المستوى الرابع - كيمياء - الأطياف المغناطيسية والأرضية ك ٤٢٤

Mansoura University Faculty of Science Chemistry Department Subject: Chemistry Course(s): Inorganic chemist 424	كلية العلوم جامعة المنصورة	Second Term Date : May. 2014 Time Allowed: 2 hours Full Mark: 80 Marks

ANSWER THE FOLLOWING QUESTIONS

1. Put (✓) or (X) on the following : **[15 Marks]**

i) In antiferromagnetic, above TN, Xg varies inversely with T

ii) χparamagnetic is an universal property

iii) χdia depends on the magnitude of the radius electron orbital .

iv) I/Ho is the magnetic permeability

v) μs may augmented or diminished by an orbital contribution

2. Comment on the following : **[20 Marks]**

a) The complexes at cross over region will give anomalous moments

b) In the tetragonally distorted, trigonal bipyromidal or in square pyramidal complexes the magnetic moments should be close to the spin only moments

c) There are two types antiferromagnetism

d) The normal square pyramidal diagrame of complexes differed than square pyramidal oxovanadim (IV) complexes such as $[VO\ (en)_2]^{2+}$

3. a) d^2 ion and a d^8 ion have the same Russel-saunders symbol but not the same J value . How ? **[10 Marks]**

b) What is the molecular term symbol for the following : **[15 Marks]**

i) Oh complexes : t_{29}^3, eg^o , $t_2g^3\ eg^1$

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

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

4.a) The UV/Vis absorption spectrum for $[\ NiCl_4]^{2-}$ shows three d-d absorption bonds at 4000, 7500 and 15000 Cm^{-1}. Assign the bonds using the correlation diagram of d^8 ion tetrahedral **[10 Marks]**

b) Explain the energy difference between states in terms of Racah parameters. **[5 Marks]**

c) Explain : $3d^5$,$3d^7$ and $3d^8$ in their LS octahedral will have orbital contribution to their spin only moments . **[5 Marks]**

Prof. Dr. G.M Abu El-Reash

المستوى الرابع - كيمياء
كيمياء نبات
كيمياء حيوان
كيمياء الكربوهيدرات ك ٤٣٤

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

جامعة المنصورة
كلية العلوم
قسم الكيمياء
المنصورة – مصر

Second Semester: Final Exam. 2014

Educational Year: Fourth Year
Course (s): Carbohydrates Chemistry
Date: 7 June/ 2014
Course Code: Chemistry 434

Subject: Chemistry
Full Mark: 80
Time: 2 Hours

Answer the following questions:

1-Starch is a natural polysaccharides isolated from plant skeletal (1 & 2)
a- Describe the glycosidic bond in starch. [6 Marks]
b- What the effect of both phenyl hydrazine and HNO_3 on monosaccharide units in starch. [7Marks]
c- Discuss the effect of Periodic acid on furanose and pyranose Monosaccharide. [7Marks]

2- Raffinose is a trisaccharide is found in legumes and vegetables (3) .
a- Describe the glycosidic bond[linkage] in it. [6 Marks]
b- How can you elucidate the ring structure of monosaccharide? [7 Marks]
c- Sucrose(4) and maltose are disaccharides; which of them does not undergoes Mutarotation? [7 Marks]

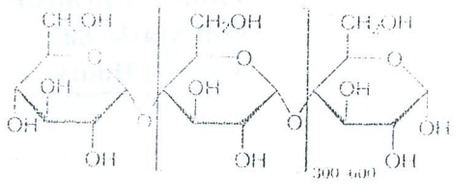
3- a- Explain by equation, how you can proof of glucose stereochemistry. [7 Marks]
b- Formation of osatriazole from D-Fructose. [7 Marks]
c- Convert of the following: [6 Marks]
i - Glucose to Fructose
ii- ribose to arabinose

4- Lactose (5) is disaccharides consisting of two monosaccharide units:
a- Draw the Fisher projection and Haworth formulation of the hydrolyzed monosaccarides of this compound. [5Marks]
b- Determine the structure of lactose. [5Marks]

P.T.O

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

d- Describe the type and point of attachment of each glycosidic bond in (4 & 5) disaccharides. [5Marks]



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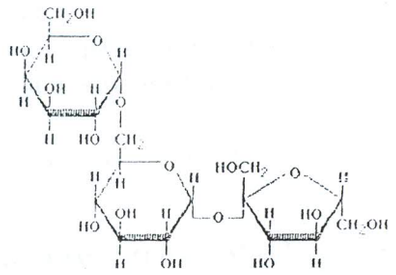

