



TECHNICAL UNIVERSITY OF MOMBASA
FACULTY OF APPLIED AND HEALTH SCIENCES
DEPARTMENT OF PURE & APPLIED SCIENCES

UNIVERSITY EXAMINATION FOR:

DAC 16S / DSLT 16S

: ACH 2201: CHEMICAL ANALYTICAL METHODS I

END OF SEMESTER EXAMINATION

SERIES: SEPTEMBER 2018

TIME: 2 HOURS

DATE: Pick Date Sep 2018

Instructions to Candidates

You should have the following for this examination

Answer Booklet, examination pass and student ID

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

Do not write on the question paper.

Question ONE

- a) Differentiate between the following terms
- (i) Sampling and sample **(4 marks)**
 - (ii) Homogeneous sample and Heterogeneous sample. **(4 marks)**
- b) Indicate the sample size for the following types of analysis
- (i) Micro **(1 marks)**
 - (ii) Ultramicro **(1 marks)**
 - (iii) Semimicro **(1 marks)**
 - (iv) Macro **(1 marks)**
- c) Define the following terms in relation to chemical methods of analysis
- (i) Precision **(2 marks)**
 - (ii) Accuracy **(2 marks)**
 - (iii) Bias **(2 marks)**
 - (iv) Sensitivity **(2 marks)**
 - (v) Concentration range **(2 marks)**

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

Question TWO

- a) 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%, 0.81%, 0.92% with what confidence limit may data point be rejected if one uses
- (i) Q-test **(5 marks)**
 - (ii) T-Test **(5 marks)**
- b) State any FIVE factors that influence volumetric analysis. **(5 marks)**

Question THREE

Using relevant examples describe sampling procedures of solids, liquids and gases **(15 marks)**

Question FOUR

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 the mean, median, Concentration range, standard deviation and relative standard deviation variance **(15 marks)**

Question FIVE

- a) Briefly discuss the various types of errors and how to control them **(9 marks)**
- b) Using examples differentiate between classical and instrumental methods of analysis **(3 marks)**
- c) State any THREE advantages of instrumental analysis over chemical analysis? **(3 marks)**