NATIONAL OPEN UNIVERSITY OF NIGERIA
14-16 AHMADU BELLO WAY, VICTORIA ISLAND LAGOS
MARCH/APRIL 2016 EXAMINATION

SCHOOL OF SCIENCE AND TECHNOLOGY

COURSE CODE: **CHM303**
COURSE TITLE: **INORGANIC CHEMISTRY III**

TIME ALLOWED: **2½HOURS**

QUESTION 1: Compulsory (22mks)

(a) i. With the aid of a well labelled diagram show magnetic separation of ores. (7mks)

ii. list 5 minerals with their formulas which are separated from non-magnetic impurities by this method.(5 mks)

(b) Briefly explain magnetic separation technique of ores .(5mks)

(c) Outline five reasons why Beryllium oxide, BeO, is more like the oxide of aluminium in Group III rather than the oxides of the other element in Group II.(5mks)

Question 2. (12mks)

(a) Complete the following chemical equations:

(i) $2Ln + 3X_2 \longrightarrow$

(ii) $Ce + 2F_2 \longrightarrow$

(iii) ? $\longrightarrow$ $NaHCO_3(aq) + NaOH(aq)$

(iv) Show with balanced chemical reaction the product when any nitrate of Group 1A elements are heated.

(v) $MgCO_3(s) \xrightarrow{\Delta}$?

(vi) $B_2O_3(s) + 3Mg(s) \longrightarrow$?

(2mks each)

Question 3

1. (a) Clear show the filling of the electrons in the molecular orbitals of the element Xenon: i) Ground state.(2mks) (ii) Excited state.(2mks)
(b) Fill in the shapes of the following compounds (4mks)

Colum n I	Column II
XeF4	
$XeOF_4$	
XeF_4	
XeF_6	

(b) Using Valence Shell Electron Pair Repulsion Theory (VSEPR) justify the shape of XeF_2 compounds.(4mks)

Question 4
(4a)Explain the term crystalline clathrates or inclusion complexes of noble gases.(6mks)
(c) Write short note on these compounds:
(i) Borazine (5marks) (ii) Crystalline form of boron (1mark)

Question 5.
(a) Write on the following:
(i) Four reasons why beryllium different from other members of group IIA.(4mks)
(ii) Why caesium is a more reducing agent than sodium.(2mks)
(b) List the group1A elements. (3mks)
(ii)Enumerate the properties of group 1A elements.(3mks)

Question 6
(ai) Difference between gangue and slag.(4marks)
ii. Balanced chemical equations to show how the flux forms the slag in an iron blast furnace.(4 marks)
(bi) Why it is necessary to concentrate ores?(2marks)
(ii)Why is Carbon is a preferred reducing agent in commercial metallurgy? (2marks)

Question 7

(ai)List 4 characteristics of transition metals.(4 marks)

ii. Write short note stating the major properties of the reaction between xenon and fluorine products. (5mks)

(b) Using a balanced equation show the kroll’s process.