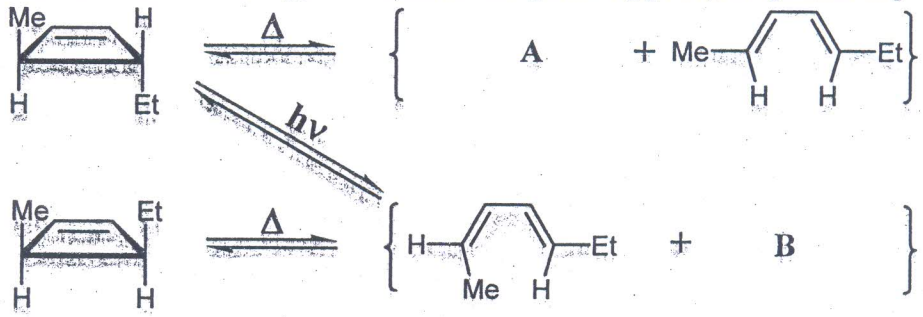
المستوى الثالث - كيمياء - التفاعلات العضوية بتماثل المدارات لـ ٢٣٩

Mansoura University
Faculty of Science
Chemistry Department
Subject: *Chemistry*
Course : Chem.(339), Organic Reactions and Orbital Symmetry

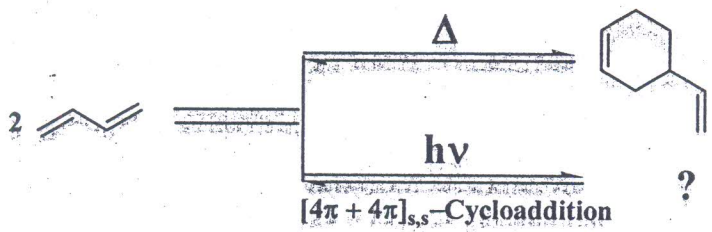
Summer course of Second Term,
Third Level Chem. Students
Final Examination
Date: 06 /06/2013
Time Allowed: *2 hours*
Full Mark: 60 Marks

ANSWER ALL QUESTIONS AS DESIRED

1-a) Predict the structures of **A** and **B**, and discuss **the stereochemical course** of the following interconversions on the basis of **the energy correlation diagram approach. [9 marks]**



b) Discuss reasonable **concerted mechanisms** for each of the following conversions and complete when necessary. **[6 marks]**



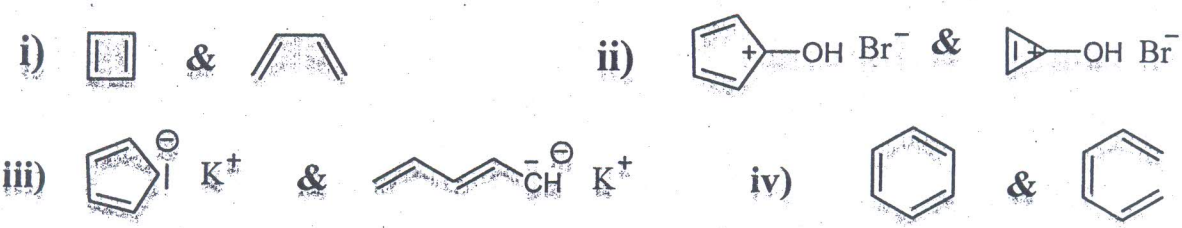
[4π + 4π]$_{s,s}$–Cycloaddition

Endo or Exo addition ? Explain on the basis of the frontier orbital approach!

2-a) Give only **one example** for each of the following conversions to demonstrate the stereoselectivity of such reactions under **the right condition** (thermal or photochemical?). Account for your answer, and discuss **only one theoretical approach** of your choice for each case: **[3 x 3 = 9 marks]**

i) [1, 3]$_s$ -C-migration with inversion of configuration.
ii) [1, 5]$_s$-H-migration.
iii) [1, 3]$_s$-C-migration with retention of configuration.

b) Compare the stability of **only three pairs** of the following compounds on the basis of **resonance concept, molecular orbital theory and the [4n + 2] Hückel rule:[3 x 2 = 6 marks]**



