المستوى الثالث - كيمياء حيوية - التحليل الوزني (كه ٣١٣)
والحراري الكمي

Mansoura University
Faculty of Science
Chemistry Department

Course: Analytical Chemistry
Date : 02/ 07/ 2011

Second term Examination
Subject: Chemistry (313)
Third level BioChemistry
Full Mark : 60 Marks
Time Allowed : 2hours

Section (A) [30 Marks]

Answer the Following Questions :

A- Wright shortly on the followings:

i-Criteria and uses of gravimetric analysis.

ii. Colloids and electric double layer.

iii-Combustion analysis , give examples

iv-The specific action of organic precipitants.

B- Discuss with examples:-

i-The weighed form is, some times, different from the precipitate.

ii-Effect of pH and the common ion , on the precipitation process.

iii-Impurities and increasing purity in gravimetric analysis.

iv-Mechanisms of weight change in TGA. What can TGA tell you ?

v- Factors affecting the decomposition temperatures in TGA .

C -Please select the Best Answer :

i- Increasing the ionic strength of a saturated solution by adding A compound with ions not common to the precipitate usually.... .... The solubility of the precipitate.

a. Decreases b. Increases c. Doesn't affect

ii. Increasing the ionic strength of a saturated solution by adding a compound with ions common to those of a precipitate Usually ... ... the solubility of the precipitate.

a. decreases b. Increases c. Doesn't affect

D–Calculate

i- You have a solution containing Ca+2 and Mg+2 ions. You wish to Precipitate out the Mg+2 leaving the Ca+2 in solution. If the Concentration of both the Mg+2 and Ca+2 ions is 0.100 M, . Is it Possible to quantitatively remove the Mg+2 as Mg(OH)2 leaving The Ca+2 in solution? If possible, at what pH would this occur? For Ca(OH)2, Ksp = 6.5 x 10-6 for Mg(OH)2, Ksp = 7.1 x 10-12

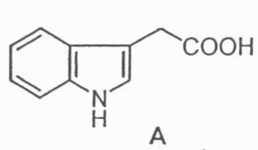
ii -The solubility of Ag_2CrO_4 in water is 0.022g/L. Determine the solubility product.(Ag_2CrO_4=332)

Mansoura University
Faculty of Science
Chemistry Department
Final Examination for Third Year [Chemistry - Biochemistry] Students
Organic Synthesis & Organometallic Chemistry [C- 338]

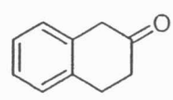
June 2011 Time: 3 hrs.

ANSWER ALL QUESTIONS [60 Marks]

1) Suggest a synthesis for each of the following compounds: [15 Marks]



A



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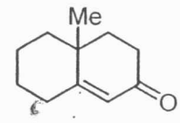

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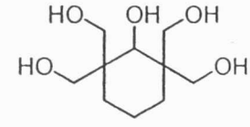
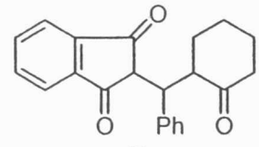


D

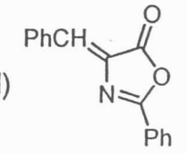


E

2) Explain by chemical equations each of the following: [15 Marks]
a) Synthesis of atropine.
b) Synthesis of dimedone and its reaction with formaldehyde.
c) Double Michael condensation.

3) Outline and show by equations how to elucidate the structure of silatoluene. [15 Marks]

4) Outline and show by equations each of the following: [15 Marks]
a) The reaction of ferrocene with CH_3COCl / $AlCl_3$.
b) Sublimation of ferrocene with 10 molecules of iodine.
c) The reaction of *o*-bromoanisole with *n*-butyl lithium.

d) 

+ 2 Ar.MgBr ⟶ .....

