Mansoura University
Faculty of Science
Chemistry Department
Subject: Biochem. 376
Course(s): Biotechnology and its Applications

Second Term
Final Exam
Third Level (Biochemistry)
Date: 27th May 2013
Time Allowed: <u>Two</u> hours
Full Mark: 60 Marks

Answer <u>ALL</u> the Following Questions; Each Question [20] Marks

[1] Rewrite the Following Sentences <u>Underlining</u> the Missing Word(s):

a- Nitrogen source for industrial fermentation may be …….$^{(1)}$……., …….$^{(2)}$……. , …….$^{(3)}$……., or …….$^{(4)}$……….

b- Vectors employed in molecular cloning are …….$^{(5)}$……., …….$^{(6)}$……., …….$^{(7)}$……., …….$^{(8)}$……., and …….$^{(9)}$……

c- The main steps of a PCR process are …….$^{(10)}$……., …….$^{(11)}$……., and …….$^{(12)}$…….

d- The main resources for storing and distributing sequence data are three large databases: …….$^{(13)}$……., …….$^{(14)}$……., and …….$^{(15)}$……..

e- Medicinal chemists attempt to use structure-activity relationship (SAR) to improve certain features of the lead compound: …….$^{(16)}$……., …….$^{(17)}$……., …….$^{(18)}$…….

f- A …….$^{(19)}$….. may become progressively more concentrated in the body of certain animals as it moves up the food chain. This process is called …….$^{(20)}$……..

[20] Marks

[2] A- Design an industrial fermentation process. **[9] Marks**

B- Humulin is the brand name for a group of biosynthetic human insulin produced by genetic engineering for the treatment of diabetes.
Illustrate the process of inserting human insulin gene into the cloning vector and the transformation of the recombinant DNA produced into the host cells. **[11] Marks**

[3] A- Give <u>ONE</u> reason for each of the following:

i- After a certain time of exponential phase, the rate of microbial growth in a fermentation process slows down.

ii- The classical chain-termination method requires a small amount of modified nucleotides (dideoxyNTPs).

iii- Amelogenin gene (AMEL) is a genetic marker used to determine sex.

iv- The ability of fungi to transform a wide variety of hazardous chemicals has inspired scientists to use them in bioremediation.

v- Bioterrorism has been a problem throughout human history.

[5] Marks
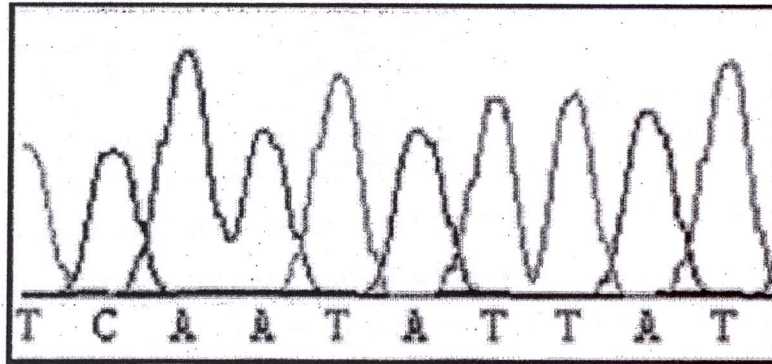
P. T. O.

B- The following is the direct sequence results for a DNA fragment:

T C A A T A T T A T

i- Deduce the precise order of nucleotides within this DNA fragment.

[2] Marks

ii- How many bands would appear in each of the A,C,T, and G lanes on the gel electrophoresis according to Sanger sequencing?

Lane	A	C	T	G
No. of Bands	....	....	....	....

[4] Marks

C- Write short notes on:

i- Sequence Alignment.   **[3] Marks**

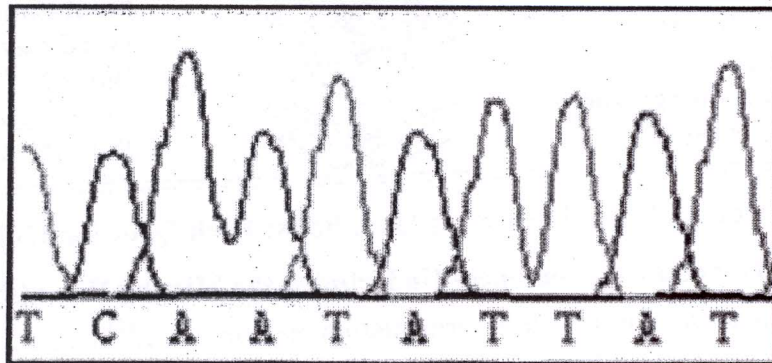ii- Tertiary Sewage Treatment.   **[3] Marks**

iii- Botulism.   **[3] Marks**

Examiner: Dr. Ahmed EL-Sokkary

-Good Luck-

B- The following is the direct sequence results for a DNA fragment:

