المستوى الثانى - كيمياء حيوية - لوج CV٤
الاحماض النووية والبروتينات

Mansoura University
Faculty of Science
Chemistry Department
Subject: Chemistry
Course (s) : Porphyrins (PDT) and Nucleic acids

First Term
المستوى الثانى (274)
Date : 24 Dec. 2012
Time Allowed : 2 hours
Full Mark : 80 Marks

Answer The Following Questions

1. Write about Measures to increase efficacy of PDT, AND ways to increase tumor selectivity. **[27 Marks]**

2. A) Write about principle of PDT AND properties for ideal photosensitizer **[13 Marks]**

   B) Starting from ribose -5- phosphate show how purines are synthesised in our body. **[13 Marks]**

3. a) Give an account on the different synthetic derivatives of purines and pyrimidines compounds which are being used in medical treatments. **[13 Marks]**

   b) Write about the important biochemical roles of adenine nucleotides. **[14 Marks]**

مع تحيات ،،،

أ.د. محمد عبد الحافظ الفار أ.د. حسين غالب عثمان

الأسئلة - كيمياء حيوية - الكربوهيدرات - ٢٠١٢

Mansoura university
Faculty of science
Chemistry Department
Subject : Biochem.271
Course : Biochemistry of carbohydrates

First Term Exam 2012/2013
Second Level BioChem Students
Date : 26 Dec. 2012
Time Allowed : 2 hours
Total Mark : 80 Marks

Answer the following questions
Provide your answer with formula, equations, pathways, figures or tables wherever possible

[1] A) Put (√) for write sentence and put (X) for wrong sentence: (20 marks)

1- Stereoisomerism is molecules having the same structure but differ in position of their different groups and atoms in the space.
2- Reduction of fructose gives sorbitol and mannitol.
3- Ribose and arabinose both gave erythrose on ruff-degradation.
4- Erythrose gave a mixture of ribose and arabinose on Killiani-Fischer synthesis.
5- Arabinose gave a mixture of glucose and mannose on Killiani-Fischer synthesis.
6- Lactose is non-fermentable due to absence of lactase enzyme from yeast.
7- Sucrose is non-ozazone forming, not mutarotating and non-reducing sugar.
8- Amylopectin is the inner part of starch granules and is water soluble and give blue color with iodine.
9- Starch is the stored form of carbohydrates in animals.
10- Glucose transport via (gluT4) in the muscle cells and adipocytes is not under the control of insulin.

PTO

[2] A) Write the structure and give ONE function for each: (15 marks)

1-Sialic acid
2-Glucuronic acid
3-Mannitol
4-Cellulose
5- Phytic acid

B) What is the meaning of : (15 marks)

1- Optical Activity.
2- Semen sugar.
3- Mutarotation.
4- Racemic mixture
5- Deoxy sugar

[3] Write the Structure and complete the following biotransformation: (30 marks)

1- HCN + D- glucose →
2- Conc. HNO_3 + D-fructose →
3- Bromine water + oxygen + glyceraldehydes →
4- Hydrogen peroxide + dil.HNO_3 + D-glucose →
5- Conc. H_2SO_4 + D-galactose →
6- Dilute alkali (under low heat condition) + D-glucose →

GOOD LUCK Prof. Abdel-Aziz Fatouh

Mansoura University
Faculty of Science
Chemistry Department
Subject: Chemistry
Course(s): Chemistry of Lipids 272

2nd Level Biochemistry Students
Date : Jan. 2013
Time Allowed : 2 hours
Full Mark: 80 Marks

ANSWER THE FOLLOWING QUESTIONS

Express your answer by formulae equations, pathways, diagrams or figures wherever possible.

