

**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 SCIENCE**

**NOVEMBER 2018, SECOND SEMESTER EXAMINATION**

**COURSE CODE: CHM 303**

**COURSE TITLE: INORGANIC CHEMISTRY III**

**COURSE UNIT: 3**

**TIME: 2⅟2 HOURS**

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

**QUESTION ONE**

1aWhy do the noble gases have the highest ionization energies compared to other elements in their respective periods?31/2mks

1bi. Discuss the periodic trend in atomic radii among transition elements**.** 41/2mks

1bii. Distinguish between main group, transition and inner transition elements. 8mks

1ci. Coordination compounds are said to be lewis adduct. Explain.21/2 mks

1cii. What is Beneficiation of ores? 2 mks

1ciii. State the methods of beneficiation of ores. 11/2mks

**QUESTION TWO**

2a. Write on the following:

1. Four reasons why beryllium is different from other members of group IIA.
2. Why caesium is a more reducing agent than sodium.

 6 mks

2bi List the group1A elements. 6 mks

**QUESTION THREE**

3a. Using Valence Shell Electron Pair Repulsion Theory (VSEPR), justify the shape of XeF2 compounds. 6 mks

3b Comment on colour of transition metal compounds. 6 mks

**QUESTION FOUR**

4ai.Differentiate between gangue and slag. 3 mks

4aii. Write balanced chemical equations to show how the flux forms the slag in an iron blast furnace. 6 mks

4bi. Why is it necessary to concentrate ores? 2mks

4bii. Why is Carbon a preferred reducing agent in commercial metallurgy? 1 mks

**QUESTION FIVE**

5a. The noble gases are chemically unreactive but chemical reactivity of the noble gases increase as we go down the group from helium to radon. Explain. 4 mks

5b. Outline any four general properties of transition elements. 4 mks

5c. Complete the following chemical equations:

1. 2K(s) + O2(g )
2. 2Na(s) + 2H2O(1)
3. ? NaHCO3(aq) + NaOH(aq)

 4mks

 **QUESTION SIX**

6a. List and explain briefly the steps involved in processing of metals from their ores after extraction/mining.

1. Beneficiation of ores
2. Reduction to metals
3. Purification of metals

 8 mks

6b. Write short note on Borazine. 4 mks