




المستوى الثالث

كيمياء حيوى

	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)

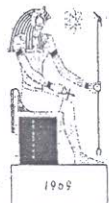
a-) Draw the d-orbital splitting indicate the number of electrons in t_{2g} and e_g

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: Ekhlas Abd Elhay



TANTA UNIVERSITY
FACULTY OF SCIENCE
DEPARTMENT OF CHEMISTRY

EXAMINATION FOR JUNIOR (THIRD YEAR) STUDENTS OF CHEMISTRY/BIOCHEMISTRY AND SPECIAL
BIOCHEMISTRY

COURSE TITLE:	HORMONES	COURSE CODE: BC3206	
DATE: 08.06.2017	TERM: SECOND	TOTAL ASSESSMENT MARKS: 100	TIME ALLOWED: 2 HOURS

Answer all the following questions (questions are on two pages)

- I. **Give an account of the following :** (20 marks)
1. Functions of calcium in body.
 2. Vasopressin secretion disorders.
 3. Control of GH secretion.
 4. The mechanism of steroid hormones.
- II. **Compare between each of the following:** (20 marks)
1. Hydrophilic and hydrophobic hormones.
 2. Paracrine and Endocrine cell signaling
 3. Goiters and Hashimoto's diseases
 4. Direct and indirect effect of growth hormone
- III. **A. Indicate whether each of the following sentences is true (T) or false (F) and comment on your results:** (10 marks)
1. The primary effect of mineralocorticoids is decreased blood sodium levels ().
 2. The primary stimulus for the release of cortisol is increased blood glucose levels ().
 3. As cortisol secretion increases, protein anabolism will decrease ().
 4. The hormone epinephrine causes the kidney to conserve sodium and excrete potassium ions and indirectly helps to maintain systemic blood pressure ().
 5. An increase in blood glucose and an anti-inflammatory effect are important actions of aldosterone ().
 6. Levels of ACTH are high in Addison's disease because levels of glucocorticoids are high ().
 7. A "moon face," and heavy fat deposition over the scapula, "buffalo hump" suggests that a person has chronically high levels of cortisol ().
 8. Low blood glucose levels cause an increased secretion of insulin ().
 9. Insulin triggers the breakdown of glucose in skeletal muscles for use in producing ATP ().
 10. The cause of type I diabetes mellitus seems to be that the receptors on the target cells become no longer responsive to insulin ().
- B. A 48 year-old male had an unremarkable medical history until 6 months prior to admission when he was found to have hypertension that has been difficult to control with variety of antihypertensive medications. In addition, he presents with persistent headaches, excessive sweating, and palpitations (noticeably rapid, strong, or irregular heartbeats). In addition, he presents with paleness that is obvious on the face. A 24 hour urine collection showed vanillylmandelic acid (VMA), 9.8 mg (normal ≤ 6 mg), metanephrine, 169 μg (normal 45-290 μg), normetanephrine, 2807 μg (normal 85-500 μg), epinephrine, 14 μg (normal 2-24 μg), and norepinephrine, 784 μg (normal 15-100 μg). A CT scan and a MRI of the abdomen revealed a 4 cm mass in the region of the left adrenal gland. A fine needle biopsy of the mass showed

adrenal medullary tissue staining focally positive for chromogranin A (CgA), a protein released from neuroendocrine cells.

Based on the given data, answer the following questions: (10 marks)

1. What is this patient's most likely diagnosis?
2. How do you explain the observed symptoms (excessive sweating, palpitations, and paleness) from which the patient complains?
3. Knowing that the patient is irresponsive to various antihypertensive medications, what do you think is the definitive treatment?

IV. A. Complete each of the following sentences: (20 marks)

1. The endocrine system is an information signal system like the _____.
2. Exocrine hormones (or ectohormones) are secreted directly into a _____.
3. _____ and _____ are secreted by Neurohypophysis.
4. Thyroid gland manufactures the hormones that help control _____ and _____.
5. Production of melatonin by the pineal gland is inhibited by _____ and permitted by _____.
6. The AQP-1 are present especially in _____ and _____.
7. The _____ is formed from neuroectodermal cells derived from neural crest cells, and the adrenal cortex is derived from _____.
8. The major free circulating adrenocorticosteroid hormone in human is _____.
9. After menopause, all female estrogens come from the conversion of _____.
10. _____ defends mineralocorticoid specificity by converting cortisol to _____ thus rendering it incapable of binding to the mineralocorticoid receptor.
11. For catecholamine biosynthesis the rate limiting enzyme is _____.
12. Epinephrine acts on _____ receptors with the subsequent inhibition of insulin release while it acts on _____ receptors with the stimulation of its release.
13. Elevated levels of glucose, especially in obese persons, may be due to _____.
14. Insulin and IGF-I signal via _____ pathway.
15. The main mechanism of _____ is inhibition of hepatic gluconeogenesis.
16. The short-acting insulin secretagogues are faster acting than sulfonylureas. They may be especially effective for _____.

