



NATIONAL OPEN UNIVERSITY OF NIGERIA
UNIVERSITY VILLAGE, PLOT 91 CADASTRAL ZONE, NNAMDI AZIKIWE
EXPRESS WAY, JABI - ABUJA.

FACULTY OF SCIENCES, DEPARTMENT OF CHEMISTRY

2024 1 EXAMINATION

COURSE CODE: CHM 413
COURSE TITLE: ANALYTICAL CHEMISTRY
COURSE UNIT: 2
TIME: 2 HOURS
INSTRUCTION: Answer question one and any other two questions.

QUESTION ONE

- 1a. The following results for five replicate determinations of calcium in limestone 14.35%, 14.41%, 14.40%, 14.32%, 14.37%. Calculate the mean and confidence interval at 95% CL. (8 marks)
- b. What are the major differences between random errors and systematic errors? (4 marks)
- c. Classify the following Systematic errors:
- i. errors traced to the use of faulty equipments, or uncalibrated or poorly calibrated weights and glass wares
 - ii. incomplete drying of samples, and transfer of solutions (3 marks)
 - iii. co-precipitation with impurities, incomplete reaction (4 marks)
- d. List four precautions taken in handling systematic errors (2 marks)
- ei. What are outliers in data sets? (2 marks)
- eii.) The following values were obtained for nitrate concentration (mg l^{-1}) in a sample of river water; 0.403, 0.410, 0.401, 0.380, 0.400, 0.413, 0.408. Should 0.380 be rejected? (6 marks)

Critical values of G ($P=0.05$)

Sample size	Critical value
3	1.155
4	1.481
5	1.715
6	1.887
7	2.020
8	2.126
9	2.215
10	2.290

f.) List the six major components of HPLC instrument.

(3 marks)