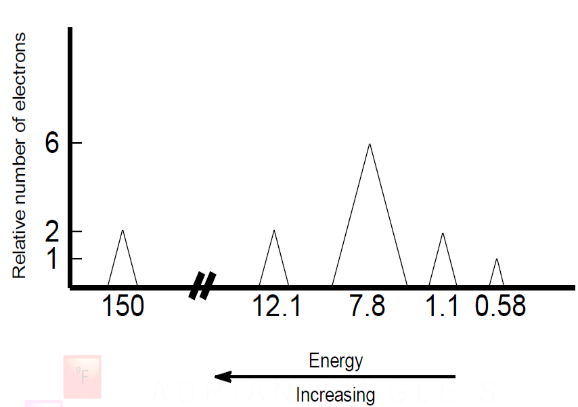
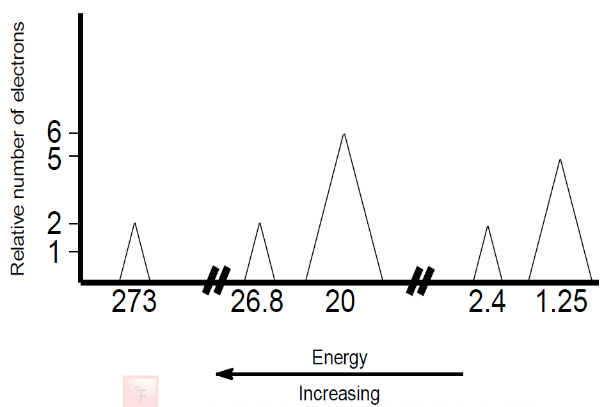
**Photoelectron Spectroscopy**

Plot 1

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Plot 2

1. Consider the simulated PES plot 1 shown above, that is produced by the analysis of the atoms of a single element. All peaks in the PES are shown.
   1. Using plot 1, suggest the electron configuration of the element and hence identify the element.
   2. Which two peaks are likely to represent electrons that are most likely to be removed when these atoms form ions? Explain.
   3. Using your answer in (b), identify the mostly likely charge on an ion of this element. Explain.
   4. Suggest a reason for the huge jump in energy between the peak at 12.1 and the peak at 150.
   5. Suggest a reason for the x-axis being labeled with increasing values from right to left.
2. Consider the simulated PES plot 2 shown above, that is produced by the analysis of the atoms of a single element. All peaks in the PES are shown.
   1. Write the electron configuration and identify the element.
   2. The plot is divided into three separate areas on the x-axis. Why is the axis divided in this manner?
   3. What would be the charge on an ion formed from this atom? Justify your answer.
   4. What is the significance of three of the peaks having the same height?
   5. The peaks at 1.25 & 2.44, as well as the peaks at 20.2 & 26.8, are relatively close to one another but have different energies? Explain why they are of the same magnitude but slightly different.
3. Consider a PES plot for carbon atoms.
   1. How many peaks would you expect in the PES for carbon? Explain.
   2. What would be the relative heights of the peaks that you have identified in (a)? Explain your answer carefully.
   3. How would you expect the height of the 2p peak in carbon’s PES to compare to the height of the 2p peak in nitrogen’s PES? Explain.