ELIZADE UNIVERSITY

ILARA – MOKIN

NIGERIA

FACULTY OF BASIC AND APPLIED SCIENCES

DEPARTMENT OF PHYSICAL AND CHEMICAL SCIENCES

2018/2019 ACADEMIC SESSION: SECOND SEMESTER EXAMINATIONS

COURSE TITLE: EXPERIMENTAL CHEMISTRY II

COURSE CODE: CHM 210

QUESTIONS WITH MARKING GUIDE

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

You are provided with water sample, Eriochrome black T indicator (EBT), sodium hydroxide of 1 N and disodium EDTA titrant of 0.01 M.

A. Outline procedures for the Preparation and standardization of 0.01 M disodium EDTA solution. **[6 Marks]**

B. State the procedure for the complexometric titration of the water sample against standard EDTA solution. **[7 Marks]**

C. Write a balanced chemical equation for this complexometric reaction. **[5 Marks]**

D. Draw the structure of EDTA **[2 Marks]**

E. Determine the average volume of EDTA used from your concordant titres **[5 Marks]**

Calculate

F. The molarity of the Ca^{2+} obtained from the water sample **[3 Marks]**

G. Calculate the Hardness, expressed as mg/L of $CaCO_3$ **[5 Marks]**

H. Discuss water hardness **[4 Marks]**

I. Classify your result obtained under section G with the information below and use it to predict the likely source of water sample. **[4 Marks]**

The U.S. Geological Survey provides the following general guidelines for classification of waters:

Soft: 0 to 60 mg/L hardness as $CaCO_3$

Moderately hard: 61 to 120 mg/L hardness as $CaCO_3$

Hard: 121 to 180 mg/L hardness as $CaCO_3$