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
SUPPLEMENTARY 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) Define Analytical chemistry (2 marks)

b) Differentiate between
(i) classical and instrumental methods of analysis (4 marks)
(ii) Qualitative and quantitative analysis (4 marks)

c) Define the following terms
(i) Accuracy (2 marks)
(ii) Precision (2 marks)
(iii) Blank (2 marks)
(iv) Resolution (2 marks)

d) State any Four factors that influence volumetric analysis. (4 marks)

e) An analyst determined the concentration of potassium in six replicates of a standard water sample by Flame Atomic Emission Spectrophotometry and obtained the following data in ppm 19.4, 19.6, 19.5, 19.8, 20.1 and 20.3 calculate the mean and standard deviation (8 marks)

QUESTION TWO

(a) The basic steps following in solving an analytical problem. **(7 marks)**

b) Using examples differentiate between classical and instrumental methods of analysis (4 marks)

c) State any THREE advantages of instrumental analysis over chemical analysis? (4 marks)

Question THREE

a) State and explain any three common sources of error in any analytical technique (9 marks)

b) State and explain steps that are used to reduce a large solid sample to a suitably sized laboratory sample. (6 marks)

Question FOUR

a) The following values were obtained in replicate analysis of the weight of iron in 2.0 g portion of an ore sample 0.3791, 0.3784, 0.3793, 0.3779 and 0.3797 g calculate

(i) The mean (2 marks)

(ii) Standard deviation (3 marks)

(iii) relative standard deviation (2 marks)

(iv) variance (2 marks)

(v) Median (2 marks)

b) The concentration of arsenic in a standard reference material which contain 2.35mg/L arsenic was analyzed by four students in replicate as shown below classify the set of results given by the students as neither accurate nor precise, precise not accurate, accurate not precise, accurate and precise (4 marks)

	1	2	3	4	5	6	mean
Student 1	2.35	2.32	2.36	2.34	2.30	2.35	2.34
Student 2	2.54	2.52	2.51	2.52	2.53	2.52	2.52
Student 3	2.25	2.52	2.10	2.58	2.54	2.01	2.33
Student 4	2.45	2.22	2.65	2.34	2.78	2.58	2.50

Question FIVE

a) Using relevant examples describe sampling procedures for Solid samples (5 marks)
b) Outline five applications of analytical chemistry (10 marks)