B. Indicate how: (Answer FOUR only) (20 marks)

1. Angiotensin II increases blood pressure?
2. The circadian clock regulates the daily rhythms of glucocorticoid release?
3. Catecholamines are metabolized?
4. The endocrine system responds to stress?
5. Diabetes mellitus (DM) is diagnosed?
6. Insulin and glucagon work to regulate blood sugar levels?

GOOD LUCK

EXAMINERS

**Prof. Dr/ Ehab M. Ali
Dr/ Mai El-keiy
Dr/ Rasha H. Abu-Khudir**



**TANTA UNIVERSITY
FACULTY OF SCIENCE
DEPARTMENT OF MATHEMATICS**

EXAMINATION FOR JUNIORS (THIRD YEAR) STUDENTS OF ZOOLOGY, BIO-CHEMISTRY

COURSE TITLE:	BIOSTATISTICS	COURSE CODE:ST3202
DATE:20	JUNE, 2017	TERM: SECOND
TOTAL ASSESSMENT MARKS: 50		TIME ALLOWED: 2 HOURS

Answer the Following Questions:

Total Mark: 50

Q1: To test the lifetime of batteries, 12 toy drummers are fitted with new batteries of one of three types: Ever ready, Endurance, Energizer. The length of time (in hours) that the drummers continue to drum are summarized on the table below

Ever ready	4.7	5.1	5.2		
Endurance	8.4	5.1	5.4	5.4	
Energizer	5.1	5.2	5.2	5.4	5.6

Determine whether there is significant difference between the mean lifetimes of the three types of batteries at $\alpha = 0.05$. **(15 Mark)**

Q2: Some leaves of a certain tree are collected to extract a drug from them. A study is done to determine if there is a correlation between the height of the leaves and the concentration of the drug.

Height (X)	2	4	7	5	3	5	6	4	7	3
Concentration(Y)	3	5	9	7	4	6	7	6	8	5

(i) Calculate Pearson correlation coefficient (r). (ii) Find the regression line $y = a + bx$.
 (iii) Test at $\alpha = 0.05$, is there a significant positive correlation between the height and the concentration? **(12 Mark)**

Q3: The following paired observations show the chemical results employed in 5 samples which carried out by a senior and junior analyst in a laboratory **(11 Mark)**

Senior	30	22	25	19	26
Junior	26	19	20	15	19

At $\alpha = 0.05$, is there a difference in the mean of the senior and the junior results?.

Q4: A quality control manager of a company that operate 4-shifts want to test is there a dependency between the quality of the production (accept or not accept) and which the shift is produced? The data collected is as follows. Test at $\alpha = 0.01$, is there a dependency them? **(12 Mark)**

	Shift 1	Shift 2	Shift 3	Shift 4
Acceptable	10	10	15	5
Not acceptable	15	5	5	35

You May Use: $F_{(0.05,2,9)} = 4.26$, $F_{(0.05,2,11)} = 3.98$, $\chi^2_{(0.01,8)} = 20.09$, $\chi^2_{(0.01,3)} = 11.34$,

$t_{(0.05,8)} = 1.86$, $t_{(0.05,9)} = 1.833$, $t_{(0.05,4)} = 2.132$, $t_{(0.025,4)} = 2.776$

With all my Best Wishes

EXAMINERS	PROF.DR. MEDHAT EL DEMSEY	DR. WAFAA ANWAR ABD EL-LATIF
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STATE OF NEW YORK
IN SENATE
January 12, 1910.

REPORT OF THE
COMMISSIONERS OF THE LAND OFFICE
IN ANSWER TO A RESOLUTION PASSED BY THE SENATE
MAY 11, 1909.

ALBANY: J. B. WOODWARD, STATE PRINTER, 1910.


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	TANTA UNIVERSITY FACULTY OF SCIENCE DEPARTMENT OF CHEMISTRY INORGANIC CHEMISTRY		
	COURSE TITLE:	Coordination Chemistry	COURSE CODE: CH 3210
DATE:	4 JUN , 2017	TOTAL ASSESSMENT MARKS: 150	TIME ALLOWED: 2 HOURS

Answer the following Questions

- I) a-Pt(IV) ion form an ionic octahedral complex (A) containing $5\text{H}_2\text{O}$ molecules, bromide and sulphate ions. This complex reacts with BaCl_2 and give complex (B) and white precipitate.

