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

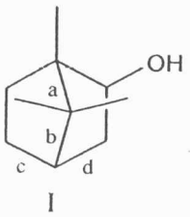
5- Biosynthetically, p-hydroxybenzoic acid is formed from:
a) polyketide pathway b) acetate pathway c) mevalonic acid pathway d) shikimic acid pathway

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

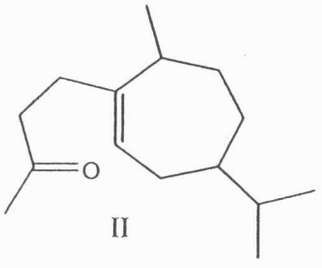
7- Compound **II** is classified as:
a) monoterpenoid b) sesquiterpenoid c) diterpenoid d) triterpenoid

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

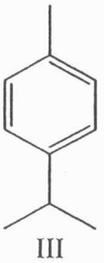
9- The precursor of compound **IV** is:
a) geraniol b) farnesol c) geranylgeraniol d) squalene

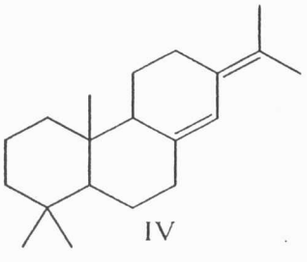


I



II


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

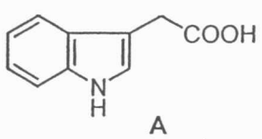
12- If a triene gave by ozonolysis one mole of acetone, two moles of formaldehyde and 1,5-pentandial-3-one, this indicates that it has:
a) only one probable structure b) two probable structures
c) three probable structures d) four probable structures

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

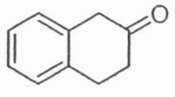
June 2011 Time: 3 hrs.

ANSWER ALL QUESTIONS [60 Marks]

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



A



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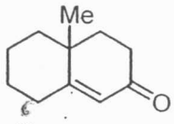
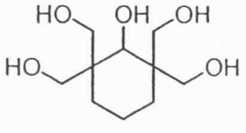
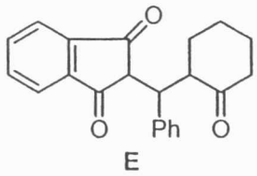


C



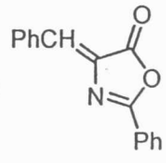
D



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 ⟶ .....

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

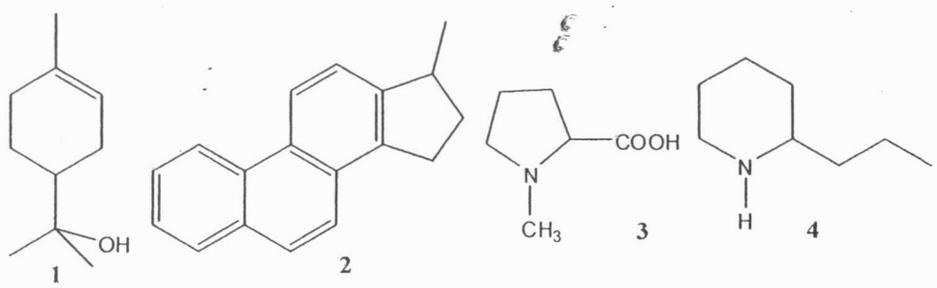
13- If an amine reacts with nitrous acid producing a yellow N-nitroso derivative, this indicates that it may be:
a) 1° amine b) 2° amine c) 3° amine d) none of them

