

المستوى الثانى

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Tanta University
Faculty of Science
Department of Chemistry

Exam for Level Two, chemistry section

CH 2204

Chemistry of Transition Elements

Term: Second

June 2017

Total Assessment Marks: 100

Time Allowed: 2 h

Answer the following questions:-

1) Comment on each of the following: (25 marks)

- The melting point and boiling points of the transition elements are high.
- Compounds of transition elements are usually paramagnetic.
- Many transition elements and their compounds have catalytic properties.
- The high density of transition elements.

2) Discuss the followings: (25 marks)

- Extraction of titanium.
- Compare and contrast the chemistry of Fe, Ru and Os.
- The chemical properties of Sc group.

3) Write on: (25 marks)

- The assumptions of the crystal field theory.
- Draw energy level diagram and indicate the type of hybridization of:
 d^4 , d^5 , d^6 , d^7 and d^8 square planar, octahedral and tetrahedral.


4) Explain: (25 marks)

- The electronic configuration and The variable valency of d-block elements.
- The general properties of the transition elements comparing with the main elements.

(Good luck)

Examiners: Prof. Dr. Gad El-Hefnawy



	TANTA UNIVERSITY FACULTY OF SCIENCE DEPARTMENT OF CHEMISTRY		
	Final Examination For Second Level Students (Special Chemistry)		
	COURSE TITLE: The Phase Rule		COURSE CODE: CH2208
	DATE: 24/5/2017	TOTAL ASSESSMENT MARKS: 100	TIME ALLOWED: 2 HOURS

Answer the following questions (label each area line and point in your diagram):

1- a) What is the phase rule ? For what systems it is applied? What is the phase equilibrium diagram? (15 marks)

b) Evaluate P, C and F for the following systems: (15 marks)

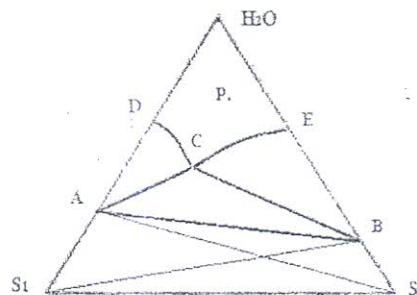
- i) A mixture of four gases enclosed in a cylinder.
- ii) Ice/water/vapor.
- iii) Hydrogen, oxygen and water enclosed in a vessel at room temperature.
- iv) $2\text{H}_2\text{O} \leftrightarrow 2\text{H}_2 + \text{O}_2$ at 1800°C starting from water.
- v) $S_{\text{Rubic}}, S_{\text{Monoclinic}}, S_{\text{Liquid}}$ and S_{Vapor} .

2- Draw the vapor pressure composition phase diagram at constant temperature and the temperature composition phase diagram at constant pressure for two liquids which forms zeotropic mixture, azeotropic mixture, partially miscible liquids and immiscible liquids.

(20marks)

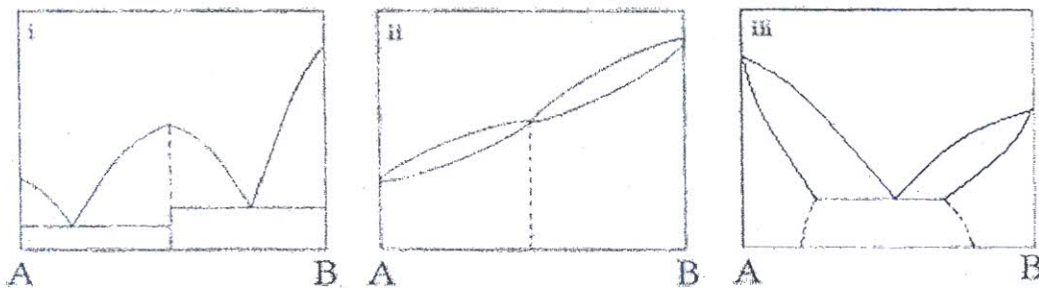
3- Discuss the following phase diagram of aqueous salt solution, apply the phase rule at each area and point in your phase diagram. Show the product of isothermal dehydration of solution P.

(20marks)





4- Define the following phase diagrams of a binary condensed system, apply the phase rule at each region, line and point in your phase diagrams.