3-a) The **following** two conversions are **concerted** under **photochemical** condition but **not concerted** under **thermal condition. Explain!** **[2 x 4 = 8 marks]**

b) Arrange the following compounds in order of decreasing **C-H-acidity** (i.e. the ability to lose one of the protons **drawn in bold**). Account for your answer! **[7 marks]**

Best Wishes *Prof. Dr. Ali Sarhan*

الفرقة الثالثة - الكيمياء - كيمياء المركبات ٢٠١٣

Mansoura University
Faculty of Science
Chemistry Department
Subject: Coordination Chemistry
Course(s): Chemistry (322)

Second Term
3rd Year Students (Chem.)
Date: 27/5/2013
Time Allowed: 2hrs
Full Mark: 75 Marks

Answer the following questions

Section A:-

Answer the following questions:- **(80 Marks)**

1- (A)- Put (√) or (x) and correct the statements (10 Marks):-

i- Tetrahederal complexes form low-spin configuration.
ii- Chain's theory explain the magnetic behavior of the Co(III) complexes.
iii- Low-spin Fe(III) complexes is less stable than high-spin complexes.
Iv- CN is a strong ligand because of its contain two lone pair of electrons.
v- Isomers are compounds have the same formulae but having different geometries.

1- (B)-

a. $[Cr(NH_3)_6]Cl_3$ complexes forms geometric isomerism.
b. In Tetrahedral complexes E_g is lower energy than T_{2g}.
c. NH_3 forms stable than en complexes.
d. VBT theory postulates the hybridization between orbitals
e. before complexation.
f. Chelate complexes coordinate in a monodentate mannar toward the metal ions.

2- Write short notes for the following (24 Marks):-

a- The effect of the nature of coordinating group on the formation of complex compounds.
b- The second postulation of Werner's theory.
c- Spectrochemical series.
d- Synthesis of complexes by substitution reactions.
e- Detection of complexes using pH measurements.
f- Difference between stability and formation constants of the metal complexes.

3- A- Compare between the limations of VBT, CFT and MOT and calculate the magnetic moment for each complex (Answer in a Table) (7 Marks).

B- Compare between the following the following complexes using the three theories (10 Marks):-

i- $[Mn(en)_3]PO_4$ and $[Mn(CN)_6]^{2-}$. (At. Wt. for Mn = 25).
ii- $[Co(CO)_4]^-$ and $[Co(CO)_4]^+$. (At. Wt. for Co = 27).

4- Name the following complexes (14 Marks):-

A- i- $Hg[Co(SCN)_4]$ ii- $[Fe(NH_3)_4SO_4]Br.2H_2O$
iii- $[CoCl_2(DMG)_2]$ iv- $[SnCl_4(Py)_2]$
v. $[(NH_3)_5Co.OH.Co(NH_3)_5](NO_3)_5$
vi- $H[Ag(Cl)_2]$ vii- $[(H_2O)_5Cr\text{-}O\text{-}Cr(NH_3)_5]^{4+}$

B- Detemine the Type of isomers and of complex for the following (15 Marks):-

i- $[CrCl_2(en)_2]Br$ ii- $Na[Mn(CO)_5]$
iii- $[Fe(NH_3)_4(SCN)_2]NO_3$ iv- $[Cr(CO)_6]$
v- $[Ni(AcAc)_2(NO_3)_2]$ (AcAc = Acetylacetone).

Prof. Dr. Mohsen Mostafa

Mansoura University Faculty of Science Chemistry Department Third level Date : 30/ 05/ 2013		Second term Examination Subject: Surface chemistry, Course: Chem.343 Full Mark : 60 Marks Time Allowed : 2 hours

Answer the Following Questions:

Question 1 (20 marks)

1- What shape does a liquid take when it weighs nothing?
2- On which side of the liquid surface, pressure is less?
3- What happens to the work done to increase the surface area?
4- The radius of a capillary tube is doubled. What change will take place in the height of the capillary rise?
5- Why clothes become water-proof when wax is rubbed on them?
6- Air is blown into a soap bubble. What will be the effect on the pressure inside a soap bubble?
7- Explain the effect of less soluble impurity on the surface tension of a liquid?
8- A drop of oil placed on the surface of water spreads out. But a drop of water placed on oil contracts to a spherical shape. Explain both the phenomena.
9- Why does a surfactant low surface tension?
10- Why is it important to have clean surface in surface studies?
11- Why is chemisorption referred to as activated adsorption?
12- Why mercury does not wet glass?
13- Why cotton dresses should be preferred in summer?
14- What happens to surface tension as temperature rises?

