THE MOMBASA POLYTECHNIC UNIVERSITY COLLEGE

(A CONSTITUENT COLLEGE OF JKUAT)

(A Centre of Excellence)

Faculty of Applied and Health Sciences

DEPARTMENT OF **PURE AND APPLIED SCIENCES**

DIPLOMA IN SCIENCE LABORATORY TECHNOLOGY
(DSLT 12J)

ACH 2223: CHEMICAL ANALYTICAL TECHNIQUES I

SPECIAL/SUPPLEMENTARY: EXAMINATIONS

SERIES: FEBRUARY 2013

TIME: 2 HOURS

INSTRUCTIONS:

You should have the following for this paper

- *Answer booklet*

This paper consists of ***FIVE*** questions.
Answer Question **ONE (compulsory)** and any other **TWO** questions
*This paper consists of **3 PRINTED** pages*

Question ONE

a) Define the following terms in relation to chemical methods of analysis.
   (i) Precision
   (ii) Accuracy
   (iii) Bias
   (iv) Sensitivity
   (v) Concentration range **(10marks)**

b) The true value of concentration of Cu^{+2} ions in aqueous solution is 18.7ppm and the mean for four replicate measurements of Cu^{+2} ion concentration in aqueous solution is 19.3ppm.
   Calculate bias of the solution **(3marks)**

c) Differentiate between the following terms
   (i) Sampling and sample
   (ii) Homogeneous sample and Heterogeneous sample. **(9marks)**

d) Indicate the sample size for the following types of analysis
   (i) Micro
   (ii) Ultramicro
   (iii) Seminicro
   (iv) Macro

   (4marks)

e) State FOUR types of constituents that are used for determining analytical procedures. Used in chemical analysis in analysis include their analytical levels. **(4marks)**

Question TWO

a) The following are seven replicate measurements of concentration of Pb^{+2} in aqueous solution.
   (a) 21.2ppm
   (b) 20.3ppm
   (c) 19.7ppm
   (d) 22.4ppm
   (e) 19.9ppm
   (f) 20.5ppm
   (g) 19.8ppm
   Calculate
   i) Concentration range
   ii) Data mean
   iii) Data median
   iv) Standard deviation
   v) Population standard deviation
   vi) Relative standard deviation variance

   (20marks)

Question THREE

a) Which of the three possibilities that can be realized from calculated Q exp. When its compared with A test table. **(6marks)**

b) A series of replicate measurements for water content in a sample of ethanol by kirl fisher approach is shown below.
0.76%, 0.75%, 0.69%, 081%, 0.92% with what confidence limit may data point be rejected if one uses
(i) Q-test **(7marks)**
(ii) T-Test **(7marks)**

Question FOUR

a) The mean data value of Cu+2 ion from the following
(a) 18.4ppm (b) 19.6ppm (c) 17.7 ppm (d) 18.2ppm (e) 20.6ppm (f) 17.9ppm
(g) 18.9ppm
(15marks)

b) What do you understand by blank determination (urtitration) **(5marks)**

Question FIVE

a) Determine the best fit calibration plot of the data below

Conc (x)	**Peak area (y)**
7.0	13.4
8.0	19.9
11.0	26.0
15.0	32.2
19.0	38.1
21.	42.2
24	46.7

(6marks)

b) State any explain FIVE factors that influence volumetric analysis. **(14marks)**