




المستوى الثالث
كيمياء / علم حشرات

	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 Δ_o 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

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 Π -bonded carbon and give the relative order of downfield shift of:

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

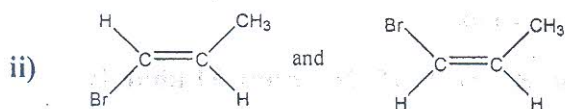
b) Is the δ value of a given kind of hydrogen proton a constant value? Find the δ value and the observed shift from TMS in HZ of a signal in a 100-MHZ instrument? That is 162 HZ in a 60-MHZ instrument.

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



b) Use ^1H 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 ^1H NMR).

c) Benzamide and acetamide (IR & ^1H NMR).

d) How will you distinguish between benzaldehyde and cinnamaldehyde (UV, IR and ^1H NMR).

e) The effect of solvent on the absorption spectro of propanal and propanone (UV & IR).

f) How could you distinguish between the following compounds ; propanoic acid, propanoic unhydride and propanamide.

5] An organic compound with molecular formula $\text{C}_4\text{H}_8\text{O}$, having the following spectroscopic data:

UV: λ_{max} 276(nm), ϵ 43 (n-hexane)

λ_{max} 242(nm), ϵ 37 (ethyl alcohol)

IR: ν in cm^{-1} 1715 (s) and 2988(m) (solid phase).

^1H NMR: τ (tau) values in CDCl_3 and TMS as standard reference 7.52 (q), 7.88(s), 8.93(t), in the ratio 3:3:2 ($J=7.1$ HZ).

Mass data: $M^+ = 72$ (61 %); $m/e = 57$ (100%) ; $m/e = 29$ (41%) and a broad peak at $m/e = 14.75$ (2.1%).

Find out the structure of the above compound, and explain all the given spectroscopic data.

Good Luck

Prof. Dr. Mohamed A. El- Borai & Ass. Prof. Dr. Sahar El-khalafy



Chemistry Department
Faculty of Science
Tanta University

Final Examination
For 3rd grade students
(Double Major Students)
May 2017, Spring semester

Course title:
Natural Products
Course Code: CH3250
Exam time: 2 hours
Assessment Mark: 100 M

Answer ALL the following questions

Q1. Discuss briefly the following. (Total 28 marks, each point 7 marks)

- 1- Properties and uses of Ephedrine.
- 2- One synthetic method of Piperine. (use chemical equations ONLY to describe your answer)
- 3- Synthesis of Caffeine from Urea. (use chemical equations ONLY to describe your answer)
- 4- Synthesis of Cocaine. (use chemical equations ONLY to describe your answer)

Q2. Write shortly about the following. (Total 28 marks, each point 7 marks)

- 1- Clinical significance, antioxidant activity, and synthesis of Vitamin E.
- 2- Synthesis of both Vitamin K₁ and Vitamin K₃ (use chemical equations ONLY to describe your answer).
- 3- The different chemical structures and the synthesis of Vitamin B₆.
- 4- Synthesis of Vitamin C (Ascorbic acid).

Q3. Answer the following points. (Total 24 marks)

a- Mark the following statements as True or False, correcting the false statement.

(10 marks, each point 2 marks)

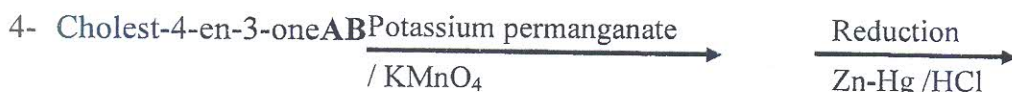
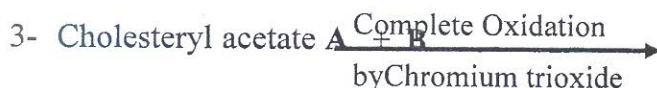
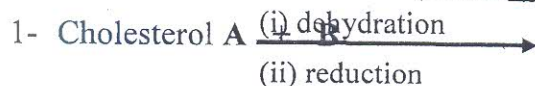
- 1- Myrcene is cyclic monoterpenoid with three conjugated double bonds, forming an adduct.
- 2- Formaldehyde, acetone, and ketodialdehyde are the products of ozonolysis of α -Terpineol.
- 3- Hydration of Geraniol in the presence of sulphuric acid give Citral.
- 4- Geraniol is an optically active cyclic monoterpenoidalcohol.
- 5- The reduction of Citral in the presence of sodium ethoxide give Geraniol.

b- Convert the following by using chemical equations. (14 marks, each point 7 marks)

- 1- Pentane 1,3,5-tricarboxylic acid to Limonene
- 2- P-Toluic acid to α -Terpineol.

Q4. Complete the following equations by chemical structures, naming your answer.

(Total 20 marks, each point 5 marks)



----- انتهت الأسئلة -----

Good Luck

Examiners: Prof. Dr. Mohamed Reda Berber, Prof. Dr. Yehia Hafez

4. Doppler broadening occurs in solid state, and decreases with temperature. ()
5. The absorption spectra of iodine in gaseous state give broad bands ()
6. Sample cells and solvents are of less problems in Raman than IR spectrometer. ()

(II) Question 4: complete each of the following:

- Generally, the intensity of the spectral line is governed by, however, the energy of transition is indicated by
- The spectral band broadening is due to.....
- The selection rules that must be satisfied in order to that an electronic transitions could be observed in UV-Vis absorption spectra are.....
- The vibrational frequency of; C=N, C=C, C=O and C=S bonds decreases following the order....., and the force constant of; C-N, C=N and C≡N bonds increases in the order.....

(III) Question 5: Solve the following problem; (3 Marks)

(III)

$^1\text{H}^{35}\text{Cl}$ shows a strong absorption of infrared radiation at 2991 cm^{-1} . By what factor do you expect this frequency to be shifted if deuterium is substituted for hydrogen in this molecule? The force constant is unaffected by this substitution.

Good Luck

Examiners	<i>Prof. Tarek A. Fayed</i> <i>Dr. Marwa N. El-Nahass</i>
------------------	--