1. Give the full electron configuration of the following atoms and ions.

   a. F atom: \(1s^2\ 2s^2\ 2p^5\)  
   b. V atom: \(1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^6\ 4s^2\ 3d^3\)  
   c. V\(^{3+}\) ion: \(1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^6\ 3d^2\)

2. Write an equation, including state symbols, to represent the following ionisation energies:

   a. 1st ionisation energy of potassium: \(K(g) \rightarrow K^+(g) + e^-\)  
   b. 2nd ionisation energy of potassium: \(K^+(g) \rightarrow K^{2+}(g) + e^-\)

3. Which group is the following element in?  
   - **group 6**

4. Which element in each of the following pairs has the highest 1st ionisation energy? Explain your answer in each case.

   a. Na or Mg
      - **Mg**  
      - Mg has more protons  
      - and smaller atomic radius

   b. P or S
      - **P**  
      - In S electron lost from orbital with 2 \(e^-\) but in P lost from orbital with 1 \(e^-\)  
      - more \(e^-\) – \(e^-\) repulsion in S

   c. Ne or Ar
      - **Ne**  
      - Ar has bigger atomic radius  
      - and more shielding

   d. Be or B
      - **Be**  
      - In Be electron lost from s orbital but in B lost from p orbital  
      - p orbital higher energy than s orbital