المستوى الرابع - كيمياء - كيمياء تحليلية بيئية لـ ٢١٣

Mansoura University
Faculty of Science
Chemistry Department
Subject: Analytical Chemistry
Course Environmental Chemistry
Course code: CHEM 413.....

4thlevel(Chemistry,Botany and Biology students)
Date:**25-5-2013**
Time allowed: **2** hours
Full Mark:80 Marks

Answer the Following Questions:

1- Explain, with examples, the effect of toxic chemicals on enzymes. . (10marks)

2- Discuss the mechanism of action of insecticide (10 marks)

3- What is pollutant cycle? Illustrate such a cycle in the environment (10 marks)

4. Write short notes on **three** only of the following : (15 marks)

(a) Sanitary landfill method for waste disposal

(b) Incineration method of waste disposal

(c) Municipal waste composting

(d) The toxic effects of CO in the body. Is this effect reversible or irreversible? Does it act on enzyme system?

5- Define the following :

a) Heavy metals b) Chemical speciation c) BOD and DO

(15marks)

Best wishes,

Dr.I. Kenawy , Dr. M. Eldefrawy and Dr Weam Abo-Elmaty

Q3) Answer of Third question

A)

B)

C)

D)

Question (1) **(15 marks)**

Complete the following: **(each one mark)**

1- What are the names of the 3 normal modes of vibration of CO_2?

2- _____(1)_____, _____(2)_____, _____(3)_____

3- Which mode(s) is/are IR active? _____(4)_(5)_____

4- Which mode(s) is/are Raman active? _____(6)_____

5- How many normal modes of vibration does each of the following have?

a. H_2O_____(7)_____ ii) CH_4_____(8)_____

iii) benzene_____(9)_____

6- The unit of frequency values is_____(10)_____.

7- A spectrum containing radiation of specific wavelengths is called a _____(11)_____.

8- In the de Broglie formula describing the movement of an electron about the nucleus, the quantity "mv" is called its ___(12)_____.

9- If a hydrogen atom electron jumps from the n=6 orbit to the n=2 orbit, energy is _____(13)_____

10- The energy of a photon is ___(14)_____ proportional to its wavelength while is _____(15)___ proportional to its frequency.

Question (2) Choose the Correct answer (2marks for each one)

1	**Balmer series is of the historical, importance as it:** a- Lies in the far-infra red region b- Lies in the visible region c- Lies in the far-ultraviolet region d- Lies in the infrared region
2	**Which of the following transitions is the highest energy transition?** a- n to σ^* b- n to π^* c- σ to σ^* d- π to π^*
3	**The frequency of a transition is 5.4×10^{15} Hz. What is the corresponding wavelength?** a- 5.6×10^{-6} m b- 180 000 cm^{-1} c- 560 nm d- 5.6×10^{-8} m
4	Selection Rule for electronic spectra : a- $\Delta S = \pm 1$ b- $\Delta S = \pm 1/2$ c- $\Delta S = 0$ d- none of these
5	**Which statement is correct about the vibrational ground state of an H_2 molecule?** a- The molecule is vibrating. b- The molecule is static in its ground state c- In its vibrational ground state, the molecule has no vibrational energy. d- The molecule is in its lowest vibrational level but is not vibrating
6	**Which statement is incorrect about H_2O?** a- H_2O has three IR active modes of vibration. b- H_2O has four degrees of vibrational freedom. c- H_2O is non-linear. d- H_2O undergoes symmetric and asymmetric stretching modes of vibration.