I. Define the following: [30 Marks]

a) Fucosidosis
b) Liposomes
c) Rancidity
d) Carrier-mediated diffusion
e) Chain-breaking antioxidants
f) Phospholipids
g) TBARS Assay
h) Body Fat Meter
i) Phase transition of lipid bilayer
j) Atherosclerosis

II. [25 Marks]

a) *True or false? and correct if statement is false* [16 Marks]

1. In Cholesterol the methyl groups are attached to C10 and C13 are in the β configuration. ( )
2. Waxes are esters of amino acids with higher molecular weight monohydric alcohols. ( )
3. Ceramides are esters of fatty acid and sphingosine in addition to a carbohydrate moiety. ( )
4. An omega-6 hexadecenoic acid is a monounsaturated fatty acid and can be abbreviated as $16:1\Delta^9$. ( )
5. The melting points of even-numbered-carbon fatty acids decrease according to unsaturation ( )
6. Phospholipids have a saturated acyl radical in the sn-2 position of glycerol. ( ).
7. plasmalogens possess an ether link on the *sn-1 carbon instead of the* ester link found in acylglycerols. ( )
8. Elevated levels of lipoproteins, particularly HDL-cholesterol are associated with an increased risk of atherosclerosis and coronary heart disease. ( )

Best wishes for our dear students,

Dr. Amr Negm

b) *Complete the missing parts in the following statements:* **[9 Marks]**

i. ……[1]…….. is a major constituent of the surfactant preventing adherence of the inner surfaces of the lungs, and its absence from the lungs of premature infants causes ……[2]…….

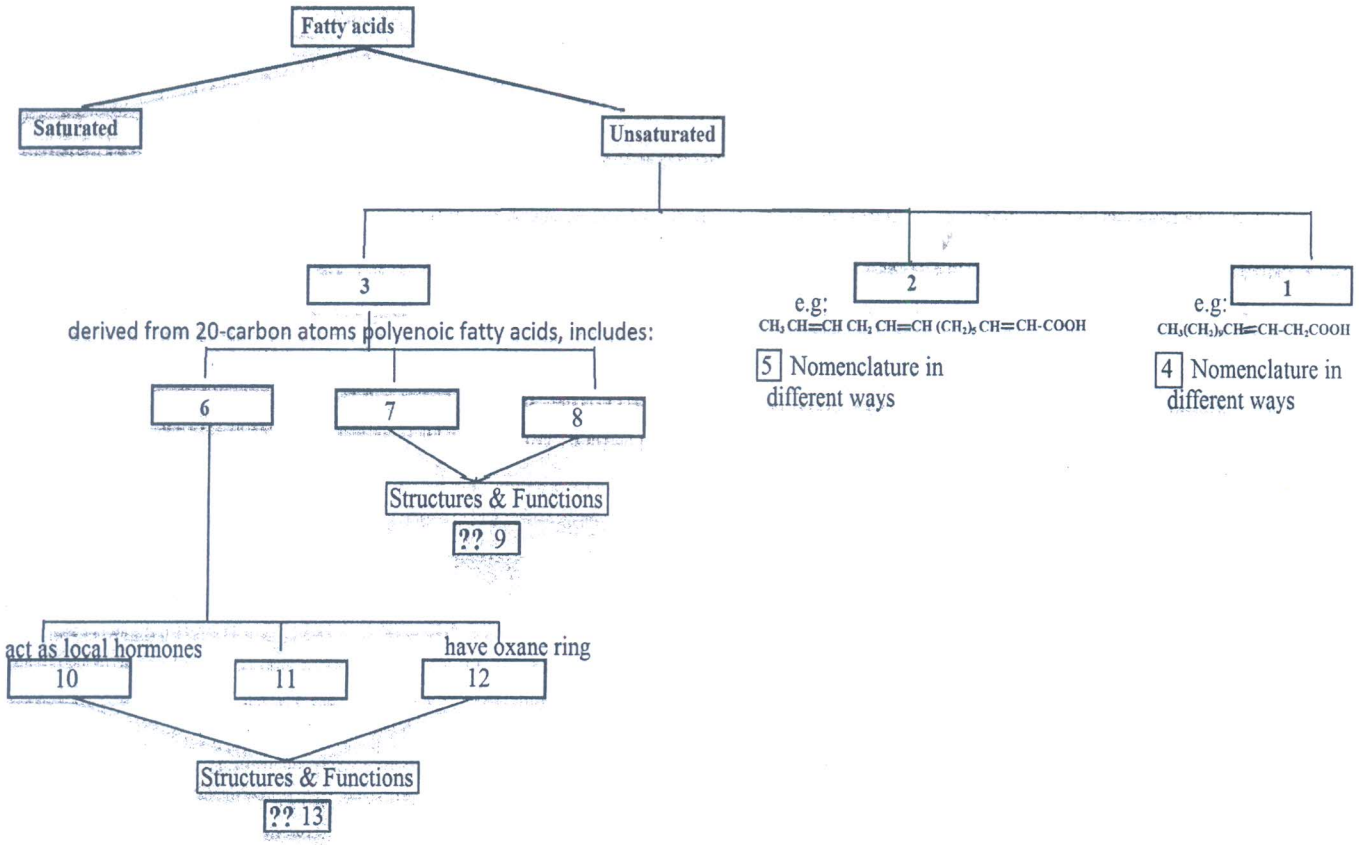
ii. Apolipoproteins serve as .....[3].....that regulate the metabolism of ……[4]…….

