المستوى الثالث - مجموعة البيولوجي
+ الفيزياء الحيوي - ١:٣ الاحصاء الحيوي

Mansoura University Faculty of Science Maths department Subject: Biostatistics (R301)		Exam: Jan 2014 Third Year Programs * Date : 23 – 1 - 2014 Time allowed :2 hours

*كيمياء و حيوان – فيزياء حيوية – ميكروبيولوجى – كيمياء و نبات – علوم بيئة.

Answer the following questions

1- a - The following table shows the age distribution of patients (21 Marks)

Age	22-24	25-27	28-30	31-33	34-36
No. of pat	3	8	12	5	2

Calculate: i- median ii- standard deviation iii- mode

b- If X has binomial distribution with mean 4/3 and standard deviation $2\sqrt{2}/3$ Find $P(X \geq 2)$. (5 Marks)

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[2]- a- A random sample with $\sum_{i=1}^{40} X_i = 280$ and $\sum_{i=1}^{40} X_i^2 = 2100$. Construct 98% confidence interval for the population mean. (10 Marks)

b- If X is a random variable has the density function (10 Marks)

$$f(x) = \begin{cases} 3x^a & 0 < x < 1 \\ 0 & otherwise \end{cases}$$

Find 1- Constant a. 2- Distribution function. 3- Variance.
4- $P(0 < X < 0.5)$, $P(0.6 < X < 4)$, $P(X = 0.3)$, $P(X > 0.1)$.

c- A sample of size 64 is drawn from a population with mean 3.2 and standard deviation 1.6 Find the probability that the sample mean will be
1- more than 3.5 2- less than 2.7 (10 Marks)

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[3] a- If $\overline{X} = 16$, $\sum_{i=1}^{n} X_i^2 = 6640$ and $S^2 = 10$, Find n. (4 Marks)

b- If X has Poisson distribution with $P(X = 0) = P(X = 1)$. Find
1- $P(X \geq 4)$. 2- $P(X < 1)$. 3- mean and variance. (10 Marks)

c- A random sample of size 16 has mean 32.8 and standard deviation 4.51, Construct 95% confidence interval for the population mean. (10 Marks)

$Z_{0.01} = 2.33$, $Z_{0.025} = 1.96$, $t_{16, 0.025} = 2.145$, $t_{15, 0.025} = 2.131$, $\phi(1) = 0.8413$, $\phi(1.5) = 0.933$, $\phi(2.5) = 0.9937$.

Best wishes *Dr. Noura Fakhry.* *Dr. Mohamed Abd El-Rahman.*

المستوى الثالث . كيمياء - كيمياء ، الفلزات الانتقالية ك ٣٢١

Mansoura University
Faculty of Science
Chemistry Department
Subject: Inorganic Chemistry
Course(s): Chemistry (321)

First Term
3rd Year Students (Chem.)
Date: 23/12/2013
Time Allowed: 2 hours
Full Mark: 60 Marks

Answer the following questions

Section A:-

Answer the following questions:-

1- (A)- Put (√) or (x) and correct the statements (15 Marks):-

i- $Fe(CO_3)_3$ is brown in color and paramagnetic in nature.
ii- The formula of ilmenit is $FeTiO_4$.
iii- La reacts with H_2O at 600 °C forming $La(OH)_3$.
iv- The most common and stable oxidation of Ni is 4.
v- CrO_4^{2-} ion has an octahedral structure.
vi- Cr(III) are more stable than Co(III) compounds.
vii- Potassium nitroprosside is used for detection of nitrogen.
viii- Co reacts with water forming CoF_2 is.
ix- The formula of the brown ring test is $[Fe(H_2O)_4NO_2]^+$.
x- V is obtained by reducing VCl_5 with Na using Kroll's method.
xi- Fe^{3+} salts are more stable than Fe^{2+} salts.
xii- The formula of manganosite is Mn_2O_3.
xiii- $KCrO_4$ is more stable than KWO_4.
xiv- Sc has a great tendency to form complexes than Cr.
xv- Mn(VII) compounds are very stable than Mn(II).

