



KIBABII UNIVERSITY

**UNIVERSITY EXAMINATIONS
2019/2020 ACADEMIC YEAR**

**THIRD YEAR SECOND SEMESTER
SPECIAL/SUPPLEMENTARY EXAMINATIONS
FOR THE DEGREE OF BED (SCIENCE)**

COURSE CODE: SCH 328/321

COURSE TITLE: CO-ORDINATION CHEMISTRY **DURATION:** 2 HOURS

DATE: 20/1/2022

TIME: 2-4PM

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

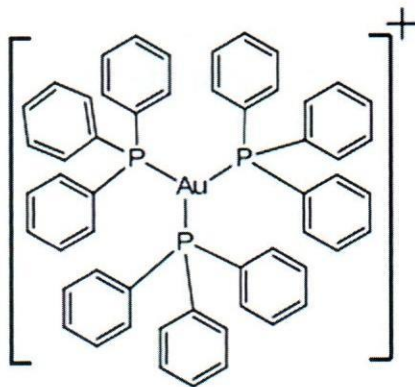
b). Names four complexes used in cancer treatment

[2 marks]

c). Explain the coordination number, hybridization and shape structure of the compound

below

[3 marks]



d). Giving examples distinguish between homoleptic and heteroleptic complexes

[3 marks]

e). What is EDTA in full and draw its structure

[3 marks]

f). State the various method that are used in synthesizing coordination compounds.

[4 marks]

g). Draw the geometric isomers form [PtCl₂(NH₃)₂]

[4marks]

h). State three factors that Affect Stability of Metal Complexes

[3 marks]

i). Name the following complexes as used in coordination chemistry

[4marks]

- i. [Ni(CO)₄]
- ii. [Cu(NH₃)₄(H₂O)₂]SO₄
- iii. [Co(NH₃)₅Cl]Cl₂
- iv. K₄[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]
- Thermodynamic stability and kinetic stability
 - Diamagnetism and paramagnetism
 - 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]
- $[Cu(CN)_2]^- + 2CN^- \dots\dots\dots$
 - $[Ag(NH_3)]^+ + 2NH_3 \dots\dots\dots$

QUESTION FIVE (20 MARKS)

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