Mansoura University **Faculty of Science** **Chemistry Department** **Second Level Biochemistry** **Course Title: Biochemistry of amino acids and proteins**		**First Term** **Date: 27/ 12/ 2015** **Code No.: Biochemistry 273** **Time allowed: 2 Hours** **Full Mark: 60 Marks**

Answer the following questions

Question 1: (18 Marks)

1- 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.

2- One of these tests gives positive result with phenylalanine:
a) Mellon's test.
b) Sakaguchi reaction.
c) Xanthoproteic acid test.
d) Pauly's reaction.

3- One of these is not a metalloprotein which is
a) α-globulin.
b) Ferritin.
c) Catalase.
d) Ceruloplasmin.

4- There are several levels of protein structure, the most complex of which is
a) Primary.
b) Secondary.
c) Tertiary.
d) Quaternary.

5- Identify which of the following terms refers to the order in which amino acids are linked together in a protein.
a) Primary structure.
b) Secondary structure.
c) Tertiary structure.
d) Quaternary structure.

6- Identify which of the following terms refers to the overall three dimensional shape of a protein.
a) Primary structure.
b) Secondary structure.
c) Tertiary structure.
d) Quaternary structure.

7- The most common covalent cross-links in proteins are sulfur-sulfur bonds that form between two amino acids with -SH (thiol) groups as side chains. Which amino acid has this side chain?
a) Tryptophan.
b) Methionine.
c) Cysteine.
d) Proline.

8- Identify the strongest form of intermolecular bonding that could be formed involving the residue of the amino acid serine.
a) Ionic bond.
b) Hydrogen bond.
c) Van der Waals interactions.
d) None of the above.

9- Identify the strongest form of intermolecular bonding that could be formed involving the residue of the amino acid glutamic acid.
a) Ionic bond.
b) Hydrogen bond.
c) Van der Waals interactions.
d) None of the above.

10- Identify the strongest form of intermolecular bonding that could be formed involving the residue of the amino acid tyrosine.
a) Ionic bond.
b) Hydrogen bond.
c) Van der Waals interactions.
d) None of the above.

11- In proteins, elements of secondary structure combine to form a(n)
a) Domain.
b) Motif.
c) Alpha helix.
d) Beta sheet.

12- At what level(s) of protein structure would you expect to find disulfide bridges?
a) Primary.
b) Secondary.
c) Tertiary.
d) Quaternary.
e) Only in b and c.

13- Among these are the amino acids that disrupt the helix by ionic bonds or by electrostatically repelling each other, <u>Except:</u>

a) Lysine. b) Arginine.
c) Proline. d) Aspartate.

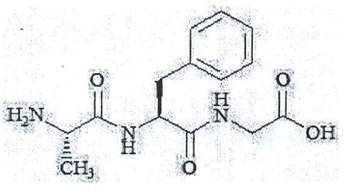
14- Which part of an amino acid gives it its unique properties?

a) The amino group.
b) The carboxyl group.
c) The side chain.

15- In a folded protein, the nonpolar (hydrophobic) amino acids tend to be:

a) Tucked away inside the protein.
b) Exposed on the outside of the protein.
c) Distributed randomly throughout the protein.

16- Identify the correct name for the following peptide.



a) L-alanyl-L-phenylalanyl-glycine.
b) glycyl-L-phenylalanyl-L-alanine.
c) L-phenylalanyl-L-alanyl-glycine.
d) L-alanyl-glycyl-L-phenylalanine.

17- Which of the following statements is true about a peptide bond (RCONHR')?

a) It is non planar.
b) It is capable of forming a hydrogen bond.
c) The *cis* configuration is favored over the *trans* configuration.
d) Single bond rotation is permitted between nitrogen and the carbonyl group.

18- Which parts of amino acids are involved in peptide bonds?

a) The carboxyl group on one amino acid and the side chain on the other.
b) The carboxyl group on both amino acids.
c) The amino group on one amino acid and the carboxyl group on the other.
d) The amino group on both amino acids.

