Technical University of Mombasa

Faculty of Applied and Health Sciences

DEPARTMENT OF **PURE AND APPLIED SCIENCES**

DIPLOMA IN ANALYTICAL CHEMISTRY
(DAC 12S)

ACH 2208: CHEMISTRY OF S AND P BLOCK ELEMENTS

SPECIAL/SUPPLEMENTARY: EXAMINATIONS

SERIES: OCTOBER 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 **2 PRINTED** pages*

Question ONE

a) Use Hinds rule to fill the following table **(6marks)**

Element	*Atomic no.*	*Electronic Configuration*	*Group*	*Period*	*Block*
Se	34	i	ii	iii	iv
Sr	38	v	vi	vi	viii
Z	27	ix	x	xi	xii

b) Define the following terms :-
   (i) Lattice energy
   (ii) Sesquioxide
   (iii) Electron affinity
   (6marks)

c) Briefly explain why:-
   (i) Group one elements are called alkaline metals **(2marks)**
   (ii) Electro negativity increases from left to right of periodic table **(3marks)**
   (iii) Group 2 elements are more hydrated than group one **(3marks)**
   (iv) Atomic size of Aluminium is large than that of Gallium. **(3marks)**

d) State the medicinal importance of magnesium and nitrogen **(2marks)**

e) Explain the valency of group V elements **(5marks)**

Question TWO

a) Compare the following properties of group 1 and 3.
   (i) Complex formation **(2marks)**
   (ii) Oxidation state **(2marks)**

b) State :-
   (i) Three applications of silicon compounds **(2marks)**
   (ii) Chemistry which makes MgO to be used as refractory brick. **(2marks)**

c) Define the term catenation and Explain the trend of caternation of group IV elements **(4marks)**

d) Explain the trend of bascity of the oxides of group 3 elements with the help of appropriate equations. **(3marks)**

Question THREE

a) Explain why:-
   (i) Bond length in BF_3 is shorter than the sum of covalent radii **(4marks)**
   (ii) Oxygen exhibits invariably 2 oxidation state only **(3marks)**

b) Sketch the structures of NO_2 and BO_3 oxides **(2marks)**

c) Explain:-
- The trend of oxidizing power of halogens
- Oxidation state of group VI elements **(6marks)**

Question FOUR

a) Compare the halides of Beryllium and Aluminium **(4marks)**
b) State medicinal importance of sulphur and oxygen **(3marks)**
c) Explain :-
   (i) Titration of orthoboric acid and sodium hydroxide
   (ii) Why oxidation state of thallium is +1 and not +3 **(6marks)**
d) Complete the following reactions **(2marks)**
   (i) Be + NaOH $\longrightarrow$
   (ii) SI + O_2 $\longrightarrow$

Question FIVE

a) Sketch a well label diagram of an atom **(3marks)**
b) Explain the trend of :
   (i) Reducing power of group 1 elements
   (ii) Oxidizing power chlorine **(6marks)**
c) Name TWO allotropes of carbon and Four of sulphur **(3marks)**
d) Explain toxicity of Arsenic **(3marks)**