iii. Lipid bilayers are usually composed of phospholipids, which have a ……[5]……head and two ……[6]……tails.

iv. ……[7]……..is caused by a deficiency in the enzyme alpha-N-acetylgalactosaminidase, which leads to excessive accumulation of ……[8]…….throughout the body.

v. ……[9]…….caused by a deficiency of the enzyme lysosomal acid lipase.

III. Complete the following diagram: [25 Marks]



Best wishes for our dear students,

Dr. Amr Negm

Mansoura University
Faculty of Science
Department of Chemistry

Date 09.01.2013
Time: Two Hours
Full Mark (60)

Exam. of Course 231(Principles of Organic Chemistry)
For 2nd Level (Chemistry and Chemistry/Biochemistry Students)

ANSWER THE FOLLOWING QUESTIONS

1- A The Friedel-Crafts alkylation of benzene with butyl chloride gives two products (major and minor). Explain with mechanism. [10 Marks].

B- Carbocation rearrangements can occur upon the addition of H_2SO_4/H_2O to 3,3-dimethyl-1-butene to give 2,3-dimethyl-2-butanol as a major product. Explain with mechanism [10 Marks] .

2- A) Predict the major organic product or products of each of the following reactions. [10 Marks]

i-

$$CH_3C{\equiv}CH \xrightarrow[HgSO_4]{H_2SO_4,\ H_2O}$$

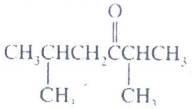
ii-

$$CH_3C{\equiv}CCH_3 \xrightarrow[\text{Lindlar's catalyst}]{H_2}$$

B) Based on the terms of radical substitution reactions, explain with mechanism the formation of cyclohexyl chloride from cyclohexane and chlorine. [10 Marks]

3- A) -Alkenes can be converted to alkynes by bromination and two consecutive dehydrohalogenation reactions. Give mechanism with 1-butene**(10 Marks)**.

B) Synthesize the following compound using an alcohol of not more than 4 carbons as the only organic starting material [10 Marks].



A

Good Luck

Prof.Dr. Mohamed Abbas Metwally and Prof.Dr. Sayed El-Desoky

المستوى الثانى - كيمياء حيوية - كيمياء الفصل الأول ٢٠١٢

Mansoura University
Faculty of Science
Chemistry Department
Subject : Inorganic Chemistry
Course(s): Representative Elements
Code : Chem (221)

First term
Second Level (Biochemistry) Students.
Date : 13 January, 2013
Time Allowed: 2 hours
Full Mark : 80 Marks

