المستوى الرابع كيمياء - علم الإنزيمات و إنزيمولوجيا ٢١٢ ن

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Exam of Enzymology
4th level
Botany and Chemistry
Time: 2 hr

Department of Botany
Faculty of Science
Mansoura University

Question 1

I-**How could you prepare** the following compounds by enzymatic reactions?. Mention the names of enzymes and compounds and write the equations. (**10 Mark**)

1-C_2 from C_4 .
2-C_3 from C_4 .
3-C_5 (keto) from (C5 amino).
4-C_4 with double bond from C_4 without double bond.
5-CO_2 from C_4 in presence of NADP.

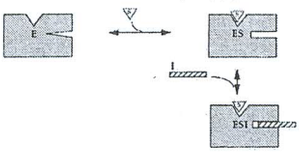
II-Mention two examples of isomerases and write the chemical equations. **(5mark)**
III-Compare between ribulose bisphosphate carboxylase and oxygenase. (**5 marks**)

Question 2

I-Give two examples for the enzymes involved in medicine, write the chemical equations of the reactions in details.(**10 mark**)

II- Answer the following items based on the represented figure

a- The following figure indicates ..... Inhibition (**1 Mark**)



b- The inhibitor could bind to the enzyme only when..... (**1 Mark**)
c- This type of inhibition is ..... (**1 Mark**)
(1-reversable, 2-irreversable, 3- compatible, 4- degradable)
d- Compare between this type of inhibition and the other nearest type of inhibition (**4 Marks**)
e- Do you think that enzyme inhibition has an importance inside the cell? How? (**2 Marks**)
f- From your study, do you think that there is an inhibitor specificity? (**1 Mark**)

Question 3

I- Explain the following terms (8 marks):

a- Alpha helix
b- Coenzyme
c- Heterodimer enzyme
d- Induced fit model
e- Recombinant protein
f- Holoenzyme
g- Ion exchange chromatography
h- SES complex

II- Briefly write on the following items (12 marks):

1- Characteristics of the active site
2- How could the enzyme decrease the activation energy of the substrate
3- Product specificity

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Prof. Hamed M El-Shora Best wishes Dr Amr Mowafy

كيمياء نبات
كيمياء حيوان
كيمياء عضوية كيمياء بيئية ك ٤٢١

Mansoura University
Faculty of Science
Chemistry Department
Course(s): Photochemistry&
Organic spectroscopy (CH 431)

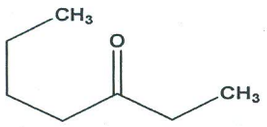
First term
4th Year, Students.
Date: 30 / 12 / 2014.
Time Allowing: 2 Hours
Full Mark: 60

Photochemistry Part: Answer the following questions:

Question (1): Write brief account on the following and explain your answer by an example:

a) Norrish type I. (5 Marks)
b) Photoreaction of cyclic enones. (5 Marks)
c) Jablonski diagram. (5 Marks)

Question (2): Complete the following photochemical equations and suggest the suitable mechanisms. (15 Marks)

1) 

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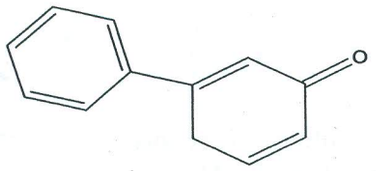
2) 

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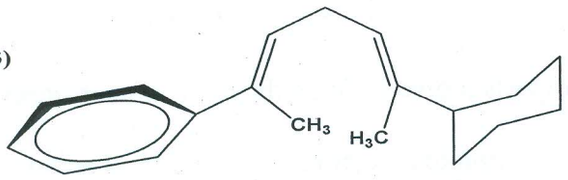
3) 

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Organic Spectroscopy Part: Answer the following questions:

Question (3): (15 Marks)

(A) A $C_9H_{10}O$ compound has strong infrared absorption at 1695 cm^{-1}. The ^1H NMR spectrum has three sets of signals: a triplet at $\delta = 1.3$ (3H), a quartet at $\delta = 2.2$ (2H), and a multiplet at $\delta = 7.1 - 7.7$ (5H). Suggest a structure for this compound.