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Prof. Dr. E. M. Afsah -- Prof. Dr. S. S. Elmorsy

Section (B) Electroanalytical Chemistry (30 marks):

1-For each of the following, choose the appropriate answer and give the reason:(10 marks)

(i)- How long will it take to deposit all the copper in 100 mL of 0.250 M Cu^{2+} solution, using a current of 1.20 A? (a) 1005 sec (b) 2010 sec (c) 4020 sec
(d) 502.5 sec (e) none of these

(ii)- Which of the following **is/are** true about constant current coulometric titrations:
a) Current is analogous to the volume of titrant in classic titration.
b) Current is analogous to the concentration of titrant in classic titration.
c) Time recorded is analogous to the concentration of titrant in classic titration.
d) There is no similarities between coulometric and conventional titration.

(iii)- In the coulometric titration of $U^{4+}$to UO_2^{2+} in the presence of excess Ce^{3+}, it require 652 seconds to reach the equivalence point using a constant current of 100.0 mA. How many moles of U^{4+} were present in the solution? a) 6.76 X 10^{-4} moles b) 1.35 x 10^{-3}moles
c) 3.38 x 10^{-4} moles d) 1.69 x 10^{-4} moles e) none of the above

(iv)- In electrogravimetric analysis electrolysis is completed when:
a) A colored analyte solution becomes colorless. b) The working electrode dissolves completely.
c) A qualitative test for the analyte gives positive results d) a and c.
e) None of the above.

v) A standard material of 4.41 % is use to validate the new method. A new method with four replicates gives a mean analyte concentration of 4.83% with standard deviation of 0.38. Is that error is significant within a 95% confidence interval? ($t_{tab.}$=3.182))
a)significant b) not significant c) data is not enough

2- Answer thre only (i,iii,iv) or (ii,iii,iv):- (10marks)

(i) Explain a method used for qualitative and quantitative analysis of Pb^{2+} in tap water.
(ii) What are the problems in polarography and How to overcome?
(iii) Write on the application of potentiometry for determination of solubility product and formation constant of complex using electrode of first kind, give examples.
(iv) Draw Ladder diagram for coulometric titration of arsenious acid using electrogenerated I^- explaining the complete equations, conditions and calculation at end point.

3- (i) To determine the equilibrium constant (K_b) for the reaction: ***(5marks)***

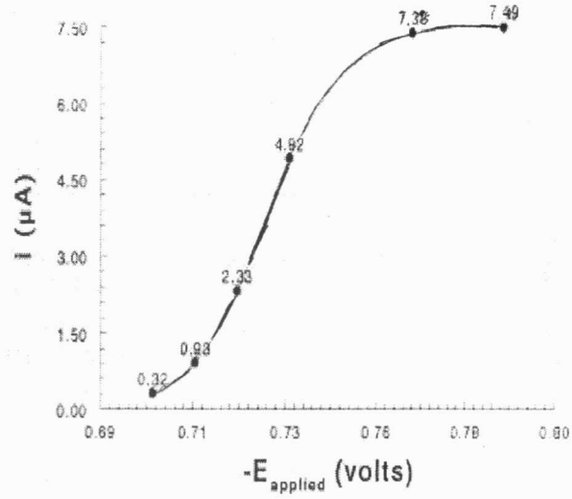
$$C_5H_5N + H_2O \longrightarrow C_5H_5NH^+ + OH^-$$

the following galvanic cell was constructed, If the voltage of the cell is 0.563 volt, what is K_b?

Pt, H_2 (0.200 atm) | C_5H_5N (0.189 M), $C_5H_5NH^+$ (0.0536 M) || Hg_2Cl_2(s), KCl(s) | Hg

(ii) A current-sampled DC polarogram of 50 ml an unknown substance containing either Zn or Cr was acquired and found to have a limiting current of 7.50µA.