What are the formulae of complexes A and B (10 MARKS)

b- Draw the splitting of d^5 and d^7 of octahedral complex (10 MARKS)

c- For complex $\text{K}_3[\text{Mn}(\text{CN})_6]$, $\mu = 2.82 \text{ BM}$. Define the type of complex (Mn 25). (10 MARKS)

- II) a- Define the ambidentate ligands (6 MARKS)

b- What are the formula of the following complexes: (9 MARKS)

1- μ - hydroxo-bis {penta-amine nickel(II) } bromide.

2- Tetra amine copper(II) hexa-chloro copperate(III).

3- Dinitro Tetra amine manganese (III) ion

c- Nickel ion forms diamagnetic complex ion with cyano ligands (Ni 28)

Derive the formula and the geometry of the complex. (15 MARKS)

- III) For Fe^{2+} the electron pairing energy (P) is 210 KJ/mol. The values of Δ_0 for the complexes $[\text{Fe}(\text{H}_2\text{O})_6]\text{Cl}_2$ and $\text{K}_4[\text{Fe}(\text{CN})_6]$ are 120 and 390 KJ/mol., respectively.

i-What is the name of each complex? (4 MARKS)

ii- Calculate the CFSE for the outer complex (Fe=26). (13 MARKS)

iii- Calculate the magnetic moment value for the inner complex. (13 MARKS)

- IV) For the complex Di Nitrito tetra aqua iron(III) sulphate

1- What are: a) Formula b) Isomers c) types of Isomerism (25 Degree)

2- Calculate the EAN (Fe 26) (5 MARKS)

- V) Discuss the following:


a- The important uses of CFSE values. (15 MARKS)

b- The factors affecting the value of Δ_0 . Give examples. (15 MARKS)

Examiners

Prof. Dr. Mohamed Gaber Abu-Elazm

Prof. Dr. Kamal El-Baradie

	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.

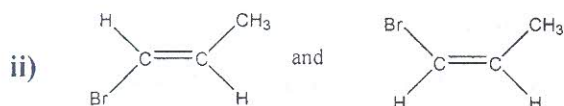
b) Is the δ value of a given kind of hydrogen proton a constant value? Find the δ value and the observed shift from TMS in HZ of a signal in a 100-MHZ instrument? That is 162 HZ in a 60-MHZ instrument.

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

- i) p - $\text{CH}_3\text{-C}_6\text{H}_4\text{-CH(CH}_3)_2$ ii) $\text{C}_6\text{H}_5\text{-O-CH}_2\text{-CH}_2\text{Cl}$
 iii) o - $\text{CH}_3\text{-O-C}_6\text{H}_4\text{-COOH}$ iv) $\text{CH}\equiv\text{C-CH}_2\text{-O-CH}_3$

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

	TANTA UNIVERSITY, FACULTY OF SCIENCE, DEPARTMENT OF CHEMISTRY		
	FINAL EXAM FOR THIRD YEAR SPECIAL CHEMISTRY STUDENTS		
COURSE TITLE:	SOLID STATE CHEMISTRY	COURSE CODE: CH 3208	
DATE: 28-5-2017	TERM: SECOND	TOTAL ASSESSMENT MARKS: 50	TIME: 2 HOURS

Answer the following questions:

Question 1 (8 marks)

The room temperature polymorph of iron exists in the bcc unit cell. Given its density as 7.86 g/cm^3 , then calculate the radius (r) of an iron atom in this crystal. The atomic mass of iron is 56 g/mol and Avogadro's number $N = 6.02 \times 10^{23} \text{ mol}^{-1}$. [Hint for bcc, $(4r)^2 = 3a^2$].

Above 910°C , iron exists in fcc unit cell. Using the above data, calculate also the density of this high temperature form. Answer also the following questions:

- Give the names of the bcc and fcc forms.
- Which form has the higher density?
- Write the balanced chemical equation for Haber reaction in which Fe is used as a catalyst.
- Which plane of iron has the highest catalytic action. Using a cubic unit cell, draw this plane.

