



# KIBABII UNIVERSITY

**UNIVERSITY EXAMINATIONS  
2019/2020 ACADEMIC YEAR**

**THIRD YEAR SECOND SEMESTER  
MAIN EXAMINATIONS**

**FOR THE DEGREE OF BED (SCIENCE)**

**COURSE CODE:** SCH321\*/328

**COURSE TITLE:** CO-ORDINATION CHEMISTRY

**DURATION:** 2 HOURS

**DATE:** 8/10/2021

**TIME:** 8:00-10:00AM

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## INSTRUCTIONS TO CANDIDATES

- Answer **QUESTION ONE** (Compulsory) and any other two (2) Questions.
- Indicate **answered questions** on the front cover.
- Start every question on a new page and make sure question's number is written on each page.

This paper consists of 4 printed pages. Please Turn Over



KIBU observes ZERO tolerance to examination cheating

**QUESTION ONE (30 MARKS)**

1 a). Define the following terms as used in coordination chemistry

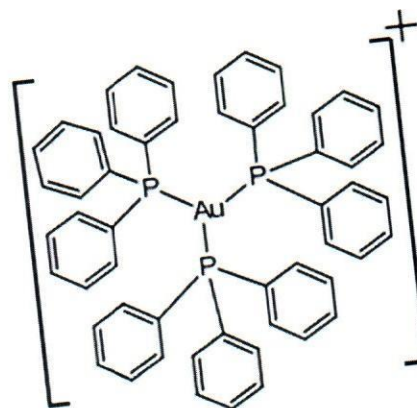
[4 marks]

- i. Chelate
- ii. Ligand.
- iii. Co-ordination sphere
- iv. A complex

[2 marks]

b). Names four complexes used in cancer treatment  
 c). Explain the coordination number, hybridization and shape structure of the compound below

[3 marks]



- d). Giving examples distinguish between homoleptic and heteroleptic complexes
- e). What is EDTA in full and draw its structure
- f). State the various method that are used in synthesizing coordination compounds.
- g). Draw the geometric isomers form  $[PtCl_2(NH_3)_2]$
- h). State three factors that Affect Stability of Metal Complexes
- i). Name the following complexes as used in coordination chemistry

[3 marks]

[3 marks]

[4 marks]

[4marks]

[3 marks]

[4marks]

- i.  $[Ni(CO)_4]$
- ii.  $[Cu(NH_3)_4(H_2O)_2]SO_4$
- iii.  $[Co(NH_3)_6]Cl_2$
- iv.  $K_4[Fe(SCN)_6]$

### QUESTION TWO (20 MARKS)

2 a). Explain steps involved in formation of a complex  $ML_n$ , stepwise and overall stability constants [10 marks]

b) State and explain five types of ligands giving examples for each ligand [10 marks]

### QUESTION THREE (20 MARKS)

3 a). State three examples of biological complexes that found in living organisms [3 marks]

b). Explain the application of coordination compounds in our modern world [10 marks]

c). Differentiate between the following complexes terminologies [7 marks]

i. Thermodynamic stability and kinetic stability

ii. Diamagnetism and paramagnetism

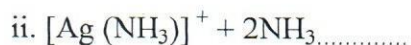
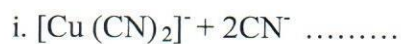
iii. Primary and secondary valences

### QUESTION FOUR (20 MARKS)

4 a). Explain seven types of isomerism possible for coordination compounds, giving example of each [14 marks]

b). State four factors which influence the stability of chelates [4 marks]

c). Give the product of the following reactions [2 marks]



### QUESTION FIVE (20 MARKS)

a. Discuss the following reactions in the in preparation of metal complexes. [4 marks]

i Substitution reaction

ii. Redox reaction

b. State four limitations of valency bond theory [4 marks]

c. Explain two factors affecting the stability of metal complexes [4 marks]

d. Explain properties of the ligand affect the stability of the metal complexes [8 marks]