

**Examination of Organic Chemistry (411C) for 4 th Level Students
(Petroleum chemistry, Petrochemicals and Chromatography)**

Answer the following three sections (50 mark)

Section (A): Petroleum chemistry (17 Marks)

1- Answer three only of the following questions: (9 Marks)

- Discuss the characteristics of O-compounds present in the crude oils?
- Discuss the hydrocracking process of heavy oils over zeolite catalyst?
- What are the definitions of API-gravity & Watson factor (UOP)? How can their values useful in determination of oil quality?
- Describe fully the functions of batch and continuous distillation columns?

2- Explain briefly four only of the following: (8 Marks)

- Copper chloride sweetening process
- Thermal conversion processes (Visbreaking & Delayed Coking)
- Catalytic hydrodesulfurization process
- Octane number & Oxygenate additives
- Solvent extraction & Dewaxing processes

Section (B): Petrochemistry (17 Marks)

Answer the following questions:

1- Answer three only of the following questions: (9 Marks)

- Outline the important petrochemicals based on isobutylene?
- Explain by equations the synthesis of TAME and MTBE?
- Discuss the production of nitric acid by oxidizing ammonia?
- Describe by equations the preparation of ethanolamines by amination process?

2- Discuss briefly four only of the following: (8 Marks)

- Single Cell Protein (SCP)
- Hydration of ethylene (Ethanol Production)
- Teijin oxychlorination method
- Methanation process
- Aromatics production from propane

Section (C): Chromatography

Write on only four of the following : (16 Marks)

- Ternary system, Coloumb,s law and Van Deemter equation.
- Instrumentation, advantages, disadvantages of thin layer chromatography (TLC) and methods of location of the separated organic components on it.
- Organic resins, gel and flash chromatography of open column chromatography.
- Instrumentation, derivatisation and applications of gas chromatography
- Instrumentation of high performance liquid chromatography (HPLC) and capillary zone electrophoresis (CZE).

Assiut University
Faculty of Science
Chemistry Department



Final Examination in Petroleum & Petrochemicals (451C) for the 4th Level
Geology Students (Summer Term)

Date: Tuesday, 30/08/2016

Time: 2 hours.

Answer all these Sections:

Section A: Petrochemicals:

(25 Marks)

Answer the following:

- 1) Starting from the following building blocks , discuss what are the petrochemicals can be produced from it :
 - a) Ethylene
 - b) Propylene.
 - c) Butadiene
 - d) Xylene
- 2) Discuss the following terms:
 - a) Steam cracking mechanism of Ethane.
 - b) Thermal cracking of higher alkanes.
 - c) Absorption and Adsorption Processes
 - d) Syngas conversion for petrochemicals production.

Section (B): Petroleum chemistry

(25 Marks)

1- (I)- Answer *two only* of the following:

(9 Marks)

- a) Describe in details the thermal conversion processes (Visbreaking & Delayed coking) ?
- b) Discuss the characteristics of N-compounds present in the crude oils?
- c) Describe the functions of batch and continuous distillation columns?

(II)- What is the definition of API gravity? Does a lighter crude oil have a lower or higher value
(4 Marks)

2- Explain briefly *four only* of the following:

(12 Marks)

- a) Doctor's sweetening process equations.
- b) Isomerization mechanism (*n*-Alkanes into isoparaffins).
- c) Octane number & Oxygenate additives.
- d) Propane deasphalting.
- e) Catalytic hydrodesulfurization process.

Good Luck
Examiners:
Prof. Dr. Kamal I Aly & Dr Hassan A Kotb

Final Exam. Of Chemistry of Biomolecules (413 C)
(Chemistry of carbohydrates, amino acids & proteins, lipids and nucleic acids)

Answer **Only Four** of the following questions:

Question No. 1:

- (a) Show by equations how can you carry out the following transformations:
(i) Glucose to fructose (ii) Arabinose to glucose
- (b) Draw the structural formula of following compounds:
(i) Palmitic acid (ii) Oleic acid (iii) Linoleic acid

Question No.2:

- (a) Conduct a comparison between:
(i) Nucleotides and Nucleosides (ii) RNA and DNA
- (b) Write the complementary base sequence for matching strand in the following DNA section : A-G-T-C-C-A-A-T-G-C-

Question No.3:

- (a) Give an account for:
(i) Glucose, fructose and mannose give the same osazone
(ii) Maltose is a reducing sugar but sucrose is a non reducing one although both of them is a disaccharide
- (b) Draw the structure of triolein. What is the type of this triglyceride? Calculate its iodine number (M. Wt of triolein =884; A. Wt of iodine = 127).

