Assiut University Faculty of Science Chemistry Department	First Semester Final Examination Instrumental Analysis (C-445) Credit Hours System	Dec 2018 Time: 2 hour

Section (A) (25 Marks)

Answer The Following Questions:

***First Question**: Answer **Only Two** from the following: (12.5 Marks)*

(1) Write on the following:

(a) Ilkovic equation:

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(b) Randles-Sevcik equation

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(c) Carbon electrodes (Give examples):

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(2) (a) A Cd^{2+} solution of unknown concentration yields a diffusion current of 1.00 μA. Then, to 10.00 mL of the unknown solution is added 0.50 mL of a standard solution of Cd^{2+} whose concentration is 0.04 M. The diffusion current with the spiked solution is 1.50 μA. Calculate the Cd^{2+} concentration of the unknown solution.

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(b) Write on advantages of stripping voltammetry

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(3) Sketch the relation between current and time for differential pulse voltammetry.

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***Secon Question**: Answer **Only Two** from the following: (12.5 Marks)*

(1) Mark (√) for the correct statement and (X) for the wrong statement

a) It is desirable to make electrochemical measurements without current flowing through the RE

b) Normal pulse is about 5-10 times more sensitive than differential pulse polarography

c) The half wave potential ($E_{½}$) can be used to identify the analyte concentration.

d) Current of polarizable electrode remains unchanged with changes in the electrode potential

e) Hg forms soluble amalgam with many metals hence lowers their reduction potentials

f) Non-faradaic currents exist in an electro- chemical cell are related to any redox reaction

g) In anodic stripping methods, the WE behaves as a cathode during the deposition step

a	b	c	d	e	f	g

(2) Write on the following:

(a) The principle of electrochemical biosensor (Give an example).

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(b) Role of auxiliary electrode: (with drawing)

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(3) Write on the following:

a) Amperometry.....

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b) Adsorptive stripping voltammetry:

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c) The oxidation of uric acid (UA) is a $2e^-$ process. A cyclic voltammetric anodic peak current (I_p) of 2.2 μA is observed for 0.4 mM solution of UA in phosphate buffer at carbon paste electrode of 2.6 mm^2 with a scan rate (v) of 25 mV/s. What will I_p be for v =100 mV/s and 1.2 mM UA?

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Section (B) (25 Marks)

Answer Only Five of the Following Questions:

Q.1: Explain why fluorescence and absorption between the ground and excited states (for example, $S_0 \leftrightarrow S_1$) are not observed at the same wavelength

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Q.2: Sketch the spectrophotometric titration curves for reactions between an analyte (A) and a titrant (T) to give a product (P) if a) only P absorbs and b) Both P and T absorb

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Q.3: Discuss the slope ratio method for determining the stoichiometry of a ligand-metal complex

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Q.4: The transmittance of a solution is found to be 85.0% when measured in a cell whose pathlength is 1.00 cm. Calculate the percent transmittance if the pathlength is increased to 10.00 cm

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Q.5: A standard (M.wt.= 412.83 g/mol) with a concentration of 400 ppm has an absorbance of 0.424 at 460 nm. Calculate the % transmittance of a solution of 3.20×10^{-3} M of this standard measured at the same wavelength

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Q.6: A solution of 5.00×10^{-5} M 1,3-dihydroxynaphthalene in 2 M NaOH has a fluorescence intensity of 4.85 at a wavelength of 459 nm. Calculate the concentration of 1,3-dihydroxynaphthalene in a solution with a fluorescence intensity of 3.74 under identical conditions?

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Good Luck

MEDICAL BIOCHEMISTRY EXAMINATION

CLINICAL CHEMISTRY

FACULTY OF SCIENCE

Time: 2hr	Total marks:50	Date: 5-1-2019

Answer all the questions:

A. Complete the following sentences (16 marks)

1. PTH acts to increase degradation of bone causes ---------- to release cytokines or activating factors , which stimulate ----------
2. ALT levels ----------with hepatocellular damage
3. ALT was formerly known as----------
4. AST Known as ----------
5. ALP stands for ----------.
6. Liver enzymes increased in ----------.
7. The respiratory acidosis of the arterial blood gas ----------
8. Cardiac Biomarkers----------and----------
9. Normal levels of Blood PH ----------O2----------CO2---------- HCO3----------
10. Acidic PH level of Urine ---------- and Alkaline PH level of Urine---------

B- Match (4marks)

A. PTH, low blood calcium	Calcitonin target tissues
B. Bone, kidney, intestine	Effectors that stimulate calcitriol
C. High blood calcium level	Calcitonin stimulus
D. Low blood calcium level	Active form of Vitamin D stimulus

C- Choose the correct answer **(8 marks)**

1. In which type of chromatography, the stationary phase held in a narrow tube and the mobile phase is forced through it under pressure?
a) Column chromatography
b) Planar chromatography
c) Liquid chromatography

2. In chromatography, the stationary phase can be _____ supported on a solid.
a) Solid or liquid
b) Liquid or gas
c) Solid only
d) Liquid only

3. In chromatography, which of the following can the mobile phase be made of?
a) Solid or liquid
b) Liquid or gas
c) Gas only
d) Liquid only

4. Chromatography with solid stationary phase is called
a) Circle chromatography
b) Square chromatography
c) Solid chromatography
d) Adsorption chromatograph

D. Mention Briefly **(16 Marks)**

1. Discuss what Parathyroid Hormone is and what it does?
2. Identify cells that break down and build up bone?
3. Precaution of ABG sampling and equipment's
4. Write short note on applications of TLC.
5. How to screen any cardiovascular effect of drugs?
6. How to differentiate between opioid and NSAID?
7. Enumerate: the biochemical tests in clinical medicine?
8. Causes of Turbid Urine?