1- (B) Complete and balance the following equations (15 Marks):-

i- $CrCl_2 + H_2O \rightarrow$
ii- $Mn + N_2$ (heat) $\rightarrow$
iii- $AgCl + HCl \rightarrow$
iv- $La_2O_3 + H_2O \rightarrow$
v- $TiO_2 + NaOH \rightarrow$
vi- $VO_2 + NaOH \rightarrow$
vii- $Cr + H_2O$ (heat) $\rightarrow$
viii- Pt + Aqua regia $\rightarrow$
Ix $FeCl_3$ + 1,10-Phentharoline $\rightarrow$
x- $WCl_3 + H_2O \rightarrow$
xi- $Mo + O_2$ (heat) $\rightarrow$
xii- $Os + O_2 \rightarrow$
xiii- $KMnO_4 + K_2SO_3 \rightarrow$
xiv- $[Mn(H_2O)_6]^{2+} + K_2S_2O_8 \rightarrow$

xv- MnO_2 + KNO_2+ NaOH (fusion) →

2- Comments on the following (10 Marks):-

i- Copper is an inert element.
ii- Cyanide compounds are poisinous.
iii- $FeCl_3$ is dimeric in gaseous state.
iv- V_2O_5 is red in color and and used as a catalyst.
v- $TiCl_4$ is unstable compound in air.

3- Write short notes on the following:-

i-	Catalytic properties of transition metals	(1.5 Marks).
ii-	Extraction of Tc	(2 Marks).
iii-	Differentiation between Ni^{2+} complexes	(1.5 Marks).
Iv-	Importance of Mn(IV) salts	(2 Marks).
vi-	Methods of detection of chloride ions in solution	(1.5 Marks).
vii-	Preparation of manganesr basic acetate	(1 Marks).
viii-	Preparations of anhyrous ferrous haildes	(1.5 Marks).
ix-	Lanthanide contraction	(2 Marks).
x-	Non-stoichiometric compounds	(1 Marks).
xi-	Importance Fe^{3+} in Analytical chemistry	(2 Marks).

4- Arrange the following:- (4 marks)

i-	Ti, Cr, Mn	(according reactivity)
ii-	CrF_3 , CrF_5 CrF_6	(according to ionic character)
iii-	Ti^{2+} , Cr^{2+} , Fe^{2+}	(according to stability)
iv-	V, Cr, Ni	(according to formation of complexes)
v-		

Good Luck and Best Wishes

P rof. Mohsen Mostafa

Mansoura University Faculty of Science Chemistry Department Subject: Gravimetric analysis Course(s): Chem. 311	كلية العلوم جامعة المنصورة	first Term, final exam 3rd level Chemistry Students . Time Allowed: 2 hours Full Mark: 80 Marks Date :26 /12/2013

Answer The Following Questions

First Question (20 marks)

1a) **Define the following :**

i) Internal complexes ii) Peptization iii) TG and DTA

iv)Inclusion and occulusion v) Volatilization methods of analysis

vi) Macro and trace analysis vii) Homogenous precipitation viii) Salt effect

1b) If Ksp for PbSO4 = 1.6×10^{-8}, is it possible to precipitate $PbSO_4$ by mixing equal volumes of $=1 \times 10^{-4}$ mole /l $PbNO_3$ and Na_2SO_4 have the same concentration

Second Question (20 marks)

2a) **Discuss with examples the effect of:**

a) Complex formation on the dissolution of sparingly soluble salt
b) Function groups on the selectivity of organic reagents
c) pH on the precipitation of sparingly soluble salts of weak acids

2b) The iron in an organometallic compound was determined by heating a 0.4873-g sample to volatilize the organic material. After ignition, the residue of Fe_2O_3 weighed 0.2091 g.

(a) What is the %w/w Fe in this compound?

(b) The carbon and hydrogen in a second sample of the compound were determined by a combustion analysis. When a 0.5123-g sample was carried through the analysis, 1.2119 g of CO_2 and 0.2482 g of H_2O were collected. What are the %w/w C and %w/w H in this compound and what is the compound's empirical formula

Third Question (20 marks)

3a) How does the relative super-saturation affect the particle size of a precipitate? Indicate the optimum conditions for getting a crystalline precipitate

3b) The thermogram for a 22.16 mg sample of $MgC_2O_4 \cdot H_2O$ shows two steps: a loss of 3.06 mg from 100–250°C and a loss of 12.24 mg from 350–550 °C. For each step, identify the volatilization product and the solid residue that remains.