(B) Using mass spectrometry, how can you distinguish between 1-propanol ($CH_3CH_2CH_2OH$) and 2-propanol ($CH_3CH(OH)CH_3$)?

(C) How many signals would the molecule ($CH_3OCH_2CH_2OH$) show in its ^1H-NMR spectrum?

باقى الأسئلة فى الخلف

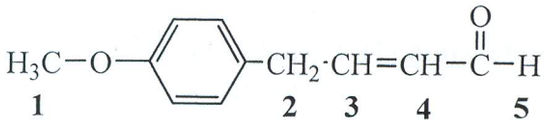
Question (4): (15 Marks)

(A) Choose the correct answer.

1- When the spectrum is carried out in acid medium, the λ_{max} for aniline has shifted to:
(a) shorter wavelength (b) longer wavelength

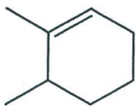
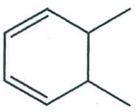
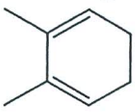
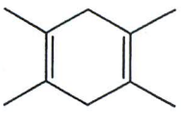
2- Which of the following is true regarding the spectra of acetophenone ($PhCOCH_3$):
(a) The IR spectrum will display a significant absorption at about 2200 cm^{-1}
(b) The IR spectrum will display a significant absorption at about 1700 cm^{-1}
(c) In the ^1H NMR, the CH_3 group will resonate at approximately $\delta = 4.3$ ppm
(d) In the mass spectrum, a significant peak will occur at m/e = 140

3- Which proton type (from H1 to H5) is the MOST deshielded?



(a) H1 (b) H2 (c) H3
(d) H4 (e) H5

4- Which of the following cycloalkenes would have the largest λ_{max}?

(a)  (b)  (c)  (d) 

5- Which compound would be expected to show intense IR absorption at 2250 cm^{-1}?
(a) $(CH_3)_2CHCN$ (b) $CH_3CH_2CH_2CO_2H$
(c) $CH_3CH_2CH_2CONH_2$ (d) $(CH_3)_2CHCH_2OH$

6- When a high energy electron impacts molecule M in the ionization chamber, what type of species is initially produced?
(a) cation (b) radical (c) radical cation (d) radical anion

(B) Explain the reason: The $\pi \rightarrow \pi^*$ transition for ethene ($CH_2=CH_2$) has $\lambda_{max} = 173$ nm but for 1,3-butadiene ($CH_2=CHCH=CH_2$) has $\lambda_{max} = 217$ nm.

GOOD LUCK

Prof. Dr. Mohamed Abou El-Dahab, Prof. Dr. Ehab Abdel-Latif and Dr. Eman Helmy

كيمياء ونبات - فطريات ومقاومة للأمراض وعلاقة العائل (ب ٢١٥)

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

جامعة المنصورة
كلية العلوم
قسم النبات
المنصورة- مصر

4th level Bot. & Chem. (Credit hrs) Course: Fungi , Host parasite and control (B 415)

Time: 2 hrs Date: 17 / 1 / 2015 Full mark: 60 Question mark: 20

1- (A) Complete the following sentences:-

1- Steps of disease diagnosis are ..... , ..., ..., ..., ..., ...
2- Asexual reproduction in yeast is ....., ...
3- Dissemination of the pathogens by ....., ..., ..., ...
4- Spores produced in the hosts of *Puccinia graminis* are ....., ..., ..., ...
5- Nutrition in mycophta is ....., ..., ...
6- Fungistasis is ..... While soil suppression is .....
7- Ascocarps in Ascomycetes are ....., ..., ...
8- Kingdom of mycota are classified into 3 Divisions are ....., ..., ...
9- Nutrition in Mycophyta is ....., ..., ...
10- Pre-existing defense structures by means ....., ..., ..., ...

2- Write short notes with labeled diagrams on the following:-

1. Classification of Erysiphales into genera.
2. Formation of Basidium and Basidiospores.
3. Microbial toxins and chemical weapons of the pathogen.
4. Ascus and ascospores formation in Ascomycetes.

