



ELIZADE UNIVERSITY, ILARA – MOKIN, ONDO STATE, NIGERIA
DEPARTMENT: PHYSICAL AND CHEMICAL SCIENCES
FIRST SEMESTER EXAMINATIONS: 2019/2020 ACADEMIC SESSION B
COURSE CODE: CHM 201 COURSE TITLE: INORGANIC CHEMISTRY I

HOD'S SIGNATURE

SECTION A

ATTEMPT TWO QUESTIONS FROM EACH SECTION

1.
 - a. Complete and balance the following equations
[5marks]
 - i. $\text{Fe}_2\text{O}_{3(s)} + \text{CO}_{(g)} \rightarrow$
 - ii. $\text{Zn}_{(s)} + \text{Au}(\text{CN})_2^{-}(aq) \rightarrow$
 - iii. $\text{CaCO}_{3(s)} + \text{heat} \rightarrow$
 - iv. $\text{Na}_2\text{CO}_{3(s)} + \text{H}^{+}(aq) \rightarrow$
 - v. $\text{Be}^{+2}(aq) + \text{OH}^{-}(aq) \rightarrow$
 - b. It has been suggested that hydrogen could be placed in Group 1 or Group 17 of the periodic table. Give arguments for and against each of these positions. [5marks]
 - c. State five economic and social benefits derived from nobles gases [5marks]
2.
 - a. Outline a suitable method of extraction Aluminium which is 90 – 95 percent from Bauxite. State the reason for your choice of method
[8marks]
 - b. What is the origin of the diagonal relationship between Beryllium in group IIA and Aluminium in group III?
[1mark]
 - c. Explain how Argon (${}_{18}\text{Ar}$) reacts with Fluorine (${}_{9}\text{F}$) to form ArF_2 compound.
[6marks]
3.
 - a. Explain why the compounds of Beryllium are covalent, and those of the other group II elements are predominantly ionic.
[3marks]
 - b. Chlorine -36, $t_{1/2}$ 350000years is a convenient radiotracer that emits beta particles. Describe how you would use this radiotracer to carry out the following experiments
[8marks]
 - i. To determine whether Chloroacetic acid[CCl_3COOH] undergoes any ionization of its chlorine atoms to chloride ions in aqueous medium
 - ii. To demonstrate that the equilibrium dissolved BaCl_2 and solid BaCl_2 in a saturated solution is a dynamic process

- c. Potassium - 40 decays to Argon - 40 with a half-life of 1.27×10^9 years. What is the age of a rock in which the mass ratio of ^{40}AR to ^{40}K is 4.2 [4 marks]

SECTION B

QUESTION 1

Discuss the properties of transition elements under the following headings:

- i. Variable oxidation state [3 marks]
- ii. Magnetic properties [3 marks]
- iii. Formation of coloured ions [3 marks]
- iv. Complex formation [3 marks]
- v. Catalyst [3 marks]

QUESTION 2

- a) AgCl is more soluble in water than in KCl solution, discuss. [4 marks]
- b) Explain briefly why Scandium has variable oxidation state and calcium does not. [4 marks]
- c) Briefly discuss the Anomalous Behaviour of Carbon [3 marks]
- d) Discuss the major types of allotropes of carbon [4 marks]

QUESTION 3

- a) What is a ligand? [2 marks]
- b) Distinguish between a bidentate and polydentate ligand [4 marks]
- c) With the aid of chemical equations, describe the reactions of halogens with cold dilute alkali and when heated with concentrated alkali [4 marks]
- d) Briefly explain the molecular orbital theory [5 marks]