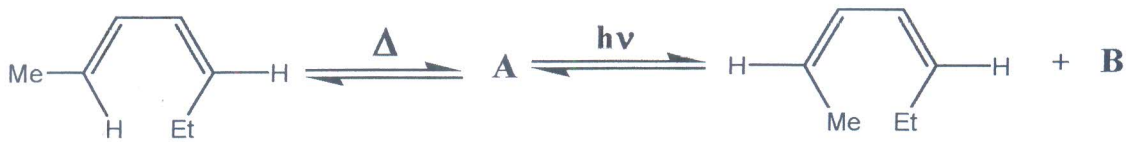
المستوى الثالث كيمياء - التفاعلات العضوية وتماثل المدارات ٣٣٩ ك

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

Second Term
Third Level Chem. Students
Final Examination
Date: 21 /05/2014
Time Allowed: *2 hours*
Full Mark: 60 Marks

ANSWER ALL QUESTIONS AS DESIRED

1-a) What is the structure of **A** and **B** in the following reaction? **EXPLAIN!** Use an **energy correlation diagram** to account for the **stereo chemical course** of the reaction.
[12 marks]



b) Compare the stability of **only two pairs** of the following compounds on the basis of the **resonance concept**, the **molecular orbital** theory and the **HÜCKEL-4n+2-Rule:**
[2 x 4 = 8 marks]

i)  **ii)** 

iii) 

2- Classify each of the following reactions and Indicate whether they would be allowed or forbidden under the **given conditions**. Account for your answer by considering **only one** theoretical approach of your choice for each case: **[4 x 5 = 20 marks]**

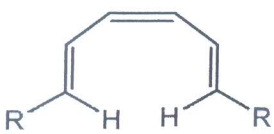
a) 

b) **2** 

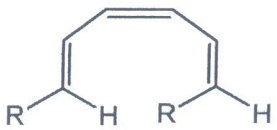
c) 

d) 

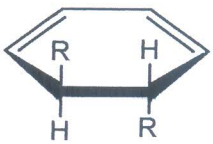
3-a) When compounds **(1)** and **(2)** are heated, predict the resulting products among the stereoisomers **(3)** and **(4)**, by classifying them as symmetry allowed or symmetry forbidden for each case. Suggest a pericyclic concerted (one step) mechanism, which may explain your predictions and account for your answer on the basis of the frontier orbital approach and the aromatic transition state concept. **[12 marks]**



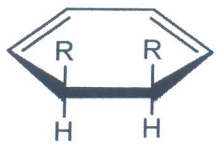
(1)



(2)



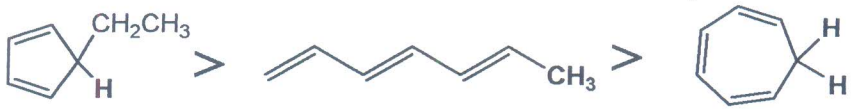
(3)



(4)

b) Account for the following observations: **[2 x 4 = 8 marks]**

i) The **C-H-acidity** (the ability to loss one of the protons drawn in **bold**) of the following compounds decrease in the following order:



ii) Trials on the preparation and isolation of **cyclobutadiene derivatives** were never successful but the preparation of the **acyclic analogue 1,3-butadiene derivatives** are very common.

Best Wishes *Prof. Dr. Ali Sarhan*

Mansoura University
Faculty of Science
Chemistry Department
Course: Physical Chemistry
Date: 4/ 06/ 2014

Second term Examination
Subject: Surface chemistry, Chem.343
Third level
Full Mark: 60 Marks
Time Allowed: 2hours

Answer the Following Questions:

1-a-Write True or False and correct the false ones(one mark for each one)

1-The physical adsorption increases with the increase in temperature.

2- The BET adsorption isotherm can be used to model monolayer adsorption.

3- The solubility level of solute does not affect the adsorption from solution onto a solid adsorbent?

4- The adsorption of a gas, on a solid surface, varies with pressure of the gas in which it is Independent of the pressure –fast –slow.

5- The curve indicating the variation of amount of the adsorption with pressure at constant temperature is known as adsorption isostere.

6- During the adsorption of Krypton on activated charcoal at low temperature $\Delta H = T\Delta S$.

7- In Freundlich equation constants K and n vary with temperature.

8-The coloring matter which gets adsorbed on activated charcoal is called absorbent.