3c) On mixing of 0.01M solutions of Pb^{2+} and Hg_2^{2+} with iodide ion, PbI_2 and Hg_2I_2 are precipitated:

$PbI_2(s) \rightleftharpoons Pb^{2+} + 2I^-$ $\quad Ksp = 7.9 \times 10^{-9}$

$Hg_2I_2(s) \rightleftharpoons Hg_2^{2+} + 2I^-$ $\quad Ksp = 1.1 \times 10^{-28}$

Show by calculations if Hg_2^{2+} and Pb^{2+} could be completely separated?

→See behind

Fourth Question (20 marks)

4a) **Give an account on:**

i) Use of volatilization methods for analysis of, ammonium, silicon and boron compounds

ii) Experimental factors which must be considered in elaborating thermal analysis measurement

iii) Different types of co-precipitation and how can you avoid it.

iv) Properties of colloidal precipitate and how could you overcome filtration problems

4b) A 0.611-g sample of an alloy containing Al and Mg is dissolved. Aluminum and magnesium are precipitated using 8-hydroxyquinoline, providing a mixed precipitate of $Al(C_9H_6NO)_3$ (M.Wt=459.45) and $Mg(C_9H_6NO)_2$ (M.Wt=312.61) that weighs 7.815 g. Igniting the precipitate converts it to a mixture of Al_2O_3 (M.Wt=101.96) and MgO (M.Wt=40.3) that weighs 1.002 g. Calculate the %w/w Al and %w/w Mg in the alloy.

(atomic Weights Al =27, C=12, O =16, H=1, Mg =24, Fe=55.8)

With My Best Wishes

Prof. Dr. Magdi E. Khalifa

المستوى الثالث - كيمياء - كيمياء حركية لـ ٣٤٢

Mansoura University Faculty of Science Chemistry Department Subject: Chemistry Course(s): Chem. 342 Chemical Kinetics .	كلية العلوم جامعة المنصورة	First Term Third level Chemistry Time Allowed: 2 hours Full Mark: 80 Marks Date: Jan.2014

Answer The Following Questions

1-a) Derive the integrated equation for a second order reaction. (10 degrees)

b)Two equimolar solutions of A and B were mixed to give A + B ----->P if 75% of reactant A were reacted after one hour , calculate how much of it will not react after two hours :

i) for first-order of A and zero-order of B (10 degrees)

ii) for first-order of both A and B . (10 degrees)

2-a) Discuss the effect of temperature on the reaction rate . (10 degrees)

b) The time of half change of a gaseous substance undergoing thermal decomposition was 105 and 950 s at initial pressures 750 and 250 mm respectively . What is the order of the reaction . (10 degrees)

3- Write on **THREE** only of the following : (10degrees for each)

a) The kinetic equation of consecutive reaction .

b) Effect of ionic strength on reaction rate.

c) The collision theory of unimolecular reaction.

d) The postulates of the transition state and of the collision theories of reaction rates.