Question 2 (26 Marks)

<u>A- What is the expected result when:</u> (10 Marks)

i- Light passes through a protein solution.
ii- A red blood cells put in a hypertonic solution.
iii- A red blood cells put in a hypotonic solution.
iv- Allowing an electric current to passes through a mixture of glutamic, valine and arginine applied on a paper moistened in a buffer of pH, 8.9.
v- Changing the dielectric constant of an aqueous protein solution by adding an organic solvent.

<u>B- Compare between each of the following doubles:</u> (16 Marks)

i- The structure of collagen and elastin and the related diseases.
ii- Fibrous and globular proteins.
iii- β-sheets and domains.
iv- Bends and loops.

Question 3: (16 Marks)

<u>A- Write the scientific name for each of the following:</u> (6 Marks)

i- A motif, which is frequently used to connect two *parallel β-strands*. The central α-helix connects the C-termini of the first strand to the N-termini of the second strand.
ii- A motif links two segments of *antiparallel β sheet*, in which the first residue is hydrogen-bonded to the fourth.
iii- A test is specific to activated benzene ring and differentiates between tyrosine and phenylalanine.

<u>B- Write short notes on the following:</u> (10 Marks)

i- Dialysis principals in human body.
ii- Effect of alternating the pH on the solubility of proteins.
iii- Hofmeister series.
iv- Preparation of alanylglycine by carbobenzoxy chloride reaction.

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

Mansoura University | **First term Exam, 3/1/2016**

Faculty of Science | **2nd level**

Physics Department | **Time allowed: 2 hours**

Full mark: 80 marks

Subject : physics | **Course : 221ف Physical optics**

Answer the following questions:

1- a) Give the optical arrangement to get Fraunhofer diffraction pattern using a rectangular single slit. Discuss this diffraction pattern. Drive the formula of intensity distribution of the resultant pattern.

(19 marks)

b) A grating with 6000 lines/cm is illuminated with monochromatic light at normal incident, the second order spectral line is observed to be deviated through 30^{o}. Calculate the wavelength of the spectral line.

(8 marks)

2- a) Give a brief account, with an explanatory diagram of the optical arrangement of Fabry-Perot system of multiple- beams interference. Drive an expression for the intensity distribution in transmission for this system when the two coated plate are of same transmission coefficient T and of same reflectivity R. Sketch schematic diagram for the intensity distribution.

(20 marks)

b) Drive Malus law of the intensity of polarized light transmitted through analyzer.

(7marks)

3- a) Demonstrate an explanatory diagram of the optical arrangement of Young's double slits experiment. Drive the necessary formulae for the brightness and darkness conditions.

(10marks)

b) Give an experiment to determine the thickness of a thin sheet of transparent material using Fresnel's biprism. Drive the necessary formula.

(8 marks)

c) A water film ($\mu = 1.33$) in air is 3000 A^{o} thick if it is illuminated with white light at normal incidence. What color will appears to be in reflected light?

(8 marks)

Good Luck

Prof. Dr. Taha Sokkar

Mansoura University **Faculty of Science** **Dept. of Chemistry** **Subject: *Chem 231***		**First Term** **2nd Year Chem.& Biochem. Students** **Time Allowed: 2 hours** **Date : 10/ 1/ 2016**

Answer All The following Questions:

1. A) Select the Correct Answer: [10 Marks]

1-To differentiate between 2-pentanone and 3-pentanone the best reagent used is :

a) $K_2Cr_2O_7/H_2SO_4$ b) Zn-Hg/HCl c) I_2/NaOH d) LiAlH

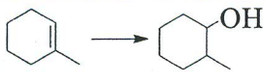
2- Which of the following reagents should be used to convert hex-3-yne to (E)-hex-3-ene:

a) H_2, Pt b) Na, NH_3 c) H_2, Lindlar's catalyst d) H_2SO_4, H_2O

3-Which of the following compounds give geometrical isomerism:

