

قسم الكيمياء



الأختبار في صفحتين

Section (A): Physical Chemistry (100 marks)

Answer **ONLY FOUR** questions:

1- Define the following: (25 marks)

Molarity - Molality- Normality- Osmotic pressure - Osmosis- The three acid base concepts (definitions) - Molecularity- Partition (Distribution) coefficient.

2-(a) Discuss the effect of (Pressure- Catalyst and Temperature) on the following Reaction: (15 marks)



(b) Draw and discuss the phase diagram of the H₂O system (10 marks)

3- (a) Draw the curves of partially miscible liquids and define the critical temperatures for each one. (13 marks)

(b) Discuss the factors affecting the adsorption of gases on solids, write the Freundlich equation of adsorption. (12 marks)

4- (a) Derive the relation between K_p and K_c. (10 marks)

(b) Discuss the properties of ideal and non- ideal solutions of two miscible liquids. Draw the vapor pressure curves of each case. (15 marks)

5- (a) Discuss the effect of addition of sodium chloride and sodium acetate on the ionization of acetic acid. (12 marks)

(b) Derive the rate equation for the following first order reaction and calculate the half- life time. (13 marks)



أنظر الصفحة الخلفية

Section (B): Organic Chemistry

(50 Marks)

Answer the following questions :

1) Explain using electronic factors only:

The basic strength of aliphatic amines is more than that of aromatic amines? **(12 Marks)**

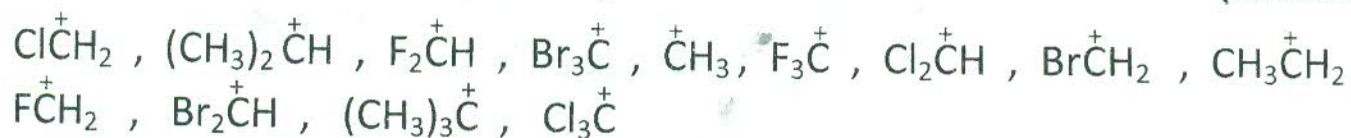
2) Write the mechanism of the halogenation of methane. **(10 Marks)**

3) Explain with examples **ONE** only of the following: **(15 Marks)**

a) Effect of steric hindrance on mesomeric effect.

b) Electrophilic addition mechanism (Markovnikov and anti-Markovnikov).


4) Show how can use inductive effect to arrange the following according to increasing stability. (Number 1 is the most stable) **(13 Marks)**



Good Luck

Prof.Dr.El-S. Ali, Prof.Dr.M. Shaaban, Prof Dr.S. Attya, Dr. A. Morsi and Dr. Atlam

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 <p>Chemistry Department Faculty of Science Tanta University</p>	Final Examination for 3rd grade students (Double Major, Special students)	June 2016, 2 nd term
		Course Code: CH3250
		Exam time: 2 hours
		Assessment Mark: 100 M

Q1: Answer the following parts (A, B, and C). (25 mark)

A- Choose one ONLY.

- Which of the following statements regarding Ergosterol chemical structure are correct?
Please select all that apply.
 - Ergosterol has three double bonds.
 - Ergosterol has a hydroxyl group, which is a secondary alcoholic one.
 - Ergosterol consumes one mole of hydrogen to obtain a saturated compound.
 - Ergosterol upon oxidation gives a ketone rather than an aldehyde.
 - All the above information.
- Which of the following statements regarding Estrone chemical structure are correct?
Please select all that apply.
 - Estrone behaves as a ketone and contains one hydroxyl group.
 - Estrone is a steroid based compounds.
 - Estrone has three double bonds located in one ring.
 - Estrone is a male sex hormone.
 - All the above information.

**B- Starting from Cholestanone, how can you get Allocholanolic acid.
Use chemical equations to describe your answer.**

**C- Starting from Coprostanol, how can you get Cholanic acid.
Use chemical equations to describe your answer.**

Q2: Answer five ONLY of the following, giving the structure of compounds A, B, C, and D in each case (25 mark)

- Myrcene $\xrightarrow{O_3}$ (A) + (B) + (C)
- Cholesterol $\xrightarrow{CuO/heat}$ (A) $\xrightarrow{[O]/KMnO_4}$ (B) $\xrightarrow{Zn(Hg)/HCl}$ (C) $\xrightarrow{degradation}$ (D)
- Ergosterol $\xrightarrow{Catalytic\ hydrogenation}$ (A) $\xrightarrow{Acetylation}$ (B) $\xrightarrow{[O]/CrO_3}$ (C)
- 5 α -Cholestanyl acetate $\xrightarrow{[O]/CrO_3}$ (A) $\xrightarrow{Barbier-Wieland\ degradation}$ (B)
- Citral $\xrightarrow{OH^-/aq. K_2CO_3}$ (A) + (B)
- Geranic ester $\xrightarrow{Ac_2O/H_2O}$ (A) $\xrightarrow{Ca\ salt/(HCOO)_2Ca/heat}$ (B)

