




المستوى الثالث  
كيمياء / علم الحيوان



	TANTA UNIVERSITY FACULTY OF SCIENCE DEPARTMENT OF CHEMISTRY			
	FINAL EXAMINATION FOR ALL DOUBLE MAJOR THIRD LEVEL STUDENTS			
COURSE TITLE:	(Coordination Chemistry)		COURSE CODE: CH3246	
DATE:	1, JUNE 2017	TERM: SECOND	TOTAL ASSESSMENT MARKS 50	TIME ALLOWED: 2 HOURS

**Answer the following Questions:**

1-) For each complex define the following: (Total marks 20)

1- Name

2- The type of isomerism

3- The type of hybridization

4- Calculate the magnetic moment

I-)  $[\text{Mn}(\text{H}_2\text{O})_6]\text{Cl}_2$

(5marks)

II-)  $\text{K}_2[\text{Zn}(\text{CN})_4]$

(5marks)

III-)  $\text{K}_2[\text{Ni}(\text{NO}_2)_4]$

(5marks)

IV-)  $\text{Na}_3[\text{CoCl}_6]$

(5marks)

2-) A-) Iron ion forms an inner diamagnetic complex ion containing the cyano ligand. Derive the formulae of the complex. (4marks)

B-) Discuss the effect of central metal ion and its charge on  $\Delta_0$  value. (4marks)

C-) Manganese (II) ion forms inner complex ion with cyano ligands. Calculate the magnetic moment value of the complex. (4marks)

D-) Discuss the hydration isomerism with example. (3marks) (Total marks 15)

3-) A-) Write full account on Jahn-Teller effect with examples (5marks)

B-) What is the formula of the following complex: (2marks)

Tetrammine copper (II) hexachloro copperate (II)

C-) For the two complexes: 1-) Hexammine cobalt(III) chloride (8marks)

2-) Potassium hexacyano ferrate (II)

a-) Draw the d-orbital splitting indicate the number of electrons in  $t_{2g}$  and  $e_g$

b-) Calculate the CFSE value and magnetic moment for each complex. (Total marks 15)

Note : (Atomic number for Mn 25, Fe 26, Co 27, Ni 28, Cu 29 & Zn 30)


**Good Luck**

**Examiners:** Prof. Dr : Kamal Elbaradie, Prof. Dr: Ekhlal Abd Elhay



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	TANTA UNIVERSITY FACULTY OF SCIENCE DEPARTMENT OF CHEMISTRY			
	Final Examination of for third year students (Double major)			
COURSE TITLE	Organic Spectroscopy		COURSE CODE: CH3248	
DATE: JUN. 2017	TERM: SECOND	TOTAL ASSESSMENT MARKS: 100	TIME ALLOWED: 2 HOURS	

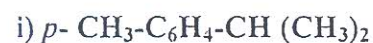
Answer the following questions: (100 marks) (Each question 20 marks)

1] a) Discuss the chemical shift of hydrogen attached directly to a  $\Pi$ -bonded carbon and give the relative order of downfield shift of:

Acetylenic, vinylic, aldehydic and aryl hydrogen compared to alkyl hydrogens.

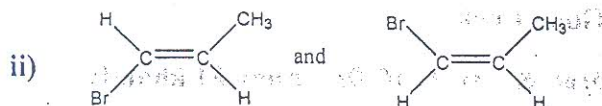
b) Is the  $\delta$  value of a given kind of hydrogen proton a constant value? Find the  $\delta$  value and the observed shift from TMS in HZ of a signal in a 100-MHZ instrument? That is 162 HZ in a 60-MHZ instrument.

2] a) Draw the  $^1\text{H}$ NMR spectra with multiplicity, peak accounting and showing relative chemical shifts for the following structures:



b) Use  $^1\text{H}$ NMR spectroscopy to distinguish between the following geometric isomers:

i) Cis-stilbene and trans-stilbene.



3] a) 4-Heptanone shows two important characteristic peaks in its mass spectrum due to ions at  $m/e = 86$  and  $m/e = 58$ . Explain the fragmentation pattern of the compound.

b) How do you explain that  $m/e = 57$  and  $m/e = 44$  ions is formed in the mass spectrum of pentanal.

c) Give the typical fragmentation pattern in  $n$ -propyl benzene.

4] Explain the following by using the mentioned spectroscopic methods:

a)  $o$ -Nitroacetanilide is deep yellow but the  $p$ -nitroacetanilide is yellow (UV & IR).

b) The ketonic and enolic forms of ethyl benzoyl acetate (UV, IR and  $^1\text{H}$ NMR).

