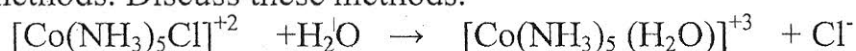
	TANTA UNIVERSITY FACULTY OF SCIENCE DEPARTMENT OF CHEMISTRY		
	EXAMINATION FOR B.S.C STUDENTS (CHEMISTRY SECTION)		
	COURSE TITLE:	Inorganic Reaction Mechanism	COURSE CODE: CH 4216
DATE:	JUNE, 2015	TOTAL ASSESSMENT MARKS: 100	TIME ALLOWED: 2 HOURS

Answer in the following questions:

- 1) a- Discuss the mechanism of substitution reactions in octahedral and square planar complexes.
b- Show by equations :
 - 1- Substitution reactions without breaking metal-ligand bond.
 - 2- Dichloro diamine platinum(II) complex.
 - 3- Synthesis of Trans Dichloro nitro amine platinum(II).
 - 4- Mechanism of one electron transfer reactions in complexes.
- 2) a- Define the complementary and non-complementary reactions.
b- What are the factors affecting the rate of substitution reaction?
c- Define the Trans series.

- 3) The progress of the following reaction can be followed by different methods. Discuss these methods.




- 4) Tetrachloro platinum(II) ion reacts with ammonia molecule giving complex (A) which reacts with bromide ion followed by pyridine molecule giving complex (B). Also, complex (A) reacts with another ammonia molecule giving complex (C).

What are the geometrical structures of complexes A, B and C.

- 5) Chloro pentaamine cobalt(III) ion (A) reacts with hydroxide ion giving complex (B) and water molecule. Complex (B) loses chloride ion giving complex (C) which reacts with water molecule giving complex (D).
What are the formulae of these complexes?

Examiners

Prof. Dr. Mohamed Gaber Abu-Elazm

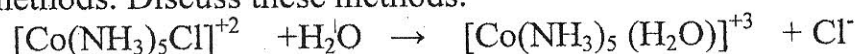
	TANTA UNIVERSITY FACULTY OF SCIENCE DEPARTMENT OF CHEMISTRY		
	EXAMINATION FOR BS.C STUDENTS (CHEMISTRY SECTION)		
	COURSE TITLE:	Inorganic Reaction Mechanism	COURSE CODE: CH 4216
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- 3) The progress of the following reaction can be followed by different methods. Discuss these methods.




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What are the formulae of these complexes?

Examiners

Prof. Dr. Mohamed Gaber Abu-Elazm

	TANTA UNIVERSITY FACULTY OF SCIENCE DEPARTMENT OF CHEMISTRY			
	EXAMINATION FOR SENIOR STUDENTS OF CHEMISRY SECTION			
	COURSE TITLE:	NUCLEIC ACID METABOLISM	COURSE CODE: 4230	
DATE: 15 - 6.15	JUNE, 2015	SECOND TERM EXAM	TOTAL ASSESSMENT MARKS: 50	TIME ALLOWED: 2 HOURS

Answer the following questions:

I- A-Explain each of the following:-

(25 marks)

- i- The specificity of the pancreatic nucleotidases and that of lysosomal nucleotidases.
- ii- Origin of atoms in purine rings and the De Novo purine nucleotide synthesis.
- iii- The pyrimidine ring system is completed before a ribose 5-phosphate is attached.
- iv- The synthesis of AMP from IMP and the salvage of IMP via AMP catabolism have the net effect of deaminating aspartate to fumarate
- v-. Uric acid is the end product of purine catabolism .

B-A portion of template strand of a gene has the sequence
TCCATGAGTTGA. · identify the 5' end and the 3' end of the molecule. write the nucleotide sequence of the complementary DNA segment.What is the sequence of nucleotides in the RNA that is formed from this template?
(3 marks)

II- Illustrate in equations .

(12 marks)


- i-The enzymatic methylation of the dUMP is catalyzed by thymidylate synthase
- ii-Thioredoxin is a physiologic reducing agent of ribonucleotide reductase
- iii-CMP and UMP are degraded to their respective bases in a series of reactions. Specifically, these are dephosphorylation, deaminase and phosphorylation reactions,

III- Choose the correct answer (s) .

