



**ELIZADE
UNIVERSITY**

FACULTY: BASIC AND APPLIED SCIENCES

DEPARTMENT: PHYSICAL AND CHEMICAL

SECOND SEMESTER EXAMINATIONS

2017/2018 ACADEMIC SESSION (*Stream 1*)

**ILARA-
MOKIN**

COURSE CODE: CHM 202
COURSE TITLE: Analytical Chemistry
DURATION: 2 hours

A rectangular box containing a handwritten signature in black ink, which appears to read 'Ilara-Mokin'.

HOD's SIGNATURE

TOTAL MARKS: 60

INSTRUCTION: Answer only three questions

Question One

- a. i. Mention the advantage (s) of instrumental methods of analysis over wet chemical methods of analysis [5marks]
ii. Fill in the blanks with appropriate material(s) that can be dissolved by the under listed solvents and reagents.
- Sulfuric acid _____ [1mark]
 - Hydrofluoric acid _____ [1mark]
 - Aqua regia _____ [1mark]
 - Water _____ [1mark]
 - Flux _____ [1mark]
- b. i. Differentiate between the terms: molarity and normality [2marks]
ii. What is the molarity of a solution that has 6.5 mol of solute dissolved in 250.0 mL of solution? [4marks]
- c. The following numerical results were obtained in a given laboratory experiment: 25.946, 25.945, 25.948, 25.949, 25.947. Given that the true value is 25.905. Comment on the accuracy and precision of the data [4marks]

Question Two

- a. Write short notes on each of the following
- i. Thermal extraction. [1 marks]
 - ii. Supercritical fluid [1marks]
 - iii. Calibration [1marks]
- b. Differentiate between the following pairs
- i. Qualitative and Quantitative methods of analysis [2marks]
 - ii. Analyte and matrix [2marks]
 - iii. Loss on Drying and loss on ignition [2marks]
 - iv. What is the percent loss on drying if a sample weighs 4.5027 g before drying and 3.0381 g after drying? [3marks]
 - v. Mention at least three industries where loss on ignition analytical procedure finds application [3marks]
- c. i. The following numerical results were obtained in a given laboratory experiment: 25.946, 25.945, 25.948, 25.949, and 25.947. Given that the true value is 25.905. Comment on the accuracy and precision of the data [2mks]
ii. Mention the salient information that can be obtained from a quantitative measurement [3marks]

Question Three

- a. i. Describe the various categories of solids that may be determined in water and waste water samples [5marks]
ii. Mention the various methods by which analytes can be extracted from liquid matrices [3marks]
- b. A sample of lake water is tested for suspended solids and the following data are obtained.
How many milligrams of suspended solids are there per liter of sample?
Volume of water used = 250.00 mL
Weight of empty, dry filter = 0.0513 g
Weight of dried Gooch crucible after filtering the water = 0.5837 g [4marks]
- c. i. What is Gravimetric factor? [1marks]
ii. What is the gravimetric factor for converting a weight of AgCl to a weight of Cl? [2marks]
(Ag= 107. 8683g/mol Cl=35.4527g/mol)
iii. Enumerate the analytical strategies involved in gravimetric analysis [5marks]

Question Four

- a. Give a brief definition of the following sampling techniques :
- i. Composite sampling.
 - ii. Selective sampling.
 - iii. Random sampling
 - iv. Representative sampling [8marks]
- b. Predict which of these sampling techniques is suitable for a homogeneous bulk system [2marks]
- c. Discuss the preparation activities necessary for solid materials before applying any analytical method [10marks]