7	**Match the molecular formula to the number of degrees of vibrational freedom. Which pair is correct?** a- CS_2; 3. b- H_2S; 4. c- CO_2; 3 d- SO_2; 3.
8	**Which is the correct sequence of wavenumbers associated with the stretching of the following bonds?** a- C–I > C–Cl> C=O > C≡N b- C–I > C–Cl< C=O < C≡N c- C–I < C–Cl< C=O < C≡N d- C–I > C–Cl> C=O < C≡N
9	**What is the moment of inertia, IB, of $^{1}H^{79}Br$ if the bond distance is 142 pm? Atomic masses are: ^{1}H = 1.008, ^{79}Br = 78.92.** a- 1.22×10^{-7} kg m^2 b- 3.00×10^{46} kg m^2 c- 2.34×10^{-37} kg m^2 d- 3.33×10^{-47} kg m^2
10	**For which of the following molecules could a pure rotational spectrum not be observed in the gas phase?** a- N_2 b- CO c- NO d- HCl
11	The rotational constant of a phosphorus pentafluoride, PF_5, molecule is 3.566 Hz. Calculate the lengths of the equatorial P-F bonds. a- 2.731 Å b- 1.577 Å c- 1.109 Å d- 1.325 Å
12	In IR spectroscopy, the C-O bond has a _____ frequency than the C-N bond because_____. a- lower, an O atom has more mass than an N atom b- higher, an O atom has an even number of neutrons c- higher, an O atom has more electronegativity than an N atom d- higher, an O atom has more mass than an N atom
13	A nonlinear molecule with n atoms generally has _____ fundamental vibrational modes. a- 2n b- 3n - 6 c- 3n - 3 d- 3n
14	In Hydrogen spectrum, which one of the following series lies in the ultraviolet region? a) Ballmer series b) Pfund series c) Lyman series d) Bracket series

15	moments of inertia of Prolate symmetric top is a- $I_C = I_B > I_A$ b- $I_C > I_B = I_A$ c- $I_C > I_B > I_A$ d- $I_C = I_B = I_A$
16	Sunlight spectrum is. a- Discrete b- Line spectrum c- Continuous spectrum d- none of these
17	Electromagnetic radiation travels through vacuum at a speed of _____ m/s. a- 186,000 b- 125 c- 3×10^8 d- It depends on wavelength
18	An electron in a Bohr hydrogen atom has an energy of -1.362×10^{-19} J The value of n for this electron is _____. a- 1 b- 2 c- 3 d- 4
19	The photoelectric effect is _____. a- the total reflection of light by metals giving them their typical luster b- the production of current by silicon solar cells when exposed to sunlight c- the ejection of electrons by a metal when struck with light of sufficient energy d- the darkening of photographic film when exposed to an electric field e- a relativistic effect
20	In the Bohr model of the atom, _____. a- electrons travel in circular paths called orbitals b- electrons can have any energy c- electron energies are quantized d- electron paths are controlled by probability e- both A and C

Question (3) (25 marks)

A) The first band in the photoelectron spectrum of hydrogen, H_2, occurs close to 15.4 eV and consists of a progression of peaks separated by 285 meV corresponding to transitions to excited vibrational states of the H_2^+ ion. Calculate the wavenumber of the vibration of the lowest electronic state of the H_2^+ ion. **(5 marks)**

B) The first ionization energy of nitric oxide, NO, is 9.27 eV. Calculate the velocity of the photoelectrons ejected when a sample of nitric oxide gas using radiation of energy 21.22 eV from a helium lamp source. **(5 marks)**

C) Calculate the vibrational frequency and energy in Joules per mole of a normal mode in its ground state of n=0 for CO, the force constant k = $1.86X10^3 kgs^{-2}$. **(5 marks)**

D) Write short notes about Raman spectroscopy**(10 marks)**

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1 e.v = $1.602 * 10^{-19}$ 1 amu = $1.66x10^{-27}$ kg h = $6.63x10^{-34}$ J•s
ħ = $1.05x10^{-34}$ J•s C = $3.00x10^{10}$ cm/s mass of electron = 9.10×10^{-31}
Atomic weight H= 1, N= 14, O= 16, C= 12

المستوى الرابع - كيمياء . ك ٤٢٦ البلمرات

Mansoura Univ.
Fac. Of Sci.
Chem. Depart.
Subject:Chemistry
Course: Org. Chem. 436

Second Term
4th year Chemistry
Level 4, Date, 18/6/2013
Time:2 hrs, Full mark: 80 marks

Polymer chemistry exam:

1-(a) Write short notes on three only of the following topics (3x8 marks):

(i) Viscosity measurements and its relations.

(ii) Polymerization of lactams.

(iii) Crosslinking of polymers.

(iv) Introduction of new functional groups.

(b) Explain the mechanisms of Ziegler Nattā catalysts for preparation of stereo regular vinyl polymers (12.5 marks).