(10 marks)

- i- PRPP synthetase reaction is stimulated for a source of nitrogen by:-
a) ATP b) R-5-P c) IMP d) all of the above
- ii- Allopurinol, a drug approved for the treatment of Gout inhibits:-
a)hypoxanthine oxidase b)xanthine oxidase c) HGPRTase d) uricase
- iii- Cytidine nucleotides are formed in a glutamine-dependent amination, the substrate of which is
a) UDP b)UTP c)CMP, d) dCDP
- iv- ATCase ,
a) inhibited by CTP and activated by ATP
b) inhibited by ATP and activated by CTP
c) inhibited by UTP and activated by ATP
d) inhibited by ATP and activated by UTP
- v- The end products of uracil catabolism are
a) CO₂,NH₃,β alanine
b) CO₂,NH₃,β aminobutyrate
c) CO₂,NH₃,β aminoisobutyrate
d) β -Ureidopropionate

PROF. Dr. AHMED SAAFAN

	TANTA UNIVERSITY FACULTY OF SCIENCE DEPARTMENT OF CHEMISTRY			
	EXAMINATION FOR SENIOR STUDENTS OF CHEMISRY SECTION			
	COURSE TITLE:	NUCLEIC ACID METABOLISM	COURSE CODE: 4220	
DATE: 15 - 6.15	JUNE, 2015	SECOND TERM EXAM	TOTAL ASSESSMENT MARKS: 50	TIME ALLOWED: 2 HOURS

Answer the following questions:

I- A-Explain each of the following:-

(25 marks)

- i- The specificity of the pancreatic nucleotidases and that of lysosomal nucleotidases.
- ii- Origin of atoms in purine rings and the De Novo purine nucleotide synthesis.
- iii- The pyrimidine ring system is completed before a ribose 5-phosphate is attached.
- iv- The synthesis of AMP from IMP and the salvage of IMP via AMP catabolism have the net effect of deaminating aspartate to fumarate
- v-. Uric acid is the end product of purine catabolism .

B-A portion of template strand of a gene has the sequence TCCATGAGTTGA. · identify the 5' end and the 3' end of the molecule. write the nucleotide sequence of the complementary DNA segment.What is the sequence of nucleotides in the RNA that is formed from this template? (3 marks)

II- Illustrate in equations .

(12 marks)

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- ii-Thioredoxin is a physiologic reducing agent of ribonucleotide reductase
- iii-CMP and UMP are degraded to their respective bases in a series of reactions. Specifically, these are dephosphorylation, deaminase and phosphorylation reactions,

III- Choose the correct answer (s) .

(10 marks)

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- a) hypoxanthine oxidase b) xanthine oxidase c) HGPRTase d) uricase

iii- Cytidine nucleotides are formed in a glutamine-dependent amination, the substrate of which is

- a) UDP b) UTP c) CMP, d) dCDP

iv- ATCase ,

- a) inhibited by CTP and activated by ATP
- b) inhibited by ATP and activated by CTP
- c) inhibited by UTP and activated by ATP
- d) inhibited by ATP and activated by UTP

v- The end products of uracil catabolism are

- a) CO₂, NH₃, β alanine
- b) CO₂, NH₃, β aminobutyrate
- c) CO₂, NH₃, β aminoisobutyrate
- d) β -Ureidopropionate

PROF. Dr. AHMED SAAFAN



Tanta University
Faculty of Science
Department of Chemistry

Final Exam. for M.Sc. students

Computational Chemistry

Course Code: 4214

Jun. 1st 2015 Term: second Total Assessment Marks: 50

Time Allowed: 2 Hours

Answer the following questions:

The quantum mechanics is applied in different fields of chemistry to solve many Problems such as the formation of molecular wave function from the interaction of atomic wave function. Sketch the correlation diagram from the attached data for NH₃ molecule. Show the different types of overlap ,electronic distribution for NH₃ molecule

ATOM		X	Y	Z		S		P				
					N	EXP	COUL	N	EXP	COUL		
H	1	0.00000	.00000	.00000	1	1.2000	-14.000				1	10 1 0
N	2	-1.50000	.00000	.00000	2	1.6237	-18.000	2	1.617	-13.00	7	30 2 3
H	3	-1.50000	.00000	1.5000	1	1.2000	-14.000				1	10 1 0
H	4	-3.0000	.00000	.0000	1	1.2000	-14.00				1	10 1 0

ENERGY LEVELS (EV)

E(1) =	18.00000	0
E(2) =	6.00000	0
E(3) =	6.00000	0
E(4) =	-13.00000	2
E(5) =	-17.00000	2
E(6) =	-17.00000	2
E(7) =	-20.00000	2

ENERGY= -140.000000 EV.

