NATIONAL OPEN UNIVERSITY OF NIGERIA
UNIVERSITY VILLAGE, PLOT 91 CADASTRAL ZONE, NNAMDI AZIKIWE EXPRESS WAY, JABI - ABUJA.
FACULTY OF SCIENCES
DEPARTMENT OF CHEMISTRY
2024_2 EXAMINATION

COURSE CODE: **CHM 303**
COURSE TITLE: **INORGANIC CHEMISTRY III**
COURSE UNIT: **3**
TIME: **3 HOURS**
INSTRUCTION: **Answer question one and any other three questions.**

QUESTION ONE

(1a) Explain how hydrogen is more related to group 1 element? (5 marks)

(1b). State the different groups of minerals? (5 marks)

(1ci) With a balanced chemical equations, explain the term roasting as used in extraction of metals? (5 marks)

1cii. Explain the term hydrometallurgy? 5marks

(1d) What is the main source of helium?

(1marks)

1e. Explain the term calcination ? 4marks

QUESTION TWO

(2a) Explain why boron can not for cation in +3 oxidation state, that is B^{3+} ? (5 marks)

(2b). Give reasons to account for the non-existent pentahalides of nitrogen.? (5 marks)

(2c) Describe the classes of ligands?. (5 marks)

QUESTION THREE

(3a) Discuss the term benefication of ores? . (5 marks)

(3b) Use chemical equations to explain the process involved in the formation ofboron trioxide. (6 marks)

(3c)Give the order of oxidizing strength of the following halogens Br, Cl, I, F? (4 marks)

QUESTION FOUR

(4ai) State three reasons why BeO is more like aluminum in group IIIA? (3 marks)
4aii. Provide the reasons why metallurgy cannot be used in some cases? 3marks
(4b) Provide a chemical equation to explain the reduction of chromium oxide with aluminium powder and heating with silicon **(5marks)**
(4c) State at least three compounds each of Ne and He? (**4 marks)**

QUESTION FIVE

(5ai) Write the electronic configuration of Cu^{2+}?(2 marks)
5aii. Explain how lead is purified by the method of liquation? 5marks

(5bi). Write the chemical formula for chromium ore? (1 marks)
5bii. Explain why reduction certain ores cannot done using carbon? 5marks

(5c). Write the mathematical expression to show the number of possible pairs of electrons with parallel spin? (2 marks)

QUESTION SIX

(6a) State at least three uses of wrought iron? (3 marks)

(6b). Explain the structure of Xenon hexafluoride using molecular orbital theory? (6 marks)

(6ci). Explain why electronic configuration of chromium is $3d^5\ 4s^1$ not $3d^4\ 4s^2$? (2marks marks)
6cii. Use chemical equation show how titanium ores are heated with carbon at 1200 K in a current of chlorine gas: 4marks