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)***

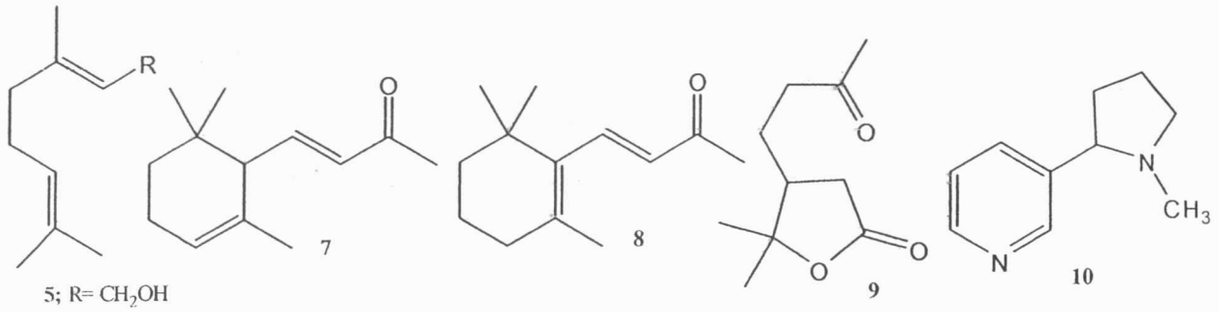
a) P-toluic acid into α-terpineol **1**.
b) 2(1-naphthyl)ethyl magnesium bromide into Diel's hydrocarbon **2**.
c) 3β-hydroxyandrost-5-en-17-one (DHEA) into 17-hydroxyandrost-4-en-3-one (testosterone).
d) 1,3-dibromopropane and sod. Diethyl malonate into hygrinic acid **3**.
e) Pyridine into coniine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

المستوى الثالث - كيمياء وحيوان - كيمياء كيربية (ل ٣٤١)

Mansoura University **Faculty of Science** **Chemistry Department** **Code: Chem.341** **Subject : Electrochemistry**	كلية العلوم جامعة المنصورة	**Second Term** **Third Level** **Program : Chemistry/Zoology** **Date : June 2011** **Time Allowed : 2 hours** **Full Mark : 60 Marks**

Answer All Questions الأسئلة على الوجهين

First Question: **(15 Mark)**

[A] Complete : **(4 Mark)**

(1) For an electrode, osmotic pressure is ---------- while solution pressure is --------

(2) In testing cell reversibility, if the outer emf exactly equal the cell emf, then the cell reaction ---------- .

(3) Calculated cell emf if +ve, the cell reaction is ---------- while if –ve, the cell reaction is ----------

(4) In chemical cells, emf is due to ---------- while in concentration cells, emf is due to ----------

[B] Derive mathematically the Nernst equation relating electrode potential and concentration. **(6 Mark)**

[C] Taking : $E^{o}_{Zn^{2+}/Zn} = -0.76$; $E^{o}_{Cu^{2+}/Cu} = 0.337$ v, $\left(\frac{\partial E}{\partial T}\right)_p = 4.18x10^{-4} V/\text{deg.at } 25^{o}\text{C}$ **(5 Mark)**

Write the electrode and cell reaction. Calculate: cell emf , ΔG^{o}, Δ S and the equilibrium constant K.

Second Question: **(15 Mark)**

[A] Tick (√) for the correct answer: **(4 Mark)**

(1) For KCl solution the anion transport and cation transport number:

(i) Each equal 1 ( ) (ii) Greatly different from each other ( )

(iii) Each equal 0 ( ) (iv) Very near to each other ( )

(2) Theoretically $E_j = 0$ when

(i) $t_{(+)} = t_{(-)} > 1$ ( ) (ii) $t_{(+)} = t_{(-)} = 1$ ( ) (iii) $t_{(+)} < t_{(-)}$ ( )

(iv) $t_{(+)} - t_{(-)} = 0$ ( ) (v) $t_{(+)} > t_{(-)}$ ( ) (vi) $t_{(+)} + t_{(-)} = 0$ ( )

(3) The cell: Pt, $H_{2(g)}$(P)|HCl(a) |AgCl|Ag is an example of:

(i) Concentration cell without transference ( )

(ii) Chemical cell with transference ( ) (iii) Chemical cell without transference ( )

(iv) Electrolyte concentration cell without transference ( )

(4) The cell: Na(Hg) ($a_{Na} = a_1$)|Na^+ a_{Na^+}|($a_{Na} = a_2$) (Hg) Na is an example of:

(i) Electrode concentration cell with transference ( ).

(ii) Chemical cell without transference( ). (iii) Chemical cell with transference( ).

(iv) Electrode concentration cell without transference ( ).

[B] Give reason : **(3 Mark)**

(1) Amalgam electrode is sometimes preferred than the metal electrode

(2) Glass electrode is preferred than other electrodes for measuring solution pH.