a) Vinylchloride b)1,1-dichloroethene c) trichloroethene d) 1,2-dichloroethene

4- What is the suitable reagent for this reaction



a)$KMnO_4$ b) B_2H_6/ H_2O_2 c) $Hg(OAc)_2$/ NaOH d)HBr / KOH

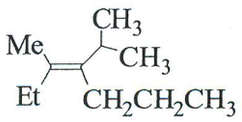
5- What is the best reagent for following reaction: $CH_3COCl \longrightarrow CH_3CHO$

a) NaBH4 b) LiAlH4 c) $LiAlH(O^tBu)_3$ d) PCC

6- Which of the following alkenes gives 2mole of acetic acid by treatment with alkaline $KMnO_4$:

a) 2-butene b) 1-butene c) 1-methylpropene d) 2-methylpropene

7- The geometry of the following compound is...



a) cis- b) trans- (c) E- (d)Z-

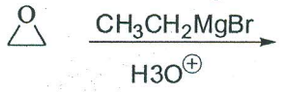
8-The addition of Br_2 to toluene gives:

a) *o*-bromotoluene b)*m*-bromotoluene
c) benzylbromide d) no one of them

9- The reaction of aldehydes with hydroxylamine.HCl gives the corresponding:

a) hydrazone b) oxime c)Schiff's base d) no reaction

10- Which of the following reactions will yield 1-butanol.

a) 

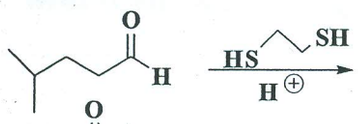
b) HCHO $\xrightarrow[H_3O^{\oplus}]{CH_3CH_2MgBr}$

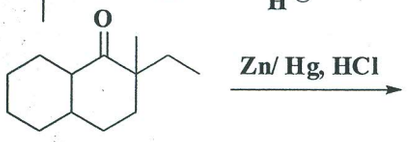
c) $CH_3\overset{O}{\overset{\|}{C}}-H \xrightarrow[H_3O^{\oplus}]{CH_3CH_2MgBr}$

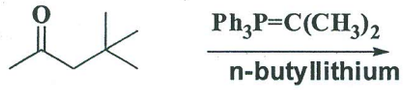
d) $CH_3\overset{O}{\overset{\|}{C}}CH_3 \xrightarrow[H_3O^{\oplus}]{CH_3CH_2MgBr}$

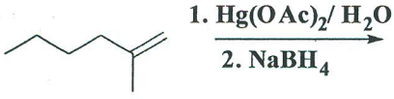
P. T. O

2 A) Complete each of the following chemical equations: [20 Marks]

I. 

II. 

III. 

IV 

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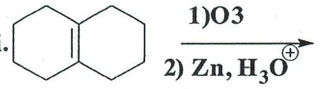
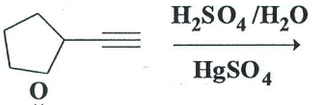
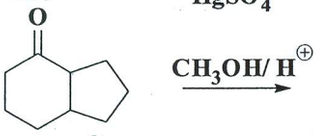
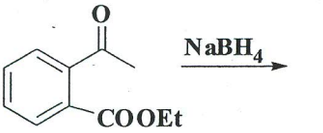
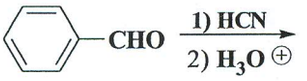
VIi. 

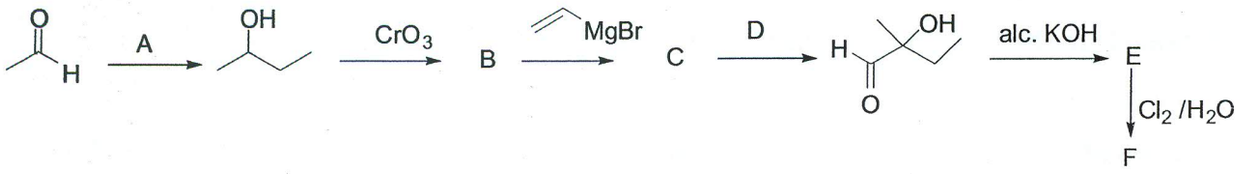
VII. 

VIII. 