(30marks)



(Good luck)

	TANTA UNIVERSITY FACULTY OF SCIENCE CHEMISTRY DEPARTMENT			
	Examination of Second level students of Special Chemistry			
	Course title:	Organic Chemistry (4)	Course code: CH 2216	
	27/5/2017	Total Marks: 150	Time allowed: 2 hrs.	

Answer the following questions:

1- Answer by mechanism the following:

- a- Addition of water to C=O group. Discuss the mechanism and factors affecting such reaction.
- b- Effect of acid on 1,2-diols.
- c- Explain in details the Benzyne mechanism.
- d- Hoffmann hypobromide reaction. Show the mechanism.

2- Explain by mechanism the following reactions:

- a- Transformation of cumene to phenol and acetone. Show mechanism.
- b- Diazo coupling mechanism. Explain in details.
- c- Explain by mechanism how cyanide ion can be used as ambident nucleophiles.
- d- Addition of HCl to 3,3-dimethyl-1-butene. Show mechanism.

3- Answer the following reaction:


- a- Reaction of Bromine with benzene ring. Show the mechanism.
- b- Discuss in details the factors affecting of aliphatic nucleophilic substitution reaction.
- c- Explain the both Saytzeu and Hoffmann rules in elimination.
- d- 1,2-chlorohydrin can act as neighbouring group participation. Explain the mechanism.

4- Answer the following reactions:

- a- Correlate between the mechanism of both SN1 and SN2 mechanism.
- b- Addition of Br₂ to alkenes is Trans addition. Explain the mechanism.
- c- Explain the mechanism of Elimination reaction.
- d- Show the mechanism of S_Ni and S_Ni⁻.

Kind regards ...

Prof. Dr. Mahmoud Fahmy

	Tanta University Faculty of Science Chemistry Department		
	Examination for Second Level Students (Credit Hours System)		
Course Title	Stereochemistry	Course Code: CH2246	
Date:	31/ 5/ 2017	Total Assessment Marks: 50	Time Allowed: 2 hrs


- 1. Draw the following isomers:** (6 marks)
- i. (R)-2-Aminopropanoic acid
 - ii. (S)-2-Chloro-1-butanol
 - iii. (2R, 3S)-Aldotetrose
- 2. Discuss the following:** (12 mark)
- i. Conformations of n-butane
 - ii. Synthesis of (±)-3-methyl-2-pentanol
 - iii. Separation of (±)-2-aminopentane
- 3. The chemical shift for ethylenic proton (δ H) was found experimentally to be 5.6 ppm for 2-chloro-2-pentene, ($\text{Et}_{\text{gem}}=0.44$, $\text{Me}_{\text{trans}}= -0.29$, $\text{Me}_{\text{cis}}= -0.26$, $\text{Cl}_{\text{cis}}=0.19$, $\text{Cl}_{\text{trans}}=0.03$). Determine the geometrical isomerism of the above alkene?** (4 marks)
- 4. Define each of the following:** (12 mark)
- i. Specific rotation
 - ii. Pairs of enantiomers
 - iii. Racemic mixture
- 5. Give reason (writ equations if possible):** (4 marks)
- i. Maleic acid readily forms a cyclic anhydride, while fumaric acid does not
 - ii. Meso-tartaric acid is optically inactive compound
- 6. Compare between each of the following:** (12 mark)
- i. Stereoselective hydroxylation of cis- and trans-3-methyl-2-phenyl-2-pentene
 - ii. Racemization of (-)-mandelic acid and (+)- α -chloroethylbenzene
 - iii. Conformations of 1,2- and 1,3-disubstituted cyclohexane

,,, *With Best Wishes*,,

Prof. Dr. Adel selim

Dr. Mohamed Azaam

Dr. Atif El-Gharably

	Tanta University Faculty of Science Chemistry Department		
	Examination for Second Level Students (Credit Hours System)		
Course Title	Stereochemistry	Course Code: CH2246	
Date:	31/ 5/ 2017	Total Assessment Marks: 50	Time Allowed: 2 hrs


- 1. Draw the following isomers: (6 marks)**
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	TANTA UNIVERSITY		FACULTY OF SCIENCE	DEPARTMENT OF CHEMISTRY
	EXAMINATION FOR SOPHOMORES (SECOND LEVEL) STUDENTS OF SPECIAL CHEMISTRY SECTION			
1969	COURSE TITLE:	STEREOCHEMISTRY		COURSE CODE: CH 2212
DATE: 31	MAY, 2017	TERM: SECOND	TOTAL ASSESSMENT MARKS: 100	TIME ALLOWED: 2 HOURS

Answer The Following Questions :

1) Describe the separation of each of the following : (18 Marks)

- a- (\pm)-3-Aminohexane using (R)-(-)- mandelic acid.
b- (\pm)-Phenylglycine using chiral stationary phase (C.S.P.).

