NATIONAL OPEN UNIVERSITY OF NIGERIA
UNIVERSITY VILLAGE, PLOT 91 CADASTRAL ZONE, NNAMDI AZIKIWE EXPRESS WAY, JABI - ABUJA.

FACULTY OF SCIENCES

DEPARTMENT OF PURE AND APPLIED SCIENCES

FEBRUARY/MARCH2018 EXAMINATION

COURSE CODE: **CHM 303**

COURSE TITLE: **INORGANIC CHEMISTRY III**

TIME: **2½ HOURS**

INSTRUCTION: **Question one is compulsory. Answer question one and any other four questions.**

QUESTION ONE

1ai) Discuss briefly why Group 1A elements are electropositive, and the trend of electropositivity among members of the group.4½ marks

1aii) Complete this reaction:

XeF4 + Pt?2 ~~marks~~ ⟶

1aiii) Apart from oxygen other members of Group VI elements can make up to six covalent bonds, discuss.(2 marks)

1b) Comment on colour of transition metal compounds.9½ marks

1ci) Depending on chemical composition, classify minerals of metals. (2½ marks)

1cii) What are coordination compounds?(1½ marks)

1ciii) Mention and explain the classes of coordination compounds.(3 marks)

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QUESTION TWO

2ai) Discuss briefly the following:

i. The compound boron nitride
ii. Froth flotation process
iii. Rare earth elements 15 marks

QUESTION THREE

3ai) Discuss the periodic trend in atomic radii among transition elements. (4 marks

3aii) Distinguish between main group, transition and inner transition elements. (5marks)

3bi) Show with balanced chemical reaction the product formed when any nitrate of Group1A elements are heated. (2 marks)

3bii)Complete the following chemical equations. (4 marks)

i. $2K(s) + O_2(g) \longrightarrow$
ii. $2Na(s) + 2H_2O \longrightarrow$

QUESTION FOUR

Write short note on the following methods of metal purification:

I. Electrolysis
II. Zone refining

15 marks

QUESTION FIVE

5ai) Write on the following:

i. Four reasons why beryllium is different from other members of group IIA.
(6 marks)

ii. Why caesium is a more reducing agent than sodium.(2marks)

5b) Describe formation of coordination compounds by Valence Bond Theory.(7 marks)

QUESTION SIX

6a) Write balanced chemical equations to show how reduction of iron oxide takes place in a blast furnace. (6 marks)

6b) List and explain briefly the steps involved in processing of metals from their ores after extraction/mining. (9 marks)