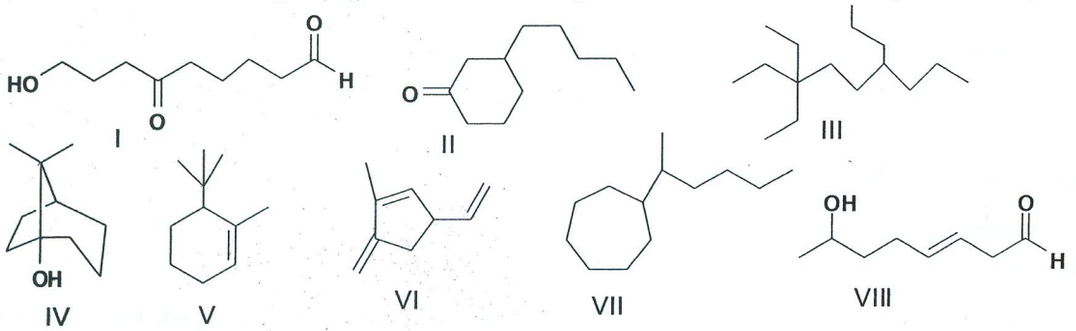
IX. 

X. 

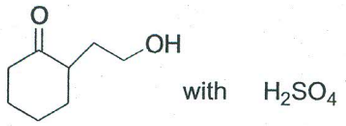
B) Fill in the blanks left in each of the following syntheses: [5 Marks]



3. A) Name the following compounds according to IUPAC rules: [10 Marks].



B) Write the mechanism for the following reaction. [15 Marks].

i. 

ii. The reaction of 2 moles of acetaldehyde with 50% NaOH.

iii. The reaction of 2 moles of 4-nitrobenzaldehyde with NaOH.

iv. The reaction of neopentylalcohol with H_2SO_4.

v. The reaction of propene with HBr/ H_2O_2.

With our Best Wishes, Dr. Mona Elsayed & Dr. Noha Saker.

Mansoura University Faculty of Science Chemistry Department Course: Represented Elements Code: Chem 221		First Semester 2nd Level Microbiology Date: Jan. 2016 Time: 2 hours Marks: 80

Answer The Following Questions

I) Comment on (7 only) of the following:- (28 marks)

1) Thallous (I); Tl^+ compounds are stable.
2) The 1st Ionization Energy (1st IE) of ($_4$Be, $_7$N and $_{10}$Ne) is high while for ($_8$O) is low.
3) The reaction of elements of Group IA with water is increasing through the group.
4) Berylium metal is amphoteric whereas aqueous solution of Be(II) is acidic.
5) Carbon monoxide is considered as good reducing agent.
6) Magnesium(II) chloride is heavily hydrated more than Barium(II) chloride.
7) Nitrogen (N_2)molecule is generally unreactive while Phosphorous molecule (P4) is highly reactive.
8) The solubility of most of the salts of alkali group (IIA) elements is decreasing down the group.
9) The acidity and pka values in the hydrolysis of one molecule and three molecules of boric acid (H_3BO_3).
10) Effect of increasing CO_2 or O_2 concentration on the blood pH.

.....

II) A- Write shortly on (4 only) of the following:- (20 marks)

1) Biological importance of carbon dioxide.
2) Separation of pure silicon element (Si) from silica ore (SiO_2).
3) Photodissociation of nitrogen dioxide (NO_2) and Ozone (O_3) levels in sunny days.
4) Isolation of pure aluminium (Al) from bauxite ore {AlO(OH)}.
5) Production of nitric acid (HNO_3) by Ostwald process.
6) Bond strength of the pairs of (C-C & Si-Si) and (C-O & Si-O) bonds

.....

II) B-Complete (4 only) of the following chemical equations:- (8 marks)

1) $Ba + O_2$ (at 500 °C) →
2) $H_2BO_3 + H_2O$ →
3) $Be_2C + H_2O$ →
4) $^{14}_{7}N + ^{1}_{0}n$ →
5) $Li_3N + D_2O$ →
6) $B_2O_3 + NH_4BF_4$ →

.....