2)a- Describe the synthesis of (\pm)-3-ethyl-2-hexanol . (18 Marks)

- b-Using Camphor asymmetric reagent describe the synthesis of (2S)-2-ethyl-1-hexanol.

3) Mark (\checkmark) or (X) and correct the false statements : (12 Marks)

- a- Mutarotation is the conversion of glucose to galactose . ()
b-Trans- stilbene has slightly lower λ_{\max} and very higher ϵ than that of cis- isomer with UV- spectra . ()
c- The asymmetric C-atom is that atom which attached with four similar groups. ()
d- Fumaric acid readily give a cyclic anhydride with heating while maleic acid does not give an anhydride under the same conditions. ()

4) Describe each of the following: (15 Marks)

- a- Stereoselective addition to cis- and trans-2,3-diphenyl-2-hexene .
b- Diastereomers and racemic mixture .
c- Stability of cyclic hydrocarbons .

5)a-Using Mayer's asymmetric reagent describe the syntheses of (3R)-3-phenylhexanoic acid. (9 Marks)

- b-The chemical shift of ethylenic proton δ_{H} was found experimentally to be 7.55 ppm for **Ph-CH=C(Me)-COOMe**. What is the geometrical isomerism of the above ester ? Write its chemical name.(substituent constants for chemical shifts are : $-\text{Ph}_{\text{gem}} = 1.35$, $-\text{COOMe}_{\text{cis}} = 1.25$, $-\text{COOMe}_{\text{trans}} = 0.67$, $-\text{Me}_{\text{cis}} = -0.26$, $-\text{Me}_{\text{trans}} = -0.29$ ppm). (8 Marks)

6)a-Draw and name the isomers of the following compounds (with comment):(11Marks)

- i-3,4-Dichlorohexane. ii-3-Bromo-2-pentanol. iii-1,4-Dimethylcyclohexane.

b- Draw the following compounds : (9 Marks)


- i- (2R,3S)-Aldotetrose. ii-(2S,3S)-Tartaric acid. iii-(2Z,5R)-2,5-Dibromohexane.

Examinars:

Prof.Dr. Adel Selim

Dr. Mohamed Azam

Dr. Atef El-Garably

	TANTA UNIVERSITY		FACULTY OF SCIENCE	DEPARTMENT OF CHEMISTRY
	EXAMINATION FOR SOPHOMORES (SECOND LEVEL) STUDENTS OF SPECIAL CHEMISTRY SECTION			
	COURSE TITLE:	STEREOCHEMISTRY		COURSE CODE: CH 2212
DATE: 31	MAY, 2017	TERM: SECOND	TOTAL ASSESSMENT MARKS: 100	TIME ALLOWED: 2 HOURS

Answer The Following Questions :

