**Titration SAC task: Outcome 1 Unit 4**

**Aim**: To design a titration to determine the oxalic acid content of an impure sample.

**Materials**

Burette

Pipette

* 1. M NaOH

Balance

Oxalic acid

Sodium chloride

100 mL volumetric flask

**Sample preparation**: to be done with the whole class.

* Sit a 250 mL beaker on a balance.
* Tare the balance
* Add around 5 g of oxalic acid dihydrate but do not record the actual mass
* Add sodium chloride until the mass is around 6.0 g. Record the exact mass.
* Add 100 mL of distilled water and stir to dissolve solids.

Your task is to perform a titration to determine the %oxalic acid in the solids you added to the beaker. To do this you have to conduct a titration with 0.100 M NaOH solution.

Use a pipette and volumetric flask to dilute your sample by a factor of 10 before titrating.

You have to design the titration yourself, choosing the aliquot size and the indicator to use.

Conduct the titration to obtain concordant results.

**Experiment design**

1. Describe your titration procedure in point form 4 marks

**Results**

2. Record your volume measurements and mean titre 4 marks

**Report**

3. Write a balanced equation for the reaction (oxalic acid is C2H2O4). 2 marks

4. a. Calculate the number of mole of NaOH.

 b. Calculate the number of mole of oxalic acid in your diluted sample.

 c. Calculate the number of mole of oxalic acid in the original sample.

 d. Determine the %mass of oxalic acid in the original sample (do not include the dihydrate in

 the %mass oxalic acid.) (1 + 1 + 1 + 3 = 6 marks)

5. Explain your choice of indicator for this experiment. 3 marks

6. List what you used to rinse

* burette
* pipette
* volumetric flask
* conical flask 4 marks

7. Write equations to show the two stage ionisation of oxalic acid in water. 2 marks

8. List possible errors in this titration. 3 marks

9. What design modifications would you use to improve the procedure you used? 2 marks

10. Obtain results from other groups in the class. Comment on the precision of these results. 2 marks

11. If the NaOH was really 0.090 M in concentration, explain carefully how your results would have differed.

 2 marks

12. Explain the consequences of using methyl red as an indicator. 2 marks

Total 36 marks