9- Finely divided substance is less effective as an adsorbent.

10- Chemsorption shows specificity for any particular gas because it involves van der Waals forces are universal.

11- Surface chemistry deals with phenomena that occur at the surfaces or interfaces.

12- The air becomes dry in the presence of silica gel because the $CO_{(g)}$ molecules get adsorbed on the surface of the gel.

13- If a gas like NH_3 is taken in a closed vessel containing powdered charcoal, it is observed that the pressure of the gas in the enclosed vessel does not change.

14- Adsorption arises due to the fact that the surface particles of the adsorbent are in the same environment as the particles inside the bulk.

1-b- 64 identical drops of water of radius 0.1 mm coalesce to form single big drop. Find the energy liberated, if the surface tension of water is 0.072 Nm^{-1}. (3marks)

1-c- In the determination of surface tension of a liquid by the drop number method, it gives 55 drop, while water gave 25 drop for the same volume. The densities of the liquid and water are 0.996 and 0.800 g cm^{-3} respectively. Find the surface tension of the liquid if that of water is 72.0 dyne cm^{-1}. (3 marks)

II-a Choose the response answer(one mark for each one)

i- A number of small drops of mercury coalesce adiabatically to form a single drop. The temperature of drop
(a) Increases b) Is infinite (c) Remains unchanged (d) May decrease or increase depending upon size

2- The angle of contact between a glass capillary tube of length 10 cm and a liquid is 90°. If the capillary tube is dipped vertically in the liquid, then the liquid s
(a) Will rise in the tube
(b) Will get depressed in the tube
(c) Will rise up to 10 cm in the tube and will over flow
(d) Will neither rise nor fall in the tube

3- If soap bubbles of different radii are in communication with each other
(a) Air flow from the larger bubble into the smaller one until the two bubbles are of equal size
(b) The sizes of the bubbles remain unchanged.
(c) Air flows from the smaller into the larger on and lager bubble grows at the expense of the smaller one
(d) Air flows from the larger into the smaller one becomes equal to that of the larger one and the large one equal to that of the smaller one.

4- Two soap bubbles have radii in the ratio of 4:3. What is the ratio of work done to below these bubbles?
(a) 4:3 (b) 16:9 (c) 9:16 (d) 3:4

5- The surface of water in contact with glass wall is
(a) Plane (b) concave (c) convex (d) Both b and c

6- The height of a liquid in a fine capillary tube
(a) Increases with an increase in the density of a liquid (b) Decreases with a decrease in the diameter of the tube
(c) Decreases with an increase in the surface tension (d) Increases as the effective value of acceleration due to gravity is decreased

7 How do insects such as pond skaters stay afloat on water?
(a) Because of high surface tension of water b) As they can swim
(c) Because they are less dense than water (d) None of the above reasons

8- What is the main result of adding surfactants into a liquid composed of two immiscible phases such as oil and water?
(a) Reduction in the interfacial tension between the phases (b) Increase in the interfacial tension between the phases
(c) Catalysation of a chemical reaction between the phases (d) Nothing happens

9- A surfactant with Hydrophile-Lipophile Balance (HLB) value (e.g. 5) is expected to function as a:
(a) Anti-foaming agent (b) Water in oil (w/o) emulsifier (c) Oil in water (o/w) emulsifier (d) Solubility enhancer

10- Which of the following drug delivery systems comprises a hydrophobic core and a hydrophilic surface?
(a) Liposomes (b) Micelles c) Reverse micelles d) None of the above

11- In a surface tension experiment with a capillary tube water rises up to 0.1 m. if the same experiment is repeated on an artificial Satellite which is revolving around the earth. The rise of water in a capillary tube will be

(a) 0.1 m (b) 9.8 m (c) 0.98 (d) Full length of capillary tube

12- 5 g of water rises in the bore of capillary tube when it is dipped in water. If the radius of bore capillary tube is doubled, the mass of water that rises in the capillary tube above the outside water level is
(a) 1.5 g (b) 10 g (c) 5 g (d) 15 g

II-b- Answer the following points: (one mark for each one)
1- Why oil is poured to calm sea waves?
2- 'Smaller the angle of contact better is the detergent'. Is it correct? Why?
3- Why is it difficult to fill mercury in the glass tube of a mercury thermometer?
4- Why cotton dresses should be preferred in summer?
5- When a glass window is smeared with glycerine, the rain drops do not stick to glass.Why?