WITH BEST WISHES

PROF. DR H.M. ABU EL-NADER

PROF. DR A. E. AHMED

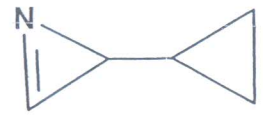
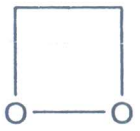
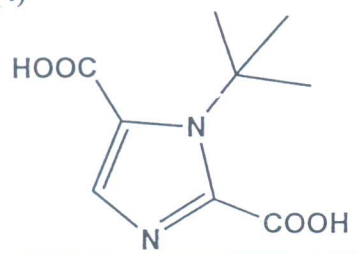
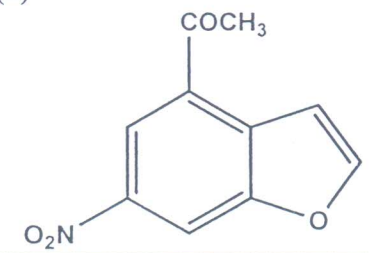
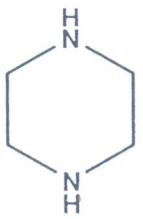
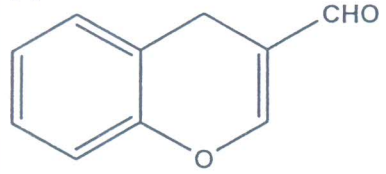
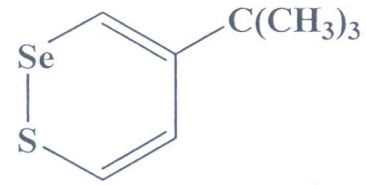
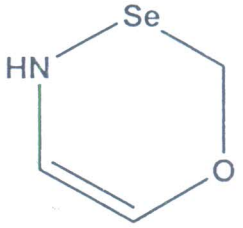
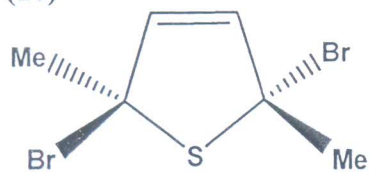
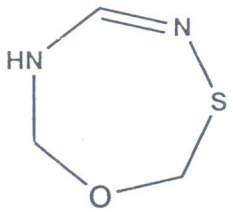
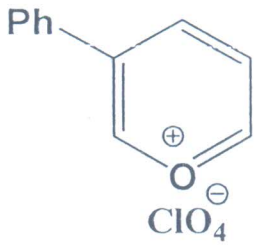
المستوى الثالث - كيمياء - غير متخصصة الكلية ٢٠١٣

Mansoura University Faculty of Science Chemistry Department Subject: Chemistry Course(s): Chem. Heterocyclic Chemistry		First Term 3rd Major Chemistry Full Mark: **60** Marks Date: 02 January. 2014 Time Allowed: 2 hour

Answer All Questions

Question 1: [20 Marks]

A) Give the suitable name (s) of the following compounds: [12 Marks]

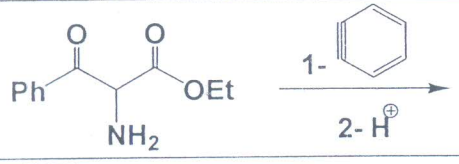
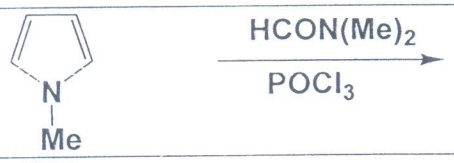
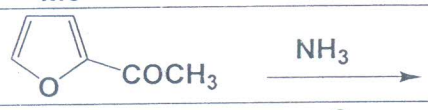
(1) 	(2) 	(3) 
(4) 	(5) 	(6) 
(7) 	8) 	(9) 
(10) 	(11) 	(12) 

B) Pyridine is less reactive towards electrophilic reagents than pyrrole, Discuss the reasons and How can you prepare 4-Nitropyridine from pyridine? [5 Marks]

C) The nitration of furan with acetyl nitrate proceeds via 2,5-addition intermediate with the reagent. Formulate the complete reaction. [3 Marks]

Question 2: [20 Marls]

Complete the following equations with the suitable product(s)?

1-	
2-	
3-	
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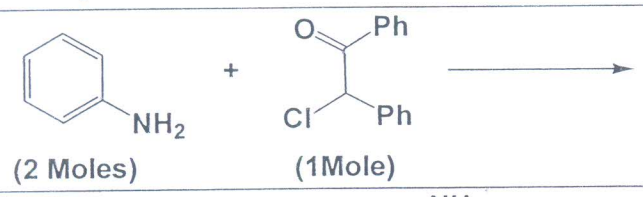
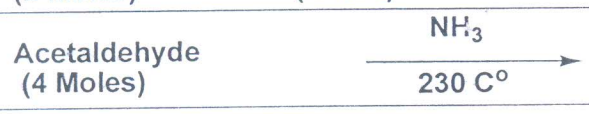
5-	
6-	

