	TANTA UNIVERSITY		
	FACULTY OF SCIENCE		
	CHEMISTRY DEPARTMENT		
	FINAL EXAM FOR SOPHOMORES STUDENTS (BIOCHEMISTRY AND DOUBLE MAJORS)		
	COURSE TITLE:	INSTRUMENTAL ANALYSIS I (CH2244)	TIME ALLOWED:
DATE: MAY 26, 2018	TERM: SECOND	TOTAL ASSESSMENT MARKS: 100	2 HOURS

Question 1. Complete the following sentences:**(25 Marks)**

- A. Planck's law is and the wavenumber unit is
- B. The exposure of a chemical compound to UV light leads to changing while the exposure to X-ray leads to changing
- C. Tungsten lamp is used in the region of while deuterium lamp is used in the region of
- D. The ion-colored filter is made of
- E. The unit of the extinction coefficient is while the absorbance is unitless due to
- F. Thermopile contains a group of
- G. A check on the instrumental factor (for the deviation of Beer-Lambert laws) can be made by plotting versus
- H. The disadvantage of Nernst glower is while the advantage of tungsten-halogen lamp is
- I. The relation between absorbance and transmittance is
- J. The absorption curve is a relation between versus
- K. The deviation of Beer-Lambert laws based on chemical factor is caused by
- L. The light source is defined as and its types are and
- M. The long-wave pass filter is described as
- N. The prism is made of in the IR region while in the UV-visible region, the prism is made of but it is made of in the visible region.

Question 2. Compare between the followings:**(25 Marks)**

- A. Photometric titration diagrams of:
 - i) Nonabsorbing sample versus a nonabsorbing titrant to produce an absorbing compound,
 - ii) Nonabsorbing sample versus an absorbing titrant to produce a nonabsorbing compound.
- B. The electronic transitions in stilbene and trimethylamine (structures and transitions)
- C. Single beam and double beam spectrophotometers (diagrams only)
- D. Mole-ratio method and continuous variation method (principle and diagrams only)
- E. Prism monochromator and grating monochromator (diagrams only)

Question 3:**[28 Marks]**

- a) Give reasons for the following statements: **(6 Marks)**
 - i. The graphite furnace technique is especially suited to micro and trace analysis.
 - ii. Most of phosphorescence cannot be recorded in solution at room temperature.

Examiners: Prof. Ahmed F. Rehab and Dr. Wael A. Amer

- iii. The relation between fluorescence intensity and concentration is not always linear.
- iv. Detectors in spectrofluorometer lie at right angle with light source.

- b) Explain: (15 Marks)
- i. Atomization steps in the flame technique with diagram.
 - ii. Difference between photometry and fluorometry (law, graph).
 - iii. Interference (definition, types and examples) in the atomic absorption spectroscopy.
- c) Illustrate with drawing "Jablonisky diagram" and define the different processes of deactivation the excited states. (7 Marks)

Question 4: Choose the correct answer (22 Marks)

1. In which state the concentration of the element is measured in the atomic absorption spectroscopy?
a) gaseous state b) solution state c) solid state d) plasma state
2. The excellent exciting light source used in the atomic absorption spectroscopy is:
a) low pressure lamp b) hollow cathode lamp
c) Xenon lamp d) tungsten-halogen lamp
3. Which of the following is not active in IR absorption spectroscopy?
a) CHCl_3 b) CH_4 c) Cl_2 d) C_6H_6
4. Fluorescence occurs within:
a) 10 s b) 10 ms c) 10 μs d) 10 ns
5. Which of the following statements best defines luminescence?
a) Emission of light due to nonthermal process, a chemical reaction or the absorption of ionizing radiation
b) The emission of light by a substance after absorption of excitation energy
c) Light is absorbed by the ground state atoms
d) Emission of light requiring a light source
6. In atomic emission spectroscopy, which of the following statements is false?
a) Flame is used to excite the element to a higher energy state
b) A hollow-cathode lamp with a cathode made of the element to be analyzed is used to produce a wavelength of light specific for the material
c) The light is absorbed by the ground state atoms in the flame
d) There is a net decrease in the intensity of the beam
7. The main advantage of fluorescence over UV-Vis spectroscopy is
a) Its compatibility with separation techniques b) Its sensitivity

c) Its compatibility with most analytes

d) None of the above

8. Which of the following statements about atomic absorption is true?

- a) It uses an anode made of the same element being measured
- b) It uses a tungsten lamp as the light source
- c) It measures absorption of light
- d) It requires that the element to be measured be brought to a non-ionized ground state

9. In fluormetry, the emission radiation is always:

- a) Longer wavelength than the excitation radiation
- b) Equal to the excitation radiation.
- c) Shorter wavelength than the excitation radiation.
- d) More energetic than the excitation radiation.

