ELIZADE UNIVERSITY, ILARA-MOKIN, ONDO STATE

FACULTY: BASIC & APPLIED SCIENCES

DEPARTMENT: PHYSICAL & CHEMICAL SCIENCES

2016/2017 ACADEMIC SESSION: FIRST SEMESTER EXAMINATIONS

COURSE CODE: CHM 391 COURSE TITLE: EXPERIMENTAL CHEMISTRY III

HOD's SIGNATURE

DURATION: 2.5 HOURS

INSTRUCTIONS:

- **ATTEMPT ALL QUESTIONS.**
- **BORROWING OF WRITING MATERIALS, ELECTRONIC CALCULATORS OR LENDING OF ANY SORT IS STRICTLY PROHIBITED**
- **GRAPH PAPERS WILL BE PROVIDED BY THE INVIGILATORS**

1. The table below is the experimental data obtained for the determination of the formula and stability constant of silver (I) ammonium complex.
   a. Determine the stability constant and the formula of the silver ammonium complex from the data below. [14marks]
   b. Write the balanced chemical equation for reaction [1mark]
   c. State the basic principle for this experiment [4marks]
   d. What title will you give to this experiment [1marks]

Total concentration of NH_3 in Solution after titration/ Mdm^{-3}	0.197	0.290	0.384	0.537	0.695
Concentration of Cl^- in solution after titration/ Mdm^{-3}	1.3×10^{-4}	2.4×10^{-4}	4.1×10^{-4}	8.9×10^{-4}	1.1×10^{-3}

The solubility product (K_{sp}) of AgCl is 1.1×10^{-10}

2. a. Write a balanced chemical equation stating all the conditions for the reaction between salicylic and acetic anhydride. [3marks]
   b. An experiment on the synthesis of Aspirin from 4g salicylic acid and 20ml of acetic anhydride (density $=1.08 gcm^{-3}$) yielded 2.1076g of the product. Calculate the theoretical and percentage yield of Aspirin (c=12, O =16, H =1) [4marks]
   c. Differentiate between actual yield and theoretical yield. [2marks]
   d. Explain why it is impossible to obtain 100% yield from synthesis of organic compounds. [3marks]
   e. Plot the calibration curve for sample X at 500nm from the following data and determine the concentration and the molar absorptivity of a sample labelled Y

whose absorbance at 500nm is 0.760. (assume a path length of 1cm)
[8marks]

Absorbance	0.211	0.435	0.589	0.768	0.896	0.967
Concentration (M)	9.78×10^{-5}	1.89×10^{-4}	3.67×10^{-4}	4.98×10^{-4}	6.57×10^{-4}	7.11×10^{-4}

3. Describe a laboratory procedure for the determination of the eutectic temperature and composition of Naphthalene and 1- Naphthol [20marks]