NATIONAL OPEN UNIVERSITY OF NIGERIA
UNIVERSITY VILLAGE, PLOT 91 CADASTRAL ZONE, NNAMDI AZIKIWE EXPRESS WAY, JABI - ABUJA.
FACULTY OF SCIENCES
DEPARTMENT OF PURE AND APPLIED SCIENCE
SECOND SEMESTER EXAMINATION 2020

COURSE CODE: **CHM 391**
COURSE TITLE: **PRACTICAL CHEMISTRY V – INORGANIC AND ANALYTICAL**
CREDIT UNIT: **TWO (2)**
TIME: **2 HOURS**
INSTRUCTION: **Answer question one and any other three questions.**

QUESTION ONE

1a. Calculate the total alkalinity and total CO_2 of a water sample which was titrated with standard solution of 0.02M HCl and 0.02 Na_2CO_3 solution. The volume of Na_2CO_3 used for the total alkalinity and total CO_2 is 7.20 and 7.50 respectively 9 mks

1bi. Explain the term reprecipitation in precipitation gravimetry? 2 mks

1bii. Plot a graph of absorbance against concentration of the following:

	Concentration Mg/l	Absorbance
Calibration Zero	0.0000	0.0065
Standard 1	0.5000	0.0350
Standard 2	1.0000	0.0650
Standard 3	2.0000	0.1253

From the graph determine the concentration at an absorbance of 0.06**.** 7 mks

1c. List the different types of potentiometric titration you know. 4 mks

1d. Washing can be used to remove impurities, explain. 3 mks

QUESTION TWO

2a. What is homogeneous precipitation 4 mks

2b. Describe an experimental procedure for determining the concentration of cyclohexane using IR spectroscopy 5 mks

2c. Explain the methods used in acidity measurement 6 mks

QUESTION THREE

3. In qualitative analysis of cations, to separate and identify individual cations present in an unknown mixture containing a mixture of two or more cations, the unknown solutions or mixture was diluted using deionized water and addition of dilute HCl which gives a white precipitate. Now;

i. Identify and separate the cations present 9 mks

ii. State the confirmatory test of the cations present. 6 mks

QUESTION FOUR

4a.There is an assertion that not all molecules can absorb in the infrared region. Discuss $4^1/_2$ mks

4b. Explain the simple ball-stick diagram using AgCl $4^1/_2$ mks

4c. State the economic importance of hard water 3 mks

4d. Mention the criteria for a complex to exhibit charge-transfer behaviour. . 3mks

QUESTION FIVE

5a. Calculate the total hardness of a water sample if 25.0ml of 0.01M EDTA was used to titrate 10ml of a water sample. $5\ ^1/_2$ mks

5b. Mention the main issues involved in analyzing a sample using infrared spectroscopy $4^1/_2$ mks

5c. State the energy activities between HOMO and LUMO in UV-Visible radiation 5 mks