3- Compare and contrast between the following pairs:-

1. Gametangial contact and gametangial copulation.
2. Antagonistic microorganismis and antagonistic plants.
3. Wounds and natural opening penetration of the pathogens.
4. Infectious and non-infectious diseases.

"Best of Luck"

Examiners: Prof. Dr. Gamal M. Abdel-Fattah Dr. Huda. M. Soliuman

Mansoura University **Faculty of Science** **Chemistry Department** **Subject code: Chem. 415** **Course: Electro-analytical chemistry and spectroscopic methods of analysis**		**First semester examination** **4th level students** **Program: Chemistry/Zoology and Chemistry/Botany** **Date: 13/1/2015** **Time allowed: 2 hours** **Full mark: 80 marks**

Answer the following questions: (الأسئله في صفحتين)

Section A: (Spectroscopic methods of analysis) (40 marks)

Question 1: (20 marks)

a. **Define each of the following: (10 marks)**

1. Spectroscopy.
2. Frequency.
3. Atomic absorption spectrum.
4. Chromophore.
5. Turbidimetry.

b. **Compare between:** obedience and deviations of Beer's law. **(6 marks)**

c. **Calculate** the molar absorptivity coefficient of $K_2Cr_2O_7$ at 455 nm, given that: **36.5 mg** was dissolved in **500 mL** and exhibits **12%** transmittance at 455 nm in a **2-cm** cell. (K=39, Cr=52, O=16). **(4 marks)**

Question 2: (20 marks)

a. **Put true (√) or false (×) and correct the wrong one: (10 marks)**

1. Saturated hydrocarbons can be analyzed using UV radiations.
2. In phototube detector, electrons move from anode to cathode.
3. The sample holder which used in UV analysis is made of crystalline NaCl.
4. Deformation vibrations involve change in bond length.
5. The source of colour in V_2O_5 is due to charge transfer spectra.

b. **Sketch the diagram which represents:** the atomic transition. **(4 marks)**

c. **Calculate** (ν, λ and E) for (O-H) bond knowing that: ($k=7.7\times10^5$ dyne/cm, $h=6.63\times10^{-34}$ J/s, $c=3\times10^{10}$ cm/sec, O=16, H=1). **(6 marks)**

Please turn the page →

Section B: (Electro-analytical chemistry) (40 marks)

Question 3: (20 marks)

a. **Complete each of the following sentences: (5 marks)**

1. ISE's not affected by ..... or.....
2. In Gran's Plot, ... is plotted against.....
3. As^{3+} can be determined by titration with I_3^- at pH.....in presence of ..... solution.
4. In potentiostatic coulometry, ... and .....will decrease with time.
5. Ilkovic equation used for ..... analysis, while $E_{1/2}$ used for ..... analysis.

b. **Put true (√) or false (×) and correct the wrong one: (5 marks)**

1. In static methods, no current passes in the electrochemical cell as in potentiometry.
2. Electrodes of 4^{th} kind can follow the reaction mechanism for any redox reaction.
3. Alkaline error appears in glass electrodes when the measured pH is lower than the true pH.
4. High stirring rate in controlled-potential coulometry will help to minimize electrolysis time.
5. The current maxima may be removed by addition of surfactant like (Triton X-100).

c. **Sketch the diagram which represents**: the cell used for electro-deposition process. **(4 marks)**

d. A cyclic voltammetric peak current of (**10.5 µA**) is observed for (**0.6 mol/L**) solution of vitamin C at glassy carbon electrode of (**3.2 mm^2**) area with potential scan rate of (**0.25 v/sec**). **Calculate:**

1. **i_p** if potential scan rate is (**1.5 v/sec**) and concentration is (**0.9 mol/L**). **(3 marks)**
2. **E^o_{mid}** and **number of electrons**, if (**E_{pa}= 0.5566 v** and **E_{pc}= 0.5271 v**). **(3 marks)**