Answer The Following Questions

I. Give an explication of EIGHT ONLY of the following : **[32 Marks]**

1. A positive ion is smaller than the corresponding atom **whereas** a negative ion is bigger than the corresponding atom.
2. The increasing of reactivity of alkali metals, with increasing of the atomic number, is demonstrated by their reactions with water.
3. Magnesium (II) chloride is more heavily hydrated than barium (II) chloride .
4. Conductivity measurements of alkali metal ions give results in the order : ($Cs^+ > Rb^+ > K^+ > Na^+ > Li^+$) in an aqueous solution .
5. Boron trifluoride (BF_3) is Lewis acid.
6. The hardness of diamond is due to its structure .
7. Carbon monoxide is a good reducing agent **and also**,is an important ligand . **Explain and support with an example** for each of both properties.
8. i) Univalent thallium ($_{81}Tl$) compounds are the most stable.
   ii) The nitrogen molecule (N_2) is generally unreactive.
9. **i)** White phosphorus should never be allowed to come into contact with body skin.
   ii) Photochromic eyeglasses have a small amount of added silver chloride.
10. **i)** Fluorine is the most reactive of all the elements . **Give four reasons .**
    ii) The concentrated (H_2SO_4) acid is strong dehydrating agent . **Give two examples .**

II. A) Write shortly on FOUR ONLY of the following, on the basis of the chemical reaction equations : **[20 Marks]**

1. Biological importance of carbon dioxide.
2. Isolation of the pure elemental **silicon** from **silica** (SiO_2)
3. Production of nitric acid (HNO_3) by **Ostwald** process.
4. Separation of aluminum metal from its **ore (bauxite) ; AlO(OH) .**
5. Photodissociation of nitrogen dioxide (NO_2) and ozone (O_3) levels in sunny days .

II. B) Complete the following chemical reaction equations: **[10 Marks]**

1. $Li_3N + D_2O \rightarrow$
2. $_7N^{14} + {}_0n^1 \rightarrow$
3. $Be_2C + H_2O \rightarrow$
4. $H_3BO_3 + H_2O =$
5. $Ca_3(PO_4)^2 + H_2O \rightarrow$

III.1) Give an account on ortho and para Hydrogen. **[4 Marks]**

2). Deseribe the structure and nature of bonding of Diborane (B_2H_6), **[4 Marks]**

3). An insulator like silicon can be converted to a semiconductor (n-type and /or p- type). Explain . **[6 Marks]**

4). Account for the high (1st IE's) for ($_{12}Mg$, $_{15}P$ and $_{18}Ar$) and the low (1st IE) for ($_{16}S$). **[4 Marks]**

..... Best Wishes .....

Dr. Doaa Abd-El-Latif & Prof. Dr.Tawfik Rakha

المستوى الثاني - كيمياء حيوية - الجزيئات الحيوية الأحماض الأمينية والبروتينات ٢٧٣ ك

	Mansoura University **Faculty of Science** **Chemistry Department**
First Term **Second Level Biochemistry** **Course Title: Biochemistry of amino acids and proteins** **Code No.: Biochemistry 273** **Time allowed: 2 Hours** **Full Mark: 60 Marks**	**January 2013** **Date: 20/ 1/ 2013**

Answer the following questions

Q1: (20 Marks)

Give a brief account on the following: (illustrating your answer with figures if possible)

i- Dialysis. **ii-** Domains. **iii-** β-turn.
iv- Ion exchange chromatography. **v-** Sanger's reaction. **vi-** Metalloproteins.
vii- Edman's reaction. **viii-** Affinity chromatography. **ix-** β-sheets. **x-** Tyndal effect.

Q2: (20 Marks)

A- Derive Henderson-Hasselbalch equation for calculating pH of weak acids. Write two of its applications.