1- From the data provided, determine $E_{1/2}$ for the reduction
2- Both the reduction of Zn^{2+} to Zn as well as the reduction of Cr^{3+} to Cr have the same E^o, Based on the data, Is the reduction wave due to Zn^{2+} orCr^{3+}?
3- If we add 10 ml 5x10^{-2} M analyte the current increase to 15.3 µA, what is the concentration of the analyte in original sample? ***(5 marks)***



With Our Best Wishes

Prof.Dr. M. A. Akl
Dr. A.M. Ouf

المستوى الثالث - كيمياء حيوية لوح ٣٧٥ الأحماض النووية

Mansoura University Faculty of Science Botany Department Biochemistry Program		جامعة المنصورة كلية العلوم قسم الكيمياء برنامج الكيمياء الحيويه

Final Examination in Botany
Second Term: Jun. 2011

Educational Year: Third level **Program (Branch): Biochemistry**
Subject: Bio 375 **Course(s): Nucleic acids as Genetic Information**
Time: 2 hrs **Date: 11/06 /2011** **Full mark: 60** **Question mark: 20**

Answer the following questions:

1 True/ False & complete missing word(s) (2 points each):

1. Degeneracy refers to the fact that almost all amino acids are encoded by multiple codons.
2. Degeneracy is found mainly in the third and first positions of all codons without changing the amino acid.
3. Formyl-methionine is the first amino acid incorporated into in *E.coli* expressed protein.
4. Sometimes the phenotypes are partially masked due to dominance of an allele for a gene over the other.
5. It is possible that an Rh^- mother can carry an Rh^+ fetus and develop antibodies which will attack & destroy the fetal blood.
6. In males, if a recessive allele exists on the X chromosome, it will always be expressed and show dominance.
7. Allele equals a gene which encodes for a trait and is written as............
8. Principle of Segregation is defined as ....
9. Law of independent assortment means two or more alleles will separate independently of each other when gametes are formed.
10. In their search to reveal the identity of genetic materials Griffith (1928) and Avery, et al. (1944) concluded that.................

2 Multiple choice: Choose the correct answer (2 points each):

1. Reading frames of genetic codons are:
   - a- Read in groups of three nucleotides and continues.
   - b- The initiation codon is usually a Methionine (AUG)
   - c- Ribosome binding sequence establish the initiation codon
2. Gene expression proceeds from:
   - a- DNA to RNA to mRNA to protein to functional protein.
   - b- DNA to shRNA to mRNA to protein to functional protein.
   - c- DNA to pre-mRNA to protein to functional protein.

3- Prokaryotic and Eukaryotic gene structures differ in:
- a- Presence of exons in prokaryotes and lack of introns in eukaryotes.
- b- Exons and introns are alternating with each others.
- c- Prokaryotic gene consists only of Exons, while Euokaryotic consists of exons and introns alternating with each others.
- d- Lack of exons in prokaryotic gene only.

4- Dihybrid crosses can be defined as:
- a- two traits are being analyzed
- b- are made when phenotypes and genotypes composed of 2 independent alleles are analyzed.

c- Plant height (Tt) with tall being dominant to short (t)

5- Diffrential codon usage is
   a- Used more often to encode specific trait.
   b- Used more frequently to encode specific amino acid
   c- indicative of the abundance of tRNA for specific gene
   d- helps in reverse genetics

6- Whobble in codon-anticodon pairing is:
   a- Some nucleotides in the anticodon (tRNA) can pair with more than one nucleotide in the third position in the codon.
   b- Results in silent mutation.
   c- Occure in non-degenerate position in the codon.
   d- Occure in the degenerate position of the codon.

7- RNA splicing takes place in:
   a- cytoplasm of bacterial cell
   b- nucleolus of the eukaryotic cell
   c- nucleus of the eukaryotic cell
   d- during translation process.

8- Lac operon is characterized by having :
   a- a polycistronic transcriptional genetic unit and monocistronic translational units.
   b- each gene of the operon have its own regulatory region.
   c- a single regulatory region , single promoter and a single operon.
   d- lactose as repressor agent for regulatory gene.