E. By Diagram only **(6 marks)**

A. gas chromatography

B. Vit D Absorption from the intestine.

BEST WISHES

Cement Raw Material for 4th level Students (Chem 405)

Industrial Chemistry

Dec. 2018 Time: 2 hrs.

Answer ONLY FIVE of the following questions:

1) A - Put (True) or (False) against each statement: (5 marks)

1. Limestone is an argillaceous material while clay is a calcareous material
2. Moisture content in solid raw materials is a weight increase
3. GBFS is a corrective material where Blast Furnace Slag is a cement additive material
4. Hydraulic Modulus (HM) = Base oxide / Acidic oxides
5. X-ray fluorescence is used for structural characterization where X-ray diffraction is used for chemical characterization in solid materials

B - Answer the following: (5 marks)

What are the gypsum forms? Which is the highest SO3 %? Prove with calculation

2) A - Answer the following: (5 marks)

Calculate the total clay reserve from the following data:

Quarry volume is 1000,000 M3, clay bulk density is 1.67 Ton / M3 and average of the last five years consumption is 83,500 Tons / year

B - Give short account on: (5 marks)

1. Clay overburden and clay crushers
2. Pozzolana and Kaolinite (Kaolin)

3) A- Answer the following: (5 marks)

Calculate the total limestone quantity (in million tons) for a limestone quarry area of 2 Km length, 1 Km width and a face height of 100 m, limestone bulk density is 2.22 Ton / M3

B- Answer the following: (5 marks)

1. What means by the physical analysis of raw materials
2. Describe the steps of choosing a new quarry

4) A- Answer the following: (5 marks)

Which Iron forms is the richest in Fe %; Hematite, Pyrite or Magnetite? Prove with calculations

B- Answer the following: (5 marks)

1. What is the mix design? Why do we analyze raw materials?
2. What are the minimum materials needed to correct the raw meal three parameters; LSF, SM and AM?

5) A- Answer the following: (5 marks)

What is the limestone? Calculate the purity %, SM and AM from this analysis:

SiO_2	Al_2O_3	Fe_2O_3	CaO
1.0	0.2	0.1	54.9

B- Answer the following: (5 marks)

1. What means by the reclaiming and stacking of cement raw materials?
2. What is the dangerous effect of high alkalis and Chlorine contents in cement raw materials

6) A - Answer the following: (5 marks)

Calculate the SO_3 % in 1.0 g sample if the weight of the ppt. is 0.075 g in the sulfate determination by $BaCl_2$ test

B – Answer the following: (5 marks)

1. What is the source of loss on ignition in each of the following materials: Limestone, gypsum and clay?
2. What is the theoretical LOI % in pure gypsum and limestone

Considering the atomic weights: Ca= 40, O= 16, C= 12, S= 32, H= 1, Ba= 137, Fe= 55.85

(Good Luck)

Examiner: Chemist / Hassan Mohamed

Chemistry Department
Faculty of Science
Assiut University

Jan, 2019
Time: 3 hours
50 Marks

Final Exam of Organic Chemistry (Petroleum, Petrochemicals and Chromatography-411C) for the 4th Level Chemistry Students

Answer all of the following questions:

Section (A): Petroleum Chemistry (17 Marks)

1- Answer *three* only of the following: (3×3 = 9 M)

a) Describe the catalytic reforming process of naphtha feedstock?
b) Define the API-gravity and Watson factor (UOP)? How can their values useful in assignment of oil quality?
c) Outline *three* only of the sweetening processes of sour feed stocks?
d) Discuss the basic principles of propane deasphalting and dewaxing processes?

2- Explain briefly *four* only of the following: (4×2 = 8 M)

a) Classification of continuous distillation columns.
b) Thermal visbreaking processes.
c) Characteristics of N&S-compounds present in the crude oils.
d) Octane number and antiknock index.
e) Advantages of hydrocraking processes of heavier feedstocks.

Section (B): Petrochemicals (17 Marks)

1- Answer *three* only of the following: (3×3 = 9 M)

a) Outline the important *n*-butenes petrochemical?
b) Describe the manufacture steps of acetic acid using rhodium complex catalyst?
c) Outline in details the reactions of *ethylene oxide* with alcohols, carboxylic acids and ammonia?
d) Describe in details the oxidation mechanism of propene to acrolein?