10. Intersystem crossing is where...

- a) A molecule converts its excess energy to light, and emits a photon
- b) The spin of an excited electron reverses, changing the state of the molecule
- c) A molecule converts excess electronic energy to vibrational energy

11. Why are phosphorescence measurements usually made at a low temperature?


- a) To prevent thermal degradation of the phosphorescent species.
- b) To increase the efficiency of the detector
- c) To promote phosphorescence by slowing the rate of radiationless transfer processes.

12. In flame emission photometry, a photon of light with a wavelength specific for a given element is emitted when:

- a) An orbital electron is raised to a higher energy state by incident light.
- b) The bonds of the molecule vibrate and release light.
- c) The element absorbs ultraviolet radiation and release energy at longer wavelengths.
- d) Thermal energy is absorbed by orbital electrons to higher energy state and release energy when the orbital electrons return to the ground state.

===== With Best Wishes =====

Examiners: Prof. Ahmed F. Rehab and Dr. Wael A. Amer

	TANTA UNIVERSITY FACULTY OF SCIENCE DEPARTMENT OF CHEMISTRY			
	EXAMINATION FOR SOPHOMORES (SECOND YEAR) STUDENTS OF BIOCHEMISTRY			
	COURSE TITLE:	Biochemistry (1)		COURSE CODE: BC 2202
DATE: 6-6-2018	JUNE, 2018	SECOND TERM EXAM	TOTAL ASSESSMENT MARKS: 100	TIME ALLOWED: 2 HOURS

II -Carbohydrates Section:

Answer the following questions:

1-A-Explain each of the following:- (20 Marks)

- i-Why do glucose and mannose, and similarly galactose and talose, form osazone derivatives with the same melting points?
- ii-Fructose gives a positive test with Fehling's solution as does Glucose .
- iii- Mutarotation is the change in specific rotation that accompanies the interconversion of α and β -anomers in aqueous solution
- iv-Hydrolysis of the pentamethyl derivative of glucose results in a free C5 hydroxyl
- v-Alpha-galactosidases is commercially used as digestive enzymes for galactose containing sugars of legumes

2-A-Give the structural formulas for the following compounds: (20 marks)

- i-(1,6)-Dichloro-(1,6)-dideoxy- β -D-fructofuranose
- ii- Gentiobiose
- iii- β -D-Glucopyranosyl- α -D-Fructofuranoside
- iv- Inulin
- v-Hyaluronic Acid

B-Outline the steps involved in :-

- i- UDP-glucose and UDP-glucuronic acid and vitamin C syntheses
- ii- The cooperative action between the three enzyme classes (cellobiohydrolases (CBHI), (CBHII) and Endo-1,4- β -D-glucanases (EGs) on a model of cellulose substrate
- iii- Lysozymes exhibit hydrolytic activity to specifically cleave bonds between the NAN and NAG of the bacterial cell wall.

3--AChoose the correct answer.Explain by equations (10 marks)

Periodic acid oxidation confirms the structure of sucrose . This gives

- a- glyoxalic acid
- b-glyceric acid
- c- hydroxypyruvic acid

B-Identify each of the glucose derivatives.

A+ 4 HIO₄ yielded 3 HCO₂H + HCHO + OHC-CO₂H

B+ 5 HIO₄ yielded 4 HCO₂H + 2HCHO

PROF. Dr. AHMED-SAAFA



TANTA UNIVERSITY
FACULTY OF SCIENCE
DEPARTMENT OF CHEMISTRY

EXAMINATION FOR JUNIOR (SECOND YEAR) STUDENTS OF CHEMISTRY BIOCHEMISTRY

COURSE TITLE: CHEMISTRY OF CARBOHYDRATES AND LIPIDS

COURSE CODE: BC2202

DATE: 6-6-2018

TERM: SECOND

TOTAL ASSESSMENT MARKS: 50

TIME ALLOWED: 1 HOUR

Answer all the questions

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

- 1) Myristoylated protein and palmitoylated protein.
- 2) Halogenations and hydrogenation of oils.
- 3) Waxes and triacylglycerol.
- 4) Plasmalogens and lecithins.