9- Key elements of translation are:
   a- Promoter where RNA polymerase binding site
   b- Operator where repressor binding site
   c-Ribosome binding sequence (RBS) ; near...
   d- Initiation codon (usually ATG/AUG)
   e-Stop (termination) codon (one of three)
   f- Transcription terminator
   g- Splice sites (eukaryotes)

10- Ribosome is the factory for:
   a- rRNA synthesis
   b- peptide and polypeptide synthesis
   c- small, medium and large subunits.
   d- small and large subunits which are attached to each other during translation and separated during resting stage.

3 Hershey-Chase (1953) had proved that DNA (not protein) is the genetic material of all living organisms. Explain their experiment to reach such conclusion; use drawing to illustrate your answer. (20 points).

Examiner Prof. Dr. *Yehia Ellazeik*

المستوى الثالث - كيمياء حيوية لوح ٣٧٥ الأحماض النووية

Mansoura University
Faculty of Science
Botany Department
Biochemistry Program

جامعة المنصورة
كلية العلوم
قسم الكيمياء
برنامج الكيمياء الحيويه

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Examiner Prof. Dr. *Yehia Ellazeik*

٣ كيمياء حيوية - كح ع ٣٧٦ - التكنولوجيا الحيوية

Mansoura University
Faculty of Science
Chemistry Department
Biochemistry Program

جامعة المنصورة
كلية العلوم
قسم الكيمياء
برنامج الكيمياء الحيويه

Final Examination
Second Term: May 2011

Educational Year: Second Level		**Program (Branch): Biochemistry**	
Subject: Biochem 376	**Course(s): Biotechnology**		
Time: 2 hrs	**Date: 21 /06 /2011**	**Full mark: 60**	**Question mark: 16-24**

Answer the following questions:

1- Choose the correct answer(s) or complete the missing words (2 points each):

1- Modern biotechnology allows us to transfer just one or more very specific genes so that the plant expresses those desired traits (T or F)

2- The vector (DNA carrier) we used to put the glowing gene into the bacteria is called a.:
a- Chromosome b- virus c- pippett d- plasmid

3- Of the following indications of the health of a water body, which is the most widely accepted means of measuring how polluting an effuent is?
a- Chloroform content b- BOD (biological oxygen demand)
c- COD (chemical oxygen demand)

4- Ferementation technology needs several disciplines of scientific knowledge such as:
1. Molecular biology 2. Computer-controlled fermentation
3. Downstream processing. 4. None of the above 5. All of the above.

5- Batch culture is defined as.........., fed batch is ....and continuous culture is .... and ....

6- System of water purification where sewage is sprayed over rocks coated with bacteria is called:
1. sludge digestion 2- activated sludge 3- bulking
4. eutrophication 5- trickling filter system

7- Bioremediation:
1. utilizes microbes to preserve food
2, use microbes to remove environmental wasyes
3. is the use of bacteria to produce acetic acid
4. is the use of microbes to produce industrial enzymes

8- What is a mismatch:
1. Cortisone -------------- minor skin irritations (eczema).
2. Plastics ---------- polymers of Polyethylene, Polypropylene and Polystyrene
3. Cephalosporin -------- banana plants
4. restriction enzymes------cutting nucleic acids.

9- Microbial primary metabolite are formed in parallel with growth and are ------ for ------------- of cell, whereas, secondary metabolite are formed --------- has occurred --------- and seemingly ------------- for --------------..

10- The growth of microbe used in biotechnology industry requires:----------, ----------, and adjusting culture conditions such as ------, ------, ------, --------, etc.

11- Gene structure in prokayotes differe from those in eukaryotes in being:

1. regulated by genetic elements upstream of the starting codon
2. lack of both exons and introns 3. lack of introns only
4. the regulatory sequences located at -75, and – 35 region.
5. the regulator sequences located at -35 and – 10 regions.