Question No.4:

- (a) Define each of the following terms:
Saponification value – Acid value – Epimers - Anomers
- (b) Show by equations how can you prepare aspartic acid by using Gabriel's Synthesis

Question No.5:

Write short notes on of the followings:

- (a) Importance of lipids
(b) Disadvantages of hydrogenated oils
(c) Isoelectric point
(d) Rancidity

Good Luck

أ.د. عطيفى عبد الغفار

Analytical Chemistry(2) C-441

Answer **Five Only** of the following questions: (Each question 10 marks)

1-a- Discuss the Inductively coupled plasma(ICP) technique.

b- The programmed temperature chromatogram.

2-Write on:

a- Determination of primary, secondary and tertiary amines mixtures.

b- i- X-ray absorption analysis.

ii- Radiation titration of an active substance against non-active one.

3-a- Explain the removal of dissolved inorganic by reverse osmosis.

b- Write : i-The condensation of aniline , Leucine and tyrosine

ii- The dimerization of cytosine and deoxyribose.

4-a- Write the determination of total organic carbon(TOC) in water.

b- Electrochemical methods are useful techniques for water analysis.Explain.

5-a- Discuss the combination of gas chromatography with mass spectrometry.

b-i- The extraction of phenol in each of acidic and basic medium.

ii- Calculate E% of 1.0 g of solute in aqueous medium using 90 ml organic solvent($D_c=10$) by one extraction.

6-a- Discuss the using of strong acidic and basic Resins to remove CaSO_4 from hard water.

b-i- Write on the accuracy and precision.

ii- The normality of a solution is determined by four separate titration, the result being 0.2041 , 0.2039 , and 0.2043. Calculate the mean, median, range, average deviation, relative average deviation, standard deviation and the coefficient of variation.

Good Luck,,,,,,

Dr. Ahmed Hassan Ibrahim

Surface chemistry and Electrochemistry (C432) Exam

Answer all the following questions:

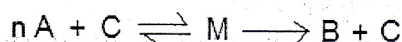
(16 2/3 marks for each)

1) Answer Only Two questions from the following:

- Drive the relation between the over- all reaction rate and ionic strength for an acid catalyzed reaction in presence of salt [not for the acid].
- Discuss the different intermediates formed in the catalytic oxidation of $S_2O_3^{2-}$ ions by H_2O_2 in presence of either I^- or MoO_4^{2-} . Then derive the appropriate equation adapting such kinetics.
- Drive the BET equation for multilayer adsorption of vapor on solid surfaces and show how to calculate the following
 - Specific surface area
 - Heat of adsorption

2) Answer Only Three questions from the following:

- According to the dualistic theory of homogenous catalysis, show how to calculate the individual rate constants that correspond to each active species involved in acid catalyzed reaction with its common salt.
- Discuss the different types of adsorbate – adsorbent interactions.
- Discuss the main tests for homogenous catalysis given by Shpitalsky and derive the kinetic equation for the reaction



- Discuss the different steps included in homogenous catalytic reactions, then show the conditions can be adjusted that the reaction would be kinetically and diffusion controlled.
 - Heat of adsorption

3) Answer only four from the following questions:

- Starting from First law of thermodynamic prove that "the amount of work we can extract electrically from a system".
- Explain by chemical equations the corrosion process of a piece of iron in an acid solution in presence and in absence of oxygen.
- In a short note define the following: solid electrolyte – Protective coatings.
- The current density for the evolution of hydrogen at platinum is $1.0 \times 10^{-3} \text{ mA m}^{-2}$. Using the polarization resistance equation calculate the current density at 298 K for an overpotential 5 mV? ($R = 8.314 \text{ J K}^{-1} \text{ mol}^{-1}$, $F = 96485 \text{ C mol}^{-1}$)
- Describe the polarization cell and role of each electrode in it.

