     |
|----|-----|--------------------|-------------------------------------|
| 8. | (a) | potassium chromate | <b>K<sub>2</sub>CrO<sub>4</sub></b> |
|----|-----|--------------------|-------------------------------------|

- (b) sulfur trioxide  $\text{SO}_3$
- (c) iron(III) nitrate  $\text{Fe}(\text{NO}_3)_3$
- (d) sulfur hexafluoride  $\text{SF}_6$