12- Mutations are inheritable changes in the base sequence of nucleic acid and translated into proteins. These mutations could lead to either normal protein and is termed----------, faulty protein and is called--------. or incomplete protein and is called----------.

2	Microorganisms are used for chemical synthesis of industrial chemicals such as: industrial ethanol, Citric acid, Vinegar, Butanol , and Enzymes. Explain the statement and discussing the production of vinegar by ***Acetobacteria*** **and** ***Glucanobacter*** bacteria. Write the necessary chemical equation and if possible illustrate your answer by drawing. (16 points)
3	Plasmids are vectors used for example to introduce human insulin gene into bacteria for industrial production of this important human hormone. Explain the general strategy for a cloning process and what are the properties of a good plasmid. Use drawing to illustrate your answer. (20 points)

Examiners:	**Prof. Dr.** ***Yehia Abdel-Moneim Osman Ellazeik***

المستوى الثالث - كيمياء حيوية - لعام ٢٠١١ - سؤال الجسم

Mansoura university
Faculty of science
Chemistry Department
Subject : Biochem.377
Course : Body Fluids

Second Term Exam 2010/2011
Third Level Biochem Students
Date : 28th June, 2011
Time Allowed : 2 hours
Total Mark : 60 Marks

Answer the following questions

Provide your answer with formula, equations, pathways, figures or tables wherever possible

[1] Write briefly on the followings: **[15 Marks]**

i- Plasma proteins (Explain the functions - sites of synthesis and albumin / globulin ratio)

ii- Types of anaemia and polycythemia (how to affect on the circulating system)

iii- Genesis of the white blood cells (defind the pathologic variation in leucocytic counts).

[2] A) What are the biological importance of the followings: **[10 Marks]**

i- Anticoagulants (heparinand and lepirudin)

ii- Aqueous and mucous layer of the tears.

iii- Hematocrit and Rh-value.

iv- Erythropoitin

v- Bile soap and pancreatic sodium carbonate

B) Differentiate between each pair of the following: **[10 Marks]**

i- SROM and PROM

ii- Chyle and chyme

iii- Leukemia and leucopenia

iv- diapedesis and phagocytosis

v- White blood cell casts and granular and waxy casts

[3] MCQs:

(Select the right answer and correct the other wrong sentences): [25 Marks]

1- Urine:

a- Ketones in urine are easily detected using sodium nitroprusside.

b- A positive nitrate test indicates that oxalate may be present in urine.

c- A positive result of leukocyte esterase, indicate the absence of white blood cells in urine.

d- Hematuria is the presence of abnormal white blood cell in urine.

PTO

2- Blood groups:

a- The blood under test, if the agglutination occurs with anti-A and anti-B, the subject belongs to group **AB**.

b- Group **O** is universal recipient and group **AB** is universal donor .

c- The blood under test, when only type **B** agglutinogen is absent, the blood is type **B**.

d- Autologous transfusion is the transfusion of the blood from another person.

3- Breast milk:

a- Breast milk is produce under the influence of the hormone oxytocin.

b- Breast milk is produce under the influence of the hormone progesterone.

c- Sheehan's syndrome is known as postpartum hypopitutaryism, which is associated with prolactin increases.

d- 1,3-arachidonyl glycerol is the main component of mother's milk.

4- Blood clot:

a- Wrfarin is commonly anticoagulants and affects of vitamin E –dependent clotting factors (III,V and X)

b- Tissue plasminogen activator (t-PA) and urokinase are the agents that convert plasminogen to the active plasmin.

c- Delta-aminocaproic acid and transexamic acid are used as initiate the fibrinolysis.

d- During pregnancy, factor XI increases while fibrinogen and factor VIII are decreases.

5- Synovial and amniotic fluids:

a- The amniotic fluid decreases in volume as the fetus grows.

b- Preterm premature rupture of membranes is a condition where the amniotic sac leaks fluids before 38 weeks of gestation.

c- The outer membrane of synovial fluid is called synovial membrane

d- Hyaluronan is synthesized by the synovial membrane to decrease the viscosity.

