



ILARA – MOKIN, NIGERIA

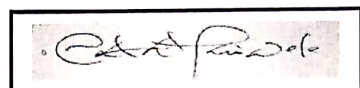
FACULTY OF BASIC AND APPLIED SCIENCES

DEPARTMENT OF PHYSICAL AND CHEMICAL SCIENCES

2016/2017 ACADEMIC SESSION: SECOND SEMESTER EXAMINATIONS

COURSE TITLE: EXPERIMENTAL CHEMISTRY II

COURSE CODE: CHM 210



INSTRUCTIONS: ATTEMPT ONE QUESTION

TIME: 3 HRS 30 MINS

QUESTION ONE

You are provided with 0.25 g of solid sample A, 9 g of AgNO_3 , CaCO_3 , NaHCO_3 , 5% K_2CrO_4 and 0.25 g of NaCl .

- A. State the procedure for the standardization of 0.1 M AgNO_3 against 10 ml of NaCl [5 Marks]
- B. Write a balanced chemical equation for this precipitation reaction [2 Marks]
- C. Determine the average volume of silver nitrate used from your concordant titres [5 Marks]

Calculate

- D. The number of mmoles of AgNO_3 required for the reaction [5 Marks]
- E. The concentration of AgNO_3 in molarity [3 Marks]
- F. Outline the procedure for the determination of chloride from sample A by Mohr method [5 Marks]
- G. Determine the average volume of silver nitrate used from your concordant titres [4 Marks]

Calculate

- F. The mmoles of the chloride ion in sample A [4 Marks]
- H. The mass of chloride ion in sample A [2 Marks]
- I. What is the role of chromate ions in chloride determination? [2 Marks]
- J. Why pH range is important in chloride determination? [2 Marks]
- K. Explain precipitation reaction [1 Mark]

Question two

A student is provided with 3.2 g of KMnO_4 crystal, 0.1 M of H_2SO_4 , 4.5 g of $\text{K}_2\text{C}_2\text{O}_4 \cdot \text{H}_2\text{O}$ solid and 0.2 g of $\text{Fe}(\text{NH}_4)_2(\text{SO}_4)_2 \cdot 6 \text{H}_2\text{O}$.

- A. Write down the procedure for the standardization of KMnO_4 against 10 ml of $\text{K}_2\text{C}_2\text{O}_4 \cdot \text{H}_2\text{O}$ [3 Marks]
- B. Using the half-reaction method, balance the redox reaction of permanganate with oxalate ion in acidic media and state which half-cell reaction is either reducing or oxidizing [3 Marks]
- C. Determine the average volume of KMnO_4 consumed from your concordant titres [4 Marks]

Calculate

- D. Calculate the molar concentration (molarity) of the standardized KMnO_4 solution [4 Marks]
- E. Suppose that the KMnO_4 solution you've prepared is primary standard; what should be its molar concentration? [3 Marks]
- F. Outline the procedure for the determination of iron in iron(II) ammonium sulfate solid salt [5 Marks]
- G. Balance the redox reaction of permanganate with iron (II) in acidic media. [4 Marks]
- H. Determine the average volume of KMnO_4 consumed from your concordant titres [5 Marks]
- I. Calculate the mass percentage of Fe in $\text{Fe}(\text{NH}_4)_2(\text{SO}_4)_2 \cdot 6\text{H}_2\text{O}$. [5 Marks]
- J. Explain Redox reaction [2 Marks]
- K. Give reasons why indicator is not needed for this reaction [2 Marks]