II) Give short note for each of the following : (15 marks)

- A. Digestion of lipid.
- B. Ester and salt formation of fatty acid.
- C. Oxidative rancidity and ways to minimize rate of it.
- D. Classification of waxes.
- E. Types and function of PL.

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


- A. Prostaglandins.
- B. Cholesterol.
- C. Oceanapiside.
- D. Diphosphatidyl glycerol.
- E. Fatty acid contain (C18:2^{Δ9,12}).

IV) Complete the sentences: (8 marks)

- A. Prenylated protein is one type of And the type of its linkage is
- B.are found in large amount in brain and nervs and in small amounts in lung and spleen.
- C. Micelles of fatty acids in water are organized such that the faces the solvent and the are directed toward the interior.
- D. is used for detection of hydrolytic rancidity because it measures the amount of free fatty acids present.
- E. If three fatty acids connected to glycerol are the same type the fatty acid is
- F. In polyunsaturated fatty acids, the first double bond occure

EXAMINERS	PROF. DR. AHMED SAFAAN
	DR. MAI EL-KEIY

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	TANTA UNIVERSITY			FACULTY OF SCIENCE	DEPARTMENT OF CHEMISTRY
	EXAMINATION FOR FRESHMEN (LEVEL 2) STUDENTS OF BIOPHYSICS				
	COURSE TITLE:	PRINCIPLES OF BIOCHEMISTRY (1)			COURSE CODE:BC2202
DATE:	JUNE, 6, 2018	TERM: SECOND	TOTAL ASSESSMENT MARKS:100		TIME ALLOWED: 2 HOURS

**Sec. (I) Amino Acids, Proteins, Enzymes, Nucleotides and Vitamins
(50 marks)**

Answer the following Questions:-

Q1:- (18 Marks)

a- Give structures of the ribonucleotides which are the building blocks of *RNA*. Explain how these nucleotides are attached together in the *RNA* strand. (10 Marks)

b- Give examples of reactions catalyzed by the following enzymes: (8 Marks)

i- *Dioxygenases*. ii- *Dipeptidases*. iii- *Mutases*. iv- *Ammonialyase*.

Q2:- (16 Marks)

a- Write the corresponding enzyme and coenzyme in each of the following conversions: (12 Marks)

i- *Pyruvic acid* into *Acetyl CoA*. ii- *Glutamic acid* into γ -*aminobutyric acid*.
iii- *Lactic acid* into *Pyruvic acid*.

b- Write an example of a *transamination* reaction catalyzed by *GOT* enzyme. (4 Marks)

Q3:- (16 Marks)

a- "Amino acids are obtained by the digestion of proteins", Explain the action of each of the following enzymes: i- *Pepsin* ii- *Trypsine*

iii- *Chymotrypsine* iv- *Carboxypeptidase* (12 Marks)

b- Write the *deamination* reaction of *L-alanine* and explain how NH_3 is excreted as urea. (4 marks)

Turn the paper



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:

6-6-2018

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)

- A. **2 carbons** are removed from fatty acyl coA in one turn of **omega oxidation** of fatty acid.
- B. If the three fatty acids connected to glycerol in the triglyceride are the same type this is **mixed triglyceride**.
- C. **Immiscibility** is one of the characteristic features of fatty acid which mean that the fatty acid has hydrophilic head and hydrophobic tail.
- D. The sugar is called alpha if the OH group of anomeric carbon is to the **left**.
- E. In lactose, the glucose molecule is connected to galactose molecule by **an alpha 1, 6** glycosidic bonds.
- F. Any compound containing a phosphate group linked to a lipid moiety is called **proteolipids**.
- G. **Sphingophospholipids** are compounds contain glycerol as an alcohol.

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

- A. The first dehydrogenation step and third dehydrogenation step in beta oxidation of fatty acid (with equations).
- B. glycogenesis and glycogenolysis.
- C. Wax and neutral fat.
- D. Epimers and Enantiomers.


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

- A. The structure of starch.
- B. Hardening of oil.
- C. polyunsaturated fatty acids
- D. Transport of glucose into cells

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

- a) Cardiolipin.
- b) Maltose
- b) Cholesterol.
- d) Cyclic ring of glucose.
- e) Phosphatidyl serine.

