ELIZADE UNIVERSITY

ILARA – MOKIN

NIGERIA

FACULTY OF BASIC AND APPLIED SCIENCES

DEPARTMENT OF PHYSICAL AND CHEMICAL SCIENCES

2020/2021 ACADEMIC SESSION: SECOND SEMESTER EXAMINATIONS

COURSE TITLE: ANALYTICAL CHEMISTRY I

COURSE CODE: CHM 202

DURATION: 2 HOURS

QUESTIONS WITH MARKING GUIDE

SECTION A

ANSWER TWO QUESTIONS FROM THIS SECTION

QUESTION ONE [15 Marks]

A. The dissociation constant for acetic acid is 1.75 $x10^{-5}$ at 25 ^{0}C. In an experiment, if a student arrives at exactly this value, his value is said to be accurate. Discuss? [2 Marks]

B. Briefly explain the following terms and relate it to analytical chemistry [8 Marks]

i. Precision

ii. Absolute error

iii. Relative error

iv. Mean value

C. The actual length of a field is 490 feet. A measuring instrument shows the length to be 509 feet. Find:

a. The absolute error in the measured length of the field. [3 Marks]

b. The relative error in the measured length of the field. [2 Marks]

QUESTION TWO [15 Marks]

A. Differentiate between homogenous sample and heterogeneous sample [2 Marks]

B. Briefly describe the listed with example [6 Marks]

a. Instrumental error

b. Operative error

c. Methodic error

C. How many significant figures are in: [3 Marks]

a. 0.00335

b. 504.70

c. 4000

D. Step-wisely analyze the use of powder thief [4 Marks]

QUESTION THREE [15 Marks]

A. 10. 00 mL solution containing Cl^- was treated with excess $AgNO_3$ to precipitate 0.4368 g of AgCl. What was the molarity of Cl^- in the unknown? (molar mass of Ag = 107.87, Cl = 35.5, N = 14, O = 16) [5 Marks]

B. List all the types of gravimetric methods [2 Marks]

C. Write short notes on the listed: [6 Marks]

i. Colloids

ii. Relative supersaturation

iii. Nucleation

D. Complete this table [2 Marks]

Analyte	Precipitant	Precipitate formed
Ba^{2+}		$BaCrO_4$
CN^-		AgCN

SECTION B

ANSWER ALL QUESTIONS

1a. with the aid of a diagram, explain the basic difference in the principle and instrumental set-up of atomic absorption and emission spectrometry. [4 MARKS]

b. A 7.25×10^{-5} solution of potassium permanganate has a transmittance of 44.1% when measured in a 2.10 cm cell at a wavelength of 525nm. Calculate (a) the absorbance of this solution (b.) the molar absorptivity of $KmnO_4$. [4 MARKS]

c. Outline 4 applications of Atomic Absorption Spectrometry [2 MARKS]

2a. Describe briefly the working principle of the column chromatography. [4 MARKS]

b. State Beer-Lambert's Law (define each parameter in the law) [3 MARKS]

c. Highlight 5 basic components of a UV Spectrophotometer. [3 MARKS]

3a. The component of a liquid mixture contains A (b.p 65 ^{O}C) and B (b.p 75 ^{O}C), what method will be used for separating the mixture?. [2 MARKS]

b. State 4 applications of thin layer chromatography [2 MARKS]

c. Highlight 3 detectors used in gas chromatography and the type of analysis each one is used for [3 MARKS]

d. Define the term "Partition Coefficient". [3 MARKS]