2- Explain briefly *four* only of the following: (4×2 = 8 M)

a) Synthesis of glycerol from allyl alcohol
b) Acetone production and uses
c) Production of hydrazine
d) Hydration of ethylene
e) Synthesis of 2-ethylhexanol

Section (C): Chromatography (16 Marks)

Answer *four* only of the following: (4×4 = 16 M)

a) Discuss the distribution constant (*Kc*), resolution (R_S), separation factor (α) and Van Deemter equation of a symmetric Gaussian peak?
b) Discuss the theory and main aspects of affinity chromatography (AC)?
c) Outline the classification of chromatographic methods based upon the development procedures?
d) State in details *three* only of (LC) detectors used in HPLC-systems?
e) Outline the purpose, uses and main characteristics of gas chromatography and electrophoresis?

Good Luck

Assoc. Prof. Hassan Abdou Kotb

Faculty of Science
Chemistry Department

Dec. 22. , 2018
Time : 3 hrs

Petroleum Chemistry (409C)

Final Exam. For The 4th Fourth level Students

Answer on the Following Questions: **(50 Marks)**

1] – Write Briefly on the Following: **(2.5 X 4= 10 Marks)**

1- Migration of Petroleum oil.

2- The modern method of evaluation of crude petroleum oils.

3- The Aniline point –structure relation ship, and its significance.

4- The pretreatment "Desalting" process in petroleum oil refining .

II]- Answer on the Following: **(5 X 4= 10 Marks)**

1-What are the Feed stock(s) of the following Refinary and Conversion processes:

a- Atmospheric distillation, b- Catalytic cracking , c- Alkylation processes.

2-Define only **Three** of the Following :

a- Fire point , b- Pour point , c- Parafin- Base crude oil , d- Cetane number

III] – Discuss only Three of the following: **(10 Marks)**

1- The different types of Sulfur compounds may be present in Crude Petroleum. **(3 Marks)**

2- The role of catalyst in Catalytic Cracking processes. **(3 Marks)**

3-The possible Hydrocracking processes of Naphthalene, discuss using chemical equations. **(4 Marks)**

4-- What are the Sulfur Sweetening operations with special reference to Doctor Method. **(3 Marks)**

IV] – Mark right (√) or wrong (X) on only Four of the following statements and discuss your answer : **(2.5 X 4= 10 Marks)**

1-The % of Hydrogen in all crude petroleum oils varies between 4.0% - 14.0% . ( )

2-Topped crude oils contain a high amount of Gasoline . ( )

3-n- Heptane has Cetane number = 100 ( )

4-Straight run Gasoline has only ~ 5% of Oxygen Compounds. ( )

5-Naphthenes have lower Octane Number than n-paraffins. ( )

V] - Answer on only Three of the Following Questions: **(10 Marks)**

1- Write short note on quality, including laboratory role in Oil & Gas industry. **(3 Marks)**

2- Mention the international standards organization responsible for test methods in petroleum industry laboratories . **(3 Marks)**

3- What are the simple and complex refineries ?. **(3 Marks)**

4- Define the main features (specifications) of refinery feedstock & Jet fuel including the tests performed. **(4 Marks)**

Good Luck

Industrial Catalysis Examination for 4th Level Students(Chem.401)

Industrial Applied Chemistry Program

Time :2 h

Date: 26 / 12/ 2018

Assiut University

Faculty of Science
Chemistry Department

Answer the Following Questions:

1-Short answer on three only of the following: **(14 Marks)**

a) Catalyst (A) is more active and selective than catalyst (B)

b) The common features of catalytic oxidation processes.

c) The role of a catalyst for proceeding a chemical reaction

d) Applying the impregnation method for synthesis of supported catalysts.

2- Answer four only of the following. **(36 Marks)**

a) The activity of $Cu/ZnO/Al_2O_3$ for methanol synthesis depends on the procedures used.

b) How is acylic acid manufactured industrially taking in your consideration the catalyst and conditions used.

c) Discuss how is ethylene oxide produced industrially.

d) What are the desired characteristics of a catalyst and explain shortly the forming operations.

e) What is the importance of formaldehyde and explain the conditions for it's commercial production over iron molybdate catalyst.

Good Luck

Prof. Dr. Abdel-Aziz A. Said

Assiut University
Faculty of Science
Chemistry Department

January 2019
Time: 3 Hours

Selected Topics in Inorganic Chemistry C-423 (Final Examination)

Section # 1 (Metallurgy): **(17 Marks)**

Answer Only Three questions of the following, your answer must include the first question.

1. Write about physical properties, ores, effects of acids and bases and extraction of one of the following metals: Tungsten – Uranium 235 – Aluminum – Chromium. **(7 Marks)**
2. a) Write about the percentages of the constituents of the following alloys and their uses: Chromium vanadium steel – White gold - Bronze – Printing alloy - Duralumin. **(2.5 Marks)**
   b) Write the chemical structure of the following ores: Carnotite – Wolframite – Galina – Pyrolosite – Bentlandite. **(2.5 Marks)**
3. Explain conditions applied in electrometallurgical processes for extraction of some metals. **(5 Marks)**
4. Write about the pyrometallurgical alumino-thermite process for extraction of some metals and give example. **(5 Marks)**

Section # 2 (Inorganic Biochemistry): **(17 Marks)**

1. **Draw the molecular structure of Three Only of the following:** **(9 Marks)**

a) A drug is used for treatment of arthritis.
b) An inorganic complex is used as a contrast agent in medicinal diagnosis.
c) An enzyme catalyzes the hydrolysis of urea to ammonia and carbamate.
d) An oxygen transport protein is found in arthropods.