2-(a) Describe the mechanism of polymerization when using the following initiators Na, HCl and HOOH/Fe^{+2} in preparation of different vinyl polymers (12 marks).

(b) Give a brief account on the kinetics of the free radical vinyl polymerization (9 marks).

3-(a) Complete the following sentences (5x1.5 marks):

(i) Copolymerization equation is.....

(ii) $\{CH_2\text{-}CH\}$ (O $COCH_3$) $\xrightarrow{CH_3OH}$ .....

(iii) $\{CH_2\ CH\}$ ($CO\text{-}CH_3$) $\xrightarrow{h\nu}$ .....

(iv) Polybutadiene rubber has Tg ..... room temperature.

(v) $2(CH_3)_2\dot{C} - CN \longrightarrow$ .....

(b) Put √ or X on the correct answer of the following sentences (5x1mark):

(i) P-chlorostyrene gives cationic polymerization ( ).

(ii) Acrylaldehyde gives cationic polymerization ( ).

(iii) Acrylamide gives Ziegler Natta polymerization ( ).

(iv) When Mw = Mn the polymer is distributed ( ).

(v) Polyvinylchloride has Tg under zero temperature ( ).

(c) Write only in two of the following subjects,(10 marks):

(i) Chain transfer in free radical vinyl polymerization (6 marks).

(ii) Mechanism of inhibitors (4 marks).

(iii) Stepwise polymerization (4 marks).

With my best wishes

Prof/ Elsayed Abdel Hamied Abdel Razik

المستوى الرابع - كيمياء - كيمياء المبيدات ٤٣٧

Mansoura University
Faculty of Science

Chemistry Department

Subject:Chemistry

Course(s):Chem.437"Pesticides"

First Term

4th level students

Date: May, 2013

Time Allowed:2hours

Full Mark: 80

Answer the following questions:

1. a) Compare between systemic and non systemic pesticides. (8marks)

   b) What are the conditions required for a given candidate chemical to be an effective protectant fungicide ? (8marks)

   c) Write short notes on: i- LD_{50} ii- Bordeaux mixture (10marks)

2. a) Give a brief account for each of the following:

   i- DDT ii- DNOC iii- 2,4-D (14marks)

   b) Give reasons:

i- Many varieties of maize and sugar cane are resistant to the herbicidal action of triazines. (4marks)

ii- Nicotine kills vertebrates. Show the mode of action for the observed toxic symptoms. (6marks)

   c) Draw the chemical structure for each of the following pesticides and mention its main function (insecticide, fungicide or herbicide).

   i-Profenofos ii- Thiram iii-Simazine iv- Schradan. (12marks)

3.Show by equations how the following pesticides could be prepared.

   a) Chlorobenzilate b) Karathane (dinocope)

   c) Asulam (Asulox) d)Paraoxon. (18marks)

GOOD LUCK

Dr.D,S.Badawy

ANSWER SHEET

I)Choose the most correct answer:-

No.	a	b	c	d	e
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					

II)True and Faulse; circulate the suitable response:-

No.	T	F
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		

III)Matching from column (A) to column (B):-

No.	1B	2B	3B	4B	5B	6B	7B	8B	9B	10B
1A										
2A										
3A										
4A										
5A										
6A										
7A										
8A										
9A										
10A										

Mansoura University Faculty of Science Chemistry Department Subject: Chem 422 Symmetry and Group Theory)		Second Semester Level 4; Chemistry Date: 20th May 2013 Time: 2 hours Marks: 80

Answer the following questions

I)Choose the most correct answer:- (20 marks)

1) ..... point goup of Staggered $(CH_3)_2$

a) C_{3h} b) D_{5d} c) D_{3d} d) D_{3h} e) C_{5d}

2) ..... is belonged to D_{3h} family

a) $B(OH)_3$ b) NH_3 c) BCl_3 d)BH_3 e) c & d

3) Formaldehyde has .....

a) C_2 b) σv c) C_s d) C_2, σv, C_s e) C_2, σ_v, C_{2v}

4) In the molecule, CO_2, $\nu_s(CO)$ stretch is .....

