# 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 4304 : BIOINORGANIC CHEMISTRY

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**

a) Define the following terminologies;

(i) Metalloproteins **(2marks)**

(ii) Active site of an enzyme **(2marks)**

(iii) Co-factor **(2marks)**

b) State the FOUR features common in all metalloenzymes **(4marks)**

c) State the THREE components of nitrogenase enzyme. **(3marks)**

d) List the THREE major classes of metal-containing electron transfer proteins **(3marks)**

e) State the THREE factors that determine essentiality of elements **(3marks)**

f) Give the structure of ATP **(3marks)**

g) State the functions of each of the following metals in living systems

(i) Sodium **(2marks)**

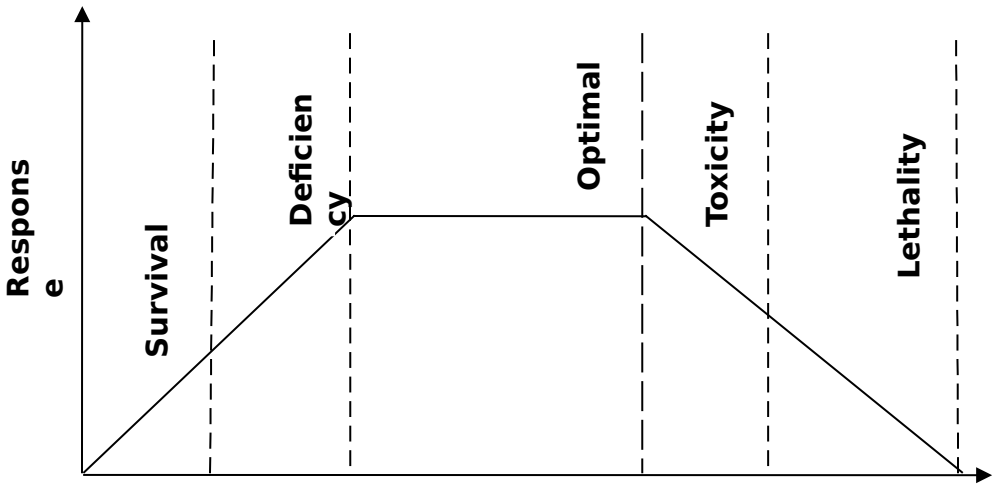
(ii) Calcium **(2marks)**

(iii) Zinc **(2marks)**

h) State TWO applications of bioinorganic chemistry in medium **(2marks)**

**Question TWO**

Study the graph below and answer the questions that follow




**Essential element dosage**

a) What does the graph above represent **(1mark)**

b) Interpret each stage in the above graph **(5marks)**

c) State and explain the FOUR classes of chemical elements essential to life forms

**(8marks)**

d) Explain the THREE factors that are used to define essentiality of elements **(6marks)**

**Question THREE**

a) Describe the structure components of chlorophyll **(3marks)**

b) Explain how chlorophylls participates in photosynthesis. **(9marks)**

c) State and explain the FOUR evidences of enzymes – substrate complex **(8marks)**

**Question FOUR**

a) Explain the extent of cyanide toxicity in reaction to its distribution in nature **(3marks)**

b) List any FOUR plant species that contain cyanide **(4marks)**

c) Give any FOUR food substances for humans and animals that are rich in cyanide.

**(4marks)**

d) Describe lethality of cyanide **(3marks)**

e) Compare toxicity of cyanide in ruminants and non ruminants animals **(6marks)**

**Question FIVE**

Discuss vitamin $B_{12}$ under the following sub-tittles

a) Physiological functions **(5marks)**

b) Structural components **(4marks)**

c) Synthesis and interconversion **(4marks)**

d) Medical and commercial uses **(7marks)**