2. **Discuss Two Only of the following:** **(8 Marks)**

a) The differences between the hemoglobin's R-state and T-State.
b) The protein's various structures.
c) The siderophores which are used by several microorganisms for chelating iron.

Section # 3 (Structural Inorganic Chemistry): **(16 Marks)**

1. **Answer Three Only of the following:** **(12 Marks)**

a) Calculate the linear atomic density along the [111] direction in the copper crystal lattice. Copper is FCC and has a lattice constant of 0.361 nm.
b) Iron is BCC at 911□C with a lattice parameter of 0.2863 nm. At 913□C, iron is FCC with a lattice parameter of 0.3591 nm. Determine the % change in volume.
c) Show all differences between the two carbon allotropes "graphite and diamond".
d) What is meant by tetrahedral and octahedral interstices? Discuss their positions in FCC unit cell.

2. **Discuss One Only of the following:** **(4 Marks)**

a) The cesium chloride structure.
b) The zinc blende structure.

Good Luck

***The Examiners*: Prof. Dr. Mostafa Kamal Hassan & Dr. Ahmed Bayoumi.**

Chemistry Department
Faculty of Science
Assiut University

Jan. 2019
Time: 2 hours

Final Exam. of Petroleum & Petrochemicals Course for (451C) Students

Answer the following questions:

1- I- Answer *two only* of the following: **(10 Marks)**

a) Definition of reservoir rock, higher °API and diesel index.
b) Write by equations hydrotreatment process of indole.
c) Starting with benzene, how can you prepare of terephthalic acid?

II- Draw and discuss delayed coking and how decoked from the drum?.

2- I- Discuss *two only* of the following points: **(10 Marks)**

a) Effect of sulfur on industrial furnaces.
b) Steam cracking process.
c) Starting by ethane, how can you prepare of PVCand its uses.

II- Draw and discuss Phillips as alkylation process and the difference between H_2SO_4 and HF acids as catalysts for this process.

3- I- Explain *two only* of the following: **(10 Marks)**

a) Starting with methane, how can you prepare formaldehyde and its uses.
b) Disadvantages of thermofore catalytic cracking.
c) Paraffin-Base crude oils.

II- write by equations, hydrotreament for naphthalene.

4- I- Give an account *two only* on the following: **(10 Marks)**

a) NaOH as solvent extraction method for desulfurization process and the difference between NaOH and KOH as alkali for this method.
b) Types of catalysts in catalytic cracking.
c) Definition of depropanizer, demister pads and spent catalyst .

II- If you have butane, write by equations two general types reaction occur during thermal cracking.

5- I- Write a short notes *two only* of the following: **(10 Marks)**

a) Difference between catalytic and thermal cracking.
b) Starting with propane, how can you prepare isopropanol and its uses.
c) Definition of naphtha, porphyrin and honeycomb coke.

II- Draw and discuss visbreaking process and its significant.

مع تحياتى بالنجاح والتوفيق
أ.د. عبدالعال جابر

Faculty of Science
Chemistry Department

Time: 2 hour
Jan 2019

Analytical and Bioanalytical Chemistry (C-441) Final Exam

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Answer *only five* of the following questions: *(50 Marks)*

1. Define the following Terms: *(10 Marks)*
   i) Internal quality control
   ii) Electrophoretic mobility
   iii) The Zeta Potential (ζ)
   iv) Analytical run
   v) Quantitative RT-PCR

2. What are: *(10 Marks)*
   i) The objectives of Quality systems in analytical chemistry labs? And how it could be implemented?
   ii) The format of an analytical Standard Operating Procedure.
   iii) The different types of sample material? Discuss in details.

3. What are the different parameters used for HPLC? Discuss in details. *(10 Marks)*

4. What are the key factors that affect electroosmotic mobility in capillary electrophoresis? Discuss in details. *(10 Marks)*

5. In capillary electrophoresis, what are the factors controlling electroosmotic flow (EOF)? Discuss in details. *(10 Marks)*

6. State the difference between: *(10 Marks)*
   i) Normal phase & reversed phase chromatography.
   ii) Mobile phase & stationary phase.
   iii) Selectivity & sensitivity.
   iv) Gas-chromatographic detectors.

Good Luck

Examiner: Prof. Nagwa Abo El-Maali

Assiut Universitry

Faculty of Science

Chemistry Department

Jan 2019

Time: 3h

Final examination of the " Industrial Chemistry " course (code 453 C) for the 4th level students

Section I (15 Marks)

Answer the following

1. Discuss the relation between color and constitution in organic compounds.
2. Write on the industrial production of azo dyes.

