

CHE 112



ALUPE UNIVERSITY

**OFFICE OF THE DEPUTY VICE CHANCELLOR
ACADEMICS, RESEARCH AND STUDENTS AFFAIRS**

UNIVERSITY EXAMINATIONS

2023/2024 ACADEMIC YEAR

FIRST YEAR FIRST SEMESTER REGULAR EXAMINATION

**FOR THE DEGREE OF BACHELOR OF
EDUCATION SCIENCE**

COURSE CODE: CHE 112

**COURSE TITLE: INTRODUCTION TO ANALYTICAL
CHEMISTRY**

DATE:

TIME:

INSTRUCTION TO CANDIDATES

- SEE INSIDE

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CHE 112

REGULAR – MAIN EXAM

CHE 112: INTRODUCTION TO ANALYTICAL CHEMISTRY

STREAM: BED (Sci)

DURATION: 3 Hours

Instructions to candidates

- i. Answer all questions.

Question one

- a) Differentiate between qualitative and quantitative analysis as used in analytical chemistry. (4 Marks)
- b) Explain the meaning of the following terms used in analytical chemistry. (5 Marks)
- i. Analysis
 - ii. Analyte
 - iii. Matrix
 - iv. Determination.
 - v. Measurement
- c) Differentiate between systematic and random errors. (4 Marks)
- d) State the importance of a sampling plan. (1 Mark)

Question two

- a) List the steps followed in a chemical analysis. (7 Marks)
- b) Explain the following analytical chemistry terms
- i. Precision. (1 Marks)
 - ii. Accuracy. (1 Marks)
- c) Describe the difference between atomic emission and atomic absorption spectroscopy. (2 Marks)
- d) State the disadvantages of flame sources for emission spectroscopy. (3 Marks)

Question Three

- a) Describe the process of successful gravimetric analysis. (5 Marks)
- b) What factors determine the particle size of precipitate in gravimetric analysis. (4 Marks)
- e) State
- i. Two properties of an ideal precipitating agent. (2 Marks)

- ii. Three properties of an ideal precipitate. (3 Marks)

Question Four

- a) Analysis of Iron ore gave the following percentage values for the iron content. 7.08, 7.21, 7.012, 7.09, 7.16, 7.14, 7.07, 7.14, 7.18, 7.11.
calculate the
- i. Mean. (3 Marks)
 - ii. Standard deviation. (4 Marks)
 - iii. Coefficient of variation for the values. (3 Marks)
- b) The results of a certain analysis are 32.98 compared with the accepted value 34.06g. what is the relative error in parts per thousand. (3 Marks)

Question Five

- a) Explain the following with respect to liquid chromatography.
- i. Partition chromatography. (1 Mark)
 - ii. Adsorption chromatography. (1 Mark)
 - iii. Ion exchange chromatography. (1 Mark)
 - iv. Size exclusion chromatography. (1 Mark)
- b) Substance A and B were found to have a retention time of 16.40 and 17.63 minutes respectively on a 30cm column. An unretained solute passed through the column in 1.30 minutes. The peak width at the base for A and B were 1.11 and 1.21 respectively.
Calculate
- i. Column resolution. (3 Marks)
 - ii. Average number of plates. (2 Marks)
 - iii. Plate height. (3 Marks)
- c) Differentiate between isocratic elution and gradient elution. (2 Marks)