IIIA)

1-Discuss the structure and nature of bonding for

a) Diborane (B_2H_6) b) Trimethylamine {$N(CH_3)_3$} (7 marks)

2-An insulator like Silicon (Si) can be converted to semiconductors (n-type & p-type) (5 marks)

.....

IIIB) Choose the most correct answer for 8 only:- (12 marks)

1) Li + O_2 → ....., while Rb + O_2 → .....
a) Li & RbO b) LiO_2 & RbO_2 c) Li_2O & RbO_2 d) LiOH & RbO_2

2) $CaC_2 + N_2$ → .....
a) Ca_3N_2 b) $CaCN_2$ + C c) $CaCN_2$ d) C

3) The structure of $N(SiH_3)_3$ has .....

a) triagonal b) triagonal pyramidal c) due to sp^2 d) a & c are correct

4)Diamond is ..... than graphite due to .....

a) harder, saturation b) sp^2 c) weaker, sp^3 d) harder, sp^2

5)Pb^{2+} is stable than Pb^{4+} due to

a) metallic character b) inert pair effect c) reactivity of $6s^2$ electrons d) b & c

6) Baking powder (.....) is responsible for evolution of CO_2 during baking

a) $NaHCO_3$ b) Na_2CO_3 c) $Ca(H_2PO_4)_2$ d) $CaHPO_4$

7) $H_2SO_4 + SO_3 \rightarrow$ .....

a) fuming sulphuric acid b) $H_2S_2O_7$ c) H_2SO_3 d) a & b

8) Oxidation state of Cl in $HClO_4$ is

a) +1 b) +7 c) +5 d) +4

9) $^{7}_{3}Li$ isotop is used in treatment of cancer *via*.....

a) neutron capture therapy b) physiotherapy c) chemotherapy d) electron capture therapy

10) Chlorophyll is ..... porphyrin complex, catalyse the ..... process

a) Ca^{2+}, gypsum b) Mg, photosynthesis c) Fe^{2+}, O_2 storage d) Mg^{2+}, photosynthesis

11).....is used as anti-acid for ulcer patients

a) $CaSO_4$ b) $MgCO_3$ c) $BaSO_4$ d) $NaHCO_3$

Best wishes

Prof. Tawfik Rakha

Prof. Sahar Mostafa

Dr. Rania Ramadan

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

2nd Level Biochemistry Students
Date : Jan. 2016
Time Allowed : 2 hours
Full Mark: 80 Marks

ANSWER THE FOLLOWING QUESTIONS

I. **[29 Marks]**

a) Briefly explain the biomedical importance of lipids, and give rise to carrier-mediated diffusion. [14 Marks]

b) Lipidoses are a group of inherited metabolic disorders of lipids. Discuss and illustrate different types of lipid storage disease. [15 Marks]

II. Define the following: **[25 Marks]**

1. Thiobarbituric acid reactive substances assay.
2. Gangliosides
3. Bile acids.
4. The geometric isomerism of steroids
5. carrier-mediated diffusion

III. ***Put true or false in front of the following statements and correct the false ones.*** **[26 Marks]**

1. In Cholesterol the outside methyl groups, attached to C10 and C13, are in the β-configuration.
2. Palmitic acid and stearic acid have 14 and 16 carbons respectively are the two most abundant unsaturated fatty acids.
3. The series 2 prostanoids have 3-*cis* and 5-*trans* double bonds are synthesized from the fatty acid arachidonic acid.
4. The melting points of even-numbered-carbon fatty acids decrease according to chain length.

Best wishes for our dear students,

Dr. Amr Negm

5. Most naturally occurring unsaturated fatty acids have *trans* double bonds.
6. Enzymes can distinguish between the identical carbons No. 1 and 3 of glycerol.
7. Phosphatidylethanolamine is a major constituent of the surfactant preventing adherence in the inner surfaces of the lungs.
8. The higher the iodine number of fatty acids, the lower the melting points.
9. Plasmalogens possess an ester link on the sn-1 carbon and a saturated acyl radical in the sn-2 position of glycerol.
10. Waxes are esters of amino acids with lower molecular weight monohydric alcohols.
11. lysophospholipids have a saturated acyl radical in the sn-2 position of glycerol.
12. Elevated levels of lipoproteins, particularly HDL-cholesterol are associated with an increased risk of atherosclerosis and coronary heart disease.
13. The hydrolysis of ceramide yields a fatty acid, phosphoric acid, choline, and sphingosine.