OMO'S IN COLUMNS, AO'S IN ROWS

	1	2	3	4	5	6	7
1	-1.2000	.0000	-.3000	.0000	-.4000	.0000	-.6000
2	.7000	-.2000	.8000	.0000	-.5000	.4000	-.3000
3	.0000	.0000	.5000	-1.0000	.0000	.0000	.0000
4	.0000	.0000	.0000	.0000	.0000	.0000	.0000
5	.0000	-.4000	.0000	.0000	.0000	.3000	.0000
6	-.7000	.8000	.0000	.0000	.0000	.5000	-.2000
7	-.7000	.0000	.6000	.0000	-.4000	.0000	-.2000


OATOM NET CHG.ATOMIC ORBITAL OCCUPATION FOR GIVEN MO OCCUPATION

		S	X	Y	Z
H	1	.10000	.97317		
N	2	-.30000	1.12890	.97589	2.00000
H	3	.10000	.97311		
H	4	.10000	.97307		

- 1- calculate the eigen value of NH₃ molecule.
- 2- Define the HOMO and LUMO levels and calculate the energy gap.
- 3- calculate the electronic configuration of 2Px and 2Py of N atom.
- 4- Explain the stability of NH₃ molecule.
- 5- Differentiate between non-bonding and antibonding orbitals
- 6- What type of overlap between N and H₃ atoms.
- 7- Define the ionization potentials for 2p of N and 1s of H atoms.
- 8- Differentiate between electronegativity of N and H atoms.
- 9- How many atomic orbitals are involved in the interaction.
- 10- Explain the importance of wave function matrix.

Good Luck

Prof. Dr. Mohamed K. Awad

	TANTA UNIVERSITY FACULTY OF SCIENCE DEPARTMENT OF CHEMISTRY			
	EXAMINATION for Seniors students (Fourth Year) students of Chemistry			
	COURSE TITLE:	Applied Polymer Chemistry تطبيقات البوليمرات	COURSE CODE: CH4222	
DATE:	MAY 25 TH 2015	TERM: SECOND	TOTAL ASSESSMENT MARKS:100	TIME ALLOWED: 2 HOURS

Answer the following questions:

1- Put the sign (√) on the correct statement and the sign (X) on the incorrect statement **10 marks**

- a- Hydrogels are hydrophilic polymers that absorb water and are insoluble in water at physiologic temperature ()
- b- Poly vinyl alcohol cannot be produced from poly vinyl acetate ()
- c- Smoke Suppressants is to increase smoke evolution ()
- d- Light stabilizers are effective as antioxidants at low and moderate temperature ()
- e- Drugs can also be covalently conjugated to the hydrogel matrix ()

2- Choose the correct answers **10 marks**

- a- chloroprene is manufactured from:
 - i- acetylene and hydrogen chloride reaction ()
 - ii- ethylene and hydrogen chloride ()
 - iii- problem and hydrogen chloride ()
 - iv- acetylene and hydrogen chloride ()
- b- Polymer as drug carrier, should possess features:
 - i- The polymer should remain water-soluble even after drug loading ()
 - ii- Molecular weight of the polymer should be large enough ()
 - iii- Drug-carrier linkages should be stable in body fluid and yet degradable after capturing in target cells. ()
 - iv- All of the above ()

3- Discuss controlled release technology, and the features of controlled release formulations. **10 marks**

4- Write notes on drug properties and therapeutic requirement should be taken into account in designing a controlled release system. **10 marks**

5- Write short notes on Polymeric Prodrugs. **10 marks**

6- Discuss important synthetic rubbers, their properties and uses **10 marks**

7- Vulcanized rubber **10 marks**


8- Classification of hydrogel **10 marks**

9- Extending the effectiveness of hydrogels for drug delivery **10 marks**

10- Antimicrobial Agents as polymer additives **10 marks**

EXAMINERS	Professor El-Refaie Kenawy	

425

 1969	TANTA UNIVERSITY FACULTY OF SCIENCE DEPARTMENT OF CHEMISTRY			
	EXAMINATION FOR SENIORS (FOURTH YEAR) STUDENTS OF CHEMISTRY			
	COURSE TITLE:	Instrumental Analysis (3)		COURSE CODE: CH4206
DATE:	MAY, 2015	TERM: SECOND	TOTAL ASSESSMENT MARKS: 100	TIME ALLOWED: 2 HOURS

