***EXPERIMENT NO. 4*** *To determine the percentage composition of KMnO4 and K2Cr2O7 in a binary mixture by UV\VIS spectroscopy*

**Apparatus** Beakers; volumetric flask; pipette; sucker; test tubes and spectrophotometer **Chemicals required** *H2O; KMnO4 and K2Cr2O7* **Theory** Permanganate and dichromate ion both absorb visible light though their absorbance maxima are fairly well separated. By measuring the absorbance at two different wavelengths of a solution containing both ions, it is possible to simultaneous determine the concentration of each ion in the solution. According to Beer-Lambert law

**Absorbance**= ἐ b c

Where c= concentration, b= path length in cm, ἐ = molar absorptivity of any substance

**Procedure**

1. Apparatus was taken, washed and dried.

***2.*** 100ppm stock solution of *KMnO4 and K2Cr2O7* was prepared.

3. Various concentrations of 5, 10, 15, 20, 25, 30, 35, 40, 45 and 45 were prepared by dilution method.

4. Instrument was calibrated by using distilled water.

5. Absorbance was measured for all the samples and unknown solution by using spectrophotometer.

6. Calibration curves are drawn for each ion at each wavelength.

***Preparation of solutions:***

1000 ppm standard solution = 1000mg of solute in 1000 ml solution

= 250mg of solute in 250 ml solution

100ppm Stock solution Dilution formula C1V1=C2V2

1000 ×V1 = 100×100

V1 =10ml Sample solution:

1. 5ppm Solution 100×V1=5×20

V1 =1ml

2. 10ppm solution 100 ×V1 =10×20

V1 =2ml

3. 15ppm solution 100×V1 =15×20

V1= 3ml

4. 20ppm solution 100×V1 =20×20

V1 =4ml

And similarly all sample solutions are prepared for *KMnO4 and K2Cr2O7*

**Observations and calculations**

UV-VIS spectra of *KMnO4 for calculation of max. wavelength*

UV-VIS spectra of *K2Cr2O7*

UV-VIS spectra of mixture of *KMnO4 and K2Cr2O7*

Determination of unknown mixture concentration from UV-VIS spectra of *KMnO4, K2Cr2O7 at fixed wavelength*

*Unknown mixture has absorbance 0.5 hence its concentration is 35ppm.*