B- What is meant by pI? discuss how to calculate the pI for both alanine and aspartic according to:

Amino acid	pK_1	pK_2	pK_3
Alanine	2.3	9.1	-
Aspartic acid	2.01	3.86	9.82

C- Complete the following: (8 Marks)

a- In SDS-PAGE, the role of TEMED is ……(1)…… However, the role of SDS is……(2)……

b- Using isoelectric focusing, a mixture of proteins can be electrophoresed through a solution having a stable ……(3)……from the anode to the cathode and each protein will migrate to the position according to its ……(4)……

c- Ampholytes are……(5)……which help maintaining ……(6)…….. in the presence of high voltage.

d- ……(7)……is a chronic obstructive lung disease resulting from deficiency of ……(8)……enzyme particularly in cigarette smokers.

Q3: (20 Marks)

A) Choose the correct answer: (1 Mark each)

1- Which of the following is(are) termed common motifs:
a) Helix-loop-helix. b) β-sheet.
c) Greek key. d) Hairpin turn.

2- Loops exist in a specific conformation is stabilized by the following interactions **except:**
a) Salt bridges. b) Covalent bonds.
c) Hydrogen bonding. d)Hydrophobic interactions

3- Hemolysis of erythrocytes occurs when the surrounding fluid is……..
a) hypotonic solution. b) hypertonic solution.
c) isotonic solution. d) either hypotonic or hypertonic solution.

4- Most proteins are precipitated from solutions of high salt concentrations because salt ions cause……
a) shielding effect b) proteins interact and aggregate.
c) strengthen hydrophobic interactions. d) all choices are correct.

5- Rosenheim's reaction is characteristic for……..
a) histidin. b) tyrosine.
c) tryptophan. d) cysteine.

6- One of these is the result of that the protein solution is a colloidal solution:
a) Tyndal effect. b) Variation in pH.
c) Bipolar nature. d) Optical activity.

7- These are the causes for considering NH_4^+ and SO_4^{2+} ions favorable for precipitation of proteins by salting out technique **except**:
a) High solubility in water. b) Allow high concentrations (about 4M).
c) Irreversible denaturation. d) Reversible denaturation.

8- The tertiary structure of protein is stabilized by.....
a) disulfide bridges. b) hydrogen bonds.
c) ionic bonds. d) hydrophobic interactions.
e) All of them.

9- Loops regions of varying structure and length .....
a) constitute epitopes, for antibodies binding b) participate in catalysis..
c) bridge domains in enzymes for binding substrates. d) All of them are correct.

10- One of the following proteins is a quaternary structure:
a) Hemoglobin. b) Collagen.
c) α-keratin. d) Insulin.

11- Collagen is a .....structure.
a) monomeric b) trimeric
c) dimeric. d) tetrameric.

12- Which of the following is not related to Osteogenesis imperfecta:
a) Bleeding and loosing teeth. b) Genetic deficiency in collagen type I.
c) Abnormal bone formation in babies. d) Frequent bone fracture.

13- Among these the commonly used gel filtration materials **except**:
a) Sephadex. b) Sepharose.
c) Cellulose. d) Polyacrylamide.

14- These are requirements for polyacrylamide gel electrophoresis (PAGE) **except**:
a) Sodium sulphate. b) TEMED.
c) *N,N'*-methylenebisacrylamide. d) Ammonium persulphate.

15- These are amino acids that if present disrupt an α-helix **except**:
a) Proline. b) Tryptophan.
c) Glutamate. d) Glycine.

16- Which of these does not from the factors affecting the solubility of proteins in water:
a) pH. b) Organic solvent.
c) Concentration of salt. d) Pressure.

