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National Open Unversity of Nigeria
Plot 91, Cadastral Zone, Nnamdi Azikiwe Expressway, Jabi - Abuja
Faculty of Sciences
Department of Pure & Applied Sciences
January/February, 2018 Examination Questions

CHM423: Coordination Chemistry
CREDIT UNIT: 3 Units
TIME: 2 ½ HOURS
INSTRUCTION: ANSWER QUESTION ONE & ANY OTHER FOUR QUESTIONS.

Question 1

a) Define Coordination compound? Give an example. (3 marks)

b) Considering the following complexes;
i. [Ni(Co)], ii. $[Fe(CN)_6]^{3-}$, iii. $[Ag(NH_3)_2]^+$ indicate the coordination number and valency of each metal. (3 marks)

c) Mention four Alfred Werner's findings to coordination chemistry. (4 marks)

d) (i) Explain briefly the term '' ligand'' (3 marks)
(ii) differentiate between ambidentate and polydentate ligand. (5 marks)

e) Give classification of these ligands according to their groups:
i. Water, ii.ethylenediamine, iii.diethylenediamine and iv. No_2^- (4 marks)

Question 2

a) What is coordination number? (3 marks)

b) give the coordination number of the followings ;i. $[AuCl(PPh_3)_2]$, ii. $[NiCl4^{2-}]$, iii. $[Cu(H_20)_6]^{2+}$, iv. $[Fe(CN)\ 6]^{3-}$. (4 marks)

c) Define isomerism based on coordination chemistry. (2 marks)
(ii). what are the six classes of structural isomerism. (3 marks)

Question 3

5A. What is nephelauxelic effect. (2 marks)

B. Give the differences between a complexed metal ion and an uncomplexed metal ion according to nephelauxelic effect. (4 marks)

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C. Metal ions and their complexes display colourful appearances, discuss? (4 marks)

Question 4

A. Define thermodynamic stability of a complex. (2 marks)

B. Given a metal atom M and a monodentate neutral ligand L.

(i) Write equations for the stepwise formation of complexes ML_1, ML_2, ML_3 and ML_4 (4 marks)

(II) Write expressions for the equilibrium constants $K_1 – K_4$.
for the stepwise formation of complexes

(4 marks)

C. Why do the k values decrease in the order $k_1 > k_2 > k_3 > k_4$? (2 marks)

Question 5

A. what is chelate effect? (2 marks)

B. Mention 3 factors that could account for the stability of a complex. (3 marks)

D. Describe three techniques used in studying reaction kinetics of complex. (7 marks)

Question 6

A. Differentiate between real time analysis and the quenching method. (5 marks)

B. Give four ways of achieving quenching method. (4 marks)

C. Discuss three factors that can influence the rate of a complex reaction. (3 marks)