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 a- (\pm)-3-Aminohexane using (R)-(-)- mandelic acid.
 b- (\pm)-Phenylglycine using chiral stationary phase (C.S.P.).
- 2)a- Describe the synthesis of (\pm)-3-ethyl-2-hexanol . (18 Marks)
 b-Using Camphor asymmetric reagent describe the synthesis of (2S)-2-ethyl-1-hexanol.
- 3) Mark (\checkmark) or (X) and correct the false statments : (12 Marks)
 a- Mutarotation is the conversion of glucose to galactose . ()
 b-Trans- stillbene has slightly lower λ_{\max} and very higher ϵ than that of cis- isomer with UV- spectra . ()
 c- The asymmetric C-atom is that atom which attaced with four similar groups. ()
 d- Fumaric acid readily give a cyclic anhydride with heating while maleic acid does not give an anhydride under the same conditions. ()
- 4) Describe each of the following: (15 Marks)
 a- Stereoselective addition to cis- and trans-2,3-diphenyl-2-hexene .
 b- Diastereomers and racemic mixture .
 c- Stability of cyclic hydrocarbons .
- 5)a-Using Mayer's asymmetric reagent describe the syntheses of (3R)-3-phenylhexanoic acid. (9 Marks)
 b-The chemical shift of ethylenic proton δ_{H} was found experimentally to be 7.55 ppm for **Ph-CH=C(Me)-COOMe**. What is the geometrical isomerism of the above ester ? Write its chemical name.(substituent constants for chemical shifts are : $-\text{Ph}_{\text{gem}} = 1.35$, $-\text{COOMe}_{\text{cis}} = 1.25$, $-\text{COOMe}_{\text{trans}} = 0.67$, $-\text{Me}_{\text{cis}} = -0.26$, $-\text{Me}_{\text{trans}} = -0.29$ ppm). (8 Marks)
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 i-3,4-Dichlorohexane. ii-3-Bromo-2-pentanol. iii-1,4-Dimethylcyclohexane.
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 i- (2R,3S)-Aldotetrose. ii-(2S,3S)-Tartaric acid. iii-(2Z,5R)-2,5-Dibromohexane.

Examinars:


Prof.Dr. Adel Selim

Dr. Mohamed Azam

Dr. Atef El-Garably

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Tanta University Faculty of Science Chemistry Department	Final Examination of Chemical Kinetics		
	Level Two	Course code: CH 2202	
	June 2017	Total Assessment Marks: 100	
Special Chemistry Students		Time allowed: 2 h	Date : 3/6/2017

ملحوظة: الامتحان في ثلاثة صفحات

Question (I): Choose the correct answer for the following?

1- An 8.00 g piece of magnesium was placed into 6.0 M HCl. After 25 s, 3.50 g of unreacted magnesium remained. The average rate at which magnesium was consumed is

- (i). 0.14 g/s (ii). 0.18 g/s (iii). 0.32 g/s (iv) 4.50 g/s

2-Consider the following reaction; $\text{N}_2 (\text{g}) + 3 \text{H}_2 (\text{g}) \rightarrow 2\text{NH}_3 (\text{g})$

If the rate of formation of NH_3 is 9.0×10^{-4} mol/s, then the rate of consumption of N_2 is

- (i) 4.5×10^{-4} mol/s. (ii) 6.0×10^{-4} mol/s. (iii) 9.0×10^{-4} mol/s. (iv) 1.4×10^{-3} mol/s

3-Consider the following reaction; $\text{NaOH} (\text{aq}) + \text{HCl} (\text{aq}) \rightarrow \text{NaCl} (\text{aq}) + \text{H}_2\text{O} (\text{l})$

The rate of this reaction could be determined by monitoring the change in concentration of:

- (i) H^+ (ii) Cl^- (iii) Na^+ (iv) H_2O

4-Which of the following properties could be used to measure the rate of the following reaction taking place in an open container; $\text{Zn} (\text{s}) + 2\text{HCl} (\text{aq}) \rightarrow \text{ZnCl}_2 (\text{aq}) + \text{H}_2 (\text{g})$

- (i)-mass of Zn (ii) solubility of HCl (iii) concentration of Cl^- (iv) color of the solution

5-Consider the following reaction: $2 \text{S} (\text{s}) + 3 \text{O}_2 (\text{g}) \rightarrow 2 \text{SO}_3 (\text{g}) + \text{heat}$

The rate of this reaction could be increased by

- (i) Decreasing the temperature. (ii) Adding a catalyst (iii) Increasing the concentration of $\text{S} (\text{s})$
(iv) Increasing the concentration of $\text{SO}_3 (\text{g})$

6-Which of the following are necessary for effective collisions to occur?