B) Put true (√) or false (x) and correct: (0.5 Mark each)

1- Mellon's test is characteristic for arginine. [ ]
2- Denaturation of protein structure by salt ions caused by strong ionic interactions that disrupt H-bonding. [ ]
3- In gel filtration chromatography, the separation of protein molecules is on the basis of size only. [ ]
4- In isoelectric focusing, proteins can be denatured by urea but does not put charges on a protein. [ ]
5- The difference in the degree of cross-linking in the G-types of Sephadex changes their degree of swelling and their fractionation range. [ ]
6- Using SDS-PAGE, the separation of proteins is based on their mass. [ ]
7- Most enzymes and blood proteins are fibrous proteins. [ ]
8-Cerulloplasmin carries 90% of plasma copper, containing four atoms in it structure. [ ]

With my Best Wishes *Dr. Nivin A. S. Islam*

المستوى الثانى - فيزياء - فيزياء حيوية
كيمياء - كيمياء حيوية
مقدمة الفيزياء الحيوية فرع (1)

Mansoura University
Faculty of Science
Physics Department
Course code: Bio-Phys 211
Course title: General biophysics

First term 2012-2013
Date: 16-1-2013

2nd Level students
Biophysics-Physics-Microbiology-Chemistry-Biochemistry-Chemistry Botany - Chemistry Zoology and Environmental Science
Full Mark: 80
Allowed time: 2 hours

Answer all the following questions:

1- A- Write true (√) or False (χ) [each item = 1.5 Mark]

i. The frequency range detected by the human ear is between 20 Hz-20000 KHz.

ii. Hypermetropia caused by irregularity shaped cornea results in light focusing in front of retina.

iii. There are three types of color sensitive cones in retina.

iv. The human eye is organ design to receive visible light having wavelengths between 380 and 760 μm.

v. Ionizing radiations are known to cause DNA damage, cancer, mutation and birth defects.

vi. The electric potential of the heart can be measured by electro-encephalogram EEG.

vii. There are negative charges on the outside of the cell membrane of neurons than the inside produces a resting potential of -70 mV.

viii. The conduction speed of unmyleinated axons is given by $u = 1.8\sqrt{a}$ (m/sec) where a is the radius of axon (μm).

ix. The efferent neurons are those axons travel from sensing areas to the spinal cord

x. The ear canal behaves like a pipe open from one end and the other end is closed by tympanic membrane.

B- Calculate the lowest frequency in which sound resonates in ear, knowing that the velocity of sound is C=350 m/sec and the ear canal length is L=2.5 cm (n=1 when $L=\lambda/4$). **[5 Marks]**

C- What is the total flow resistance of a two parallel arteries in a calf have radius 0.5 mm and length 100 mm? If the volume flow rate of blood through these arteries is 1.2×10^{-6} m^3/sec, what is the pressure drop across the arties knowing that $\eta_{blood}=3.5\times10^{-3}$ poise.

[5 Marks]

2- A- Complete the following sentences: (each item = 2 Mark)

- The P-Wave in ECG indicates .....(1).....of the right and left .....(2).....

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- The alpha waves of EEG have frequency range .....(3).....Hz in .....(4).....state.
- In .....(5).....effect, electron is ejected from the atom and is accompanied by scattered ...(6).....

B- Find an expression given for the half life time and decay constant of a radionuclide?

[8 Marks]

C- If you have 1gm of ^{226}Ra that emits $3.7x10^{10}$ photon/sec. What is the decay constant and half life time knowing that Avogadro's number=$6.02x10^{23}$. **[5 Marks]**

3- A- Choose the correct answer : **[each item = 1 Mark]**

i. The retina of the eye contains two types of photoreceptors cones and ..... (Spheres- triangles- rods-rectangles).

ii. The flow of ions causes an electric current in the ion chamber with intensity proportional to the .....of ions (volume- number-density –shape).

iii. The beta particles are a fast moving .....(protons-neutrons-electrons-photons).

iv. ..... provide the eye's color sensitivity (Rods –Cones- Corneas –Irises).

v. The percent of hydrogen atoms in human body is (53%-63%-73%-83%).

vi. About ..... of cones are green sensitive. (23%-42%-52%-62%).

vii. 1 gray equal (1 rad- 10 rad-100 rad-1000 rad).

viii. 1 rem equal (0.1 Sv-0.01 Sv-0.001 Sv-0.0001 Sv).