a) Active IR and Raman b) Active IR only c) Active Raman only

d) In-active IR and Raman e) Non of the above is correct

5) Acetone has ..... point group

a) C_{3v} b) C_{2h} c) D_{2d} d) C_{2v} e) D_{2h}

6) Number of contributed atoms in acetone in σv mirror-plane is

a) 1 b) 2 c) 3 d) 4 e) 0

7) The molecule ClF_3; has ..... characters

a) C_3, E, σv b) E, $3\sigma v$, i c) E, $2\sigma v$, C_2 d) E, i, $2\sigma v$

e) C_2, $3\sigma v$

8) In the molecule CH_3Cl, the number of unshifted atoms through σv is

a) 0 b) 1 c) 2 d) 3 e) 5

9) *cis*-$[PdCl_2(CO)_2]$ shows ..... while its *trans* analogue shows ..... stretches

a) 7, 7 b) 3, 1 c) 2, 2 d) 2, 1 e) 1,

10) SO_4^{2-} and FeO_4^- anions have ..... and ..... point groups

a) C_{4v}, T_d b) T_d, T_d c) T_d, D_{4h} d) T_d, D_4 e) T, D_{4d}

.....

II)True and Faulse; circulate the suitable response:- (20 marks)

1- T - F $POCl_3$ has (g = 4) characters

2- T - F $POCl_3$ has D_{3d} point group

3- T - F SO_2 shows three vibration motions

4- T - F In the molecule $POCl_3$, SIX vibration absorptions are calculated

5- T - F In NBr_3 molecule, the effect of symmetry rotation about z-axis is (E = +1, C_3 = +1, σv = -1).

6- T - F TiI_4 molecule has C_{4V} point group.

7- T - F O_3 shows active ν_s, ν_{as} and δ - IR and Raman bands

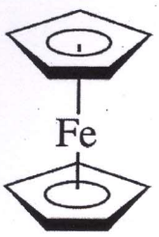
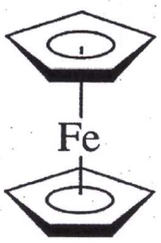
8- T - F TiI_4 has active ν_s(Ti-I) IR and Raman bands

9- T - F $[CuCl_5]^{3-}$ have point groups of D_{5h}

10- T - F CO has active ν_s IR and Raman stretching vibration bands

.....

III)Matching from column (A) to column (B):- (20 marks)

Syr. A		Syr. B	
1A	Carbon disulfide has	1B	D_{5d}
2A	Sulfur trioxide has	2B	D_{5h}
3A		3B	$D_{\infty h}$
4A	Benzene ring	4B	6
5A		5B	C_{3h}
6A	Boric acid	6B	I_h
7A	Total number of vibration motions of POI_3 is	7B	T_d
8A	NH_4^+	8B	+1
9A	New coordinate for σ is	9B	C_3 ⊥ C_2
10A	$[Ce(NO_3)_6]^{2-}$	10B	D_{3h}

.....

IV) Answer the following question:- (20 marks)

In the molecules *formaldehyde* and *Nitrogen trichloride* ; Please find

a) Reducible representations
b) Total number of freedoms
c) Number of translation and rotation motions
d) Number of vibration motions
e) Discuss the active and inactive IR spectral data

Character table for C_{2v} point group

	E	C_2 (z)	σ_v(xz)	σ_v(yz)	linear, rotations	quadratic
A_1	1	1	1	1	z	x^2, y^2, z^2
A_2	1	1	-1	-1	R_z	xy
B_1	1	-1	1	-1	x, R_y	xz
B_2	1	-1	-1	1	y, R_x	yz

Character table for C_{3v} point group

	E	$2C_3$ (z)	$3\sigma_v$	linear, rotations	quadratic
A_1	1	1	1	z	x^2+y^2, z^2
A_2	1	1	-1	R_z	
E	2	-1	0	(x, y) (R_x, R_y)	(x^2-y^2, xy) (xz, yz)

Character table for C_{2h} point group

	E	C_2 (z)	i	σ_h	linear, rotations	quadratic
A_g	1	1	1	1	R_z	x^2, y^2, z^2, xy
B_g	1	-1	1	-1	R_x, R_y	xz, yz
A_u	1	1	-1	-1	z	
B_u	1	-1	-1	1	x, y	