- I. Favorable collision geometry. II. Sufficient kinetic energy. III. Large ΔH .
(i) I only (ii) I and II only (iii) II and III only (iv) I, II and III

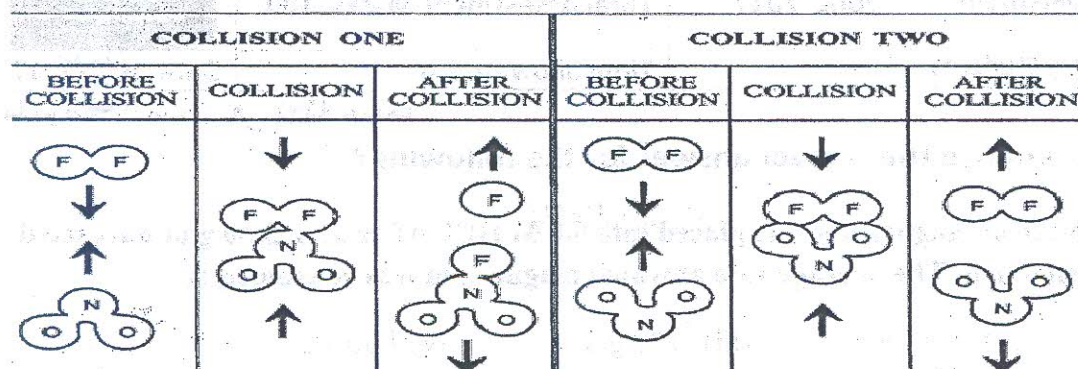
7-Which of the following factors affects the rate of heterogeneous reactions only?

- (i) Nature of reactants (ii) temperature of system
(iii) surface area of reactants (iv) concentration of reactants

8-Collision theory states that:

- (i) all collisions lead to chemical reactions. (ii) Most collisions lead to chemical reactions.
(iii) Very few reactions involve particle collisions. (iv) Effective collisions lead to chemical reactions.

9-Consider the following collisions, each occurring at the same temperature: Which one of the following factors explains why collision one is successful while collision two is not successful?



- (i) Catalyst. (ii) Geometry (iii) Concentration (iv) Kinetic energy.

10-An activated complex has

- (i) low potential energy and is stable (ii) high potential energy and is stable.
 (iii) Low potential energy and is unstable (iv). High potential energy and is unstable.

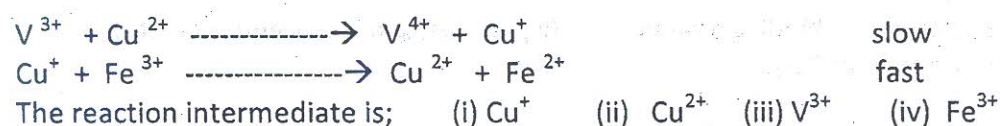
11- Activation energy can be described as the

- (i) energy of motion. (ii) Energy difference between the reactants and the products.
 (iii) Energy of the activated complex. (iv) Energy difference between the reactants and the activated complex

12-A substance that increases the rate of a chemical reaction and may be recovered unchanged at the end of the reaction is an

- (i) product. (ii) Catalyst. (iii) Activated complex. (iv) Reaction intermediate

13-Consider the following reaction mechanism:



14-The initial rate data for the reaction $2\text{N}_2\text{O}_5(\text{g}) \rightarrow 4\text{NO}_2(\text{g}) + \text{O}_2(\text{g})$ is shown in the following table. The value of the rate constant and half-life time for this reaction.

Run	$[\text{N}_2\text{O}_5]$ M	Rate (M/s)
1	1.28×10^{-2}	22.5
2	2.56×10^{-2}	45.0

- (i) 4.09 s^{-1} (ii) 0.225 s^{-1} (iii) 0.176 s^{-1} (iv) 80.1 s^{-1} (v) 0.0569 s^{-1}

15-If the reaction $2\text{HI} \rightarrow \text{H}_2 + \text{I}_2$ is second order, which of the following will yield a linear plot?

- (i) $\log [\text{HI}]$ vs time (ii) $1/[\text{HI}]$ vs time (iii) $[\text{HI}]^2$ vs time (iv) $[\text{HI}]$ vs time (v) $\ln[\text{HI}]$ vs time

Question (II)

1-The rate constant for a reaction at 30 °C is found to be exactly twice the value at 20 °C. Calculate the activation energy?

2-The following data were obtained for the decomposition of N₂O₅ in CCl₄. The following data were collected

Time (s)	0	423	753	1116	1552	1986	2343
[N ₂ O ₅] mol/L	1.46	1.09	0.89	0.72	0.54	0.43	0.35

Determine the following: (i)- the order with respect to N₂O₅

(ii)- The rate law for this reaction (iii)- The [N₂O₅] at 3500 s after the start of reaction

3-Discuss three techniques for follow-up the rate of chemical reaction?