Section II (maximum 35 Marks)

1. Give reasons for **SEVEN** of the following (answer briefly please) (14 Marks)
   - i) Phosphatic rock used in fertilizer manufacture should be low in free carbonate.
   - ii) Marls are excellent raw materials for cement production.
   - iii) Clinker is mixed with 3-4 % gypsum in cement production.
   - iv) In the " Solvay process" for Na_2CO_3 manufacture, the first step is to mix limestone with coke with a supply of air.
   - v) Glass should be thoroughly cleaned before firing.
   - vi) Glazing of earthenware ceramic objects.
   - vii) Fiberglass resists compressive and tensile forces.
   - viii) Addition of arsenic oxide and salt cake to glass melt.
2. Mark **only SIX** of the following with(✓)for the correct statement and with(χ)for the false one (6 Marks)
   - i) In phosphatic fertilizer manufacture, cradle-to-grave refers to the lifecycle assessment from source extraction to the factory gate.

انظر خلفه بقية الأسئلة

ii) The environmental impact of the PO_4^{3-} loss in single superphosphate manufacture is the acidification potential (AP).

iii) Tricalcium aluminate (C_3A) represents the highest heat of hydration among the cement component upon hydration.

iv) Mullite is the only stable compound of alumina and silica at high temperature in ceramic industry.

v) Dicalcium silicate (C_2S) lowers the clinkering temperature in cement kilns.

vi) S-glass is an alkali-lime glass with high boron content.

vii) The vitreous phase in ceramic objects acts as a bond and imparts transluscency in chinaware.

3. Complete the following (8 Marks)

   i) *Ali Baba* is the name for .....jars used to store .....

   ii) The extrusion process in ceramic industry demands a.....raw material which then forced through the die of the.....

   iii) Monosulfoaluminate (in cement of building foundations) + water + sulphate →.....

   iv) In the float process molten glass flows onto the surface of a molten.....bath.

4. Give the various reactions taking place during the following processes: (7 Marks)

   i) Glass manufacture

   ii) Kaolinite heating at different temperatures in ceramic industry.

Good Luck

Examinars

Prof.Dr. Soud Abdelmonem

Prof. Dr. Aref A. M. Aly

Assiut university

Faculty of science

Chemistry Department

Industrial chemistry level 4 (Cement Making)

Jan. 2019 Time: 2 hrs

Answer **five only** from the following questions:

1. Draw the general process diagram of the kiln and write the function for each section. (Pre-heater, Calciner, Kiln and cooler)

2. What is the main difference between raw mill and cement mill?

3. What is the 4 types of kilns and what is the properties for each?

4. What is the chemical composition of: -

   a-Clinker
   b-Gypsum.
   c-Limestone
   d-The 4 main oxides.

5. Draw the cyclone diagram of the preheater and explain how its separate material from gases?

6. What is the quality target of the following?

   a -Raw materials.
   b-clinker.
   c-Cement.

Best Regards

Essam Eldin Abd Ellatif

Assiut University
Faculty of Science
Chemistry Department

Jan 2019
Time: 2 hours
(50 Marks)

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

Answer the following questions: (50 Marks)

Q_1) Answer Only Two from the following: ..... (12.5 Marks)

a) Write on the following:

i) Advantages of conductometric titration (***Three only***). *ii)* Limitation of argentemetric titration.

b) If you are provided with 1M HCl (100 ml) 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) Nitric acid is added in Volhard method.
ii) Mohr method is applicable in neutral solution.
iii) Supporting electrolyte is used in the polarographic analysis

Q_2) Answer Only Two from of the following: ..... (12.5 Marks)

a) Define the following terms:

i) Ilkovic equation. *ii)* Buffer solutions. *iii)* Electrochemical cell .

b) Calculate the equivalent weight for :

i) $KMnO_4$ in acidic and basic medium. *ii)* $K_2Cr_2O_7$ *iii)* H_3PO_4
(K=39, Mn = 55 , O = 16, Cr = 52 , P = 30, H = 1)

c) Give the reason for the following:

i) Immiscible liquid (nitrobenzene) is added in the titration of halide by Volhard method.
ii) Oxygen must be removed from the cell before recording the polarogram in polarographic analysis.

Q_3) Answer Only Two from the following: ..... (12.5 Marks)

a) During the titration of 100 ml of NaCl (0.1N) using $AgNO_3$ (0.1N) Calculate pCl ($k_{sp} = 1.2x10^{-10}$)

i) before the titration *ii)* after the addition of 50 ml $AgNO_3$
iii) at the end point *iv)* after the addition of 110 ml $AgNO_3$

b) Write on the following:

i) Fajan method.
ii) Determination of the equivalent point and the advantages of potentiometric titration.

c) Show how you can use polarographic technique in quantitative analysis.

Q_4) Answer Only Two from the following: ..... (12.5 Marks)

a) Write on the following:

i) Standard hydrogen electrode.
ii) Molar conductivity , equivalent conductivity and cepcific conductivity.

b) 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 ---------.
iii) In the titration of the weak acid with strong base the indicator is ---------- while in the titration of the weak base with strong acid the indicator is ----------.

c) Define the following:

i) Nernst equation. *ii)* Oxidizing agent and reducing agent.

