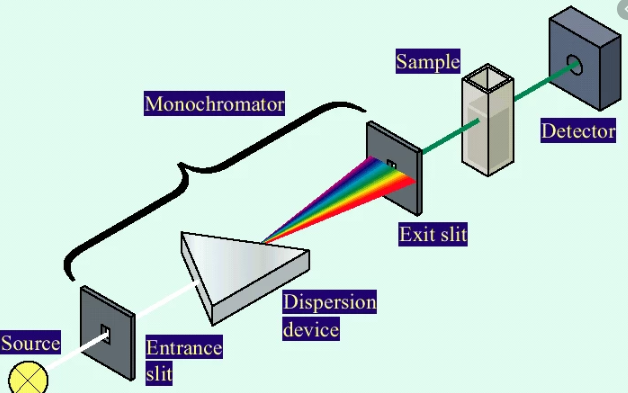
***Note: There is a video with data to accompany this sheet.***

**SAC Unit 2: Concentration of copper sulfate using UV spectroscopy determination**

**Aim**: To use UV spectroscopy to determine the concentration of a CuSO4 solution

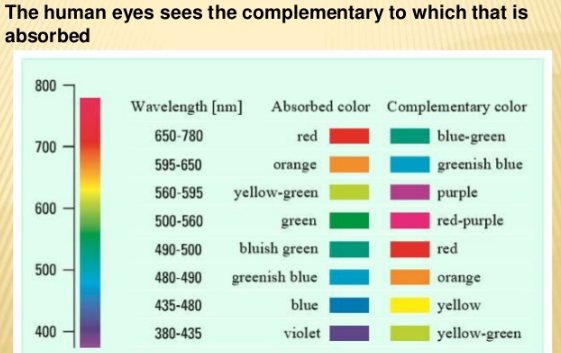
**Background**: UV spectroscopy.



Oxalic acid: a diprotic acid

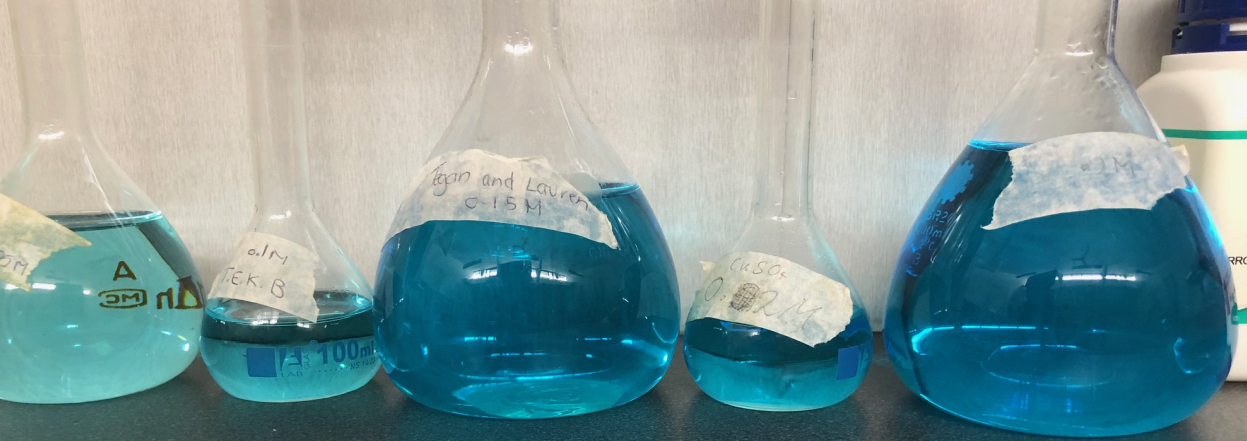
Light of a particular wavelength is directed at a solution. The more concentrated the solution the greater the absorbance of light by the solution.

The wavelength of the light used should be complementary of the colour of the light.



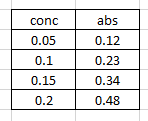
**Standard solutions**

To test the absorption of CuSO4, a series of standard solutions is made and tested for absorption.



1.5 g of the mixture above was made up to the mark in a 100 mL volumetric flask.

This was added to a burette and titrated against 20.00 mL aliquots of 0.200 M NaOH.



The absorption of the solution of unknown concentration is then tested.

Questions

1. Explain how the wavelength of light for this analysis is chosen. 3 marks

2. How does a UV spectrometer recognise that one solution might be twice as concentrated as another? 2 marks

3. Why was water tested in the instrument and the machine set to zero with water as the sample? 2 marks

4. Draw a calibration curve for the 4 standard solutions. 4 marks

5. What is the concentration of the unknown solution in

- M

- g L-1? 3 marks

6. Could the same calibration curve be used for –

-further copper sulfate solutions the next day?

- analysis of green nickel sulfate solutions? 4 marks

7. Will UV spectroscopy work for all solutions? Explain your answer. 2 marks

8. If I take 5 mL of one of the standards and add de-inoised water to make it up to 20 mL, what will happen to the

absorption of the solution? 2 marks

9. If I measure the absorption of a solution and then test it again in a test tube that is twice the width of the

previous one, what do you think will happen to the level of absorption? 2 marks

10. Suggest an alternative method for determining the concentration of a CuSO4 solution.