T C A A T A T T A T

i- Deduce the precise order of nucleotides within this DNA fragment.

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Lane	A	C	T	G
No. of Bands	....	....	............,..	....

[4] Marks

C- Write short notes on:

i- Sequence Alignment.　　　　　　[3] Marks

ii- Tertiary Sewage Treatment.　　　[3] Marks

iii- Botulism.　　　　　　　　　　[3] Marks

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Examiner: Dr. Ahmed EL-Sokkary

-Good Luck-

Mansoura University
Faculty of Science
Chemistry Dept.
3rd Year Gen. Chem.

Final Examination

2d Semester 2013
Chem. 364 (346)
Full Mark [80]
Time Allowed 2 hr

Answer the Following Questions:

1) Identify the INCORRECT statement below [5]
   a. The molecules must collide to react.
   b. There must be enough energy for the two molecules to react.
   c. The pre-exponential factor is a measure of the rate at which collisions occur in the gas.
   d. The more complex the reacting molecules, the higher the value of P.
   e. The molecules must be orientated with respect to each other correctly.

2) What are the units of k for the rate law: Rate = $k[A][B]^2$? [5]
   (a) s^{-1} , (b) s, (c) $L\ mol^{-1}\ s^{-1}$, (d) $L^2\ mol^{-2}\ s^{-1}$ (e) $L^2\ s^2\ mol^{-2}$.

3) Sketch a diagram for the consequences of light absorption. [5]

4) Derive a rate constant equation of the second order reaction;
   A + B → Products. Assume A and B have equal initial concentrations. [10]

5) Distinguish between each of the following: [15]
   a. Characteristics of fluorescence and phosphorescence.
   b. Relation of [B] with time for parallel and consecutive reactions.
   c. Intermediate and active complex (transition state).

6) A certain system absorbs 3.0×10^{16} photons of light per second. On irradiation for 10 minutes 0.002 mole of the reactant was found to have reacted. Calculate the quantum yield. [10]

7) The following data were obtained for A + B → product at 100°C:

[A]$_o$ (mol L^{-1})	[B]$_o$ (mol L^{-1})	Initial rate (mol L^{-1}s^{-1})
1.0x10^{-4}	1.0 x10^{-4}	2.8 x10^{-6}
1.0 x10^{-4}	3.0 x10^{-4}	8.4 x10^{-6}
2.0 x10^{-4}	3.0 x10^{-4}	3.4 x10^{-5}

Determine for this reaction [15]

(a) Over all order, (b) The rate law and (c) Half-life time.

8) If the reaction, $SOCl_{2(g)} \rightarrow SO_{2(g)} + Cl_{2(g)}$, is first order with a half-life of 3.2×10^4 s and activation energy 150 kJ at 327°C. Calculate [15]

(a) rate constant, (b) time required to decompose 30.0 % of $SOCl_2$.

(c) temperature at which the rate constant is 1.00×10^{-3} s^{-1}.

N.B. $N_A = 6.02 \times 10^{23}$ mol^{-1}, h = 6.626 x 10^{-34} Js, C = 3 x 10^8 ms^{-1}, k = 1.381 x10^{-23} JK-1.

GOOD LUCK

Prof. Shawky Hassan Prof. Hamed Abo El-Nadar

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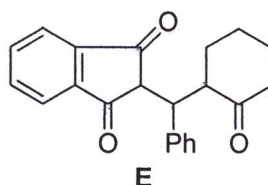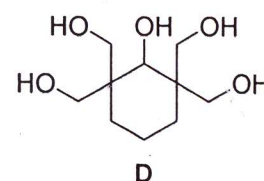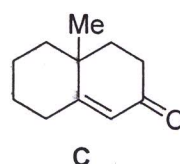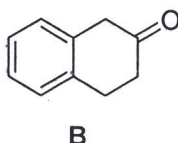Organic Synthesis & Organometallic Chemistry [C- 338]

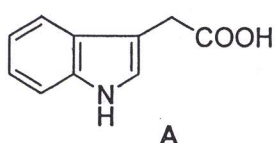June 2013   Time: 3 hrs.