Best Wishes
Prof.Sahar Mostafa

المستوى الرابع كيمياء - الاطياف الالكترونية والمغناطيسية ك 424

Mansoura University **Faculty of Science** **Chemistry Department** **Subject: Chemistry** **Course(s): Inorganic Chemistry 424**	كلية العلوم جامعة المنصورة	**Second Term** **Fourth Year Chem.** **Time Allowed: 2 hours** **Full Mark: 80 Marks** **Date:** May, 2013

Answer The Following Questions

1. a) Put (✓) or (X) on the following **[10 Marks]**

i) μs may augmented or diminished by an orbital contribution

ii) χdiam. Varies inversely with T

iii) χparam. Is an induced property

iv) The sizes and shapes of the orbitals in the closed shells are not temperature dependent

v) $\frac{B}{Ho}$ called the magnetic susceptibility

b) The direct metal – metal interaction gives lower μs values via over lap of suitable metal orbitals. Explain with examples ? **[5 Marks]**

c) Explain the curie law and curie weiss law. Indicate the significance of the weiss constant θ ? **[5 Marks]**

2. i) What corrections do we need for the calculation of χM^{corr} ? **[20 Marks]**

ii) Which of the following complexes will be more intense in color. Why ? trans $[Co(en)_2Fe]^+$ and cis-$[Co(en)_2F_2]^+$

iii) What is cross – over region ? A metal complex is close to the cross – over region will it's magnetic moment be anomalous ?

iv) d^2 ion and a d^8 ion have the same Russel- Saunders symbol but not the same J value. How?

3. a) Discuss the spectra of Mn(II) Oh complex ions . **[6 Marks]**

b) Explain which of the following ions : 3d5 , 3d7 and 3d8 in their HS and LS will have orbital contribution to their spin only moments ? **[10 Marks]**

c) The Racah parameter B is 460Cm^{-1} in $[Co(CN)_6]^{3-}$ and 615 Cm^{-1} in $[Co(NH_3)_6]^{3+}$. Consider the nature of bonding in the two complexes and explain the difference in nephelauxetic effect. **[4 Marks]**

4. a) The UV/Vis absorption spectrum for $[VCL_6]^{4-}$ shows three d-d absorption bonds at 8000, 13000 and 20000 Cm^{-1}. Assign the bands to specific electronic transition using the correlation diagram of d^3 ion . **[10 Marks]**

b) What is the molecular term symbol for the following configurations and complexes ?

i) Oh complexes : $t_2g^3eg^o$, $t_2g^3\ eg^1$

ii) Td complexes : e^2 , $e^2\ t_2^2$, $e^4\ t_2^5$

iii) GS of $[Co(H_2O)_6]^{3+}$ in HS and LS **[6 Marks]**

c) Discuss the advantages and disadvantages of Gouy method and faraday method. **[4 Marks]**

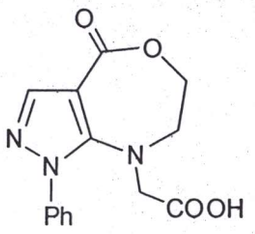
المستوى الرابع - كيمياء - كيمياء تخليقية (ع) لـ ٤٣٥

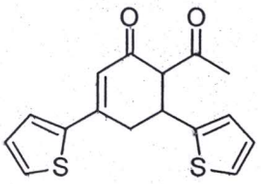
Mansoura University
Faculty of Science
Chemistry Department
Subject: Organic synthesis Chem435

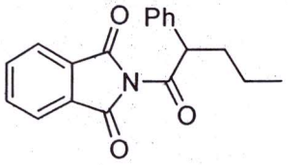
First Term
4th Year: Chemisry Students
Date: May 2013
Time allowed: 2 h
Total Marks: 60 marks

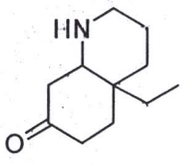
Answer the following questions:

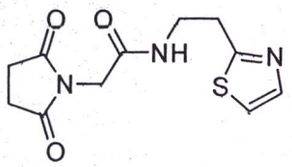
1) Disconnect the following compounds [4 marks for each]