---------- **Good Luck**----------

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

Assiut University
Faculty of Science
Chemistry Department

Date: January 2019
Time allowed: 2 Hours

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

Answer the following questions:

I. Write short notes on: **(10 Marks)**

i) Hazards of rancid fats **ii)** Disadvantage of soap

iii) Disadvantage of hydrogenated oils. **iv)** Determination of the reducing part of lactose.

II. Show how can you do <u>only four</u> of the following: **(10 Marks)**

a- Conversion of aldoses to ketoses.

b- Conversion of ketoses to aldoses.

c- The effect of sulphuric, nitric and hydrochloric acids on glucose.

d- Synthesis of aspartic acid by modified Gabriel's synthesis.

e- Preparation of tryptophan by Erlenmyer synthesis.

III. A) Conduct a comparison between: **(6 Marks)**

i) Waxes and fats & oils. **ii)** DNA and RNA.

B) A simple trigyceride has molecular weight 873.34 and iodine value equal to 261.75:

1- Calculate the number of double bonds in the molecule of this oil.

2- Calculate the saponification value of this oil. **(4 Marks)**

[At.Wt. of iodine =127; potassium=39; oxygen=16; hydrogen=1]

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

1) Oxidation of glucose with nitric acid gives:

a) Saccharic acid b) Gluconic acid c) Glucuronic acid d) Glycolic acid

2) Which one of the following amino acids has no stereocenter (has no chiral carbon atom):

a) Glycine. b) Alanine. c) Aspartic acid d) Ttryptophan

3) Rayon (or viscose) is a:

a) Cellulose acetate. b) Cellulose nitrate c) Regenerated cellulose

4) Reaction of glycine with nitrous acid gives:

a) Hippuric acid. b) Nitrogen gas. c) Glycolic acid d) b & c.

5) The sequence of amino acids in a polypeptide chain is called:

a) Primary structure b) Secondary structure c) Tertiary structure d) Quaternary structure

6) Which of the following fats has the highest iodine value?

a) Tripalmitin. b) Stearo-diolein. c) Palmito-oleo-stearin. d) Triolein.

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7) 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.

8) Which of the following fatty acids has the **lowest** melting point?

a) Palmitic acid b) Oleic acid c) Linoleic acid d) Linolenic acid

9) Alkaline hydrolysis of oils leads to the formation of:

a) Metallic salt of fatty acids and glycerol b) Fatty acids and metallic salt of glycerol

c) Metallic salt of fatty acids and metallic salt of glycerol d) Soap only

10) The complementary base sequence for matching strand in the following DNA section:
-A-G-T-C-C-A-A-T-G-C- is:

a) -T-C-A-G-G-T-T-A-C-G- b) -C-A-G-G-T-T-A-C-G-T-

c) -C-G-T-C-A-G-G-T-T-A- d) -A-C-G - G-G-T-T-A-C-G-

V. <u>Put (√)in the front of the correct Statement and (X) in the front of the wrong one:</u> (10 Marks)

1- D-glucose and D-galactose are epimers and give the same osazone.

2- The gradually change of rotation of α- and β-D-glucose to equilibrium value is called mutarotation.

3- Dialysis is a property, which used to separate proteins from small molecular weight compounds.

4- Reduction of fructose gives sorbitol and mannitol.

5- Acetylation of glucose gives two different penta- acetate derivatives.

6- The type of the peptide glycyl-L-alanyl glycine is dipeptide.

7- Deoxyadenosine-5'-phosphate is nucleotide of RNA.

8- Oils with high acetyl number are toxic.

9- Glucose can be converted to mannose by heating with organic base.

10- The saponification value is increasing as the molecular weight of oil decrease.

Good luck

Prof. Dr. Mohamed S. Abbady &Dr. Ahmed Mahmoud

Assiut University

Faculty of Science
Chemistry Department

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

Date: Saturday , 12/01/2019 Time: 2 hours

Answer the following Two Sections:

Section A: (Textiles and Dyes Chemistry). **(25 points)**

Answer the following:

1) Discuss the physical properties of Fibers related to durability.
2) Explain by chemical equations the industrial production of **Azo-Dyes**.
3) Answer **ONE** of the following :
   a) Classification of fiber and its identification by burning
   b) Color structure relation relationship in dye chemistry

Section B : (Polymers &Material Science) **(25 Points)**

Answer Five only from the following questions:

i) " Carbon Fibers..... the wonder polymer..... stronger than the steel".
Show by equations the steps of production of this polymer.

ii) Three things make the polymers are different from other compounds. Discuss briefly these things.

iii) Show by equations the mechanism of coordination polymerization using Zigler-Natta catalyst and Ethylene gas.

iv) Compare between the main differences between the step- and chain- polymerization.

v) Explain the anionic and cationic vinyl polymerization, with an example.

vi) Terephthaloyl chloride + 1,3-propane diols. Show the possibility of step-growth polymerization of these two monomers.