Question 2 (20 marks)

a- Write on the following: (12marks)

1- Drop method used for measuring surface tension.
2- Detergent and, Foaming and antifoaming
3- Adhesional wetting

b- Which of the liquids listed in the following table will spread on water and which will not spread? (Note γ_{WA} = 72.8 dyne cm^{-1} (4 marks)

Liquid	γ_{OA}	γ_{OW}
n-Hexadecane	30.0	52.1
n-Octane	21.8	50.8

c- Calculate the adsorption of 1-aminobutyric acid at the surface of an aqueous solution where concentration = 0.1 M at 25°C if $d\gamma/dc$=0.4 dyne cm^{-1} $mole^{-1}$ and $d\gamma/(d\ln c)=4\times10^{-2}$ dyne cm^{-} $mole^{-1}$ (4 marks)

Question 3 (20 marks)

a- What is the Isosteric enthalpy of adsorption?
b- Derive the Kelvin equation?
c- What is an adsorption isotherm? Describe Freundlich adsorption isotherm?
d- Calculate the surface tension of mercury and radius of capillary at 20°C if it rises 8.37 cm in a capillary of water and depression 3.67 cm in a capillary of mercury. Assume that Density of water at 20°C is 0.9982. g. cm^{-3}, the density of mercury is 13.5939 gcm. $^{-3}$ and surface tension of water is 72.75 dyne cm^{-1})
e- The monolayer capacity of one gram alumina was found to be 52.5 cm^3 of nitrogen at STP. Given that the cross sectional area of nitrogen molecule = 16.2 A^0, calculate the surface area of alumina in (m^2/ g).

Good luck

Prof. Dr. S. A. El-Hakam

الفرقة الثالثة - كيمياء، كيمياء وعلوم طبيعية ك ٣٣٥
كيمياء حيوية - كيمياء وبيئة - كيمياء حيوية

Mansoura University
Faculty of Science
Chemistry Department
Mansoura, Egypt

جامعة المنصورة
كلية العلوم
قسم الكيمياء
المنصورة – مصر

Second Semester May 2013

Educational Year: 3ed Year Chemistry.
Course (s): Natural Products.
Date: 03/06/2013.
Course Code: CH 335.

Subject: Chemistry.
Full Mark: 60.
Time: 2 hrs.

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

جامعة المنصورة – كلية العلوم
قسم الرياضيات
التاريخ : ١٠ / ٦ / ٢٠١٣ م
الدرجة الكلية : ٨٠
الزمن : ساعتان

امتحان دور مايو ٢٠١٣ م
برنامج : كيمياء حيوى + كيمياء
المستوى : الثالث
اسم المقرر : احصاء حيوى
كود المادة : ر ٣٠١

Answer the following questions:

[1] a- A random sample of size 9 is selected from a normal population has the values 5 , 9 , 6 , 8 , 10 , 13 , 15 , 11 , 4 Find a 95 % confidence interval for the population mean μ (10 Marks)

b- If the average number of visitors to a web server per minute is 4 , what is the probability that

i) The number of visitors in one minute will be less than 2 ?

ii) There are exactly two visitors in 30 seconds ? (10 Marks)

[2] a- Let X be a random variable with the density function

$$f(x)=\begin{cases} k\ (x-1) & , \quad 1\le x\le 2 \\ 0 & , \quad \text{elsewhere} \end{cases}$$

Find i) The value of the constant k ii) $E(3X-5)$ (10 Marks)

b- A random variable X takes the values 1 , 2 , 3 where $P(X=1)=0.5$ and $\mu=1.7$ Find i) $P(X=3)$ ii) $\mathrm{Var}(X)$ iii) $P(0\le X<1)$ (10 Marks)

[3] a- Suppose that the random variable X is normally distributed with mean 16 and standard derivation 4 . Find the probability that X will be

i) More than 20 ii) At most 18 iii) Between 14 and 20 (10 Marks)

b- Let X be a binomial random variable with parameters $n=8$ and $p=0.2$

Find i) $P(X>1)$ ii) $E(X)$ iii) $\mathrm{Var}(X)$ (10 Marks)

c- Complete the following: (20 Marks)

1- For the sample observations: 0.3 , 0.7 , 0.5 , 1.1 , 0.4 the sample mean is ...