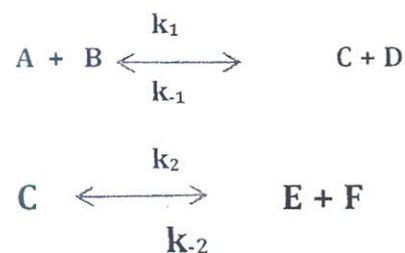
Question (III):

1-Discuss the factors affecting the rate of chemical reactions?

2-Write short notes about characteristics, classification of chemical catalysts, and discuss the mechanism of chemical catalysis according to Arrhenius concept?

3-Enumerate the methods for determination of the order of chemical reactions and discuss one of them?

4- For the reaction proceeded in a sequence of reversible steps;



Prove that the equilibrium constant for this reaction equal the product of all rate constants ratio?

Good Luck for all

Prof. Ali Gemeay

Prof. Hosny El-Daly



TANTA UNIVERSITY
FACULTY OF SCIENCE
DEPARTMENT OF CHEMISTRY

EXAMINATION FOR JUNIOR (SECOND YEAR) STUDENTS OF PHYSICAL BIOCHEMISTRY

COURSE TITLE: CHEMISTRY OF CARBOHYDRATES AND LIPIDS COURSE CODE: BC2202

DATE: 19-6-2017 TERM: SECOND TOTAL ASSESSMENT MARKS: 50 TIME ALLOWED: 1 HOUR

Answer all the questions

1) Correct the under lined word of each of the following: (7 marks)

- 3 carbons are removed from fatty acyl coA in one turn of β -oxidation.
- Beta oxidation of fatty acid takes place in cytosol.
- A fatty acid with 14 carbon atoms will undergo 6 cycles of beta oxidation
- Stereoisomers that differ only in configuration about one chiral carbon is called enantiomers.
- Liquid oil can be changed into solid fats by halogenations of unsaturated fatty acids.
- Any compound containing a carbohydrate group linked to a lipid moiety is called proteolipids.
- Glycerophospholipids are compounds contain sphingosine as an alcohol.

2) Compare between each of the following (12 marks)


- Alpha and beta isomers
- Glycolysis and gluconeogenesis
- Wax and neutral fat
- Amylose and Amylopectin

3) Give an account of the following (16 marks)

- carnitine shuttle
- classification of fatty acid
- polyunsaturated fatty acids
- Transport of glucose into cells

4) Draw the structure of the following (15 marks)

- Active form of fatty acid
- maltose
- Cholesterol
- Fructose
- Phosphatidyl ethanol amine

	TANTA UNIVERSITY		FACULTY OF SCIENCE	DEPARTMENT OF CHEMISTRY
	EXAMINATION FOR FRESHMEN (LEVEL 2) STUDENTS OF BIOPHYSICS			
COURSE TITLE:	PRINCIPLES OF BIOCHEMISTRY (I) Amino Acids, Proteins, Enzymes, Nucleotides and Vitamins			COURSE CODE: BC 2202
DATE:	JUNE, 19, 2017	TERM: SECOND	TOTAL ASSESSMENT MARKS: 50	TIME ALLOWED: 1 HOUR

Answer the following Questions:-

Q1:- (14 Marks)

a- Explain the salvage biosynthesis of **AMP**, **GMP**, **UMP** and **CMP**.

b- Write Gabriel method for the synthesis of **Phenylalanine** and **Valine**.

Q2:- (16 Marks)

a- "Amino acids are the building blocks of polypeptides and proteins", write the possible structures of the dipeptides formed from the following amino acids.

i- **Phenylalanine** and **Cysteine**.

ii- **Leucine** and **Serine**.

b- Give examples to explain the biochemical functions of the coenzymes of vitamins **Thyamin**, **Riboflavine** and **pyridoxine**.