B- Define the following: **[each item = 2 Marks]**

a. Depolarization
b. Graded potential
c. Radiation flux
d. Decibel
e. Magnetic resonance imaging

C- Calculate the capacitance per unit length and area of an unmyleinated axon, if the material in the axon membrane has dielectric constant K=7 and $\varepsilon_o=8.85x10^{-12}$ S/ohm-m and the radius a= $3.5x10^{-6}$ m and thickness of membrane is b=$5x10^{-9}$ m. **[7 Marks]**

D- If a person has an unaided near point of 0.5 m, what would the power of a lens make him able to see an object at 25 cm? **[5 Marks]**

Best wishes:

Examiners: Dr. H. Kamal Dr. N. Kenawi Dr. M. Mansour

الإمتحان مكتوب على وجهى الورقة

بسم الله الرحمن الرحيم

Mansoura University **Faculty of Science** **Department of Chemistry** **January, 23, 2013**		**Second Level, Chemistry and Biochemistry students** **Final exam 211Chem** **Fundamentals of Analytical Chemistry** **Time allowed: 2 hours**

Answer the following questions:

1. *Define the following:* **(10 marks)**

a) Zimmermann Reinhard's reagent

b) Metallic indicators

c) Standard deviation

d) Buffer capacity

e) Precision and accuracy

f) Solubility product

g) Titration Error

h) Reducing agent

i) Absolute and effective stability constant for EDTA complexes

1.b) Calculate the actual potential (E) of 50ml o.1N Fe^{2+} solution on addition of the following amounts of 0.1N Ce^{4+} solution

a) 0ml b) 10ml c) 25ml d) 50ml e) 60ml

($E^{0}_{Fe3+/Fe2+}$ =0.77 V, $E^{0}_{Ce4+/Ce3+}$ =1.61 V) **(5marks)**

2.a) Give an account on the following: **(12marks)**

i) Types of titrations of EDTA
ii) Importance of using buffer solutions in complexometric titration
iii) Restrictions of usage of Mohr method
iv) Application of $KMnO_4$ for analysis of mixture of (Fe^{2+} +Fe^{3+})

2.b) The following set of chloride analysis were reported; 103, 106, 107, 114mg/l. Determine if any .a of these values could be excluded (tabulated value of Q is 0.829) **(3 marks)**

3.a) Calculate the pH of the following mixtures: **(9 marks)**

i) 50ml HCl 0.1N+30ml NH_4OH 0.1N +20ml H_2O

ii) 50ml HCl 0.1N+50ml NH_4OH 0.1N

iii) 50ml HCl 0.1N+60ml NH_4OH 0.1N (Kb_{NH4OH}= $1.8x10^{-5}$)

3.b) A sample of NaCl weights 0.5 gram. 50 mL of 0.21M $AgNO_3$ is added to precipitate AgCl . The excess silver nitrate is titrated with 0.28M potassium thiocyanate to give 25.5 mL at the end point. Find the percentage of NaCl in the sample. (Na=23, Cl= 35.5) **(6 marks)**

4.a) Find the confidence interval for the following titration volumes:

50.00, 51.00, 50.50, 49.80

(knowing that the standard deviation (s)= 0.02 and t=4.2 at 95% confidence) **(3 marks)**

4.b) Calculate the volume of concentrated HCl solution , *having density1.14g/ml and 36% w/w percentage concentration,* required to prepare 500.00mL of 0.20 N HCl solution. (H= 1.00, Cl=35.50.) **(3 marks)**

4.c) Calculate Ksp of Ag_2CrO_4 (M.wt.= 332) knowing that its solubility is 0.004g/100ml at 25°C. **(3 marks)**

4.d) 250ml aqueous solution containing 0.05mg of copper. Express the concentration of copper in ppm and ppb scale **(3 marks)**

4.e) Indicate 3 types of indicators used in oxidation reduction titrations **(3 marks)**

Best wishes

Prof. Dr Mohamed M. El-Defrawy **Prof. Dr. Magdi E. Khalifa**