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 - 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)

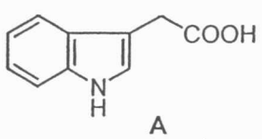
Prof.Dr. Ahlam M.A.Helmy ; Prof.Dr. Hanem Abdel-Rasoul

Mansoura University
Faculty of Science
Chemistry Department
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]



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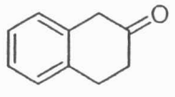

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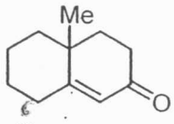

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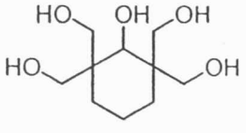

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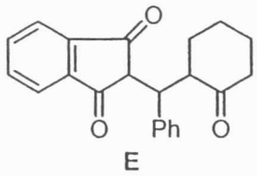
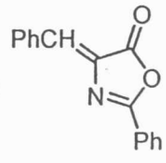


E

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

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

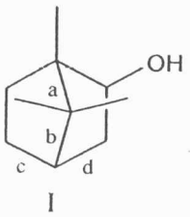
5- Biosynthetically, p-hydroxybenzoic acid is formed from:
a) polyketide pathway b) acetate pathway c) mevalonic acid pathway d) shikimic acid pathway

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



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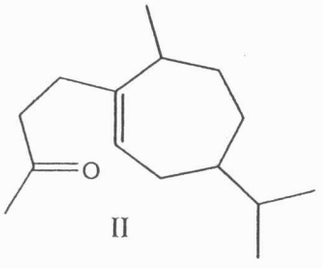

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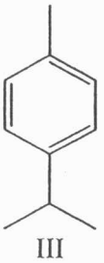
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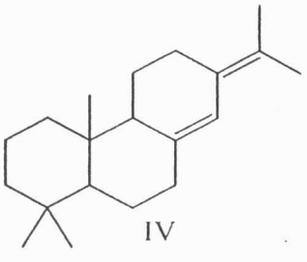

IV

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

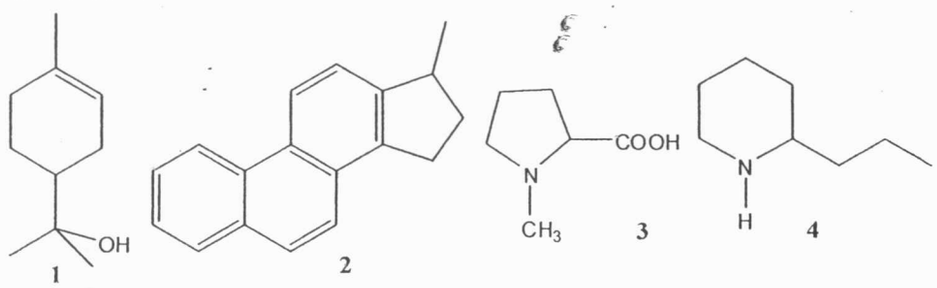
13- If an amine reacts with nitrous acid producing a yellow N-nitroso derivative, this indicates that it may be:
a) 1° amine b) 2° amine c) 3° amine d) none of them

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)***

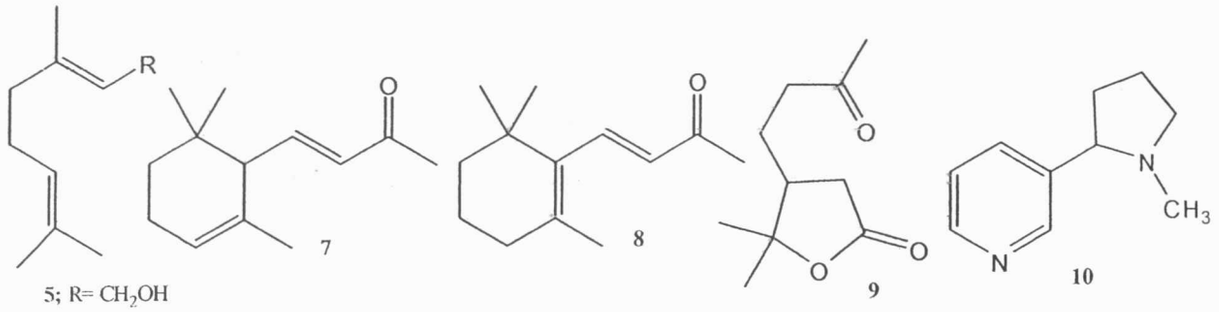
a) P-toluic acid into α-terpineol **1**.
b) 2(1-naphthyl)ethyl magnesium bromide into Diel's hydrocarbon **2**.
c) 3β-hydroxyandrost-5-en-17-one (DHEA) into 17-hydroxyandrost-4-en-3-one (testosterone).
d) 1,3-dibromopropane and sod. Diethyl malonate into hygrinic acid **3**.
e) Pyridine into coniine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