Q3:- (20 Marks)

a- Give structures of the deoxyribonucleotides which are the building blocks of **DNA**. Explain how these nucleotides are attached together in *each DNA* strand.

b- Give examples on reactions catalyzed by the following enzymes:

i- **Oxidase**.

ii- **Kinase**.

iii- **Dehydratase**.

iv- **Phosphatase**

Good Luck

Dr Yehia Hafez

Final Examination for the 2nd year students
For Material Sciences

Answer the following Questions :

Total Assessment Marks:150

1-) A- Choose the correct Answer : (In Chemical equations) . Each item 7 marks

- (1) Markovnikov's addition of HBr is not applicable to
 - (a) Propene
 - (b) 1-butene
 - (c) 1-pentene
 - (d) 2-butene
- (2) In the reaction of $\text{CH}_3\text{CH}_2\text{CH}=\text{CH}_2$ with HCl , the H of the HCl will become attached to which carbon ?
 - (a) C-1
 - (b) C-2
 - (c) C-3
 - (d) C-4
- (3) 2-Butene reacts with HBr to give
 - (a) 1-Bromobutane
 - (b) 2,3-Dibromobutane
 - (c) 2-Bromobutane
 - (d) 2,2 Dibromobutane
- (4) Which of the following alkenes will give a mixture of acetone and acetaldehyde on ozonolysis ?
 - (a) 1-butene
 - (b) 2-methyl-2-butene
 - (c) 2-butene
 - (d) 2-methylpropene
- (5) Addition of two moles of HCl to propyne gives :
 - (a) 2,2-Dichloropropane
 - (b) 1,3-Dichloropropane
 - (c) 1,2-Dichloropropane
 - (d) None of these
- (6) Oxidation of a secondary alcohol with $\text{K}_2\text{Cr}_2\text{O}_7/\text{H}^+$ produces
 - (a) a carboxylic acid
 - (b) a Ketone
 - (c) an aldehyde
 - (d) an ester
- (7) Ketones are prepared by the oxidation of
 - (a) Primary alcohol
 - (b) Secondary alcohol
 - (c) Tertiary alcohol
 - (d) None of these
- (8) The reduction of a ketone
 - (a) always gives a primary alcohol
 - (b) always gives secondary alcohol
 - (c) always gives a carboxylic acid
 - (d) always gives a ketal
- (9) Reduction of benzaldehyde in the presence of ammonia gives
 - (a) Toluene
 - (b) Nitro benzene
 - (c) benzyl amine
 - (d) Aniline
- (10) reaction of benzene diazonium chloride with methanol gives
 - (a) phenol
 - (b) iodobenzene
 - (c) chlorobenzene
 - (d) Anisole
- (11) nitration of Acetanilide followed by hydrolysis gives
 - (a) phenol
 - (b) iodobenzene
 - (c) nitrobenzene
 - (d) None of these

2-) A- Complete the following reaction (In Chemical equations) : Each item 7 marks

- a- reaction of aniline with methyl iodide give
- b- reaction of phenyl hydrazine with benzaldehyde gives
- c- reaction of acetic acid with methanol in presence of strong acid gives

B- Why no aldol condensation takes place in case of trimethyl acetaldehyde (Explain)

5 marks

3-A) starting with benzene . How can you obtain the following compound ?

Each item 6 marks

- a- Glyoxal
- b- Acetophenone
- c- benzoic acid

-B) Explain the Action of nitrous acid and HCL on aniline (name the product) 5 marks


4-) starting with benzaldehyde . How can you obtain the following compound ?

Each item 6 marks

- a- Cinnamic acid
- b- benzyl alcohol
- c- benzoic acid
- d- Toluene

Dr. Mohamed Hamed

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	TANTA UNIVERSITY FACULTY OF SCIENCE CHEMISTRY DEPARTMENT		
	FINAL EXAM FOR SENIOR STUDENTS (CHEMISTRY SECTION)		
	COURSE TITLE:	NUCLEAR CHEMISTRY (CH2210)	TIME ALLOWED: 2 HOURS
DATE: 5-6- 2017	TERM: SECOND	TOTAL ASSESSMENT MARKS: 50	

Answer the following questions:

1- A) Chose the correct answer and explain your answer for the following points: (8 Marks)

I) The nuclide formed by the beta decay of $^{40}_{19}\text{K}$ has an atomic number of _____.

- a. 18 b. 20
c. 39 d. 21

II) The nuclide formed by the alpha decay of $^{238}_{92}\text{U}$ has a mass number of _____.

- a. 234 b. 236
c. 238 d. 90

III) The relation between two nuclides $^{40}_{20}\text{Ca}$ and $^{40}_{16}\text{S}$ is _____.

- a. Isotopes b. Isotones
c. Isobars d. Isomers

IV) If the proton number or neutron number is _____ the nuclide have a special stability.