II-c- Determine the surface tension of ethyl alcohol if The density of ethyl alcohol is 0 .789 g $cm^{-3}$and values of atomic parachor are Of O=19.8,C=9.0,H=15.5 (3marks)

III-a- Drive Langmuir adsorption equation. What are the contradictions to this theory? (7 marks)

b- Write on: spreading coefficient and spreading wetting. (7 marks)

c- The linear representation of BET isotherm (N_2 adsorption at 77K), gives a slope = 1118 mol^{-1}. g and intercept = 614 mol^{-1}. g. Calculate the following: 1- V_m and c , 2- enthalpy of adsorption (vaporization enthalpy = 5.6 KJ.mol^{-1}) and 3 – Does chemisorption or physisorption occur in this system. (6 marks)

Good luck Prof. S.A.El-Hakam

كيمياء حيوى - ر 301 الإحصاء الحيوى

جامعة المنصورة – كلية العلوم
قسم الرياضيات
التاريخ :8 / 6 / 2014 م
الدرجة الكلية : 80
الزمن : ساعتان

امتحان دور مايو 2014 م
برنامج : كيمياء حيوى + كيمياء
المستوى : الثالث
اسم المقرر : احصاء حيوى
كود المادة : ر 301

Answer the following questions:

[1] a- Let X be a random variable and the probability distribution of X is given by

X	−1	0	1	2
P(x)	0.2	0.4	0.3	0.1

Find 1) $E(X)$ 2) $E(X^2)$ 3) $Var(2X+5)$ **(15 Marks)**

b- Let X be a random variable with the density function

$$f(x)=\begin{cases} k\,x^2 & , \quad 0<x<3 \\ 0 & , \quad \text{elsewhere} \end{cases}$$

Find 1) The value of the constant k 2) $P(0<X<1)$, $P(X=2)$

3) The cumulative distribution function $F(x)$ **(15 Marks)**

[2] a- Consider the following frequency table **(21 Marks)**

classes	3 –13	14 –24	25 – 35	36 – 46	47 – 57
frequency	5	10	18	20	7

Find 1) The sample mean 2) The sample median

3) The sample mode

b- Find the standard deviation of the values 2 , 6 , 8 , 3 , 4 , 7 **(9 Marks)**

[3] Choose the correct answer: **(20 Marks)**

1- For the sample observations: 3 , 5 , 6 , 5 , 2 , 5 , 6 the mode (modes) =...

a) 6 b) 5 c) 5 , 6

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2- An example of Quantitative Variable is...

a) Family size b) blood type c) Nationality

3- For the sample observations: 2 , 3 , 5 , 9 , 1 , 8 the sample median is...

a) 7 b) 4 c) 5

4- A coin is tossed 5 times the total number of outcomes is...

a) 32 b) 25 c) 10

5- The sum of relative frequencies of any frequency table is equal to

a) 100 % b) sample size c) 1

6- Suppose for a data, we have the sample mean is equal to 8 and the sample variance is equal to 4 then the coefficient of variation of the data is...

a) 25 % b) 200 % c) 50 %

7- Let A and B are mutually exclusive events, then $P(A \cap B) = \cdots$

a) 1 b) 0.5 c) 0

8- If Φ is an impossible event then $P(\Phi) = \cdots$

a) 0 b) 0.5 c) 1

9- The range of the data: 3 , 7 , 6 , 10 , 2 is...

a) 1 b) 8 c) 4

10- If the random variable X has a mean $E(X) = 6$, then the random variable $Y = 3X + 2$ has mean

a) 54 b) 18 c) 20

مع أطيب التمنيات بالنجاح د. فاتن شيحه – د. نورا فخرى

المستوى الثالث - كيمياء - طرق الفصل الكروماتوجرافى والتحليل الكهربى كـ ٣١٢

Mansoura University Faculty of Science Chemistry Department Subject: Chromatography & electro analytical chem..	كلية العلوم جامعة المنصورة	Second Term 3rd level Chemistry Students Chem 312 Date : 11 June ,2014 Time Allowed: 2 hours Full Mark : 60 Marks