EXAMINERS	PROF. DR. ADEL SELIM
	DR. YEHYA HAFEZ
	DR. MAI EL-KEIY

	TANTA UNIVERSITY FACULTY OF SCIENCE DEPARTMENT OF CHEMISTRY			
	EXAMINATION FOR LEVEL TWO OF STUDENTS OF CHEMISTRY/BIOCHEMISTRY			
	COURSE TITLE:	PRINCIPLE OF BIOCHEMISTRY II		COURSE CODE: BC2204
	DATE:	09/06/2018	TERM: SECOND	TOTAL ASSESSMENT MARKS: 150 TIME ALLOWED: 2 HOURS

I. Discuss the following questions:- (42 marks)

1. Acidosis and alkalosis.
2. Factors affecting water balance and distribution between ECF and ICF.
3. Positive and negative water balance.
4. Ionization of glutamic acid and lysine at different pH and draw their titration curves explaining the pH at which these amino acids can't move when applied to electrophoresis.
5. Compare between ICF and ECF components.
6. There are two hormones play important role in water balance achievement.

II. Complete the following sentences:- (10 marks)

1. A buffer solution best resist change in pH when.....
2. During acidosis theratio.....but if it is constant it is called.....
3. The oxidation of 1 g of carbohydrate yieldsmg of H₂O, 1 g of fat yields..... mg of H₂O and 1 g of proteins yields..... mg of H₂O
4. Zwitter ion is.....
5. Acids formed in the body that may alter acid-base balance are.....,,,

See The Next Page

1. Consider the following peptide: (15 marks)

A-L-K-M-P-E-Y-I-S-T-D-Q-S-N-W-H-H-R

Indicate the fragments generated after the following digestions:

a) trypsin

b) pepsin

2. Describe all steps in the synthesis of Proline (13 marks)

3. What amino acids among the following would you expect to find a) inside, and b) at the surface of a typical globular protein in an aqueous solution of pH 7? (15 marks)

Glu Arg Val
Phe Ileu Asn
Lys Ser Thr

4. Draw the structure of the following peptide GWYQR. (10 marks)

5. What is the net charge (+, 0, -) of the amino acids glycine, serine, aspartic acid, glutamine and arginine at: (20 marks)

a) pH 2.01 b) pH 3.96 c) pH 5.68 d) pH 10.76

Glycine (pI: 5.97)

Serine (pI: 5.68)

Aspartic Acid (pI: 2.77)

Glutamine (pI: 5.65)

Arginine (pI: 10.76)


6. What is the objective of Xanthoproteic test? (5 marks)

7. Discuss the basic structures of proteins (10 marks)

8. What are the biological functions of proteins. (10 marks)

GOOD LUCK

EXAMINERS	PROF. DR. TAREK M. MOHAMED
	DR. THORIA A. AZIZ
	DR. KARIM SAMY

	Tanta University Faculty of Science Chemistry Department		
	Examination for Sophomores (Double Major Students)		
	Course Title	Organic 3	Course Code: CH 2214
Date:	June 2018	Total Assessment Marks: 150	Time Allowed: 2 hrs

Answer the following questions:

1- Explain the mechanism of each of the following reactions: [25 Marks]

- A) Reaction of 1,3-butadiene with methyl vinyl ketone at 140 °C.
- B) Reaction of trialkyl borane with ethyl bromoacetate in the presence of a base.
- C) Claisen condensation reaction.

2- Carry out each of the following conversions: [25 Marks]

- A) Glycerol into allyl alcohol.
- B) Ethyl acetoacetate into 3-methyl-2-hexanone.
- C) Acetic anhydride into cinnamic acid.
- D) Diethyl malonate into 2-methylpentanoic acid.

3- Comment with equation and mechanism on each of the following: [25 Marks]

- A) Free radical reaction to conjugated double bond.
- B) Acid-catalyzed bromination of acetone.
- C) Wittig reaction.

4- Discuss the mechanism of pinacol-pinacolone rearrangement reaction. [10Marks]

5- Discuss the mechanism of the reaction of *p*-chloromethylbenzene with KNH₂. [10Marks].

6- What products would you expect from the following reactions? (explain your answer) [10 Marks].



7- Which of the following reactions exhibits primary kinetic isotope effect? (Explain your answer). [10 Marks].

- A) E1 reactions.
- B) E2 reactions.
- C) Nitration reaction of benzene.
- D) Oxidation of Ph₂CHOH to Ph₂C=O

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8- Mark (✓) for the correct and (X) for the wrong statements. Please correct the wrong one. [9 Marks].

A) The proportion of Hofmann elimination is found to increase with increasing branching in the alkyl group of the substrate.

