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

FACULTY OF SCIENCE

OCTOBER/ NOVEMBER 2016 EXAMINATION

COURSE CODE: CHM 303
COURSE TITLE: INORGANIC CHEMISTRY III
CREDIT UNIT: 3
Time: 2½ Hours

INSTRUCTION: Answer Any Five Questions

QUESTION ONE

ai) State the principal source of Ne, Ar and Xe and how these elements can be obtained from their source.
(3 marks)

ii. Why do the noble gases have the highest ionization energies compared to other elements in their respective periods? (4 marks)

b) 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. (7 marks)

QUESTION TWO

a) Write an equation representing the reaction between xenon and fluorine at 700k, 6 atm. (5 marks)

bi) What kind of compound is formed between quinol and the noble gases Ar, Kr or Xe at pressure of 10-40 atmospheres? How does Ar, Kr or Xe bind to quinol to form this compound? (5 marks)

ii. State two uses of Helium. (4 marks)

QUESTION THREE

ai) Explain why Group IIIB elements , unlike group I and II are essentially covalent or contain an appreciable amount of covalent character. (5 marks)

ii. What kind of oxides is formed when oxygen reacts with: (4 marks)

-Group I and II metals
-Sulphur and Phosphorus

bi) How do the elements of Group IVA make more than four covalent bonds (carbon excluded). (5 marks)

QUESTION FOUR

a) Explain Valence Shell Electron Pair Repulsion (VSEPR) theory.

b) Describe the shape of XeF_2 using Valence Shell Electron Pair Repulsion (VSEPR) theory.

QUESTION FIVE

a) i. State two characteristics of transition elements. (3 marks)
ii. What is the main source of helium and how is it obtained from this source. (4 marks)

b) Discuss the trend in ionization energy going from the transition series Sc to Zn. (7 marks)

QUESTION SIX

a) i. Expatiate on the term “lanthanide contraction” (6 marks)

ii. Identify the most stable state for lanthanides. (2 marks)

a) Why are the compounds of Sc^{3+}, Ti^{4+} and Zn^{2+} white or colourless. (6 marks)

QUESTION SEVEN

a) i. What is a coordination compound? (3 marks)

ii. Coordination compounds are said to be lewis adduct. Explain. (5 marks)

b) i. What is Beneficiation of ores? (3 marks)

ii. State the methods of beneficiation of ores. (3 marks)