----- بقية الأسئلة بالوجه الاخر للصفحة -----

Examiners: Prof. Dr. Ahmed Safaan, Dr. Yehia Hafez, Dr. Mohamed Reda

Q3: Convert three ONLY of the following (Use chemical equations to describe your answer). (25 mark)

- a- 2,3,5-trimethyl quinol to (α)-Tocpherol.
- b- Ribose tetraacetate to Riboflavin.
- c- 1,3-dimethyl urea to caffeine.
- d- Pentane 1,3,5-tricarboxylic acid to Limonene
- e- Dehydroepiandrosterone to Testosterone

Q4: Answer the following parts (A, and B). (25 mark)

A- Complete the following statements with one of the terms listed below.

- 1-is a terpenoid compound with a tertiary alcoholic group.
- 2-is cyclic terpenoid hydrocarbon compound with a M.F. of $C_{10}H_{16}$.
- 3-is a terpenoids compound, forms an adduct with maleic anhydride.
- 4-is a terpenoid compound with a primary alcoholic group.

(Myrcene – Geraniol - Limonene - α -Terpineol - Citral – Carvone)

B- Answer three ONLY of the following (Use chemical equations to describe your answer).

- 1- Staring from P-Toluic acid, how can you get α -Terpineol.
- 2- Staring from α -Terpineol, how can you get Terpenylic acid.
- 3- Staring from Limonene, how can you get Carvone.
- 4- Staring from methyl Ecgonine, how can you get Cocaine.

انتهت الأسئلة

Good Luck

مركز بحوث
العلوم

Tanta University
Faculty of Science
Chemistry Department

Final Exam of Organometallic Chemistry CH3212

For 3rd level students

Section: Chemistry

June 2016

Time allowed : 2 Hours

Answer Five questions only:

- 1) a. Explain Why instability of Sigma bonded alkyls and aryls of the transition metals.
b. Give a catalytic cycle for $\text{HCo}(\text{CO})_3$ Catalyzed isomerization of allyl alcohol to propanaldehyde.
c. Outline the main steps by which Ziegler- Natta polymerization proceed.
- 2) a. Discuss the following
Fisher carbene complexes, Mercuration and oxomercuration.
b. Explain Why Triisopropyl Al is monomeric while dimethyl phenyl Al is dimeric.
c. Explain How $\text{RhCl}(\text{PPh}_3)_3$ serves as a catalyst for the olefin hydrogenation.
- 3) a. Give a catalytic cycle for the synthesis of substituted alkene using $\text{Pd}(\text{PPh}_3)_4$ as a catalyst.
b. Discuss the applications of organo Mg compounds to organic chemistry.
c. Explain How $\text{Fe}(\text{CO})_5$ serves as a catalyst for water gas shift reaction.

- 4) a. Explain Why $\text{Ti}(\text{CH}_3)_4$ is thermally unstable while $\text{Ti}(\text{CH}_3)_4(\text{bpy})$ is thermally stable.
- b. Explain How $\text{IrCl}(\text{CO})(\text{PPh}_3)_2$ serves as a catalyst for the hydrosilylation of alkenes.
- c. Discuss the applications of organo Rh compounds to organic chemistry.
- 5) a. Show that $\text{CH}_3\text{Mn}(\text{CO})_5$ and $\text{Fe}_2(\text{CO})_9$ obey the eighteen electrons rule ($\text{Mn}=25$, $\text{Fe}= 26$)
- b. Give a catalytic cycle to account for the conversion of alkene to aldehyde employing $\text{RhH}(\text{CO})_2(\text{PPh}_3)_2$ as a catalyst.
- c. Discuss the bonding of metal carbonyls.
- 6) a. Indicate with sketches the structure of the following $\text{Mg}(\text{CH}_3)_2, \text{Al}(\text{CH}_3)_3$, $(\text{CH}_3)_2\text{SnF}_2$.
- b. Explain How $(\text{Pr})_3\text{Al}$ serves as a catalyst for dimerisation of propene.
- c. Describe the structure of the anion $(\text{PtCl}_3\text{C}_2\text{H}_4)^-$ in Zeise's salt and show with drawing the two important types of orbital overlap that explain the metal alkene bonding.

Good Luck

Examiner Dr.S.A.Ismail