



THE MOMBASA POLYTECHNIC UNIVERSITY COLLEGE

(A constituent of JKUAT)

Faculty of Applied and Health Sciences

DEPARTMENT OF PURE AND APPLIED SCIENCES

UNIVERSITY EXAMINATION FOR THE DEGREE OF BACHELOR OF
TECHNOLOGY IN APPLIED CHEMISTRY

ACH 4411 : BIOANALYTICS II

SPECIAL/SUPPLEMENTARY EXAMINATION

FEBRUARY 2013 SERIES

2

HOURS

Instructions to candidates:

This paper consist of **FIVE** questions

Answer question **ONE** (compulsory) and any other **TWO** questions

Question ONE

- Explain the factors a laboratory Quality assurance programme must fulfill **(8marks)**
- A solution of UTP of 29.3 MgL^{-1} has a extinction coefficient of 0.25 at 260nm. If the light path is 1cm and the molecular weight of UTP is 586, calculate the molar extinction coefficient and the transmittance of $10 \mu\text{molL}^{-1}$ of the solution **(6marks)**
- State the condition that can lead to changes of body's protein electrophoretic patterns **(6marks)**
- Outline the identification problems as defined by key incident management and monitoring system of any laboratory Quality assurance programme **(5marks)**
- Outline FIVE stages in a feed back monitoring cycle in pre-analytical phase. **(5marks)**

Question TWO

A student of Bachelor of technology degree in applied Chemistry at the Mombasapolytechnic University College recorded the following results in flame photometry; 116.0, 97.9, 114.2, 106.8 and 108.3

- i) Comment on the precision of the analysis
(4marks)
- ii) Comment on the accuracy of the analysis if the reference value is 108.1
(4marks)
- iii) Apply the Q-test and justify whether or not 97.9 in the analysis is an outlier **(6marks)**
- iv) Find the 95% confidence interval for the mean **(6marks)**

Question THREE

- a) Considering a hypothetical weak acid HA; deduce the Henderson-Hasselbalch (H-H) equation **(8marks)**
- b) Discuss the factors affecting the normal reference ranges in bioanalytics **(12marks)**

Question FOUR

- a) Discuss the classification of error in bio analytics **(15marks)**
- b) Explain how systematic /determinate errors **(5marks)**

Question FIVE

- a) Describe the principle of ion selective electrode **(8marks)**
- b) Given Ag/Ag⁺ as the reference electrode and Fe²⁺/Fe³⁺ as the working electrode;
 - (i) Draw a well labeled diagram of a potentiometric cell **(8marks)**
 - (ii) Write the reactions occurring at the electrode hence giving the overall reaction **(4marks)**