Question 3: [20 Marls]

a) State one method for synthesis of: [10 Marks]

i) Pyrazole. ii) Indigo. iii) Saccharin. *iv) Imidazole.*

b) Diels Alder cycloaddition reaction is consider one of the good transformation methods of the five membered ring containing one hetero atoms into homocyclic compounds. Discuss by equations this statement? [10 Marks]

With My Best Wishes

Prof. Dr. El-Sayed I. El-Desoky

Mansoura University
Faculty of Science
Chemistry Department
Final Examination for Third Year [Chemistry] Students
Organic Synthesis & Organometallic Chemistry [**C- 332**]

Jan. 2014 Time: 2 hrs.

ANSWER ALL QUESTIONS **[80 Marks]**

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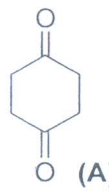
1) Discuss the synthetic applications of the following reactions: [30 Marks]

a) The use of diethyl oxalate in Claisen condensation.

b) Erlenmeyer's azalactone synthesis of α-aminoacids.

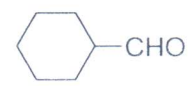
c) The use of formaldehyde as carbonyl component in aldol condensation.

2) – (i) Suggest a synthesis and give the name for the following compounds:
[10 Marks]

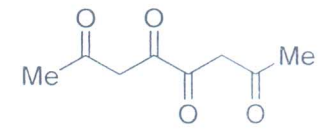


(A)

(B)



(C)



(D)

ii) Show by equations how can you prepare the following compounds:
[10 Marks]

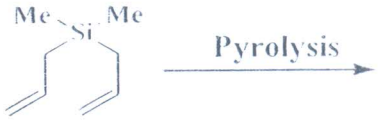
a) Cinnamoyl alcohol from cinnamaldehyde	b) Benzophenone from benzaldehyde
c) 1-Ethyl-1-cyclohexanol from cyclohexanone	d) Isobutanoic acid from isopropyl lithium

PLEASE TURN TO PAGE 2

3-i) Ferrocene can not be directly halogenated or nitrated because its case of oxidation. Discuss the chemical structure of ferrocene and its chemical reactions.

ii) Predict the products in each of the following reactions :-

a- 

b- 

iii)- Outline and show by equations that many aliphatic β-functionalized organosilanes exhibits abnormally high reactivity

: [30 Marks]

٣ كيمياء - كيمياء البترول والبتروكيماويات ٣٢٥

Mansoura University **Faculty of Science** **Chemistry Department** **Subject: Organic Chemistry** **Course (s) : .Petroleum Chemistry**		**First term Examination** **3rd Level Chemistry Students** **Date : January 2014** **Time Allowed : Two hours**

Answer three only of the following questions. Illustrate Your Answer With equation

1. a) What is meant by the octane number of a motor fuel ?. Show how it could be affected by the fuel composition.
   b) Give a brief account on the flash point of petroleum fractions.
   c) The specifications of the solvents used for extracting aromatic Hydrocarbons from petroleum and its distillates.

2. Discuss the following topics:
   a) Distillation products of crude petroleum.
   b) Cetane number of diesel fuels.
   c) Aniline point of petroleum fractions.
   d) Classification of crude oil.

3. Give brief notes on the following:
   a) The polymerization reaction used for the production of the highest grade octane number motor fuel.
   b) The main differences between thermal and catalytic cracking.
   c) Nitrogen compounds found in crude petroleum and its distillates.

4. Discuss the following items:
   a) The different reactions involved in the catalytic reforming of straight run-gasoline.
   b) Determination of the ash content in crude petroleum.
   c) Diesel index of diesel fuels.