المستوى الثالث - كيمياء وبنات - ٣١٩ بوتا - مزارع غذائية

Mansoura universty
Faculty of science
Botany Department
El-Mansoura, Egypt

جامعة المنصوره
كلية العلوم
قسم النبات
المنصوره-مصر

Final examination in Botany
Second Term: June. 2011
Educational Year: Third Level **Program: Chem/Botany**

Subject: Botany(319) **Course(s) :Nutrient Cultures &Tissue Culture**
Time: 2hrs **Date: /6/2011**
Full mark: 60 **Question mark: 20 marks**

Answer the following Questions

1- On the basis of techniques employed and methods of cultivation show and explain the different types of hydroponics.

2- A- Write brief account on:

1- Basic requirements of hydroponics.

2- Advantages and constraints of soilless cultures

B-Identify: 1-

Cultures of organized structures and unorganized tissues.

2- Compare and contrast:

Protoplast culture and protoplast fusion

3- Evaluate: Micrografting

3- Enumerate and discuss:

Types of tissue culture.

Examiners: Prof. M.A.Abbas Prof. M. N. Hassanein

٣ نبات وكيمياء - ٣١٨ - مناخ وتصنيف

Final Examination in Botany
Second Term: June 2011

Educational year: Third Year | Program (Branch): Botany / chemistry
Subject: Bot. 318 | Course (s): **Vegetation, Climate &Taxonony**
Time: 2 hrs | Date: 21/6/2011 | Full mark: 60 | Question mark: 20

Answer The Following Question:

First Question:
A)- **Give a brief account of**: (10 marks).
I: Cryptophytes Subbivisions.
II: Causes of Plant Succession.
III: Types of Aquatic Vegetation and Their Interrelationship with Environment.
IV: Characters of wind-distributed propagules and water-distributed propagules.
B)- Differentiate between the scientific meaning of the following: (10 marks).
Xeromophic and Xeroplastic- Sciophytes and Heliophytes- Orographic and Convectional rains.

Second Question:
A)- **Explain in details each of the following:**
I: Correlation between life-form class present in an area and climate. (5marks).
II: Bases of classification of Halophytes. (5marks).
B)- **Give the general characters of:**
1- Orders***: Centrospermae - Umbelliflorae.*** (6marks).
2- Subfamily: ***Rosoideae*** (habit- leaves- stamens). (4marks).

Third Question:
Write on each of the following:
1- *Monochlamydeae.* (3marks).
2- Floral characters of ***Monocotyledoneae.*** (3marks).
3- Inflorescence in ***Salicaceae.*** (5marks).
4- Economic importance of genus ***Morus.*** (3marks).
5- Androecium of:
i- Genus :***Salvia.*** ii- Family: ***Myrtaceae.*** (6marks).

Prof. Mohamed Abu Ziada **Dr. Ehsan El Habashy**

Mansoura University
Faculty of Science
Botany Department
Mansoura - Egypt

جامعة المنصورة
كلية العلوم
قسم النبات
المنصورة- مصر

Final examination in Botany
Second Term May 2011

Educational Year: Third level **Program (Branch):** Chemistry / Botany
Subject: B (317) **Course:** Bacteriology - Virology
Time: 2hrs. **Date:** 11/6/2011 **Full mark:** 60 **Question mark:** 20

Answer the following questions (الامتحان في صفحتين)

Q1):

A): Chose the most correct answer (4 Mark)

1- The earliest recorded plant viral disease was --------- by Carlos closus

a) broken b) poliomyelitis c) mosaic d) dwarf

2- Bacteriophages were discovered by ----------

a) Towrt b) D"herell c) a and b d) none

3- Viruses may be present in crystal form ---------- the host.

a) outside b) inside c) a and b d) none

4- Based on types of nucleic acids viruses may be classified into ---------- groups.

a) one b) two c) three d) none

B): True and false (circulate the correct response); correct simply the wrong one (4 Mark)

1- (T – F) Icosahedral is the only viral symmetrical pattern ----------.

2- (T – F) Bacteriophages were classified into five morphological group----------.

3- (T – F) Viral cultivation means support replication outside living system.----------

4- (T – F) All animal viruses have outer envelope. ----------

C): Fill the gaps in the following sentences (4 Mark)

1 ---------- refer to cancer causing viruses which firstly discovered by Rous..

2- Viruses are metabolically inert due to absence of----------, ---------- and ---------.