Prof. Abdel-Aziz Fatouh

May 2011 Exam
Chem 335 (Natural Products' Chemistry)
Third level: Chemistry, Biochemistry,
Chem/Zoology, Chem/Botany

Mansoura University
Faculty of Science
Dept. of Chemistry
Time allowed: 2 hours
Full Mark: 60 Marks

Instructions: **Please do not answer more than required; In case of MCQ, do not explain, only write the letter in your answer notebook.**

1) **Answer the following questions by Choosing the Right statement** ***(30 marks; 2 for each item)***

1- Alkaloids are:
a) natural products b) nitrogenous basic compounds c) physiologically activity compounds
d) all of them

2- Classification of steroids as a class of natural products is based on:
a) carbon skeleton b) biogenesis c) physiological activity d) none of them

3- Shikimic acid pathway produces:
a) terpenoids b) alkylbenzenes c) fatty acids d) steroids

4- Mevalonic acid pathway produces:
a) terpenoids b) Steroids c) carotenoids d) all of them

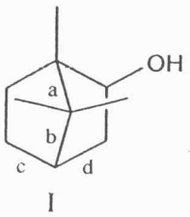
5- Biosynthetically, p-hydroxybenzoic acid is formed from:
a) polyketide pathway b) acetate pathway c) mevalonic acid pathway d) shikimic acid pathway

6- The ring closures in borneol **I** are:
a) a, b b) b, c c) a, d d) b, d

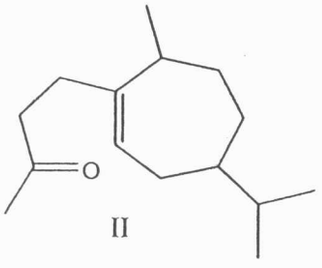
7- Compound **II** is classified as:
a) monoterpenoid b) sesquiterpenoid c) diterpenoid d) triterpenoid

8- A compound with molecular formula $C_{10}H_{18}O$, gave by aromatization p-cymene **III**. It may be:
a) An irregular monoterpene b) a regular monoterpene
c) a C_{10} compound d) a sesquiterpene

9- The precursor of compound **IV** is:
a) geraniol b) farnesol c) geranylgeraniol d) squalene



I



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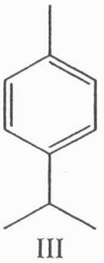
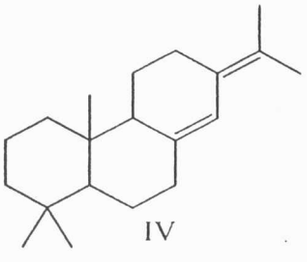

III


IV

10- When cholesterol is heated with selenium it gives:
a) squalene b) Diel's hydrocarbon c) spirostane d) sterol

11- The degrees of unsaturation in a compound with molecular formula $C_{10}H_{14}$ are:
a) 1 b) 2 c) 3 d) 4

12- If a triene gave by ozonolysis one mole of acetone, two moles of formaldehyde and 1,5-pentandial-3-one, this indicates that it has:
a) only one probable structure b) two probable structures
c) three probable structures d) four probable structures

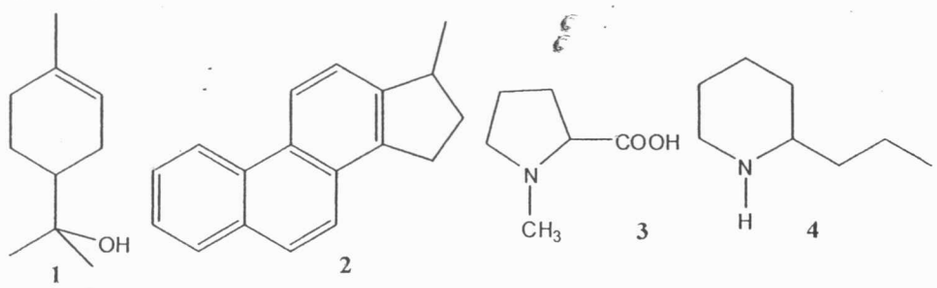
13- If an amine reacts with nitrous acid producing a yellow N-nitroso derivative, this indicates that it may be:
a) 1° amine b) 2° amine c) 3° amine d) none of them