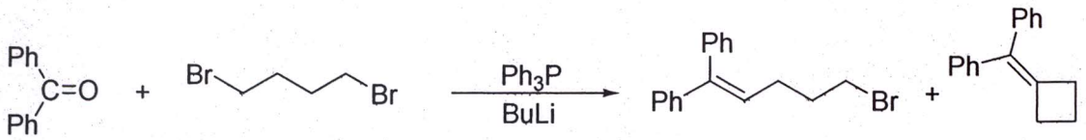




2)

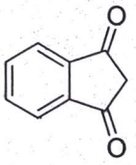
a) Briefly explain the utility of enamines. [10 marks]

b) Suggest a mechanism? [10 marks]

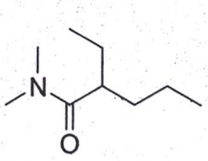


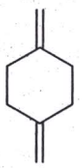
3)

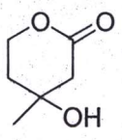
a) Starting from Phthalic acid and by using other suitable reagents, how could you prepare the following compound [8 marks]



b) Suggest a synthesis for the following compounds [3 marks for each]







With our best Wishes

Examiners:

Dr. M.Monier

المستوى الرابع - كيمياء - كيمياء الكربوهيدرات ٢٠١٣

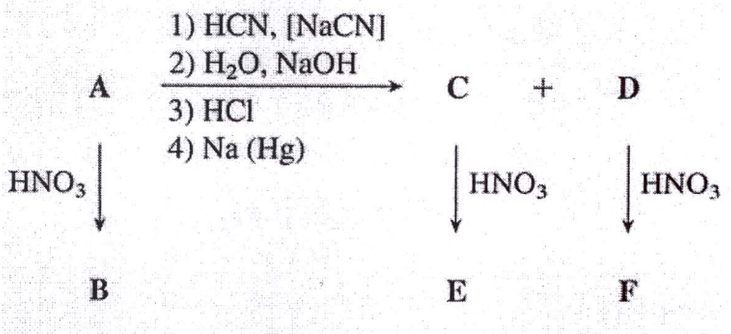
Mansoura University
Faculty of Science
Chemistry Department
El- Mansoura, Egypt

جامعة المنصورة
كلية العلوم
قسم الكيمياء
منصورة – مصر

Second Semester: Final Exam. 2013

Educational Year: Fourth Year
Course (s): Carbohydrates Chemistry — **Subject: Chemistry**
Date: 8 June/ 2013 — **Full Mark: 80**
Course Code: Chemistry 434 — **Time: 2 Hours**

1- a- Monosaccharide A in the following scheme is a D-aldopentose. Compound E does rotate plane-polarized light, wherease compound B and F do not. Show the structures of A, B, C, D, and E. [10 Marks]



b- Discuss the effect of Both Tosyl chloride and Periodic acid on Monosaccharide A. [10 Marks]

2-a- Explain by equation conversion of D-arabinose to higher aldose & ketose. [5Marks]

b- Starch is a polysaccharide contains amylose and amylopectin used for energy storage in plant.

i-Describe the type of glycosidic bond in it. [5Marks]

ii-What the effect of both HNO_3 and trityl chloride on aldose-monosaccharide units obtained by hydrolysis of starch. [5Marks]

c- Sucrose and Lactose are disaccharides; which of them does not undergoes Mutarotation? [5Marks]

3- The Following disaccharides consisting of two monosaccharide units:

i- Draw the Fisher projection and Haworth formulation of the hydrolyzed monosaccarides of compound 2. [5Marks]

ii- Which of these disaccharides has reducing power (explain by equations in compound 3). [5 Marks]

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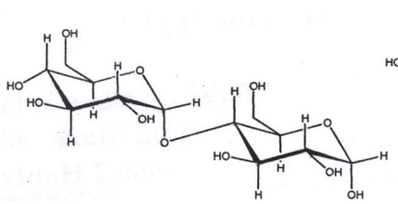
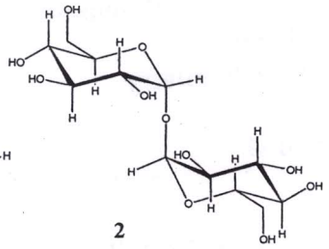
iii - Elucidate the Point of attachment in compound 1. [5Marks]