Question 2 (8 marks)

Using tables, compare each pair of the following terms:

- Amorphous and crystalline materials.
- Intrinsic and extrinsic semiconductors.
- Martensitic and non-martensitic phase transformation.
- Hygroscopic and deliquescent materials

Question 3 (16 marks; 2 marks per point)

Draw and carefully label each of the following:

- The phase diagram of the cationic surfactant cetyl- trimethylammonium bromide (CTAB) in water showing the hexagonal, cubic and lamellar liquid crystal phases.
- The chemical structure of montmorillonite clay
- Reactivity of different polymorphs of cinnamic acid.
- Energy bands, electronic and chemical processes occurring in TiO_2 nanoparticles upon use as photo-catalysts in the mineralization of industrial waste water.
- The effect of light on different crystal forms of trans - cinnamic acid crystals illustrating the topochemical postulate.
- Energy diagram of photovoltaic solar cells based on p-n junction.
- Energy diagram of semiconductor laser and light emitting diodes (LED) based on p-n junction.
- Different types of liquid crystals.

See back page أنظر خلف الصفحة

Question 4 (6 marks; 2 marks per point)

Discuss briefly each of the following (3 marks each):

- (a) Application of nanomaterials in DNA sequencing study
- (b) Application of polymerized crystalline colloidal arrays (PCCA) in medical sensing of sugar and biomarkers.
- (d) Point defects: their types, effect on stress-strain curves and explanation of color centers.

Question 5 (6 marks; 1 mark per point)

In not more than two lines, define each of the following terms (4 marks):

- (a) A plasmon
- (b) Fermi level
- (c) An exciton
- (d) Quantum dots (QDs)
- (e) The fracking process in shale oil extraction
- (f) Exciton Bohr radius a_{ex} .

Question 6 (6 marks; 1 mark per point)

In not more than two lines, give reason for each of the following (5 marks):

- (a) In lyophilization, dilute solutions are usually applied
- (b) Non- fluorescent ZnS becomes fluorescent upon heating
- (c) In zone refining, the middle part of the tube is the purist part
- (d) Swelling occurs in clays but not in zeolites
- (e) Quantum dots are not common in organic compounds
- (f) A polycrystalline Cd sample is harder than Cd single crystal

End of Exam

Examiners: Prof. Dr. El-Zeiny Mousa Ebeid and Dr. Wael Amer



Tanta University Faculty of Science Department of Chemistry			
Final exam. for Juniors students of doubled branches			
Course title:	Molecular Photochemistry		Course Code: CH3244
Date:	May 30, 2017	Term: second	Total assessment Marks: 50
			Time allowed: 2 H

Answer the following questions

- 1) Differentiate between each of the following: (16 marks)
- El-Sayed's rule and Kasha's rule
 - E- and P- types of delayed fluorescence
 - 1,2 addition and 1,2-1,4 addition of photodimerization of olefinic compounds.
 - Radiative natural and observed fluorescence lifetimes.
- 2) Draw each of the following: (12 marks)
- Triplet-triplet mechanism of energy transfer action according to the Dexter mechanism.
 - Possible transitions causing energy transfer processes in Biacety, Pyrene and Naphtalene system.
 - Singlet-singlet mechanism of energy transfer action according to Förster mechanism.
 - Jablonski Diagram for electronic transitions between ground and excited states.
- 3) Write down the following statements. Show whether each of the following statements is true or false, if false, please, write down the true. (14 marks)
- The energy gap value, $\Delta E(T_1 \sim S_0)$ is a factor which determines the relative magnitudes of k_f and k_{isc} ($S_1 \sim T_1$).
 - Each decay process represented by k_f , k_{ic} , k_r and k_{et} is bimolecular rate constant.
 - Promotion of an electron to an antibonding molecular orbital upon excitation takes about ($10^{-10} - 10^{-12}$ s), which is very quick compared to the characteristic time for molecular vibrations (10^{-15} s).
 - The rate of fluorescence can be enhanced relative to the other processes by using heavy atoms.
 - Excimers are dimers in the excited state. They are formed by collision between two excited molecules.
 - Intersystem crossing (ISC) is an iso-energetic radiationless transition between two electronic states of same multiplicity.
 - In Jablonski diagram, the triplet state($\uparrow\downarrow$) is always of lower energy than the energy of the corresponding singlet state($\uparrow\uparrow$).
- 4) Give short notes on the following: (8 marks)
- Quantum yield of fluorescence and of phosphorescence, Φ_f , Φ_p .
 - Wigner spin conservation rule.

Good Luck

The examiners : 1. Prof. Dr. Samy el-Dally
2. Prof. Dr. Shakir T. Abdel-Halim



Tanta University Faculty of Science Department of Chemistry			
Final exam. for Juniors students of doubled branches			
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 - Wigner spin conservation rule.

Good Luck

The examiners : 1. Prof. Dr. Samy el-Dally
2. Prof. Dr. Shakir T. Abdel-Halim