Best wishes for our dear students,

Dr. Amr Negm

Mansoura University Faculty of Science Physics Departement Subject: Introduction to Biophysics Course code: biophys221		First Term, Final Exam 2nd Students Time Allowed :2 h . Date :20/1/2016 Full Mark :80 Mark

Answer all the following questions

I-Write short notes about each of the followings:

a) Cobalt 60 and linear accelerator

c) Classification of light atom interaction

b) Ion distribution in cell membrane

e) Acoustic impedance

f) Transducer

g) Equivalent Circuit Model for the Plasma Membrane

h) Treatment planning software

d) Compton Effect

II-Choose the correct answer from the followings:

1) The process in which α and β rays pass close to atoms and knocks the electrons out is called:

a) Ionization

b) Ionisation

b) Decay

d) None of above

2)The sound that emanates from a piezoelectric transducer originates:

a) From a point on the active surface

b) From most of the active surface

c) From a small area in the center of the active surface

d) From the edges of the active surface

3) Period is determined by:

a) Sound source

b) Medium

c) Both

4) The time it takes a wave to vibrate a single cycle, or time from the start of a cycle to the start of the next cycle :

a) Period

b) Frequency

c) Wavelength

d) Speed

e) Power

5) Which of the following ions are involved in neuronal action potentials؟

a) Na^+

b) K^+

c) Cl^-

d) A and B only

e) A, B, and C

6) At what membrane voltage do neuronal voltage-gated Na^+ channels become activated`

a) −70 mV

b) −55 mV

c) 0 mV

d) +55 mV

7) At what membrane voltage do neuronal voltage-gated K+ channels become activated?

a) −70 mV

b) −55 mV

c) 0 mV

d) −90 mV

8) The hyperpolarization phase of the action potential:

a) Is due to the opening of voltage-gated Cl− channels

b) Is due to the prolonged opening of voltage-gated K+ channels

c) Is due to the closure of resting Na+ channels

d) None of the above

9) What is a major health concern wth MRI?

a) Reaction to applied drug

b) extrerme cold؟

c) Radiation dose

d) localized burns due to metallic implants?

10) Uses high doses of radiation to kill cancer cells and shrink tumors, delivered precisely to avoid damaging healthy brain tissue.

a) Radiation therapy

b) Ionizing radiation

c) X-ray

d) Radiosurgery

11) Which of the following is NOT true about the neuronal action potential؟

a) Action potentials are all-or-nothing .

b) Action potentials travel along axons in a non-decremental fashion .

c) Repolarization and hyperpolarization are due to the activity of K+ channels .

d) All of the above are true about action potentials.

12) Which of the following is NOT a source of background radiation?

a) Radiation from Naturally occurring unstable isotopes.

b) Radiation from a Source being measured.

c) Radiation from Space.

d) Radiation from Human Activity.

13) Which of the following types of radiation can enter living cells and cause ionization, thus damaging or destroying the cell?

a) Gamma. b) Alpha and Beta.

c) Beta and Gamma. d) Alpha, Beta and Gamma.

14) Where does radiation come from?

a) An electron b) An atom.

c) A stable nucleus d) An unstable nucleus which decays.

15) Which type of radiation would be stopped by a few millimetres of aluminium, but not by paper?

a) Gamma. b) Infra-red.

c) Alpha d) Beta.