[C] Write with examples on: (8 Mark)

(i) Gas electrode (ii) Metal-insoluble salt electrode

(iii) Standard cell . (iv) Oxidation-reduction electrode

Third Question: (15 Mark)

[A] Complete : (6 Mark)

(1) The voltage at which the current begins to flow free is known as ----------

(2) Overvoltage η is the difference between ---------- and ----------

(3) Ohmic overpotential originate as a result of ----------

(4) The decomposition potential for all alkalis and acids except ---------- acids are the same and equal ---------- v.

(5) Activation overpotential arises from ----------

[B] Write in detail on concentration overpotential . Illustrate your answer by mathematical Derivation of the relation between η_c and current i. **(9 Mark)**

Fourth Question: (15 Mark)

[A]Given Reason: (5 Mark)

1) Decomposition potential of halogen acids are different

2) Sb/Sb_2O_3 electrode is used for determination of solution pH

[B] Deduce mathematically the equation for a polarized electrode (Electrode kinetics for irreversible electrode). Illustrate the form of this equation under conditions of : (i) High overvoltage ($\eta > 0.05V$, Tafel equation). (ii) Low overvoltage ($\eta < 0.02$ V).

(10 Mark)

Prof.Dr. Ahlam M.A.Helmy ; Prof.Dr. Hanem Abdel-Rasoul

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

المستوى الثالث - حيوان كيمياء - ٣٠٨ ع - طفيليات

Mansoura University
Faculty of Science
Zoology Department

جامعة المنصورة
كلية العلوم
قسم علم الحيوان

Educational year: 3rd level
Time: 2 hr
Date: 11/6/ 2011

Program: Chemistry/Zoology
Subject: Z308
Full Mark: 60 Marks

Answer all questions:

Question (1): With labeled diagram answer only **Three** from the follwing items: [15 Marks]

a. Infective stages of *Giardia lambelia* and *Schistosoma spp* [5 Marks]
b. Lif cycle of *leishmania spp* [5 Marks]
c. Lif cycle of *Fasciola gigantica* [5 Marks]
d. Lif cycle of *Ancylostoma duodenale* [5 Marks]

Question (2): Complete the following sentences: [15 Marks]

a. According to their mode of life, the parasites are divided into .... and ....
b. There are four types of host .... , ... , ... and ....
c. *Entamoeba histolytica* causes a disease ....
d. Respiration in protozoa is either .... or ....
e. In *Nematoda*, fertilization is .... and development is ....
f. In *Platyhelminthes*, there is no .... or .... system and the muscle fibres well developed by two layers; .... and ....

Question (3): With labeled diagram answer only **Three** from the follwing items: [15 Marks]

a. Lif cycle of *Trypanosoma spp* [5 Marks]
b. Lif cycle of *Heterophyes heterophyes* [5 Marks]
c. Lif cycle of *Taenia saginata* [5 Marks]
d. Lif cycle of *Enterobius vermicularis* [5 Marks]

Question (4): With labeled diagram answer only **Three** from the follwing items: [15 Marks]

a. Asexual reproduction of *Plasmodium spp* [5 Marks]
b. Life cycle of *Ascaris lumbricoides* [5 Marks]
c. Infective stages of *Echinococcus granulasus* and *Trichomonas vaginalis* [5 Marks]
d. Reproduction in *Entamoeba histolytica* [5 Marks]

With best wishes

Prof. Sayed El-Tantawy **Dr. Enayat Salem**

Dr. Mohamed F. Abd El-All **Dr. Mohamed F. Abo El-Noor**

٢ كيمياء حيوان - ع ٢٠٢٢ شرح وتصنيف

Mansoura University
Faculty of Science
Department of Zoology

Date:May 2011
Time: 2 Hours
Full Mark: (60)

Second Semester Exam of (Insect Taxonomy and Anatomy)
For 3rd year undergraduate students, Chem./Zoology program.

Answer the following questions:

1. **Give short account on:**

A.Important characters of suborders Blattaria and Mantodea.
B.Castes of a social insect.
C.Two species of mosquitos.
D.General characters of subclass Apterygota.