Answer the following questions:

[I] Choose the correct sentences: (48 Marks)

(2 Marks for each question)

- 1) For "Control potential coulometry"
 - i) Potential of working electrode relative to reference electrode is constant
 - ii) $Q = i \times t$
 - iii) Three electrode system must be used
 - iv) All the above
- 2) For potentiometric technique
 - i) A very low impedance electronic voltammeter is used
 - ii) It is a dynamic technique
 - iii) Current does not allow to pass in the cell
 - iv) All the above
- 3) Determination of dissolved CO_2 can be carried out using
 - i) Ag_2S membrane electrode
 - ii) Glass electrode
 - iii) Gas sensing electrode
 - iv) All the above
- 4) Relative potential of an electrode is related to the concentration of an ion via
 - i) Ilkovic equation
 - ii) Faraday Law
 - iii) Nernst equation


[II] Write (✓) and (×) for the true and false statements, respectively (44 Marks)

(Give the reason for your answer in both cases & Confirm your answer by writing equations or drawing)

(4 Marks for each question)

- 1) Hg behaves as "Ideal polarized electrode" at more positive potential than +0.25 V vs. SCE.
- 2) The total amount of electrolysis is very small in voltammetric analysis.
- 3) Glucose oxidase is responsible for catalytic hydrolysis of "urea" in urea selective electrode.
- 4) Surface of the glass electrode must be hydrated before it will function as a pH electrode.
- 5) The potential of reference electrode (E_{Ref}) changes by changing the activity of its own solution species.
- 6) LaF_3 crystal must be doped with EuO or EuF_2 in "fluoride electrode".

Go to the second page

	TANTA UNIVERSITY FACULTY OF SCIENCE			
	DEPARTMENT OF CHEMISTRY			
	Final Examination for level 4 th students of chemistry			
	COURSE TITLE:	Chemistry of Dyestuffs		Course code: CH4208
DATE:	May 27 th 2015	TERM: SECOND	TOTAL ASSESSMENT MARKS:50	TIME ALLOWED: 2 HOURS

Answer the following questions:

- Write briefly on the chemistry of cellulose, regenerated cellulose and chemically modified cellulose. Enumerate the main classes of dyestuffs used for dyeing each type of fiber.
 - Explain the type of forces between the different dyes and fibers.
- Write an account on each of the following:
 - Acid dyes (leveling and milling)
 - Pre-metallised acid dyes.
- Describe the nature of the chemical reactions between cellulose with reactive dyes and give evidences for the chemical union between the dye molecules and cellulose fibers.
Illustrate your answer with different structural formulas.
- Write notes on each of the following
 - Indigo vat dyes
 - Disperse dyes



TANTA UNIVERSITY
FACULTY OF SCIENCE
DEPARTMENT OF CHEMISTRY

EXAMINATION for Seniors students (Fourth Year) students of Chemistry

COURSE TITLE:	Applied Polymer Chemistry تطبيقات البوليمرات	COURSE CODE: CH4222
DATE:	MAY 25 TH 2015	TERM: SECOND
TOTAL ASSESSMENT MARKS:100		TIME ALLOWED: 2 HOURS

Answer the following questions:

1- Put the sign (√) on the correct statement and the sign (X) on the incorrect statement **10 marks**

- a- Hydrogels are hydrophilic polymers that absorb water and are insoluble in water at physiologic temperature ()
- b- Poly vinyl alcohol cannot be produced from poly vinyl acetate ()
- c- Smoke Suppressants is to increase smoke evolution ()
- d- Light stabilizers are effective as antioxidants at low and moderate temperature ()
- e- Drugs can also be covalently conjugated to the hydrogel matrix ()

2- Choose the correct answers **10 marks**

- a- chloroprene is manufactured from:
 - i- acetylene and hydrogen chloride reaction ()
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- b- Polymer as drug carrier, should possess features:
 - i- The polymer should remain water-soluble even after drug loading ()
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3- Discuss controlled release technology, and the features of controlled release formulations. **10 marks**

4- Write notes on drug properties and therapeutic requirement should be taken into account in designing a controlled release system. **10 marks**