III-Write the scientific expression:

a) The component of the ultrasound imaging equipment that is placed in direct contact with the patient's body( ).

b) Conversion of electrical energy to mechanical energy and vice versa ( ).

c) Nerves that communicate messages between the central nervous system and the rest of the body nerves that communicate messages between the central nervous system and the rest of the body( ).

d) Places radioactive material into tumor or surrounding tissue( ).

e) The action potential goes past -70 mV because the potassium channels stay open a bit too long( ).

f) A pair of reflecting surface of which one is a perfect reflector and the other is a partial reflector( ).

مع تمنياتي بالتوفيق

د/أمل الشهاوي

Mansoura University
Faculty of Science
Chemistry Department
Subject: Chemistry
Course (s): Chem 211
Analytical chemistry

First Term
Date : January, 2016
Time Allowed : 2 hours
Full Mark : 60 Marks

Answer FOUR ONLY of the following five questions (each 15 marks):-

- Question 1.

i) Calculate the volume of conc. nitric acid, having sp. gravity 1.42 and 69% w/w percentage concentration, required to prepare 1.00 L of 0.20 M HNO3. What is the volume of the prepared acid needed to react quantitatively with 0.0106g of Na_2CO_3 (H= 1.00, N=14.00, O= 16.00, Na=23.00, C=12.00).

ii) Calculate the mean, confidence limit of five determinations 57, 57.5, 55 and 61(s = 0.02, Qt =0.05). Does the value 61 rejected or not?

iii) Number of moles of 5.8 g NaCl = ..., when dissolved in 500 ml, the solution has molarity of .....(At.wt Na=23 Cl=35.5)

- Question 2.

i) In determination of copper in copper coin, 0.7g of it was dissolved in 10ml HCl and enough KI was added, the liberated I_2 was titrated with 0.4M of $Na_2S_2O_4$, the volume needed was 25ml. Find the purity percent of the copper sample. Cu=63

ii) Calculate the pH of 50ml of 0.1M CH_3COOH on addition of the following volumes of 0.05M NaOH:

a) 0.0 ml b) 5o ml c) 100 ml d) 120 ml

Knowing that (Ka $_{CH3COOH}$= $1.8x10^{-5}$, pKa= 4.76)

- Question 3. Answer TWO of the followings:-

A-Prove that pH =pKa+log[salt]/[acid] for a buffer solution.

B-Discuss:-
i- Factors affecting the break on precipitation titration curves.
ii- The relationship between solubility product and the solubility of a salt.
iii- Methods used for Fe(II) determination(2methods).

C-5.0 ml of 0.10 M Ce^{4+} solution is added to 5.0 ml of 0.30M Fe^{2+} solution. Calculate the potential of a platinum electrode dipped in the solution relative to SHE. (E Ce^{4+}/Ce^{3+} =1.61, E Fe^{3+}/Fe^{2+} =0.771)

Question 4. - Answer only three of the followings

i) Define each of the followings:
a) Accuracy and precision
b) Self indicator.
c) Nernest equation in Redox Reactions

ii)-If you have 1M acetic acid and 0.5M sodium acetate. Calculate the necessary volumes from the two solutions to prepare 100ml buffer solution of pH = 4.

iii) Will we get a precipitate of AgI if 0.01 mg of NaI is added to 200 ml of $2x10^{-5}$ M $NaNO_3$. Ks(AgI= $1.2x10^{-16}$), At.Wts. Na=23, I=127.

iv) A 0.5 g sample containing Ca and Mg carbonates was dissolved in diluted HCl and completed with distilled water to 250 ml. 10 ml of the resulting solution were titrated with 0.01 M EDTA solution. Using EBT indicator, 19 ml of EDTA were consumed, while on using murexide indicator, 8 ml of EDTA were consumed. Calculate the percentage of both Ca and Mg carbonates in the sample. (Ca=40, Mg=24)

- Question 5 Answer TWO of the followings

i) How can you prepare 40% HNO_3 solution from 96% HNO_3, d=1.495g/ml, assuming density of water= 1g/ml.