(مع أطيب التمنيات)

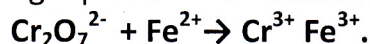
أ.د. ربيع محمد جبر أ.د. أبوالحجاج عبدالعزيز هرماس

Analytical Chemistry For Biological Students(460C)

Answer Five Only of the following questions(each question 10 marks):

1-a- Define buffer solution and Then calculate the P^H of a buffer solution containing 0.01 M acetic acid and 0.05 M sodium acetate ($P^K_a=4.76$).

b- Balance the following equation in an acidic medium.



2-a- Methods of detection of the equivalent point in the potentiometric titration.

b- Write on the Volhard's method in precipitation titrations.

3-a- Explain the determination of a mixture of a strong acid and a weak acid by conductometric titration.

b- Determine the P^H value of the each of i-0.1 M HCl.

ii- 0.2 M NaOH.

iii- 0.01 M NH_4OH ($P^K_b=4.76$).

iv- 0.01 M acetic acid ($P^K_a=4.76$).

4-a- Write on: Ilkovic equation- Half wave potential- Standard addition method in Analytical determination.

b- The Amperometric titration of an active species with non-active one (The product is non-active).

5-a- Draw a schematic diagram of a double-beam design. What is the concentration of an absorbing species if its molar absorptivity is 1500L(mol cm) and the measured absorbance in 1 cm cuvette is 0.742.

b- Discuss the programmed temperature chromatogram.

6-a- Calculate the potential at equivalent point during the titration of Fe^{2+} against Ce^{4+} ($E_{\text{Fe}}=0.77$, $E_{\text{Ce}}=1.44$ volt).

b- Write on the paper Electrophoresis.

Good Luck,,,,,

Dr.Ahmed Hassan.Ibrahim



Assiut University

Surface Chemistry & Electrochemistry for 4th Level Students (Chem.432)
(Chemistry Major)

Time : 3 h

Date: Jun. 2016



Faculty of Science
Chemistry Department

Answer the Following Questions:

Section (1) Surface Chemistry

1-Complete the following sentences.

(5 Marks)

- (i) The alcohol with long series is adsorbed on the surface (air-water) leading to in the surface tension.
- (ii) The amount of gas physically adsorbed always as temperature increased.
- (iii) Chemisorption is specific where as physical adsorption is relatively
- (iv) The basic concept of a catalyst is the of a substance that in..... causes a large change.
- (v) Selectivity of a catalyst is usually defined as the percentage of the that forms the desired products.
- (vi) The turnover number, is the that react per site per unit time.
- (vii) For an industrial catalyst, the physical properties such as, and are usually of major importance.

2-Put (✓) or (×) for the following sentences:

(4 Marks)

- (a) Adsorbent is a substance on whose surface adsorption occurs. ()
- (b) Adsorption is exothermic process which follows the equation $\Delta H = \Delta G + T \Delta S$ ()
- (c) Gases which liquefy easily are more readily adsorbed ()
- (d) Negative catalyst is a substance which increases the rate of reaction ()
- (e) A bifunctional catalyst provides two kind of sites ()
- (f) If the reflection of all lattice positions through a point brings a coincidence of points, there is a plane of symmetry ()
- (g) Slip motion many times is responsible for plasticity of crystal ()
- (h) The number of charge carriers that can result from ordinary donor or acceptor ionization is $([D] + [A])$. ()

3-Write short notes on two of the following

(6 Marks)

- (i) The factors are responsible for deactivation of a catalyst.
- (ii) Electrical properties of semiconductors.
- (iii) The factors affecting the amount of gas adsorbed on a solid catalyst.