ANSWER ALL QUESTIONS	[60 Marks]

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

A   B   C   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 $\longrightarrow$ ....

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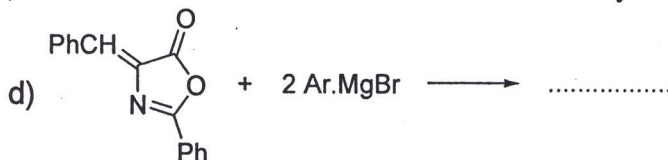
Prof. Dr. S. S. Elmorsy   Dr. S. M. Abdelmageed

Mansoura University
Faculty of Science
Chemistry Department
Mansoura, Egypt

جامعة المنصورة
كلية العلوم
قسم الكيمياء
المنصورة – مصر

Second Semester May 2013

Educational Year: 3^{ed} Year Chemistry.   **Subject:** Chemistry.
Course (s): Natural Products.   **Full Mark:** 60.
Date: 03/06/2013.   **Time:** 2 hrs.
**Course Code:** CH 335.

Answer the following questions

1 – a) Explain how α - terpenole is biosynthesized from acetyl-Co A.   (10 marks)
   b) Write the chemical structure of the following compounds and their classification   (5 marks)
1- Cholic acid.   2- Codeine.   3- Ephedrine.   4- Oestrogen.   10- Myrcene.

2 – a) How biosynthetic pathway of ergosterol is converted to Vitamin D_2 ?

explain your answer by chemical equations.   (5 marks)

   b) Nicotine is an alkaloid elucidate its chemical structure. explain your answer

by chemical equations.   (10 marks)

3 - Illustrate by chemical equations the conversion of the following: (15 marks)

a) Dehydroepiondrosterone into testosterone.

   b) p-Toluic acid to α-terpineol.

c) Shikimic acid to cinnamic acid.

4 – Clearly show the structure elucidation of the following: (15 marks)

   a) α - Terpineol

   b) Geraniol.

   c) Hygrine.

Prof. Dr. MM Abou-Elzahab, Prof. Dr. M Berghot & Dr. M Elsayed

Mansoura University
Faculty of Science
Chemistry Department
Subject: Chemistry
Course: Nucleic acids and
Genetic Information
Biochem 375
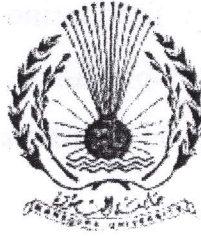
3ʳᵈ Level Biochemistry Students
Date : June 2013
Time Allowed : 2 hours
Full Mark: 80 Marks

ANSWER THE FOLLOWING QUESTIONS

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

I. Define the following: [36 Marks]

a) DNA melting temperature   b) Double-Strand Break Repair   c) major and minor grooves

d) DNA polarity   e) Gene Promoter   f) Tautomerization of nitrogen bases

g) Gene Operator   h) c-DNA   i) phosphodiester group in DNA

II.   [24 Marks]

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

i. Human tissue contains two phosphoribosyl transferases....[1]..., ...[2]...., which are important in .....[3].......

ii. ... [4]... inhibits guanylate kinase and, at higher concentrations, inosine monophosphate dehydrogenase.

iii. Purines derived from food do not participate in the salvage pathways but they are mostly converted to .... [5].....

iv. .....[6]..... acetylates histone proteins, and up-regulates transcription. While ....[7]...... deacetylates histones proteins and down- regulates transcription.

v. Thymidylate synthase convertes ...[8]... to ......[9]...., and it requires......[10].....as a cofactor.

Best wishes for our dear students,

Dr. Amr Negm

b) Inosine monophosphate (IMP) is the first purine nucleotide synthesized via de novo synthesis of purines, and it is the precursor for the synthesis of other purine nucleotides. Comment and describe the regulation of these pathways. **[15 Marks]**

III. Compare between the following: **[20 Marks]**

1) Folate analogues & Azathiopurine.
2) Hadacidin & Azaserine.
3) Floxuridine & Fluorouracil.
4) A-DNA, B-DNA & Z-DNA.