Question 4: (20 marks)

a. **Define each of the following: (6 marks)**

1. Potentiostat.
2. Coulometry.
3. Stoke-Einstein equation.

b. **What are the coulometric titration terms analogous to the conventional volumetric titration terms given below: (4 marks)**

1. Concentration of titrant.
2. Volume of titrant.

c. **Comment on the following: (6 marks)**

1. **Co** and **Fe** cannot be used as electrodes of 1^{st} kind.
2. Bubbling **N_2** into the solution for several minutes before polarographic measurements.

d. A **10 mg** sample of a purified organic base is dissolved in **150 mL** of alcohol-water solvent, and H_3O^+ is generated externally at **100 mA** and delivered to the solution. If **193 sec** are required to reach the methyl orange end point, **calculate the molecular weight** of the organic base knowing that the number of electrons involved in the reaction = **3**. **(4 marks)**

Good luck: Dr. Yasmeen Gaber and Dr. Hany Moustafa

كيمياء نبات - نظام بيئي وبيئة نباتية وتلوث (بـ ٤١٧)

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

جامعة المنصورة
كلية العلوم
قسم النبات
المنصورة - مصر

Final Examination in Botany
First Term: Jan. 2015

Educational Year: Fourth Level | **Program (Branch): Botany / Chemistry**
Subject: Bot (417 ن) | **Course(s): Ecosystem-Ecology & Pollution**
Time: 2 hrs **Date: 10 /1 /2015** | **Full mark: 60** **Question mark: 20**

Answer the following questions:

Q.1 **A. Define each of the following:** (20 marks)

Atmospheric pollution- Garbage- Persistent organic compounds-

Pathogens- Mobile source of air pollution.

B. Give an account on:

1. Primary air pollutants and explain particulate organic matter.
2. Impacts of nutrient pollution of water.

Q.2 **A- Write on** (10 marks)

1- Ozone as secondary air pollutants.
2- Thermal water pollution.

B- Give an account on: (10 marks)

1. Types of species found in ecosystems.
2. Classification of xerophytes.

Q.3 **A- Give an account on the following:** (20 marks)

1- The physical factors having the greatest effect on the ecosystem.
2- Types of xeric habitats.
3- Classification of halophytes according to their response to salinity.
4- Draw only: Phosphorus Cycle and Nitrogen Cycle.

Examiners: **Dr. Ghada El-Sherbeeny** **Dr. Yasser El-Amier**

كيمياء ونبات - التركيب الدقيق للخلية - ورقة خلوية (ب ٢١٨)

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

جامعة المنصورة
كلية العلوم
قسم النبات
المنصورة - مصر

Final Examination in Botan First Term: Jan 2015

Students: 4th Level Botany/Chemistry **Course**: Genetics and Ultrastructure of the cell (B 418)

Time: 2 hrs. **Date: 10/1/2015**
Full mark: 60 **Question mark:** 20

Q1:A- Give an account on the following: (20 marks)

1. Types of lethal genes. (10 marks)
2. Inheritance of comb shape in Poultry. (5 marks)
3. Multiple alleles and give an example. (5 marks)

Q2:A- Complete the following sentences using suitable words: (10 marks)

1- The external feature of character is termed……..
2- Based on Mendel experiments, he put two important principles or laws, these are…… and……
3- Incomplete Epistasis modifies the Mendelian F2 ratio into……
4- Crossing of F1 individuals with one of the two parents……..
5- …….. individuals have different alleles whereas……..…individuals have similar alleles.
6- Cross of an individual of unknown genotype to completely recessive individual called ……..
7- ……epistasis modifies the Mendelian F2 ratio into 13:3.
8- F2 phenotypic ratio in agouti colour of mice is……

B- Compare between each of the following:

1- Plastids and Mitochondria.
2- Light microscope and electron microscope.

Q3 Draw and discuss each of the following: (20 Marks)

1- Dynein Arms.
2- Pathways of protein sorting and transport.
3- Disassembly and reassembly of nuclear envelop during mitosis.
4- Protein-lipid Sandwich model of plasma membranes.

Best Wishes

Examiners: Dr. Rehab Mahmoud Dr. Ashraf Elsayed