2- For the sample observations: 0.2 , 3.0 , 0.5 , 2.0 , 1.0 , 0.8 the sample median is...

اقلب الصفحة ⟸

3- For the sample observations: 0.3 , 0.5 , 0.6 , 1.0 , 0.5 , 2.0 the sample mode is...

4- If for a sample we have $\sum_{i=1}^{n} x_i^2 = 9.8$, $\sum_{i=1}^{n} x_i = 3$, $n = 5$ then the sample variance is...

5- Suppose for a data, we have the sample mean is equal to 9.0 and the sample variance is equal to 20.25 then the coefficient of variation of the data is ...

6 -The range of the data: 4 , -10 , 6 , 10 , 9 is ...

7- The measures of central tendency are .....

8- The measures of dispersion are .....

9- The types of quantitative variables are ....

10- If $P(A) = 0.4$, $P(B) = 0.5$ and $P(A \cap B) = 0.2$, then $P(A \cup B) = ...$

$\varphi(0.5) = 0.6915$, $\varphi(-0.5) = 0.3085$, $\varphi(1) = 0.8413$, $t_{(0.025,8)} = 2.306$,
$t_{(0.025,9)} = 2.262$, $Z_{0.005} = 2.58$, $Z_{0.025} = 1.96$

مع أطيب التمنيات بالنجاح د. فاتن شيحه

Mansoura University **Faculty of Science** **Chemistry Department** **Subject: Physical Chem.** **Course(s): Photochem. & Colloids Chem. 345**		**Second Term** **3 Level Chem. Students** **Time Allowed: 3 hours** **Full Mark: 80 Marks** **Date:** May, 2013

Answer The Following Questions

Section (A)

a) Define the quantum efficiency and discuss the reasons of its high and law values. **[10 Marks]**

b) Explain the kinetics of quenching of florescence **[5 Marks]**

c) Discuss the excited – state process in molecules **[10 Marks]**

d) Write on the luminescence and chemiluminscence **[8 Marks]**

e) Aystem absorbs $2x10^{10}$ quanta of light per second, if 0.001 mols has been reacted after 20 min, calculate the quantum efficiency ($h=6.62x10^{-27}$ erg , $N=6.02x10^{23}$) **[7 Marks]**

Section (B)

I) **(a) Complete the following:** **[10 Marks]**

1- The potential in the diffuse part of the double layer Gouy is called ..... And the potential in the attached portion of the double layer is called .....

2- The PH value at which neither a positive nor a negative charge is called .....

3- The dispersion of solid in liquid is called ..... and a dispersion of solid in water is called .....

(b)Write on three only of the following: **[10 Marks]**

(i) The action of dialyzing membranes for purification of sol.

(ii) Sedimentation equilibrium.

(iii) Electrophoresis.

(iv) Production of gel.

(v) Two methods for preparation of sol.

إقلب الصفحة من فضلك

II) **(a) Tick (√) on the correct answer:** **[6 Marks]**

The critical Z-potential is:

(a) Above which the sol coagulate rapidly and below which the sol is relatively stable.

(b) Above which the sol is stable and below which it coagulate.

(c) The potential at which the sol coagulate.

(b) Give reason on two only of the following: **[6 Marks]**

i) Addition of an emulsifier to an emulsion.

ii) Protecting colloid prevent agglomeration of sol.

iii) Tyndall effect of a colloidal solution.

(c) Define: **[8 Marks]**

i) Excess surface energy

ii) Smokes

iii) Gels

Examiners :

Prof. Dr. H. M. Abo El-Nader
Prof. Dr. H. A. Mostafa

جامعة المنصورة – كلية العلوم
قسم الرياضيات
التاريخ : ١٠ / ٦ / ٢٠١٣ م
الدرجة الكلية : ٨٠
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امتحان دور مايو ٢٠١٣ م
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اقلب الصفحة ⟸