B) S_N1 reactions proceed with retention of configuration.

C) The strong bases are good leaving groups in S_N -reactions.

9- Arrange the following compounds according to their reactivity towards nucleophilic addition reactions to carbonyl group: Acetone, Formaldehyde, Acetaldehyde. (explain your answer) [10 Marks].

10- Which of the following alkyl halides would undergo S_N2 reaction most rapidly? [8 Marks].

(A) CH_3CH_2-Br

(B) CH_3CH_2-Cl

(C) CH_3CH_2-I

(D) CH_3CH_2-F

(E) they react at the same rate.

11- The addition of Br_2 to trans-2-butene giving meso-2,3-dibromobutane can be explained by a mechanism involving: [8 Marks].

A) A free radical.

B) A carbocation.

C) A cyclic bromonium ion.

D) A carbanion.


E) Simultaneous attack by bromine atoms.

Examiners: Prof. Mahmoud Taha

Dr. Mahmoud El-Badawi

Dr. Atif El-Gharably

Dr. Samah Shendy

	Tanta University Faculty of Science Chemistry Department		
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- 6- What products would you expect from the following reactions? (explain your answer) [10 Marks].
 - A) 3,3-Dimethyl-1-butene + HI \rightarrow
 - B) $\text{CH}_3\text{CH}_2\text{CHBrCH}_3 + ^-\text{OC}_2\text{H}_5 \rightarrow$
- 7- Which of the following reactions exhibits primary kinetic isotope effect? (Explain your answer). [10 Marks].
 - A) E1 reactions.
 - B) E2 reactions.
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Dr. Mahmoud El-Badawi

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Examiners: Prof. Mahmoud Taha

Dr. Mahmoud El-Badawi

Dr. Atif El-Gharably

Dr. Samah Shendy

	Tanta University Faculty of Science Chemistry Department		
	Examination for Sophomores (Double Major Students)		
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 - A) Free radical reaction to conjugated double bond.
 - B) Acid-catalyzed bromination of acetone.
 - C) Wittig reaction.
- 4- Discuss the mechanism of pinacol-pinacolone rearrangement reaction. [10Marks]
- 5- Discuss the mechanism of the reaction of *p*-chloromethylbenzene with KNH_2 . [10Marks].
- 6- What products would you expect from the following reactions? (explain your answer) [10 Marks].
 - A) 3,3-Dimethyl-1-butene + HI \rightarrow
 - B) $\text{CH}_3\text{CH}_2\text{CHBrCH}_3 + ^-\text{OC}_2\text{H}_5 \rightarrow$
- 7- Which of the following reactions exhibits primary kinetic isotope effect? (Explain your answer). [10 Marks].
 - A) E1 reactions.
 - B) E2 reactions.
 - C) Nitration reaction of benzene.
 - D) Oxidation of Ph_2CHOH to $\text{Ph}_2\text{C=O}$

باقى الأسئلة فى خلف الورقة

8- Mark (✓) for the correct and (X) for the wrong statements. Please correct the wrong one. [9 Marks].

A) The proportion of Hofmann elimination is found to increase with increasing branching in the alkyl group of the substrate.

B) S_N1 reactions proceed with retention of configuration.

C) The strong bases are good leaving groups in S_N -reactions.

9- Arrange the following compounds according to their reactivity towards nucleophilic addition reactions to carbonyl group: Acetone, Formaldehyde, Acetaldehyde. (explain your answer) [10 Marks].

10- Which of the following alkyl halides would undergo S_N2 reaction most rapidly? [8 Marks].

(A) CH_3CH_2-Br

(B) CH_3CH_2-Cl

(C) CH_3CH_2-I

(D) CH_3CH_2-F

(E) they react at the same rate.

11- The addition of Br_2 to trans-2-butene giving meso-2,3-dibromobutane can be explained by a mechanism involving: [8 Marks].

A) A free radical.

B) A carbocation.

C) A cyclic bromonium ion.

D) A carbanion.


E) Simultaneous attack by bromine atoms.