(20 Marks)

2. **Write short notes on:**

A.Differences between locusts and grasshoppers
B.Bionomics of Fleas.
C.Compare between:
-Peritrophic membrane & Intima.
-Diastole & Systole.
-Histology of Malpighian tubules & Trachea.
D.Demonstrate:
Accessory reproductive organs and alternative excretory organs.

(20 Marks)

3. **Complete:**

A.In the sucking lice the pharyngeal wall is provided with ....1.... helping in ....2.... into ....3.... .The wall of stylet sheath is provided with....4.... affecting it's....5.... before feeding, thus pushing....6.... outwards for....7.... .

B.In workers of termites, the extended....1.... encircled....2...., thus their food is retained in....3.... for longer period for....4.... of....5.... by....6....living in ....7.... .

C.The nervous system consists of....1.... which innervates....2...., ...3...., ...4.... and ....5....; the....6.... which innervates....7...., ...8...., ...9.... and....10....; the ....11.... which attached with the....12..... .

(20 Marks)

Best of luck.. *Prof Dr.H.Abdelhaseeb* *Dr.H.Salem*

الفرقة الثالثة كيمياء وحيوان - أحياء مائية

Mansoura University
Faculty of Science
Zoology Department
El- Mansoura, Egypt

جامعة المنصورة
كلية العلوم
قسم علم الحيوان
المنصورة - مصر

Second Term Examination, June 2011

Educational year: Third Year
Time: 2hr
Date: 25/6/2011

Program:
Chemistry&Zoology
Subject: Zoology
Course : Aquatic Fauna
Full Mark: 60 Marks

Answer **THREE** Questions only: Each Question [20] Mark

Question 1: (20 Marks)

A- What do you know about each of the following : (5 Marks)

1- *Millepora* 2- Gemmule

B- Mark true (✓) or false (✗) in front of the following sentences: (5 Marks

i- Alternation of generation is undistinct in Scyphozoa
ii- *Hydra* is freshwater and unmotile animal
iii- Rotifers are mostly freshwater animalcules
iv- Ctenophora are exclusively marine,free,solitary and pelagic or benthic
v- Sponges have a cavity called paragaster or spongocoel

C-With labeled diagrams describe the morphology of *Alcyonium* polyp & *Pinnaria*

D- Match column A with the suitable sentences from column B :

Column (A)	Column (B)
i- The sponges	- smooth tentacles
ii- Amphidiscous spicules	- are polymorphic
iii- Zoantharians have	- are colonial and sessile animals
iv- Siphonophorans	- are also called birotulates
v- Clava and Podocoryne	- are annelid worms
vi-Oligochaetes and Polychaetes	- are Athecate colonies

Question (2): (20 Marks)

A- Draw only in detail each of the following :

1- Different types of spicules and spongin fibers in Porifera
2- Generalized Rotifer

أنظر خلفه

B- Give short notes on each of the following :

1- Enteric system in Ctenophores 2- Reproduction in Rotifera

C- Choose the right answer from the following:

i- Members of Phylum Annelida are..... Symmetrical (Bilaterally- Radially)
ii- *Allolobophora* is ..... animal (Terrestrial- Marine- Freshwater)
iii- There are ..... Polyps in *Obelia* colony (2, 3, 4 or 1)
iv- In the reproduction of *Tubularia* there is.....(actinula larva , planula larva
v- There are are..... types of polyps in *Campanularia* (one, two , three or four)

Question (3): (20 Marks)

A- Define each of the following:

True coelom - carnivorous and herbivorous animal - Archaeocytes –Protosto
deuterostomes – sessile animals – Intracellular digestion–Anthocodia - coral

B- Complete the following sentences:

i- There are different types of asexual reproduction in polychaetes, these are ....., ...
..... and .....
ii- There are are ..... rows of combs in ctenophores, also they have ..... cells
iii- Cornularia has ..... differentiating it from *Clavularia*
iv- Water route in the leucon type of sponge is: ...., ..., ..., ..., ..., ..., ... and..

C- Give short notes on each of the following:

1- Life cycle of *Aurelia* 2 - Feeding in polychaetes

D- With labeled drawings give an idea on each of the following:

a –Generalized vertically developed Siphonophora
b - Formation of Tri-axonate spicules in sponges
c - Comparison between *Alcyonaria and Zoantharia*

Good luck

Examiner: Dr. Mohamed Fathy A.Mansour