14- A female sex hormone is:
a) a sterol b) an androgen c) an estrogen d) a gestogen

15- Ephedrine [ph-CH(OH)-CH($NHCH_3$)-CH_3] could be synthesized from:
a) pyridine b) pyrrole c) 1-phenyl-1,2-propandione d) none of them

2) <u>Answer only four of the following questions by illustrating by chemical equations the conversion of:</u> ***(16 marks; 4 for each item)***

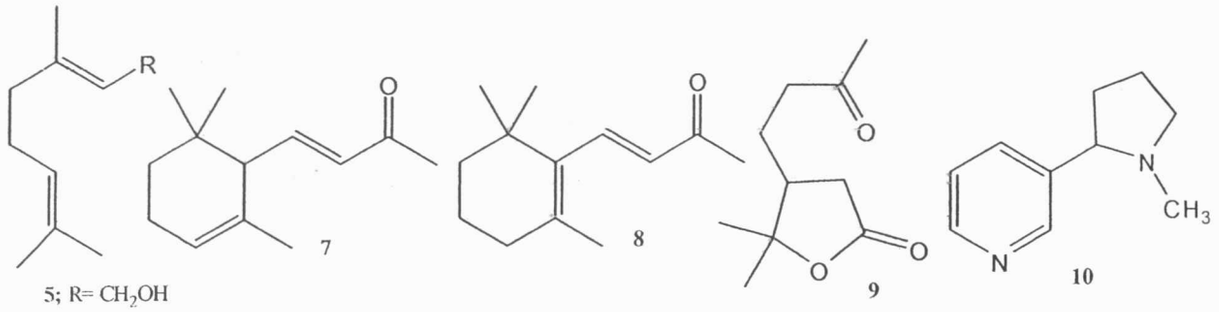
a) P-toluic acid into α-terpineol **1**.
b) 2(1-naphthyl)ethyl magnesium bromide into Diel's hydrocarbon **2**.
c) 3β-hydroxyandrost-5-en-17-one (DHEA) into 17-hydroxyandrost-4-en-3-one (testosterone).
d) 1,3-dibromopropane and sod. Diethyl malonate into hygrinic acid **3**.
e) Pyridine into coniine **4**.



1 2 3 4

3) <u>Answer only four of the following questions:</u> ***(14 marks; 3 for each item and 2 for commitment to instructions and the correct language)***

a) Illustrate the mechanism of converting geraniol **5** into α-terpineol **1**.
b) Indicate by chemical equations how citral **6** could be converted into a mixture of α-ionone **7** and β-ionone **8**.
c) Illustrate by chemical equations the conversion of α-terpineol **1** into compound **9**.
d) Illustrate by chemical equations the treatment of ephedrine [ph-CH(OH)-CH($NHCH_3$)-CH_3] by HCl, indicating the mechanism.
e) Illustrate by chemical equations the synthesis of nicotine **10** from 3-cyanopyridine.