Good Luck

Examiners:

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

ASSIUT UNIVERSITY

ASSIUT UNIVARSITY

FACULTY OF SCIENCE

INDUSTRIAL CHEMISTRY DEPARTMENT

LEVEL 4

PULP AND PAPER INDUSTRY

First question

a-What are conditions used in various bleaching stages(C-E-H-D-P-O) of chemical pulps?

b-write the chemical equation of chlorine dioxide preparetion from sod. Chlorate?

Second question

a-Write the main chemical components of wood and draw the cellulose structure?

b-what are the main parts of the sugar cane and its percentage ?

c-draw block diagram for kraft pulping?

The third question

a-what are the two types of paper machine design ?

b-what are the four chips size fractions in kraft pulping?

c-what are the Kraft pulping parameters?

d-what are the four processes of mechanical pulp

the fourth question

write definition of the following terms:

yield – consistency – active alkali - total titratable alkali (TTA) - kappa number

the fifth question

put a mark (true) or (false) for the following

1-white liquor is the cooking solution for kraft pulping ( )

2-the two main types of digesters are batch and continuous ( )

3-lignin is a material that occurs in softwoods but not in hardwoods ( )

4-the purpose of the evaporators is increase the solids of the black liquor up to65% ( )

5- D stage is bleaching with chlorine dioxide in alkaline medium ( )

With best regards

Assuit University Faculty of Science Chemistry Department		Time: 2h Date: September 2018 Course code: C460

Final Examination of Analytical Chemistry for Biology students

Answer the following questions: **(50 Marks)**

I- Write (True) or (False) in front of the following statements: **(10 Marks)**

1) Reference and indicator electrodes are mainly used in potentiometry. ( )
2) Buffer solution can't resist the change in pH when acids or bases are added. ( )
3) The rate of decrease of intensity of monochromatic light with the thickness of the medium is directly proportional to the intensity of the incident light according to Beer's Law. ( )
4) The indicator used in Mohr method is dilute potassium chromate solution. ( )
5) The energy required for n- σ* transition is less than for σ - σ* transition. ( )

II- Define only two of the following terms: **(8 Marks)**

1) Hypochromic shift
2) Titration curve
3) Molarity
4) Percent volume

III- Calculate the pH at zero, 15, 25, 50 and 60 mL titrant in the titration of 50 mL of 0.1 M CH_3COOH with 0.1 M NaOH ($K_a = 1.75 \times 10^{-5}$). **(10 Marks)**

IV- Sketch only two curves of the following potentiometric titrations: **(7 Marks)**

1) Determination of NH_4OH using HCl.
2) Determination of CH_3COOH using NaOH.
3) Determination of NaOH using HCl.

V- A sample of hexane contaminated with benzene had an absorbance of 0.070 at 256 nm in a cuvette with a 1.0 cm path length. Find the concentration of benzene in mg/L. (M.Wt. of benzene is 78.11 g/mol, $\varepsilon = 201\ M^{-1}.cm^{-1}$). **(7 Marks)**

VI- Discuss briefly the applications of Potentiometric titrations. **(8 Marks)**

Good Luck!

Dr. Ahmad Abo Markeb

Assiut University
Faculty of Science
Chemistry Department

Date: 27/8/2018
Time: 2 hours.
50 Marks

Final Exam of Organic Chemistry (413C) for fourth level students
(Chemistry of biomolecules)

Answer the following questions: (50 M)

I) Carry out the following conversions: (14 M)

a) D-Glucose into Fructose.
b) D- Arabinose into D- Glucose.
c) Malonic ester into Methionine.
d) L-Xylose into Ascorbic acid.

II) Write briefly on three only of the following: (18M)

a) Classification of proteins.
b) Difference between neutral lipids and waxes
c) Types and causes of Rancidity of fats.
d) Configuration of the Anomeric carbon atom in sugars.
e) Mutarotation and Epimerisation in carbohydrate

III) Answer using true or false and correct the false answer on the following: (18 M)

1) In Cellulose glucose moieties are joined by a β glycosidic linkage.
2) Amylopectin can be hydrolyzed to D- galactose.
3) Valine and leucine are considered basic amino acids.
4) Tryptophan is considered heterocyclic amino acids.
5) Waxes are esters of fatty acids with mericyl alcohol.
6) Proline is considered aromatic amino acid.
7) High-density lipoprotein (HDL) cholesterol is called the bad cholesterol because it goes into the bloodstream and clogs up your arteries.
8) Sphingosine is alcohol present in sphingolipids. It is synthesized in the body from serine and palmitic acid.
9) In amylose glucose moieties are joined by a α-glycosidic linkage.
10) Lactose consists of galactose and glucose molecules linked in α (1, 4) glycosidic linkage.
11) Starch and cellobiose are not considered reducing sugars and gave osazone test.
12) Glucose and Mannose are considered epimers.

