TECHNICAL UNIVERSITY OF MOMBASA

Faculty of Applied and Health Sciences

Department of Pure & Applied Sciences

UNIVERSITY EXAMINATION FOR:

DIPLOMA IN ANALYTICAL CHEMISTRY

ACH 2201: CHEMICAL ANALYTICAL METHODS I

ORDINARY EXAMINATION

SERIES:DECEMBER 2024

TIME:2HOURS

DATE: Pick Date2024

Instructions to Candidates

You should have the following for this examination

Answer Booklet, examination pass and student ID

This paper consists of **FIVE** questions. Attemptquestion ONE (Compulsory) and any other TWO questions.

Do not write on the question paper.

Question ONE

a) Differentiate between the following terms

(i) Sample and analyte (4marks)

(ii) Homogeneous sample and Heterogeneous sample (4 marks)

(iii)Volumetric and gravimetric analysis (4 marks)

b) The following data was collected in replicate analysis of a broad sample for Calcium 0.752, 0.756, 0.752, 0.757 and 0.760 grams. Calculate the mean, standard deviation and relative standard deviation (10 marks)

c) Define the following terms in relation to chemical methods of analysis

i) Variance

ii) Representative sample .

iii) Standard deviation

iv) Detection limit (2 marks each)

Question TWO

a) Define the term 'volumetric analysis' (1 mark)

b) State any FIVE factors that influence volumetric analysis. (5 marks)

c) Briefly describe the following statistical terms: Error, Systematic error and Random error. (9 marks)

Question THREE

(a) Define sampling (1 mark)

(b) To obtain an adequate representative sample, we must take into account of the state of the parent material we are to examine. Outline the four types of these states. (8 marks)

(c) Outline any three methods of sampling (6 marks)

Question FOUR

a) The following are replicate measurements of concentration of Pb^{2+} in aqueous solution. 21.2, 20.3, 19.7, 22.4, 19.9, 20.5 and 19.8 ppm. Calculate

(i) The mean (3marks)

(ii) Median (2marks)

(iii) Standard deviation (4 marks)

iv) Variance (3 marks)

v) Relative standard deviation (3 marks)

Question FIVE

a) Briefly discuss the various types of errors and how to control them (9 marks)

b) The property measured for each of the following analytical methods.

Gravimetric
Spectrometric
Electrochemical .
Radiochemical
Titrimetric
Thermal (6 marks)