(ii) Comment on each of the followings statements:-
a)- The success of an EDTA titration depends upon the precise determination of the end point.
b)- The complexing action of EDTA is unselective.
c)- Methods used for detection of the end point of argentiometric titration. Give example.

iii) In titration of Fe^{2+} in acidic medium with 0.0206 M K2Cr2O7, volume of $K2Cr_2O_7$ necessary was 40.2 ml according to the following equation

$6Fe^{2+} + Cr_2O_7^{--} + 14H^+ \rightarrow 6Fe^{3+} + 2Cr^{3+} + 7H_2O$

Calculate the weight of iron (in mg). (Fe = 56)

With best wishes

Prof. M. Eldefrawy Signature

Prof. M. Akl Signature

Mansoura University
Faculty of Science
Chemistry Department
Subject: Biochem. 274
Course(s): Chemistry of Nucleic acids- Prophyrins and their chemical applications

First Term
Final Exam
Second Level (Biochemistry)
Date: 27th January 2016
Time Allowed: Two hours
Full Mark: 80 Marks

Answer ALL the Following Questions

[1] A- Put true (√) or false (X) with correction the false one(s): **[20] Marks**

1. PDT is a non-thermal technique of treatment of cancer based on the interaction of a PS, light and molecular oxygen. ( )
2. The efficacy of ALA-PDT is somewhat limited by the hydrophobic nature, leading to poor penetration through malignant tissues. ( )
3. Fenton reaction involves the production of hydroxyl radicals when superoxide and hydrogen peroxide react together. ( )
4. Phthalocyanines exhibit high fluorescence yields, which can be used for tumor detection and efficiently generate singlet oxygen. ( )
5. Esterification of ALA with aliphatic linear and cyclic alcohols was found to reduce the amount of ALA required for photosensitization. ( )
6. In the mitochondrion, protoporphyrinogen IX is converted to protoporphyrin IX structure by protoporphyrinogen IX oxidase. ( )
7. Oxidative stress is defined as the state in which the level of toxic reactive oxygen intermediates (ROI) overcomes the endogenous antioxidant defenses of the host. ( )
8. Obstruction of the bile duct causes backup and elevation of indirect bilirubin in the plasma. ( )
9. Condensation of 4 molecules of porphobilinogen produce the linear tetrapyrrole intermediate, hydroxymethylbilane which is converted to uroporphyrinogen I in non-enzymatic conditions. ( )
10. The mechanism of action of PDT involve 2 types of reactions, in type II reaction of the triplet PS can transfer its energy directly to molecular oxygen to form excited state singlet oxygen ($^1O_2$). ( )

B- Write on the advantages of amino levulinic acid in photodynamic therapy. **[7] Marks**

P. T. O.

[2] A- Write on the properties for an ideal sensitizer. **[13] Marks**

B- Complete the following:

i- In 1928, Fred Griffith discovered that a ..... (1) ..... R mutant pneumococci could be .....(2).....into the .....(3).....S form.

ii- Nucleosomes contain four types of histones: .... (4)...., ...(5)...., ...(6)...., ...(7)....

[7] Marks

C- Match each item from column (A) with the most correct item from column (B):

(A)	(B)
i- 5- Fluorouracil	a- binds Okazaki fragments
ii- Allopurinol	b- is composed of arabinose and cytosine
iii- Cytarabine	c- is 20 Å
iv- mRNA is capped with	d- is an arabinoside with adenine
v- The width of DNA double helix	e- is employed by oncologists to treat cancer
vi- DNA ligase	f- 7-methyl guanosine triphosphate at its 5′ –end
	g- is used in treatment of gout
	h- is used to suppress immunologic rejection during organ transplantation
	i- breaks the hydrogen bonds between the complementary bases

[6] Marks

[3] A- The first two amino acids in the formation of a protein were Methionine and Leucine with Codons; AUG and UUA, respectively.

i- Show how Leucine is activated before the protein formation starts. **[6.5] Marks**

ii- Give a diagrammatic representation of the final step on the way from DNA to this protein. **[12.5] Marks**

B- Illustrate the process of adding dATP and dTTP (in order) to RNA primer during DNA synthesis.

[8] Marks

Examiners: Dr.Ahmed EL-Sokkary **Dr. Manar Refaat**

-Good Luck-