GOOD LUCK

Prof. Dr. Yasser Elossaily

Assiut University

Surfacechemistry & Electrochemistry for 4th Level Students (Chem.432)
Chemistry Major
September 2018
Time :3 h

Faculty of Science
Chemistry Department

Answer the Following Questions:

Section 1

Surfacechemistry (33 Marks)

1- a) Put (✔) or (×) for the following sentences:

(i) The rate of physical adsorption is greater than chemical adsorption. ( )

(ii) The heat of chemisorptions is a measure of strength of the bonds formed between adsorbent and adsorbate . ( )

(iii) Slip motion many times is responsible for plasticity of crystal. ( )

(iv) If the reflection of all lattice positions through a point brings a coincidence of point there is a plane of symmetry. ( )

(v) Negative catalyst is a substance which increases the rate of reaction. ( )

(vi) A bifunctional catalyst provides two kind of sites. ( )

1-b) Choose the correct answer

1- Due to adsorption
(i) surface energy increases (ii) surface energy becomes zero
(iii) surface energy decreases (iv) no change occurs in surface energy

2- On which factor adsorption of gas on solid adsorption depend
(i) on temperature (ii) on pressure of gas
(iii) on nature of adsorbent (iv) all the given

3- The industrial catalyst should be characterized by
(i) high surface area (ii) mechanical properties
(iii) stability (iv) all of them

4- Selective catalyst should :
(i) increase the reaction rate
(ii) increase the number of molecules adsorbed on the catalyst surface
(iii) change the reaction products (iv) proceed the reaction to desired product

5- The combination between cationic and anionic vacancies is :
(i) Frenkel defects (ii) Schotky defects
(ii) chemical bond (iv) none of these

2- Write short notes on three only of the following

a) Deactivation of a catalyst
b) Non-stiochiometry
c) Electrical properties of semiconductors
d) Difference between two types of adsorption of gas on solids

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3- **What is meant by carrier, explain the method for preparation of alumina and why it uses industrially.**

4- **Apply the BET method for determining S_{BET} of the solid catalyst from N_2 adsorption isotherm.**

Section 2

Electrochemistry (Marks = 17)

Answer only three questions from the following:

1) Explain the polarizable and the nonpolarizable electrodes; use platinum and mercury electrodes in HCl solution as examples.

2) Define the corrosion of metals, explain one form of corrosion and one method of protection.

3) Define the electric double layer and discuss its theories.

4) The exchange current density for the evolution of hydrogen at platinum is 3.0x103 mA m^{-2}. Using the polarization resistance equation calculate the current density at 298 K for an over potential 5 mV? (R = 8.314 J K^{-1} mol^{-1}, F = 96485 C mol^{-1})

(Good Luck)

Prof. Dr. Abdel-Aziz A. Said , Prof. Dr. Abou-El- Hagag A. Hermas

Assiut University Faculty of Science Chemistry Department		Aug., 28, 2018 Time: Two hours Mark: 50

Final Exam. of Instrumental Analysis of BSc 4nd year students (C-445)

Answer the following questions

I) **Choose the correct answer of the Following questions:**

1) The turbidity produced by suspended solution is given by: S= .....
   a) $h\gamma c$ b) Kbc c) mgC

2) The wavelength (nm): $\lambda =$ a) $Cx\gamma$ b) $\frac{C}{\gamma}$ c) $nh\gamma$

3) In nephlometric measurements is the light sourceand receptor at .....
   a) left angle b) zero angle c) right angle

Complete the Following questions:

4) The total power radiated by the atom in flame AAS technique $P_T =$ .....

5) The Boltzmann distribution equation in AAS: $\frac{N_i}{N_0} =$ .....

II) Deduce the fundamental of Beers-Lambert laws in Analytical Absorption Spectroscopy (UV-Visible absorption spectroscopy)

III) In turbidimetric analysis of sulphate a s Barium sulphate, (Mark: 5)

in a larg excess of $BaCl_2$, and different addition of Na_2SO_4

we have obtained the following data:

Vol. of sulphate (ml)	5	10	15	20	25	30	40
Scattring (S)	0.17	0.25	0.32	0.39	0.46	0.54	0.67

Using calibrated plot graph calculate:

1) Turbidity coefficient (K)
2) Concentration of sulphate (mg) at: S = 0.21, and 0.50,
   (1 ml vol. of sodium sulphate contains 2.5 mg of sulphate)

See Next page→

IV) You are consider a redox reactionz:

$$r\overline{A}_{red} + sB_{ox} + ... \longleftrightarrow pA_{ox} + qB_{red} + ...$$

i) Write the equilibrium constant (K) and equilibrium Quantity (Q)

ii) The standard electrode potential for species A, and B as:

$E_A^0 = ...$, $E_B^0 = ...$

The cell potential $E_{cell} = E_B - E_A = ...$

The electrode potential of the glass electrode: $E_{glass} = ...$

V) What is the half cell potential at end point titration of Ferrous ion with Permanganate ion in strong sulphuric acid media (1M)

The possible reaction undergoing as:

$$5FeSO_4 + KMnO_4 + 4H_2SO_4 \longleftrightarrow 5Fe(SO_4)_3 + MnSO_4 + 4H_2O$$

If: $E^0_{Fe^{3+}} = +0.771..V$ $E^0_{MnO^-} = -1.51..V$

Good Luck

Prof. Dr. Seddique M Ahmed +