Answer The Following Questions

Section (A) **[Score :30]**

Discuss the following :-

a) A 100ml sample of a pollutant (1PPM) with M.W. = 100, was extracted with 100ml solvent . The remained concentration $= 10^{-6}$M. Calculate D and the total amount extracted after 4 times. What types of detectors that should be used if the pollutant is pesticide or radioisotope.

b) i) State five distinct stationary phases with their chemical constitution

ii) How we avoid disadvantages in gel chromatography.

iii) Tr or Vr is a constant value at …… and used for ……. of analytes.

iv) Show the conditions where D and K becomes similar (give example).

v) Depict soxhlet apparatus and how it function .

vi) The conditions necessary to determine metal ions in gas chroatography . (Give examples)

vii) Effect of PH.

c) Discuss and compare between two of the most sophisticated techniques in chromatography .

Section (B)

1,a) Define the following: (5marks)

i) Mercury cathode ii) Mediator iii) Cyclic voltammetry
iv)Voltammograms , v) Selectivity of membrane

1.b) Compare between: (10marks)

i) Potentiometeric, coulometric and voltammetric techniques?
ii) Differential pulse, normal pulse and DC polarography
iii) Coulometric titration and conventional titration both in instrumental and application
iv) Different types of membrane electrodes both in construction and application
v) Different electro-generated intermediates used for complexometric, precipitation and acid –base coulometric titration (by equations)

2.a) – DiscussThe effect of: (8marks)

i) pH on the coulometric titration of $As^{3+}$with electro-generated I_3^-
ii) Complex formation on the polarographic waves indicating its application
iii) Dissolved oxygen on the polarographic measurement

2b) Calculate the liquid junction potential across a membrane in which elecrolyte1 is 1.0 M KCl and electrolyte 2 is 0.1M KCl(t_{K^+}=0.49, t_{Cl^-} =0.51) (3marks)

2c) A 0.652g of a mineral sample containing stibnite (Sb_2O_3) is dissolved in acid and diluted to 200ml. A 10 ml aliquot is added to140ml of an electrolyte containing 2MHCl and 0.3MKBr. The electro-generated bromine oxidizes Sb(III) to Sb(V) and the coulometric titration requires 5.28min. at 0.0582A to reach the end point signal. Calculate the percentage of stibnite (Sb_2O_3) in the mineral sample. At. Wts: Sb =121.75, O =16 (4marks)

With Best Wishes

Prof Dr Ahmed El – Wakil, Prof. Dr. Magdi Khalifa

المستوى الثالث - كيمياء - كيمياء ضوئية - الغرويات (الفصل الثاني)

Mansoura University Faculty of Science Chemistry Department Subject: Biochemistry Course(s) : Photochem. & Colloids.	كلية العلوم جامعة المنصورة	Second Term 3rd Level Chemistry Students Date : 14,6 ,2014 Time Allowed: 2 hours Full Mark : 80 Marks

Answer The Following Questions

Section (A) Colloids

1. i) Illustrate the role of emulsifying agent in stabilizing the emulsion. **[5 Marks]**

   ii) AgCl sols are stabilized by small excess of $Ag\ NO_3$, illustrate the charge on particles and on the two sides of the double layer the inner portion and the outer portion **[5 Marks]**

   iii) A true semipermeable membrane acts like a solvent and not like a sieve, illustrate this . **[5 Marks]**

   iv) Complete **[5 Marks]**

   a) A very fine droplets of liquid suspended in air is called .....

   b) The ion opposite in sign to the charge on the colloidal particle is the ..... , and the ion having the same sign of charge as the particle is called....., the potential in the attached portion of the doube layer is called .....

2. **Write on the following :**

   a) Optical properties of colloidal solutions **[5 Marks]**

   b) Electrodialysis **[5 Marks]**

   c) One dispersion method for preparation of sols **[5 Marks]**

   d) Excess surface energy **[5 Marks]**

Section (B) Photochemistry

1. a) State the different photochemical laws,Quantum efficiencyl.

   b) Calculate the quantum efficiency for the reaction A → B if absorption of 6.62×10^7 ergs at 3600 A forms 1×10^{-5} moles of the product B **[20 Marks]**

2. Write short notes on : i) Chemiluminescence and photoluminescence **[10 Marks]**
   ii) Photosensitisation

3. Discuss the theory of fluorescence and phosphorescence. **[10 Marks]**

Good Luck

Examiners : Prof. Dr. H.M. Abou El-Nader
Prof. Dr. H. A. Mostafa