Best wishes for our dear students,

Dr. Amr Negm

Mansoura University
Faculty of Science
Chemistry Department
Subject : Biochem.377
Course : Body Fluids

Second Term Exam 2012/2013
Third Level Biochem Students
Date : 13th June, 2013
Time Allowed : 2 hours
Total Mark : 60 Marks

Answer the following questions (20 marks for each question)
Provide your answer with formula, equations, pathways, figures or tables wherever possible

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[1] write an account of the followings: (20 marks)

1- Agranulocytosis and leukocytosis.
2- Pyuria and hematouria.
3- Chyle and chime.
4- Foremilk and hindmilk.
5- Leukemia and leucopenia.

[2] Write the composition/function of each: (20 marks)

1- Cerebrospinal fluids.
2- Bile juice.
3- Saliva.
4- Albumin/globulin ratio.
5- Tears layers.

[3] Discuss in Brief of following: (20 marks)

1- Dangers of blood transfusion.
2- Role of von Willebrand factor (vWF) in the clotting formation.
3- Erythropoietin and its effect on the erythropiosis.
4- Function of the tissue macrophage system.

Good Luck   **Examiner: Prof. A.F.Abdel-Aziz**

Mansoura University Faculty of Education Chemistry Department Subject: Chemistry Course: Analy. Chem .313		SecondTerm 3rd Year Biochemistry Time Allowed: 2 hours Full Mark: 60 Marks Date: May, 2013

Answer the following questions
PART B (ELECTROANALYSIS) (30 marks)

1- (a) Write briefly on the saturated calomel electrode (SCE) and draw the diagram. (10 marks)

(b) Calculate the liquid junction potential across a membrane at 25°C, in which electrolyte 1 is saturated KCl (4.2F) and electrolyte 2 is 0.1 F KCl. The transference number are t_K = 0.49 and t_{Cl} = 0.51. Neglect activity coefficients. (5 marks)

2- (a) Polarography is used for both quantitative and qualitative analysis of analytes, explain this with references to ikovic equation (draw the corresponding curve). (10 marks)

(b) A 3.547 sample of insecticide was dissolved in acid, all arsenic being thereafter reduced reduced to As(III), and diluted to 1000.0 mL in a volumetric flask. A 10.00 mL aliquot was added to 150 mL of a solution containing 0.05 F KI and buffered to pH7. A few drops of starch indicator were added for the endpoint signal. The coulometric titration required 415,7 sec at a constant current of 25.16 mA to reach endpoint. Calculate the percentage of As_2O_3 in the insectside. $F=9.65 \times 10^4$ (5 marks)

PART B (GRAVIMETRIC ANALYSIS) (30 marks)

3- (a) Define each of the following:
(i) Digestion (i) Peptization (iii) Filteration (9 marks)

(b) Calcium oxalate monohydrate has 3 distinct regions of decomposition on the TG curve. Illustrate the mechanism of decomposition of $CaC_2O_4.H_2O$ with knowledge of:

i) A pure sample of calcium oxalate monohydrate dried at 100°C weighing 250 mg is used.

ii) Weight losses on the TG curve are:
- in the temperature range 100°-250°C, the weight loss is 36 mg.
- in the temperature range 400°-500°C, the weight loss is 56 mg.
- in the temperature range 650°-850°C, the weight loss is 88 mg. (6 marks)

4- (a) Write briefly on the following: (6 marks)
(i) Post precipitation (ii) Effect of temperature .

(b) Calculate the volume of 2N H_2SO_4 requires to complete the precipitation of Ba^{2+} as $BaSO_4$ from $BaCl_2.2H_2O$. Knowing that the weight of $BaCl_2.2H_2O$ is 0.45g. (4 marks)

(c) Calculate the solubility product constant of $MgCO_3$ if 1L of its saturated solution contains 0.533 g of $MgCO_3$ at 20C°. (5 marks)

At. Wts Mg =24.31, C=12, O=16, Ca=40, H=1.008, Ba= 137.4 S= 32
As= 74.9216 Cl= 35.45 K= 39.098.

With my best wishes
Dr. yasmeen gaber