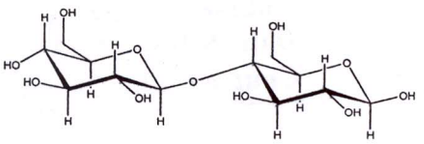
iv- Describe the type and point of attachment of each glycosidic bond in all disaccharides. [5Marks]



1



2



3

4- a- Explain by equation, how you can proof of glucose stereochemistry. [5Marks]

b- Determine the structure of lactose. [5Marks]

c- Convert of the following: [5Marks]

i- D-Ribose to D- arabinose

ii- Glucose to Fructose

d- Formation of osatriazole from D-Fructose. [5Marks]

Best regards,

Prof. Dr. Wafaa S. Hamama & Dr. Mona El-Sayed

المستوى الرابع كيمياء - ك ٤٢٣ آلية التفاعلات غير العضوية مقرر اكتوبر

Mansoura University
Faculty of Science
Chemistry Department
Subject: Mechanism of Inorganic Substitution Reactions
Course Symbol :423 Chem

Chemistry Students
Exam date: 11.06.2013A
Allowed time: 2 hours
Total marks= 80
Level: 4th

Final Exam for 4th Level Chemistry Students

Answer the Following Questions:

1-I) **Write short notes on only two of the following: -** (10 Marks)

a) Grinberg's theory.

b) π –bonding theory.

c) Garrick's explanation for S_N1 dissociation mechanism of the reaction of $[Co(en)_2(Cl)NO_2]^+ + SCN^- \longrightarrow [Co(en)_2(SCN)NO_2]^+ + Cl^-$

II) Write the rate constant expression of the given reaction showing the possible mechanism: (4 Marks)

$$[Pt(dien)Cl]^+ + Y \longrightarrow [Pt(dien)Y]^+ + Cl^-$$

2) **Complete the following statements:-** (16 Marks)

a) Acid hydrolysis or…….. reactions occur in …… and ……solutions at pH……..by……mechanism while base hydrolysis reactions occurs in ……solution at pH……..……by……..mechanism.

b) Aquation reactions in octahedral Co (III) ammine complexes proceed by a …….…… process of……order in which ……is much important than ……

c) Electron-transfer reactions occur by two mechanisms;……..……..or…….. and ……or…… ……

3) **Give the possible mechanism for two only of the following reactions:-** (18 Marks)

a) Cis $[Pt(PR_3)Cl_2]^0 \rightarrow$ trans$[Pt(PR_3)Cl_2]^0$

b) cis-$[Co(NH_3)_5Cl]^{2+} + [Cr(H_2O)_6]^{2+} + 5H_3O^+ \rightarrow [Co(H_2O)_6]^{2+} + [Cr(H_2O)_5Cl]^{2+} NH_4^+$

c) $[Co(NH_3)_5H_2O]^{3+} + NO_2^- \rightarrow [Co(NH_3)_5ONO]^{3+} + H_2O$

4) **True and false (circulate the correct response):** (12 Marks)

a) T – F S_N1CB and S_N2 displacement mechanisms in DMSO follow the same rate laws and give the same hydroxo product.

b) T – F Substitution reactions of Pt(II) square planar complexes are not stereo-specific.

c) T – F Chatt and Orgetl's theory explained the trans effect of groups such as $C_6H_5^-$, NO_2 and SCN^-.

d) T – F Substitution of ammonia by polyamine in $[Co(NH_3)_5Cl]^{2+}$ complex increases the rate of aquation.

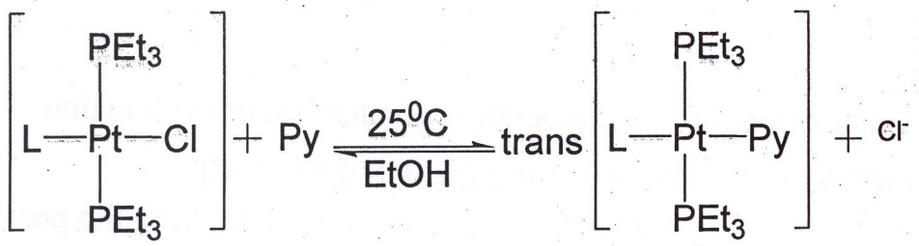
Please turn over→

4)Arrange the following in the order of increasing the property indicated in Brackets indicating the reasons if it is possible (20 Marks)

a) cis-$[Co(NH_3)_4Cl_2]^+$ &cis-$[Co(tren)(NH_3)Cl]^{2+}$. (Rate of aquation)

b) $[Co(NH_3)_5OAc]^{2+}$& $[Co(NH_3)_5NO_3]^{2+}$. (Rate of aquation)