Examiners: Prof. Mahmoud.Taha

Dr. Mahmoud El-Badawi

Dr. Atif El-Gharably

Dr. Samah Shendy

	Tanta UNIVERSITY FACULTY OF SCIENCE DEPARTMENT OF CHEMISTRY			
	Final Exam FOR LEVEL2 STUDENTS (Double major)			
	COURSE TITLE:	KINETIC THEORY OF GASES		COURSE CODE: CH2242
DATE	28 MAY, 2018	TERM: SECOND	TOTAL ASSESSMENT MARKS: 50	TIME ALLOWED: 2H

Answer All Questions (50 marks)

1- Put true or false sign and correct the false answer? (20 marks)

1. The average kinetic energy of molecules is independent of absolute temperature.
2. Deflation of the balloon filled with helium after a period of time is an example of gas compression.
3. According to the kinetic theory of gases, at absolute zero of temperature molecular motion stops.
4. The mean free path of the gas is increased by increasing the pressure.
5. For effusion to occur, the hole's diameter must be larger than the molecules' mean free path.
6. At high altitude, the pressure increases and the amount of oxygen available to breathe decreases.
7. Like a gas, plasma has neither a defined shape nor volume.
8. Carbon dioxide is much nearer to the ideal behavior.
9. For linear triatomic molecule, the heat capacity at constant volume per mole is $(13/2) R$.
10. Dalton's law corrects the non-ideality of real gases.

باقى الأسئلة خلف الورقة

2- Complete the following sentence. (20 marks)


1. The mean square velocity of five molecules of velocities 2 m/s, 3 m/s, 4 m/s, 5 m/s and 6 m/s is m^2/S^2 .
2. Neon signs are examples of whereas, the interior of the sun is an example of
3. According to equipartition of energy the total energy of a gas molecule is equally distributed among all of
4. Plasma can be made using, or
5. The volume of 1 mole of any gas at STP is
6. Collision frequency is defined as
7. The volume excluded per mole of gas (b) is given by
8. According to kinetic theory of gases, the molecular collision assumed to be
9. used to separate the fissionable isotopes (^{235}U) from the non-fissionable isotopes (^{238}U).
10. The collision cross section is defined as

3- Write about the following. (10 marks)

1. The causes and effects of global warming
2. The dependency of the barometric pressure on the elevation.

Best Wishes...

Prof. Ahmed Borhan & **Dr. Eman Fahmy Aboelfetoh**

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	TANTA UNIVERSITY FACULTY OF SCIENCE CHEMISTRY DEPARTEMENT			
	Examination of Second year students of Chemistry section			
	Course title:	Organic Chemistry (4)	Course code: CH 2216	
	26.05.2018	Total Marks: 150	Time allowed: 2 hrs.	

1- Answer by equations the following reactions (50 Marks)

- a- Addition of water on carbonyl group. Discuss by mechanism.
- b- Hoffman Hypobromide reaction. Show the mechanism.
- c- Treatment of α - bromoketone with sod.alkoxide. Explain the mechanism
- d- Cumene to acetone and phenol

2- Explain by mechanism the following reactions. (50 Marks)


- a- Explain in details the type of Elimination reaction.
- b- Diazo-coupling reaction. Explain the mechanism
- c- Benzyne mechanism.
- d- Show two examples for Neighbouring group participation.

3- Show by mechanism the following reactions (50 Marks)

- a- Alkylation of benzene. Show the mechanism
- b- Nucleophilic substitution reaction, Show the mechanism.
- c- Cyanide ion can be used as Ambident nucleophile. Explain.
- d- Pinacole- Pinacolone rearrangement. Show the mechanism

Kind regards

Prof. Mahmoud Fahmy

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Answer the following questions:-

(25 marks)

1) a) Complete the following:

- i) The assumptions of the crystal field theory are 1.....,2.....,and 3.....
- ii) The factors affecting Δ_o values are 1.....,2.....and 3.....
- iii) Oxidation number is defined as
- iv). IUPAC organization defined transition elements as those elements that.....

2- Why are:-

(25 marks)

- i- Mn^{+2} compounds very pale in colour.
- ii- Co^{+3} complexes more stable than Co^{+2} complexes.
- iii- Zr and Hf compounds are similar.
- iv- Compounds of Ti (IV) and Zn (II) white.

3) Discuss the following:-

(25 marks)

- a) The splitting of d^3, d^4, d^5 and d^6 octahedral low spin and high spin.
- b) The splitting of d^4 and d^8 square planer.
- c) Compare and contrast the chemistry of Mn and Re

4) Write down on the following:-

(25 marks)

- a) - The rusting of iron.
- b).- Ziegler-Natta catalyst for production of high-density polyethylene.
- c) - Nonstoichiometry.
- d) - Separation of lanthanides (Three methods only).

"GOOD LUCK"

Examiners: Prof. Dr. Gad El-Hefnawy