7 8 9 10

5; R= CH_2OH
6; R= CHO

Mansoura University **Faculty of Science** **Chemistry Department** **Subject:Physical Chemistry** **Course : CH346 Chem. Kinetics and photochemistry**	كلية العلوم جامعة المنصورة	**Second Term 3rd Level Students** **Date : 14 june 2011** **Time Allowed: 2 hours** **Full Mark: 80 Marks**

ANSWER THE FOLLOWING QUESTIONS :

1-a) Derive the integrated form of the second order reaction $A \longrightarrow P$ [5Marks]

b) Discuss three different methods for determining the reaction order. [15Mark]

c) In the reaction between equimolecular amounts of nitric oxide and hydrogen the time taken to decrease the pressure to half its initial value was 78 min. and 105 min. for initial pressures 263 and 227 mm Hg respectively .
What is the reaction order [10Marks]

2-a) Write briefly on three of the following: [24Mark]

i- Arrhenius equation and activation energy

ii- Eyring relation for calculating the second order rate constant theoretically .

Iii-Collision theory for unimolecular reactions.

vi-Order,Molecularity,Mechanism and Rate of a chemical reaction.

b) The rate constant for the decomposition of a substance is 0.148 and 0.868 l mol^{-1} s^{-1} at 710°C and 770 °C respectively .Calculate the Arrhenius parameters . [6Marks]

3-a) Deduce the kinetic relation representing the relation between the concentration and the rate constant for two of the following ; [10Marks]

I - $A \rightleftharpoons B$

II- $A \longrightarrow B$, $A \longrightarrow C$

III- $A \longrightarrow B \longrightarrow C$

b) State the laws of photochemistry and define the quantum yield . [6Marks]

c) Radiation of a substance at 435.8 nm with intensity of 0.0014 j s^{-1} , 80 % was absorbed in a liter of solution during 1105 s and the concentration of the substance decreased by 0.0075 mol l^{-1} . Calculate the quantum yield. [4Marks]

BEST WISHES

Examiners: Prof. Dr. H.M.Abu Elnader, Prof Dr. M.E.Emam and Dr. M.A.Hamada

جامعة المنصورة كلية العلوم -- قسم الرياضيات المـــادة:إحـــصاء حـــيـــوي كود المادة : ر301 الدرجة الكلية : 80 درجة		إمتحان نهاية الفصل الدراسى الثانى 2011 المستوى : الثـــالـــث برامج : كيمياء وكيمياء حيوى التاريخ: 25 / 6 /2011 الزمن: ســـاعتان

Answer the following questions

Q1: (25 marks)

(a) Find the standard deviation (S) for the following data :

2 , 8 , 7 , 3 , 4 , 6 , 5 , 0 , 10 (10 marks)

(b) Let X be a random variable having values 1 , 3 , 5 , 7 , 9 , 11 and Y another random variable having values 2 , 4 , 6 , 8 , 10 , 12 .

Is there a relation between X and Y ? Why ? . (15 marks)

Q2: (25 marks)

Consider a random experiment a fair die is tossed two times . Let X be a random variable denotes the sum of the two numbers appears. Then

(i) Find the sample space S . (4 marks)

(ii) Find $P(X < 7)$ (7 marks)

(iii) Find $E(2X - 5)$ (7 marks)

(iiii) Compute $V(3X + 2)$ (7 marks)

Q3: (30 marks)

(a) Write about the sampling distribution for the sample mean $\overline{X}$ (10 marks)

(b) A random sample of size 16 is taken from a normal population with mean 12 and standard deviation 4. Find $p(\overline{X} \geq 14)$. (10 marks)

(c) A random sample has elements 8.5 , 11.5 , 9.5 , 10.5 , 8 , 9 , 11 , 10 , 12 is taken from a normal population $N(\mu, \sigma^2)$ with unknown mean and standard deviation 4 . Find 95% confidence interval for μ. (10 marks)

Note that : $p(Z < 2) = 0.97$ $p(Z > 2) = 0.03$, $p(Z < 1.5) = 0.93$

$Z_{0.025} = 1.96$, $Z_{0.05} = 2{,}58$, $t_{(0.025,8)} = 2.3$, $t_{(0.05,8)} = 3.35$, $t_{(0.025,9)} = 2.26$

مع تمنيات للجميع بالنجاح د. محمد جاد