4-Answer four only from the following:

(16 Marks)

- a- Prove the Gibbs adsorption equation, from that calculate the average area occupied by each molecule adsorbed on the surface.
- b- How are electrons created within n- and p- type semiconductors by doping.
- c- Apply the $V_a - t$ polt method for determination of specific surface area (S_t) and porosity of a catalyst.
- d- Explain the importance of a catalyst support and mention the characteristic properties of a support.
- e- Summarize the most important industrial and environmental applications of catalysis

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Section (2) Electrochemistry

Answer only Three questions from the following:

(mark = 17)

- 1) Write short note about: Cost of corrosion – Protective coatings.
- 2) Describe the energy profile of electrode reaction $\text{Ag}^+(\text{aq}) + \text{e}^- = \text{Ag}(\text{s})$, in absence and in application of $\Delta\Phi$ potential to reduction process. Estimate the electrochemical rate equation for this electrode reaction.
- 3) When Pt electrode is cathodically polarized in deaerated acid solution at 25°C the hydrogen overvoltage is 0.033 V at 0.01 A cm^{-2} and 0.063 V at 0.1 A cm^{-2} , calculate the Tafel constants (a and b) and the exchange current density for discharge of H^+ on Pt under given condition.
- 4) Discuss the theories you studied for definition of the electric double layer.

(Good Luck)

Prof. Abd El-Aziz A. Said , Prof. Abo- Elhagag A. Mohamed

Section(II)

a) Answer **Only Two** of the following: (10 marks)

- (i) What is the molecular weight of a compound if it has a molar absorptivity of 1250 and 35 mg/50 ml yield a% T of 12?
- (ii) At a wave length of 356 nm the molar absorptivity of phenolic compound in 0.1 M HCl is 400 and in 0.2 M NaOH is 17100. Determined in PH 9.5 the molar absorptivity is 9800. Calculate the PKa.
- (iii) In a simultaneous determination for cobalt and nickel based upon absorption by their 8- quinolinol complexes , a molar absorptivities are $\epsilon_{\text{Co}}=3529$ and $\epsilon_{\text{Ni}}= 3228$ at 365 nm and $\epsilon_{\text{Co}}=428.9$ and $\epsilon_{\text{Ni}}=0$ at 700 nm.
Calculate the concentration of nickel and cobalt in a solution has the absorbance values of 0.724 at 365 nm and 0.071 at 700 nm (1.0 cm cells).

b) Sketch the graph you would expect from each of the following .what is significance of each plot? (6 marks)

- (i) Photometric titration of a mixture of P-nitrophenol and m-nitrophenol with a standard solution of NaOH.
- (ii) Job's plot confirming complex formation 1:2 metal to ligand ratio.
- (iii) Absorbance vs.PH graph at λ_{max} of ionized form of an acid-base indicator.

c) Complete the following sentences: (5 marks)

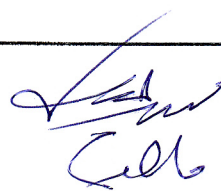
- (i) A beam of light containing several wave lengths is said to be.....
- (ii) A bathochromic shift will result by increasing degree of.....chromophore.
- (iii) In interferometer instrument, the reflected beams are recombined to produce an.....before passing through the sample.
- (iv) In mid IR the intermediate frequency range $2500\text{-}1540\text{ cm}^{-1}$ is often called.....
- (v) Stretching vibration involved..... absorbs at.....wavenumber than that contains heavier atom.

d) Define or characterize **Only Four** of the following: (4 marks)

- (i) Auxochrome - MLCT- transmitted light – acylation reactions- isobestic point

Examiners: Prof.Dr,Mahmoud A.Ghandour

Prof.Dr.Magda Seleem



Answer the following questions:

1 -A) Complete the following with the correct choice (between brackets) [10 marks]

- i) For determination of stability constants in solution.....independent concentration measurements are needed. (n , $n+1$, $n+2$)
- ii) Soft Lewis base ligands have proton affinity. (very high – very small)
- iii) The nucleophilic discrimination factor characterizes the sensitivity of the rate constant toof the ligand.(size – nucleophilicity- polarizability)
- iv) Strong field $3d^3$ and $3d^6$ complexes are generally(inert- labile).
- v) In interchange substitution mechanism, the entering and leaving groups exchangeformation of an activated complex. (with - without)
- vi) Themechanism plays a central role in octahedral substitution reactions. (associative – dissociative – interchange)
- vii) The equilibrium constant favors the encounter if the reactants are and oppositely charged. (small - large)
- viii) The K_1 pathway inmechanism of square planar substitution reactions is two-step mechanism. (intimate – stoichiometric)
- ix) The chiral form of chelate rings isreactive than the achiral form in octahedral substitution reactions.
- x) The faster the reaction of a Lewis acid with an entering group, the is the electrophilicity of the acid.

