TECHNICAL UNIVERSITY OF MOMBASA

FACULTY OF APPLIED AND HEALTH SCIENCES

DEPARTMENT OF PURE & APPLIED SCIENCES

UNIVERSITY EXAMINATION FOR:

DAC 16S /DSLT 16S

ACH 2208 CHEMISTRY OF S AND P BLOCK ELEMENTS

SPECIAL/SUPPLEMENTARY EXAMINATION

SERIES: SEPTEMBER 2018

TIME: 2HOURS

DATE: Pick DateSep2018

Instructions to Candidates

You should have the following for this examination

Answer Booklet, examination pass and student ID

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

Do not write on the question paper.

Question ONE

a) Explain why LiF is almost insoluble in water while LiCl is soluble in water and acetone **(4 marks)**

b) Aluminium trifluoride is insoluble in anhydrous HF but dissolves on addition of NaF. Aluminium trifluoride precipitates out when gaseous $BF_3$is bubbled through. Give reasons. **(6marks)**

c) Explain why the first elements in each group exhibit considerable differences from the rest of the elements of the same group **(6 marks)**

d) Explain why group I and II elements can't be obtained by chemical reduction methods **(4 marks)**

e) Explain the following observations

(i) In group IV, carbon has a stronger tendency to catenation than its homologues, while in group VI, sulphur has a stronger tendency to catenation relative to the other group members. **(5marks)**

(ii) The O-O and O-F bonds are much weaker than S-S and S-F bonds, while O-H and O-C bonds are much stronger than S-H and S-C bonds. **(5marks)**

Question TWO

a) Why are potassium and cesium, rather than lithium used in photoelectric cells? **(3 marks)**
b) Discuss the diagonal relationship of boron with silicon **(6 marks)**
c) Comment on each of the following observations: **(6 marks)**
(i) Mobilities of the alkali metal ions in aqueous solution are $Li^+ < Na^+ < K^+ < Rb^+ < Cs^+$
(ii) Lithium is the only alkali metal to form a nitride directly.

Question THREE

a) Beryllium and magnesium don't give colour to flame while other alkaline earth metals do so. Explain **(5 marks)**
b) How would you explain the following observations
(i) BeO is almost insoluble but $BeSO_4$ in soluble in water **(2 marks)**
(ii) LiI is more soluble than KI in ethanol **(2 marks)**
c) Explain the trends of solubility and stability of the carbonates and sulphates of alkaline earth metals. **(6 marks)**

Question FOUR

a) Using suitable diagram discuss Solvay process. **(10 marks)**
b) Potassium carbonate cannot be prepared by Solvay process. Why? **(1mark)**
c) Give FOUR factors to which the differences between the chemistry of fluorine and the other halogens can be attributed. **(4 marks)**

Question FIVE

a) Starting with sodium chloride how would you proceed to prepare
(i) sodium metal **(3 marks)**
(ii) sodium hydroxide **(3 marks)**
(iii) sodium peroxide **(3 marks)**
(iv) sodium carbonate? **(3 marks)**
b) Explain why BCl_3 has higher stability as compared to $TlCl_3$ **(3marks)**