# TECHNICAL UNIVERSITY OF MOMBASA

FACULTY OF APPLIED AND HEALTH SCIENCES

DEPARTMENT OF PURE & APPLIED SCIENCES

**UNIVERSITY EXAMINATION FOR:**

DIPLOMA IN PHARMACEUTCAL TECHNOLOGY

DPT 15S

ACH 2215 : INORGANIC CHEMISTRY

END OF SEMESTER EXAMINATION

**SERIES:**APRIL2016

**TIME:**2HOURS

**DATE:**Pick DateSelect MonthPick Year

**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.**

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**Question ONE**

a) Define the following terms
   i) transition elements (2 marks)
   ii) Ligands (2 marks)

b) State and explain any three factors that would affect the magnitude of ionization energy of any atom. (6marks)

c) Discuss the diagonal relationship of lithium and magnesium (6marks)

d) Define the following terms
   i) Catenation (2marks)
   ii) Allotropes (2marks)

e) Lithium ion in solution should conduct electricity better than other ions of this group but this is not the case explain why (4 marks)

f) Aluminium reacts vigorously when heated with sulphur to give aluminium sulphide, explain why Aluminium sulphide can't be obtained by mixing solution containing aluminium ions and sulphide ion? how would you expect aluminium sulphide to react with water (6marks)

**Question TWO**

a) Explain why aqueous solutions of the chlorides, sulphates and nitrates of transition metals show an acidic reaction (6marks)

b) Comment on the following statements

(i) The first ionization energy of lithium is lower than that of boron but higher than that of sodium. (3 marks)

(ii) Aqueous $Na_2 CO_3$ is alkaline while aqueous $NH_4Cl$ is acidic. Give reasons for your explanation. (3 marks)

c) Compare the hydrides and silicon (3marks)

**Question THREE**

Carbon is the first element in group IV of the periodic table with two allotropes graphite and diamond

a) Draw the structure of diamond and graphite (5 marks)

b) using the structure drawn in 4b above explain why

i) Diamond is very hard while graphite is soft (3 marks)

ii) Diamond is a poor electrical conductor while graphite is a good conductor of electricity (3 marks)

d) State two uses of diamond and graphite (4marks)

**Question FOUR**

a) Describe the periodic trend of the following giving reason in each case

i) Ionization energy (3 marks)

ii) Electronegativity ( 3 marks)

iii) melting point (3 marks)

iv) Atomic radius (3 marks)

b) Explain why alkaline metals are more reactive compared to alkaline earth metals (3 marks)

**Question FIVE**

a) Explain why transition elements are characterized by variable oxidation state, coloured ions, catalytic activity and formation of complex compound (12 marks)

b) Using ammonia show formation of sp3 hybridization (3 marks)