B) Derive the equation for calculating the average number of ligand molecules attached to the metal ion (\bar{n}) from pH-measurements. (2.5 marks)

2-A) Put ($\sqrt{\quad}$) or (X) in front of each of the following: (10 marks)

- i) Inert complexes are thermodynamically unstable ().
- ii) Complexes of trivalent f-block metal ions are inert().
- iii) Most stable complexes are those of soft Lewis acids and hard Lewis bases ()
- iv) Hard ions or molecules have a large HOMO- LUMO separation. ()
- v) Steric crowding at the center of the reaction inhibits the associative reaction()
- vi) Lower π^* electron density on the central metal ion facilitates dissociative substitution reactions in octahedral complexes. ()
- vii) Good donors stabilizes the reduced coordination number in octahedral substitution reactions.()
- viii) The increase of coordination number in a dissociative reaction relieves the crowding in the activated complex.()
- ix) In Eigen- Wilkins mechanism, an encounter complex is formed in a pre-equilibrium step.()
- x) For Co(III) and Cr(III) octahedral complexes both cis and trans ligands affect rates of substitution.().

بقية الاسئلة بالخلف



Final Exam. In Selected Topics in Organic Chemistry
(414 C) for chemistry major students

Answer the following **THREE** sections:

(50 Marks)

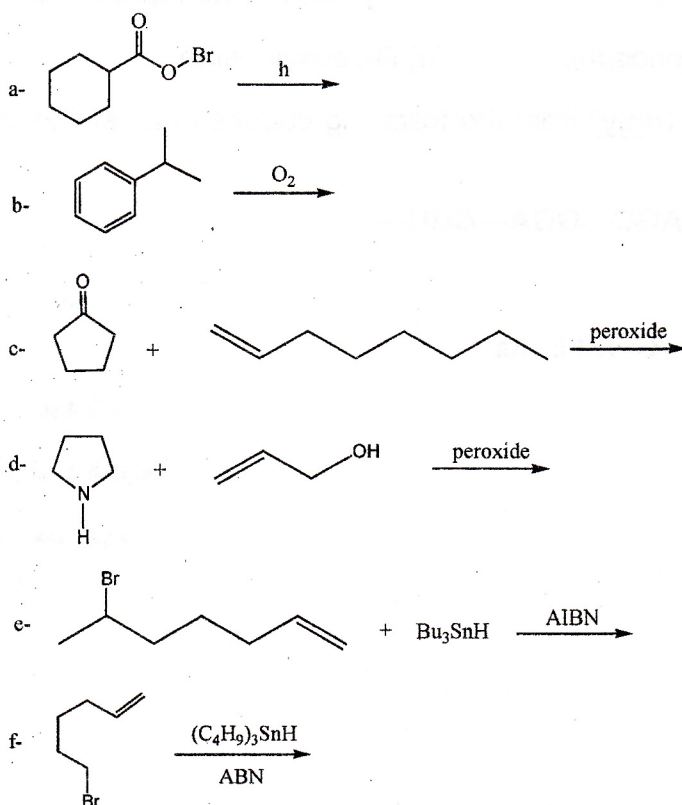
Section (A) (17 Marks)

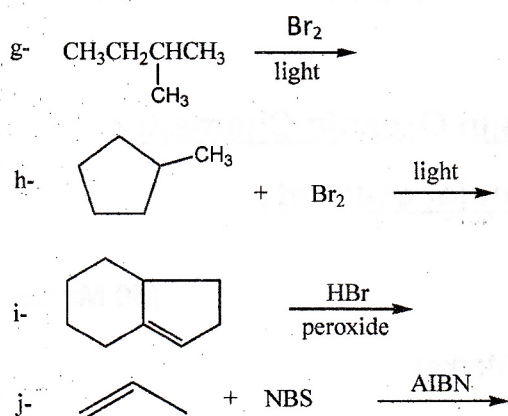
1. Try **Two** only of the following:

- Write on three cases in which sugar appears in urine.
- The biochemical reactions involved in β -oxidation of even numbered fatty acids into acetyl-coenzyme-A units. Calculate the number of ATP units stored during β -oxidation of a fatty acid containing 6 carbon atoms.
- Using chemical formulae illustrate the reactions occurring during oxidation of acetyl-coenzyme-A units in Krebs cycle.
- Write on the directions advised to follow to keep cholesterol level at optimum concentration in blood.