GOOD LUCK

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Prof. Dr. O.Habib

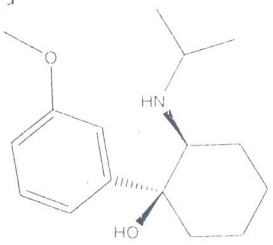
Mansoura University
Faculty of Science
Chemistry Department
Subject: Organic Chemistry
(Chem339)

First Term
3th Year: Chemisry
Date: Jan. 2014
Time allowed: 2 h
Total Marks: 60 marks

Answer the following questions:

1- (i) Mixture of (+) and (-) tryptophane has an observed rotation +15. If the specific rotation is +59. calculate the %purity of both enantiomers. [10 marks]

(ii) Ultramal (A), which is commonly known as Tramadol is a commonly used drug affecting the CNS. Assign all the chiral carbons by * and draw the enantiomer. [10 marks]



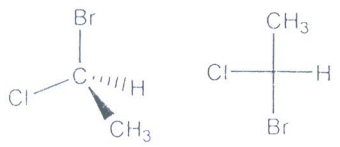
(A)

2- i) In wedge doted and Newman projection draw the most stable conformation of *(2R, 3S)*-pentan-2,3-diol then draw all other stereoisomers in Fischer projection [10 marks].

ii) Draw the structure of 2-phenylbutane and use Newmann projection to present the most stable conformation [10 marks].

3- (i) Draw the structure of trans and cis-1-methyl-2-t.butylcyclohexane and illustrate which of them are much more stable [10 marks].

(ii) In each of the following pairs, indicate whether they are enantiomers, diastereoisomers or identical [10 marks].

a)


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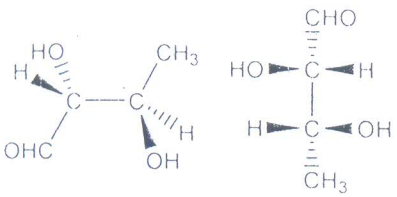

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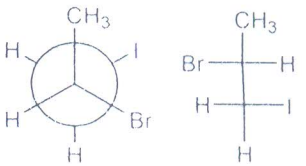

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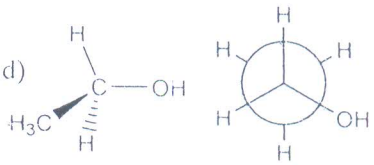

With our best Wishes

Examiner: **Dr. M.Monier**

Mansoura University Faculty of Science Chemistry Department Code: Chem.341 Subject : Electrochemistry	كلية العلوم جامعة المنصورة	First Term Third Level Program : Biochemistry& Chemistry Date : January 2014 Time Allowed : 2 hours Full Mark : 60 Marks

Answer All Questions الأسئلة على الوجهين

First Question : **(20 Mark)**

[A] Give reason: **(10 Mark)**

(i) Glass electrode is the most convenient one for measuring solution pH.

(ii) Saturated KCl is the one preferred in salt bridge.

(iii) Chemical cell with transference are not suitable for exact thermodynamic calculations.

(iv) When oxygen is reduced,the electrode potential is subject to wide variations.

(v) E^{o} for concentration cell is zero.

[B] Write on : Decomposition potential . **(10 Mark)**

Second Question : **(20 Mark)**

[A] **Complete :** **(10 Mark)**

(i) Maxwell distribution law is given by the expression.....

(ii) When the electrode is polarized , the overpotential η plays two roles:.....and.....

(iii) The overpotential necessary for electrolysis of water is.....

(iv) The transport number of the anion or the cation is.....

(v) In Cd-Weston cell .....is the anode and .....is the cathode

(vi) As an example of amalgam electrode concentration cell .....

(vii) Concentration overpotential is due to .....

[B] Deduce the relation between the electrode potential and ionic concentration. **(6 Mark)**

[C] Given the cell : Zn / $ZnCl_2$ / AgCl / Ag

(i) Complete : The type of the cell is.....because.....

(ii) Write the electrodc and cell reaction. **(4 Mark)**

Third Question : (20 mark)

[A] Write on : (10 Mark)

(i) Liquid junction potential

(ii) Work function φ

(iii) Determination of ΔH from emf measurement.

(iv) Gas electrode.

(v) Exchange current i_o.

[B] The following values of emf of the cell : (10 Mark)

$$Ag / AgBr_{(s)} / KBr\ (a=1) / Hg_2Br_2 / Hg$$

at various temperatures is given as follows :

t^oC	20	25	30
E, V	0.06630	0.06839	0.07048

Write the electrode reactions , cell reaction and calculate at 25^o C:

(i) Equilibrium constant K (ii) ΔG (iii) ΔH (iv) ΔS