5- Write short notes on Polymeric Prodrugs. **10 marks**

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7- Vulcanized rubber **10 marks**

8- Classification of hydrogel **10 marks**

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10- Antimicrobial Agents as polymer additives **10 marks**

EXAMINERS	Professor El-Refaie Kenawy	



Tanta University
Faculty of Science
Department of Chemistry

Final Exam. for M.Sc. students

Computational Chemistry

Course Code: 4214

Jun. 1st 2015

Term: second

Total Assessment Marks: 50

Time Allowed: 2 Hours

Answer the following questions:

The quantum mechanics is applied in different fields of chemistry to solve many Problems such as the formation of molecular wave function from the interaction of atomic wave function. Sketch the correlation diagram from the attached data for NH₃ molecule. Show the different types of overlap ,electronic distribution for NH₃ molecule

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5	.0000	-.4000	.0000	.0000	.0000	.3000	.0000
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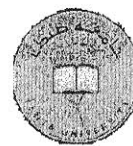
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- 5- Differentiate between non-bonding and antibonding orbitals
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- 8- Differentiate between electronegativity of N and H atoms.
- 9- How many atomic orbitals are involved in the interaction.
- 10- Explain the importance of wave function matrix.

Good Luck

Prof. Dr. Mohamed K. Awad



Tanta University - Faculty of Science - Chemistry Department

Final Exam of physical polymer

For 4th year students (Chemistry)

Date: 6/6/2014 Course Code: 4212 Total assessment marks: 100 Time

Allowed: 2h

The exam in two pages:

Answer the following four questions:

1- a) Compare between each pair of the following giving the reason

(10 Marks):

i-vinylacetate/vinylchloride copolymer and polyvinyl chloride in modulus.

ii-Polymethylmethacrylate and methylmethacrylate-butadiene copolymer in ultimate elongation.

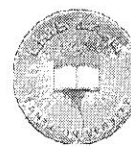
iii- Styrene-acrylonitrile copolymer and polyacrylonitrile in modulus.

iv- Asymmetrically structured polyvinyl chloride and symmetrical counterparts (polyvinylidene chloride) in glass transition temperature.

v-Polyethylene and p-polyphenylene in rigidity.

b) Choose between brackets and write the answer only: (10 Marks)

- i- Addition of water to nylon 66 leads to (increase-decrease) modulus.
- ii- Presence of secondary force in the polymer (increase-decrease) the energy of intermolecular interaction and lead to (increase-decrease) crystalline force leading to (high-low) T_m , (increase-decrease) mobility of amorphous leading to (high-low) T_g .
- iii- Addition of calcium carbonate to polyisoprene leads to (increase-decrease) modulus.
- iv- As the degree of crosslinking of microporous resins is increased, the pore size (increased-decreased), swellability (increased-decreased).
- v- By heating polyacrylonitrile at elevated temperature, till aromatization. The product is (flexible-rigid).



Tanta University - Faculty of Science - Chemistry Department

"Supramolecular Chemistry"

Final Exam for Level four students

Sections: Chemistry, Chemistry/Biochemistry and Chemistry/Zoology

Date: 10/6/2015 Course Code: CH4218 Total assessment marks: 50 Time Allowed: 2h

Question (I)

(16 Marks)

Answer the following: (Illustrate your answer with figures).

- 1- Explain why: Zwitterion hosts are better than Katapinand-like hosts for anion complexation.
- 2- Indicate the role of crown ether in the reaction of potassium fluoride with benzyl chloride in acetonitrile.
- 3- Explain the effect of chelate ring size on selectivity of cation complexation.
- 4- Compare between the cation affinity of the podand and their cyclic analogue.

Question (II)

(10 Marks)

Complete the following:

- 1- Valinomycin is selective for
- 2- Cyclodextrins consists of units that are linked together by a β -cyclodextrin: containing
- 3- Half protonated form of cryptand host is suitable for Full protonated form is suitable for Unprotonated form of cryptand host is suitable for
- 4- Weak-strength hydrogen bond occurs between
- 5- Transfer of insoluble MnO_4^- ion into organic solvents by results in quantitative oxidation of the organic substrates.

Question (III)

(12 Marks)

Give a brief explanatory note on the following:

- 1- Self-assembly.
- 2- The kinetic and thermodynamic template effect.
- 3- Coordination polymers.

