Friday Worksheet **Name: …….**

Analytical chemistry spectroscopy AAS and UV-visible worksheet 4

1) What are the similarities between UV-visible and AAS?
2) How do the two techniques of UV-visible and AAS differ?

AAS deals with metallic atoms, it excites valence electrons.

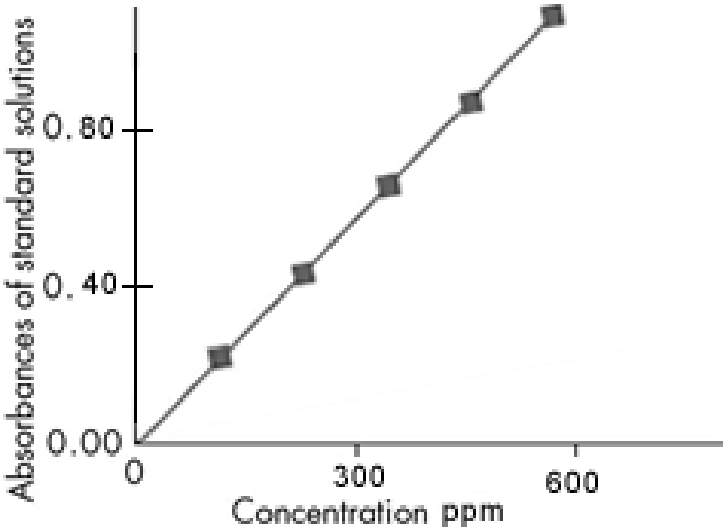
UV-visible deal with molecules, it excites electrons in molecular orbitals (i.e. electrons in bonding and non-bonding pairs)

UV-visible operates over UV and visible part of the spectrum, AAS operates in the visible spectrum.

UV-visible uses a lamp that can generate a wide spectrum, and uses a monochromator to select the wavelength required for the analysis. AAS uses a metal cathode lamp (matching the sample) that can generate a few distinct wavelengths, and uses a monochromator to select one of these wavelengths. This makes AAS more sensitive than UV-Visible.

UV visible analyses solutions, AAS analyses vapourised metal atoms.

The phosphate content of the water of a contaminated lake was analysed using UV–visible spectroscopy. In one analysis, a 25.0 mL sample of lake water was placed in a 250 mL volumetric flask and made to the mark with distilled water. The solution was treated with a small volume of sodium molybdate solution to form a blue-coloured phosphorus compound. A 5.00 mL sample was taken and recorded an absorbance of 0.60 at a wavelength of 600 nm. A calibration curve, shown below, was constructed using five standard phosphate solutions. What is the concentration of phosphate in the water given in % w/v?



Step 1 Find the concentration in ppm of the 5.00 mL sample analysed

=> 300 ppm as read off the calibration curve

Step 2 Calculate the amount of phosphate in grams in the volumetric flask

=> the concentration of phosphate in the flask is 300ppm which is 300mg/L

=> 0.300 grams / L X 0.250 = 0.0750 g

Step 3 calculate the concentration in % w/v

=> (0.0750 / 25.0) X 100 = 0.300% w/v