Section (B): (16 Marks)

1. Complete the following reaction sequences and suggest a mechanism for formation of the Major product:





Section (C): (17 Marks)

Answer the following questions:

1- Write on the following terms:

- | | |
|---|-----------------------|
| a- RNA and its types. | b- The genetic code. |
| c- The termination step in protein synthesis. | d- Viruses. |
| e- The reverse transcriptase. | f- Types of mutation. |

2- Give short notes on the steps of protein synthesis.

3- (i) Draw the structures of the following species:

- | | |
|--------------------------------------|--------------------------------|
| (a) Guanosine 5'-monophosphate. | (b) Cytidine 5'-monophosphate. |
| (c) Deoxyadenosine 5'-monophosphate. | (d) Dideoxyinosine. |

(ii) Determine the amino acids (**only**) from the following codons in a section of mRNA?

—CCU —AGC—GGA—CUU—

Good Luke

أ.د. أحمد ثابت

أ.د. أحمد الخواجة

د. أحمد عبده



Assiut University
Faculty of Science
Chemistry Department



June 2016
Time: 2 hours
(50 Marks)

Second Semester Examination for Biological Students
Subject: Analytical Chemistry (C- 460)

Answer the following questions: (50 Marks)

Q₁) Answer Only Two from the following: (12.5 Marks)

- a) Write on the following:
- i) Acid –Base indicators. ii) Factors affected on the half wave potential ($E_{1/2}$).
- b) If you are provided with 1M HCl (100ml) and titrated with 1M NaOH.
Calculate the pH value:
- i) at the beginning of the titration, ii) after the addition of 50 ml NaOH
 - iii) at the end point. iv) after the addition of 110 ml NaOH.
- Mention the indicators used and why.
- c) Give the reason for the following:
- i) Mohr method is applicable in neutral solution.
 - ii) Supporting electrolyte is used in the polarographic analysis.

Q₂) Answer Only Two from the following: (12.5 Marks)

- a) Define the following terms:
- i) Ilkovic equation. ii) Beer's Lambert law.
- b) Write on the following:
- i) Buffer solutions. ii) Electrochemical cell.
- c) Calculate the equivalent weight for:
- i) KMnO_4 in acidic and basic medium. ii) $\text{K}_2\text{Cr}_2\text{O}_7$.
- (K=39, Mn = 55 , O = 16, Cr = 52)

Q₃) Answer Only Two from the following: (12.5 Marks)

- a) Complete:
- i) The equation which give the relation between ($E_{1/2}$) and diffusion current i_d is -----.
 - ii) The indicator in Mohr method is ----- , while in Volhard method the indicators are ----- and in Fajan method the indicators are -----.
- b) During the titration of 100 ml of NaCl (0.1N) using AgNO_3 (0.1N)
Calculate pCl. ($k_{sp} = 1.2 \times 10^{-10}$)
- i) before the titration, ii) after the addition of 50 ml AgNO_3 .
 - iii) at the end point and iv) after the addition of 110 ml AgNO_3 .
- c) Define the following:
- i) Molar conductivity and equivalent conductivity. ii) Nernst equation.

Q₄) Answer Only Two from the following: (12.5 Marks)

- a) Write on the following:
- i) Standard hydrogen electrode. ii) Types of polarographic current.
- b) Show how you can use polarographic technique in quantitative analysis.
- c) Write on the following:
- i) Limitation of volumetric precipitation titration reaction.
 - ii) Advantages of dropping mercury electrode.