Question (IV)

(12 Marks)

Put (✓) in front of correct statement and (×) in front of wrong one and correct it:

- 1- An activation stage means that, the guest undergoes conformational readjustment in order to bind a host. It is energetically favorable. ()
- 2- A host species with multiple binding sites that are covalently connected forms a more stable complex than multiple unidentate ligand. ()
- 3- Hydrogen bond represents a special kind of ion-ion interaction. ()
- 4- Cyclophane hosts include all organic molecules that containing a bridged amino group specific for cations. ()
- 5- The role of the template is to enhance the rate of formation of the cyclic intermediate by stabilizing the cyclic product. ()
- 6- Divalent cations bound strongly by hosts with large cavity. ()

With My Best Whishes

Examiner: Prof. Dr. Dina M. Abd El-Aziz



TANTA UNIVERSITY
FACULTY OF SCIENCE
DEPARTMENT OF CHEMISTRY

EXAMINATION FOR SENIOR (FOURTH YEAR) STUDENTS OF SPECIAL CHEMISTRY

COURSE TITLE:	ANALYTICAL BIOCHEMISTRY		COURSE CODE: CH 4228
DATE:	13/06/2015	TERM: SECOND	TOTAL ASSESSMENT MARKS: 50
		TIME ALLOWED: 2 HOURS	

Answer the following questions

- I. a. **Write the scientific term for each of the following:** (5 marks)
1. The process whereby a biological sample is brought to a state where all fractions of the sample are equal in composition.
 2. Separation of molecules in solution based on their size through a semi-permeable membrane.
 3. The chromatographic technique which enables the purification of a biomolecule on the basis of its biological function or individual chemical structure.
 4. The method used for labeling proteins in cells with antibodies that are attached to an enzyme and produces a colored product which is visible when viewed through a microscope.
 5. The technique for transferring of proteins from a gel matrix to a polyvinylidene fluoride (PVDF) membrane support.
- b. **Compare between each of the following:** (8 marks)
1. Salting in and salting out
 2. Anion and cation exchangers
 3. Native polyacrylamide gel electrophoresis (PAGE) and sodium dodecyl sulfate (SDS)-PAGE
 4. Direct and indirect detection of immunostaining
- II. a. **How can you determine the molecular mass of a protein by using each of the following techniques?** (8 marks)
1. Gel filtration chromatography (GFC)
 2. SDS-PAGE
- b. **Determine the subunit composition of a protein from the following information:** (6 marks)
- Molecular mass by gel filtration: 200 kDa
 - Molecular mass by SDS-PAGE: 100 kDa
 - Molecular mass by SDS-PAGE with β -mercaptoethanol (β -ME): 40 kDa and 60 kDa
- III. a. **Give a brief explanation to each of the following:** (8 marks)
1. The different ligand immobilization techniques in affinity chromatography (AC).
 2. The isoelectric focusing (IEF) technique offers the highest resolution of all electrophoresis techniques.
 3. The principle on which enzyme-linked immunosorbent assay (ELISA) technique is based. How can you determine a viral antigen by using indirect ELISA.
- b. In an experiment, the two proteins (A and B) were separated by chromatography on both an anion exchanger column (Figure A) and on a gel filtration column (Figure B). The protein mixtures were applied to the columns in a buffer of pH 8.0 and low ionic strength. Elution was performed, and fractions were collected until both

- b. Fractionated by electrophoresis then treated with an oxidizing agent followed by an anionic detergent
 - c. Treated with an oxidizing agent and then with an anionic detergent followed by fractionation by electrophoresis
 - d. None of the above
- 6. In isoelectric focusing (IEF) technique, proteins are separated on the basis of their**
- a. Size
 - b. Relative content of positively charged residues only
 - c. Relative content of negatively charged residues only
 - d. Relative content of both positively and negatively charged residues
- 7. The first step in two-dimensional (2-D) gel electrophoresis generates a series of protein bands by isoelectric focusing. In a second step, a strip of this gel is turned 90 degrees, placed on another gel containing SDS, an electric current is again applied. In this second step:**
- a. Proteins with similar isoelectric points become further separated according to their molecular weights
 - b. The individual bands become stained so that the isoelectric focus pattern can be visualized
 - c. The individual bands become visualized by interacting with protein-specific antibodies in the second gel
 - d. The individual bands undergo a second, more intense isoelectric focusing and the proteins in the bands separate more completely because the second electric current is in the opposite polarity to the first current
- 8. In Western blotting**
- a. Agarose gel is commonly used
 - b. Polyacrylamide gel is commonly used
 - c. Both (a) and (b)
 - d. High resolution gels
- 9. ELISA is based on**
- a. Antigen-antibody interaction
 - b. Antigen-protein interaction
 - c. Lectin-antibody interaction
 - d. All of the above
- 10. Which of the following statements is TRUE about Edman degradation?**
- a. Using a reagent that can react selectively with the unique C-terminal carboxylate group and cleave the amino acid, identify the cleaved residue by HPLC, and then successively carry out such reaction to the next residue
 - b. Using a reagent that can react selectively with the unique N-terminal amino group and cleave the amino acid, identify the cleaved residue by HPLC, and then successively carry out such reaction to the next residue
 - c. Hydrolyzing the peptide in 6M HCl, react the resulting amino acid with ninhydrin, and identify the amino acids by HPLC
 - d. Hydrolyzing the peptide in 6M HCl, react the resulting amino acid with fluorecamine, and identify the amino acids by HPLC