- a. 3 b. 8
c. 14 d. 25

B) Discuss the following points: (6 Marks)

- a. Plasma b. smoke detector
c. uses of nuclear fission reactor

2- A) Calculate the binding energy (by million electron volt) of $^{208}_{82}\text{Pb}$. The mass of Pb is 207.976644 a.m.u. (Proton mass = 1.00728 a.m.u. and neutron mass = 1.00866 a.m.u.) (4 Marks)

باقي الاسئلة في الخلف

B) Compare between the two following (Three only) : (9 Marks)

- a. Subcritical mass and supercritical mass
- b. Hydrogen bomb and atomic bomb
- c. ^{238}U and ^{235}U
- d. Stable and unstable nucleus

3- A- Mention the bombarding particle, target nucleus, product and eject particle for the following nuclear equation $^{14}_7\text{N}(\alpha, p)^{17}_8\text{O}$ **(4 Marks)**

B- Draw diagram for stability of nucleus. (4 Marks)


4- Give the reason for the following (Five only): (15 Marks)

- a. Alpha particles effect on top layer on the skin
- b. Using magnetic field in the fusion reactor
- c. Enriching uranium
- d. Using moderator in the fission reactor
- e. ^{14}C cannot used in dating of rock
- f. Radioisotopes are uses in medical

Good Luck

④ 5/15



	Tanta University Faculty of Science Chemistry Department		
	Examination for freshmen 2 nd level students (Chemistry)		
Course Title	Organic 3	Course Code: CH 2214	
DATE: JUNE, 2017	TERM: SECOND	TOTAL ASSESSMENT MARKS: 150	

Section (A): Bifunctional compounds:

[75 Marks]

Answer the following questions:

1- With chemical equations, give one method to prepare each of the following compounds:

[15 Marks]

- i- Isoprene ii- Propargyl alcohol iii- Crotonaldehyde

2- Mark (✓) or (X) for the following statements. With equations, correct the wrong one and give briefly the reason if needed: [20 Marks]

- i- Free radical addition of simple alkenes goes faster than those of conjugated dienes. ()
- ii- Methyl benzoate undergoes Claisen condensation. ()
- iii- Reaction of HCN with methyl vinyl ketone gives cyanohydrine. ()
- iv- Mesityl oxide is obtained by the aldol condensation of acetaldehyde. ()

3- With chemical equations, illustrate the mechanism of the following reactions and name the type of reaction as well as the final product: [20 Marks]

- i- Propanal with allyl chloride and triphenylphosphine in the presence of phenyl lithium.
- ii- Acetophenone with ethyl 2-bromopropionate in the presence of Zn followed by hydrolysis.

4- With chemical equations, explain the following conversions: [20 Marks]

- i- Ethyl acetate into butanone.
- ii- Diethyl malonate into 2,3-dimethylpentanoic acid.

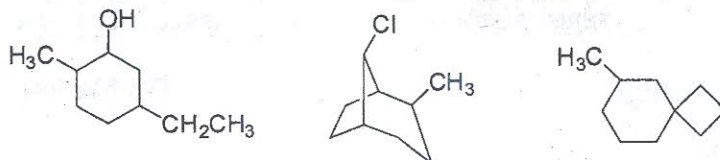
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Section (B); Alicyclic compounds:

[75 Marks]

Answer the following questions:

1- Name the following compounds according to the IUPAC nomenclature: [15 Marks]



2- with chemical equations, describe the following reactions: [20 Marks]

- Benzoylcyclopropane with HBr.
- Ketene with diazomethane in the presence of H₂O.
- Cyclopentadiene with ethylmagnesium bromide followed by treatment with FeCl₃.
- Cyclohexene with perbenzoic acid followed by addition of NH₃.

3- With chemical equations, illustrate the following conversions: [24 Marks]

- ferrocene to vinylferrocene.
- Acetone to aldimedone.
- Cyclopentanone to spiro[4.5]decan-6-one

4- With chemical equations, carry out the mechanism of the following reactions: [16 Marks]

- Pinacol-pinacolone rearrangement of 1,2-dimethylcyclohexane-1,2-diol.
- Favorskii rearrangement of 2-chlorocyclohexanone.

Good Luck

Examiner: Prof. Dr. Nasser El-Brollosy