-----Good Luck-----

Examiner: Prof. Dr. Azza M.M.Ali



Assiut University
Faculty of Science
Chemistry Department



Time: 3 hour
June 15th 2016

Selected Topics in Analytical Chemistry (C-444) Final Exam

Answer the following questions: (50 Marks)

1) Answer **Four Only** (17Marks) Examiner: Prof. Dr. Hassan sedaira

- Define or characterize:
 - Solvent extraction
 - Distribution ratio
 - Percent extracted.
- Describe the equilibrium processes involved in the solvent extraction of metal chelates.
- Discuss the effect of the pH and the reagent concentration on the solvent extraction of metal chelates.
- 96% of a solute is removed from 100 ml of an aqueous solution by extraction with two 50-ml portions of an organic solvent. What is the distribution ratio of the solute?
- For a solute with a distribution ratio of 25, show by calculation which is more effective, extraction of 10 ml of an aqueous solution with 10 ml organic solvent or extraction with two separate 5-ml portions of the same organic solvent.

2) Answer **the Following questions:** (17Marks) Examiner: Prof. Dr. Nagwa Abo-EL-Maalí

- Define: (3 Marks)
Biomass- Lipid-rich Biomass- Efficiency of solar energy conversion by plants.
- Write **briefly** on: (2Marks)
 - Conversion of biomass to biofuel and energy.
 - Production of fuel from vegetable oils biomass
- What are : (3 Marks)
 - the challenges for the use of biomass in power plants?
 - the function of proteins in the human body?
 - the significance of an absorbance graph of tryptophan?
- In the titration curve of glycine can we use glycine as a buffer in solutions? What is the isoelectric point (pI)? (2 Marks)
- Complete the following sentences: (7 Marks)
 - Hydrophobic amino acids have -----, -----, while hydrophilic have -----and -----.
 - The three principal resources for biomass are -----, ----- and -----.
 - The only type of amino acid that does not have a chiral center is ----- because -----.
 - In the human body, enzymes are more specific to ----- of the amino acids.
 - The only amino acid with a nonpolar aliphatic side chain that has a ring structure is -----.

باقى الأسئلة فى الخلف

Please turn Over

3) Answer the following questions: (16 Marks) Examiner: Dr. Ahmed Kamal Youssef

a) Answer the following : (4 marks)

- i) Describe a spectrophotometric method for the determination of secnidazole drug by azo dye formation reaction using α -naphthylamine.
- ii) How can you validate a spectrophotometric method for a pharmaceutical compound determination?

b) Answer only Four of the following: (12 marks)

- 1- Describe an acid catalyzed ring opening and subsequent amino acid cleavage for the spectrophotometric determination of 2-amino-5-nitrobenzophenone from nitrazepam.
- 2- Explain the energy scheme of various types of electron excitations for Ultraviolet/Visible spectra of organic molecules.
- 3- Describe a spectroscopic method for the detection of Fluoroquinolone antibacterial (Ciprofloxacin) drug.
- 4- Discuss an oxidative condensation between 4-amino antipyrine and phenol catalyzed by peroxidase enzyme.
- 5- Describe the scheme proposed for detection of dothiepin drug using quinalizarin.

Good Luck

Final exam of Chemistry of biomolecules (413C) for non-chemistry Students
(Chemistry of carbohydrates, amino acids & proteins, Lipids and nucleic acids)

Answer the following questions:

I- Define only five of the following terms: (10 Marks)

- | | | |
|-------------|-------------------------------------|----------------|
| a) Epimers. | b) Saponification value. | c) Rancidity. |
| d) Anomers. | e) Isoelectric point of amino acid. | f) Acid value. |

II- Show how can you do only five of the following: (10 Marks)

- a- Conversion of glucose to fructose.
- b- Conversion of ketoses to aldoses.
- c- Conversion of arabinose (pentose) to glucose (hexose).
- d- Synthesis of glycine by Gabriel's synthesis.
- e- Synthesis of tyrosine by Erlenmyer synthesis.
- f- Reaction of glycine with formaldehyde and with nitrous acid

III-a-Draw the chemical structure of triolein (5 Marks)

- 1) What is the type of this triglyceride?
- 2) Calculate the Iodine number for triolein
- 3) Calculate the Saponification value for triolein

[Mol.Wt of triolein = 884; A.Wt. of iodine =127; Mol.Wt. KOH =56]

b- Compare between the following: (5 Marks)

- | | |
|---------------------------|------------------|
| i) Waxes and fats & oils. | ii) DNA and RNA. |
|---------------------------|------------------|

IV - Choose the correct answer of the following: (10 Marks)