Good luck

EXAMINERS	PROF. DR. EHAB M. ALI
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TANTA UNIVERSITY
FACULTY OF SCIENCE
DEPARTMENT OF CHEMISTRY

EXAMINATION FOR SENIOR (FOURTH YEAR) STUDENTS OF SPECIAL CHEMISTRY

COURSE TITLE:	ANALYTICAL BIOCHEMISTRY		COURSE CODE: CH 4228
DATE:	13/06/2015	TERM: SECOND	TOTAL ASSESSMENT MARKS: 50
			TIME ALLOWED: 2 HOURS

Answer the following questions

- I. a. Write the scientific term for each of the following: (5 marks)
1. The process whereby a biological sample is brought to a state where all fractions of the sample are equal in composition.
 2. Separation of molecules in solution based on their size through a semi-permeable membrane.
 3. The chromatographic technique which enables the purification of a biomolecule on the basis of its biological function or individual chemical structure.
 4. The method used for labeling proteins in cells with antibodies that are attached to an enzyme and produces a colored product which is visible when viewed through a microscope.
 5. The technique for transferring of proteins from a gel matrix to a polyvinylidene fluoride (PVDF) membrane support.
- b. Compare between each of the following: (8 marks)
1. Salting in and salting out
 2. Anion and cation exchangers
 3. Native polyacrylamide gel electrophoresis (PAGE) and sodium dodecyl sulfate (SDS)-PAGE
 4. Direct and indirect detection of immunostaining
- II. a. How can you determine the molecular mass of a protein by using each of the following techniques? (8 marks)
1. Gel filtration chromatography (GFC)
 2. SDS-PAGE
- b. Determine the subunit composition of a protein from the following information: (6 marks)
- Molecular mass by gel filtration: 200 kDa
 - Molecular mass by SDS-PAGE: 100 kDa
 - Molecular mass by SDS-PAGE with β -mercaptoethanol (β -ME): 40 kDa and 60 kDa
- III. a. Give a brief explanation to each of the following: (8 marks)
1. The different ligand immobilization techniques in affinity chromatography (AC).
 2. The isoelectric focusing (IEF) technique offers the highest resolution of all electrophoresis techniques.
 3. The principle on which enzyme-linked immunosorbent assay (ELISA) technique is based. How can you determine a viral antigen by using indirect ELISA.
- b. In an experiment, the two proteins (A and B) were separated by chromatography on both an anion exchanger column (Figure A) and on a gel filtration column (Figure B). The protein mixtures were applied to the columns in a buffer of pH 8.0 and low ionic strength. Elution was performed, and fractions were collected until both

- b. Fractionated by electrophoresis then treated with an oxidizing agent followed by an anionic detergent
 - c. Treated with an oxidizing agent and then with an anionic detergent followed by fractionation by electrophoresis
 - d. None of the above
- 6. In isoelectric focusing (IEF) technique, proteins are separated on the basis of their**
- a. Size
 - b. Relative content of positively charged residues only
 - c. Relative content of negatively charged residues only
 - d. Relative content of both positively and negatively charged residues
- 7. The first step in two-dimensional (2-D) gel electrophoresis generates a series of protein bands by isoelectric focusing. In a second step, a strip of this gel is turned 90 degrees, placed on another gel containing SDS, an electric current is again applied. In this second step:**
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