



NATIONAL OPEN UNIVERSITY OF NIGERIA
14-16 AHMADU BELLO WAY, VICTORIA ISLAND LAGOS
SEPTEMBER/OCTOBER 2015 EXAMINATION
SCHOOL OF SCIENCE AND TECHNOLOGY

COURSE CODE: CHM 303

COURSE TITLE: INORGANIC CHEMISTRY III

QUESTION 1: Compulsory (22mks)

1. (a) With the aid of detailed chemical reactions show the reaction of Xenon and fluorine. (9mks)
- (b) Write short note stating the major properties of the products. (5mks)
- (c) Explain the term crystalline clathrates or inclusion complexes of noble gases. (6mks)
- (ii) List four examples of other substances which form clathrates with quinol. (2mks)

Question 2

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)

Column I	Column II
XeF_4	
$XeOF_4$	
XeF_2	
XeF_6	

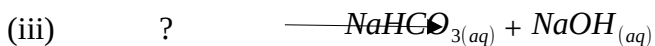
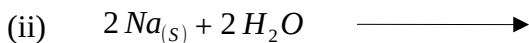
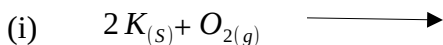
(c) Using Valence Shell Electron Pair Repulsion Theory (VSEPR) justify the shape of XeF_2 compounds. (4mks)

Question 3.

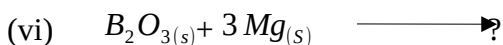
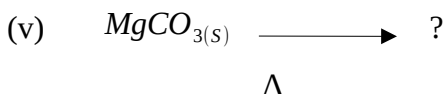
- (a) Write on the following:
 - (i) Four reasons why beryllium different from other members of group IIA. (4mks)
 - (ii) Why caesium is a more reducing agent than sodium. (2mks)
- (b) List the group 1A elements. (3mks)
- (ii) Enumerate the properties of group 1A elements. (3mks)

Question 4. (12mks)

(a) Complete the following chemical equations:



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



Question 5

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

(b) Write short note on these compounds:

(i) Borazine (5marks) (ii) Crystalline form of boron (2marks)

Question 6

(a) (i) 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

(7ai) Discuss the following:

(i) The compound boron nitride.

(ii) Froth flotation process.

(iii) (iii) Rare earth elements

(b) List six characteristics of transition metals.