- 1) Oxidation of glucose with bromine water gives:
a) Gluconic acid b) Saccharic acid c) Glucuronic acid
- 2) Maltose is reducing sugar and consists of:
a) Glucose + fructose, linked 1-2'. b) Two glucose units linked 1-4'.
c) Galactose + glucose linked 1-4'. d) Two glucose units linked 1-5'.
- 3) The presence of solid α -amino acid as Zwitter ion explains:
a) Its high melting points. b) Low solubility in organic solvents.
c) a & b. d) None of them.
- 4) Reaction of glycine with ethanol in presence of hydrogen chloride gas gives:
a) Glycyl glycinate. b) Ethyl glycinate hydrochloride. c) Hippuric acid.

-P.T.O-

- انظر خلفه باقي الاسئلة -

- 5) Carrying out the Strecker amino acid synthesis on acetaldehyde gives:
 a) Glycine b) Alanine c) Aspartic acid
- 6) The sequence of amino acids in a polypeptide chain is called:
 a) Primary structure b) Secondary structure c) Tertiary structure
- 7) Which of the following fats has the highest iodine value?
 a) Tripalmitin b) Stearo-diolein c) Palmito-oleo-stearin d) Triolein.
- 8) Rancidity increases as:
 a) The molecular weight increase. b) The molecular weight decrease.
 c) The number of double bonds increases. d) The number of double bonds decreases.
- 9) Which of the following fatty acids has the **lowest** melting point?
 a) Palmitic acid b) Oleic acid c) Linoleic acid d) Stearic acid
- 10) Saponification number increases as:
 a) The molecular weight increase. b) The molecular weight decrease.
 c) The number of double bonds increases. d) The number of double bonds decreases.

V. Put (✓) in the front of the correct Statements and (X) in the front of wrong ones: (10 Marks)

- 1- D-glucose and D-galactose are epimers.
- 2- Reduction of fructose gives sorbitol and mannitol
- 3- The Fisher open structure does not account for all the reactions of glucose
- 4- The cyclic structure of glucose is formed by reaction of -CHO with -OH on C4.
- 5- The type of the peptide glycl-L-alanyl glycine is dipeptide
- 6- In proteins, the amino acids joined by glycoside linkage.
- 7-Acid value is a measure of rancidity.
- 8- Oils with high acetyl number are toxic.
- 9-Adenosine-5'-phosphate is nucleotide of RNA.
- 10-The antiparallel strands of DNA are not identical, but are complementary.

Prof. Dr. Mohamed S. Abbady

Good luck



Final Examination for B.Sc. (Chemistry major)
Applied Organic Chemistry (412 C): (Textiles & Dyes & Polymers & Material science)

Date: Wednesday , 01/06/2016

Time: 2 hours.

Answer the following Two Sections:

Section A: (Textiles and Dyes Chemistry).

(25 points)

Answer the following:

- 1) Discuss and write examples on Cyanine Chromogen .
- 2) Explain the reaction mechanism of diazotization reaction for production of Azo dyes.
- 3) Write on the morphology of wool fiber and compare it with that of cotton.
- 4) Write on the physical properties of fibers related to durability.
- 5) What is required for coloured substance to be a dye?

Section B : (Polymers & Material Science)

(25 Points)

Answer the following questions:

- 1) What are the three main types of degradable plastics? Why are they degradable?
- 2) There is another kind of nylon called nylon-6. What is the structure of the monomer of nylon-6?
- 3) Why would a hole appear when a dilute alkali is spilt on a fabric made of polyester?
- 4) Explain the term "vulcanization of rubber". What are the differences between natural rubber and vulcanized rubber?
- 5) Three things make the polymers are different from the simple molecules. Explain?
- 6) What is a peptide linkage? Illustrate your answer with 2-aminopropanoic acid ?
- 7) Complete the following table:

Polymer	Structural formula of monomer	Structural formula of polymer	Uses
Nylon-6,6	(i)	(ii)	(iii)
Kevlar	(iv)	(v)	(vi)
Dacron	(vii)	(viii)	(ix)
Urea-methanal	(x)	(xi)	(xii)

Good Luck

Examiners:

Prof. Dr. Saud A Metwally & Prof. Dr. Kamal I Aly