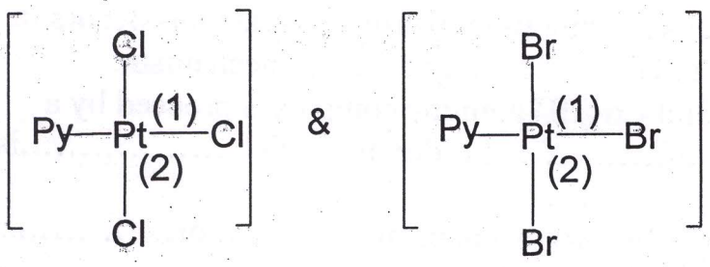
c) $[Pt(NH_3)(NO_2)Cl_2]$ &$[Pt(NH_3)(p\text{-}ClC_6H_5)Cl_2]$. (Rate of substitution)

e) trans 

L= C_2H_4, NO_2^-, Br^-, Cl^-

i) (Trans directing ability of the group).

ii) K_1 and $K_2(min^{-1})$.

f) 

(a) (b)

i) Bond length of bond(1):..... >.....

ii) Bond length of bond (2):..... .> .....

With Best Wishes

Dr.O.El-Gammal

المستوى الثالث - كيمياء - طرق الفصل الكروماتوجرافى ك ٢١٢

Mansoura University Faculty of Science Chemistry Department Subject: Chemistry Course(s): Electro-analytical & Chromatography Chemistry 312		Second Term Third Level Chemistry Time Allowed: 2 hours Full Mark: 60 Marks Date: Juna, 13, 2013

Answer The Following Questions

1*a*). *Define the following* **[6 Marks]**

a) Mercury cathode **b Ilkovic equation** **c) Diffusion current**

c) Selectivity co-efficient **d) Enzyme electrodes** **e) Mediator**

b)- Give an account on the following: **[9 Marks]**

i) The factors affecting the liquid junction potential. Explain how it could be minimized

ii) Effect of complex formation on the half wave potential and calculation of formation constant.

iii) The construction and theory of fluoride ion selective electrode

2-a) Discuss briefly the advantages of : **[10 Marks]**

i) The application of coulometric titrations compared to conventional titrations

ii) Using differential pulse polarography compared to conventional and normal pulse polarography

iii) Using dropping mercury electrode

iv) Application of ion selective electrodes for trace analysis

b) A 2.16g of an insecticide sample was decomposed and the arsenic content was reduced to to the trivalent state. As(III) was oxidized with electrogenerated I_3^- in faintly alkaline medium

$$AsO_3^{3-} + I_3^- + H_2O \leftrightarrow AsO_4^{3-} + 3I^- + 2H^+$$

The titration was completed after a constant current of 87.6 mA had been passed for 4 min. and 42 sec. Express the results of this analysis in terms of $\%As_2O_3$ in the original sample.

[5 Marks]

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إقلب من فضلك الصفحة

Section (B) **[30 Marks]**

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 chromatography . (Give examples)

vii) Effect of PH.

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

Prof. Dr. Ahmed El-Wakil
Prof. Dr. Magdi Khalifa

كيمياء - الصف الرابع ٤٤٣٥

Mansoura University
Faculty of Science
Chemistry Department
Course: Physical Chemistry
Date : 15/ 06/ 2013

Second term Examination
Subject: Spectroscopy
Fourth Level
Full Mark: 80 Marks
Time Allowed : 2hours

Rewrite the true answer in the table blew

انقل الاجابة الصحيحة فقط في اماكن الاجابة في الجدول طبقا للترقيم الموجود

Answer of Frist question (complete)		Answer of Second question (MCQ)	
1		1	
2		2	
3		3	
4		4	
5		5	
6		6	
7		7	
8		8	
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