3- Based on Lwoff and Tournier, viruses are entities differ from other micro-organisms in ----------,----------,----------,---------- and ----------.

4- ---------- refer to the viral coat, composed of ---------- (morphological unit) which in turn composed of protomers (----------).

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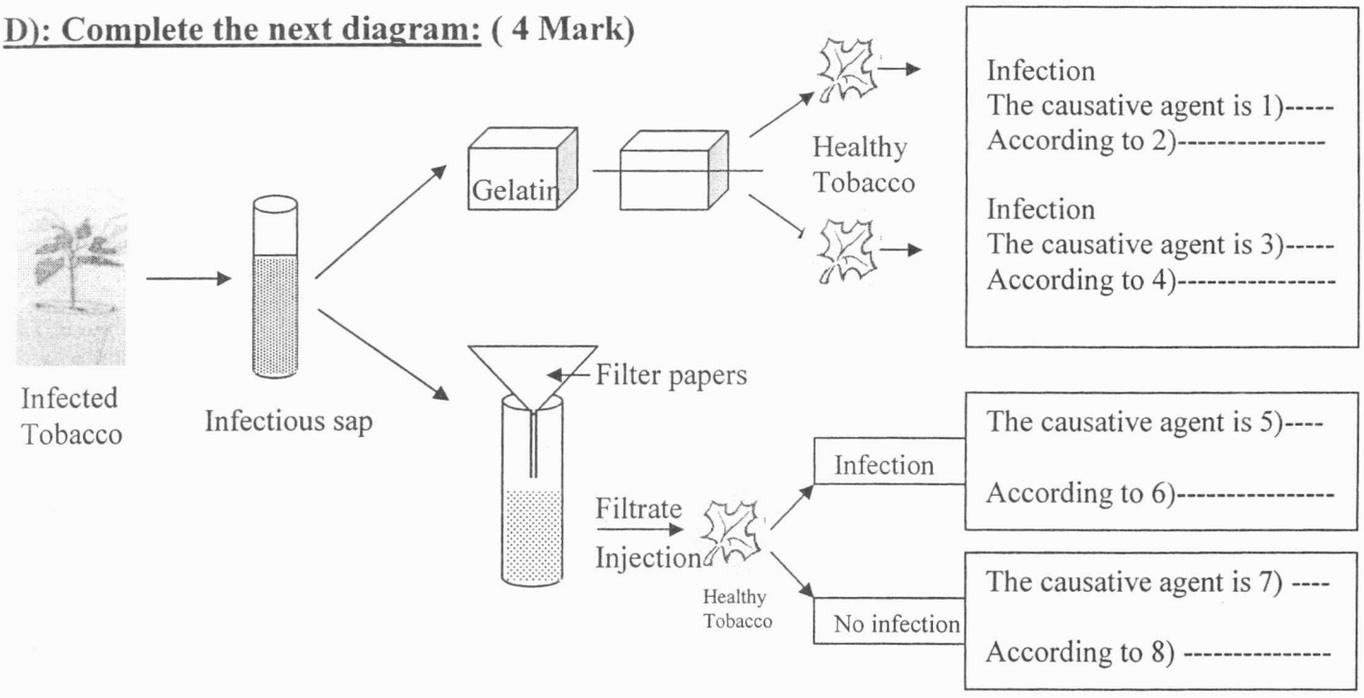
D): Complete the next diagram: (4 Mark)



E): With clear labeled diagram and commentary notes only illustrate the ideal organized tissue for viral cultivation. (4 Mark)

Q2):

A): Give a brief account with illustrations on Two only of the following :- (10 Mark)

1- Filteration and spectrophotometery as tools of virus purification and criteria of purity, respectively. **(5 Mark)**
2- Lysis cycle for viral replication and outline morphological classes of bacteriophages.**(5 Mark)**
3- Chemical nature of viral nucleic acid with respect to structure, types and only one confirmation of its function. **(5 Mark)**

B): write on the following:- (10 Mark)

1- How do bacteria reproduce? **(4 Mark)**
2- Have you ever wondered whether any kind of organism exists even in the volcanic vents or lava mud? **(3 Mark)**
3- Discuss the role of bacteria to the environment. **(3 Mark)**

Q3):

Write shot note on the following:- (20 Mark)

1- Plasmid, Ribosomes, and Chromosome. **(4 Mark)**
2- Outer membrane. **(4 Mark)**
3- Phenotypic and genotypic. **(4 Mark)**
4- Mutualism and commensalisms. **(4 Mark)**
5- Scientific classification of bacteria based on Bergy's Manual. **(4 Mark)**

With our best wishes

Examiners:- *Dr. Adel A. Al-Morsi* *Dr. Doaa B. Darwish*