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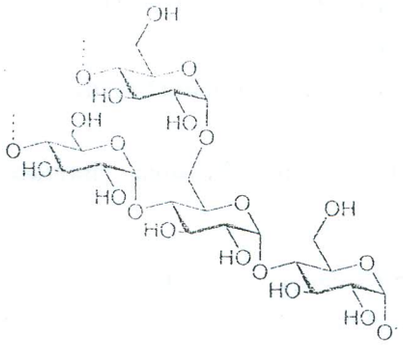

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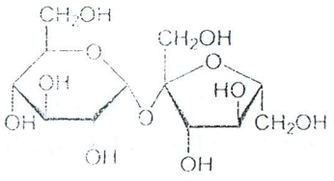

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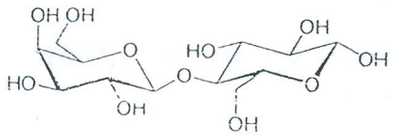

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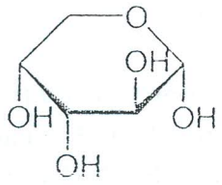

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Best regards,

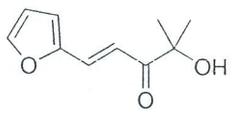
Prof. Dr. Wafaa S. Hamama & Dr. Eman Helmy

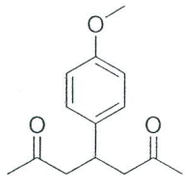
Mansoura University Faculty of Science Chemistry Department Subject: Chemistry Course(s): Chem.435 (Organic Chemistry) (Organic Chemistry-2)		Second Term Semester 4th Level Chemistry Students Date:10/06/2014 Time allowed: 2 Hours Full Mark: 60 Marks

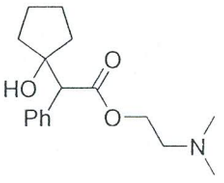
Answer the FOLLOWING questions:

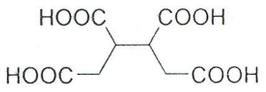
[1] **(a) Draw out** the forward synthesis of 1,5-diphenylpentan-3-yl acetate. [4 Marks]

(b) Disconnect the following compounds to **their synthons**: [16 Marks]

1. 

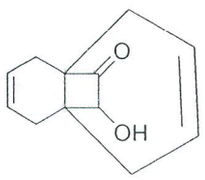
2. 

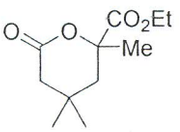
3. 

4. 

[2] **(a) Based on** the umpolung strategy, explain **benzoin condensation.** [5 Marks]

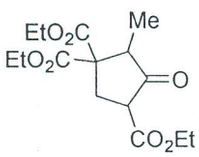
(b) How would you **make** the following **target molecules**: [15 Marks]

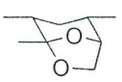
1. 

2. 

[3] **(a)** The choice of a method for **synthesizing** a compound derived from a retrosynthetic analysis should be based on some of the following criteria: **chemoselectivity**, **regioselectivity** and **stereoselectivity**. Explain? (Give examples) [5 Marks]

(b) Design a Logical **synthesis** for [15 Marks]

1. 

2. 

Best wishes

Examiner: Dr. Ahmed Fekri

المستوى الرابع - الكيمياء - نظرية المجموعات وتطبيقاتها كـ ٤٢٢

Mansoura University **Faculty of Science** **Chemistry Department** **Subject Code: Chem. 422** **Course: Group theory and its applications**	كلية العلوم جامعة المنصورة	**Second term examination** **4th Level Students** **Program: Chemistry** **Date: 31/5/2014** **Time Allowed: 2 hours** **Full Mark: 80 Marks**

Answer the following questions:

Q1.

A- Determine class and order for 1,3,5-trichlorohexane molecule. **(12 marks)**

B- Identify the point group for cis-H_2O_2 molecule. **(8 marks)**

Q2.

A- Using the character table for C_{2v} point group and indicate to which irreducible representation the vectors (P_X and d_{XZ}) belong. **(12 marks)**

B- From the symmetry point of view, what are the following symbols for irreducible representation indicate: **(8 marks)**

1. $B_{2U}^{\backslash\backslash}$
2. $T_{1g}^{\backslash}$

Q3.

A- Find the matrix representation and define its character for each of the following operations by taking the cartesian coordinates (x, y and z) as a basis set: **(10 marks)**

1. σ_{yz}.
2. S_6^2 (Anti-clock wise rotation).

B- Give the number of unshifted atoms for each of the following operations: **(10 marks)**

1- σ_v through POI_3.

2- C_2^1 through BH_3.

Q4.

A- Construct the reducible representation (Γ) for water molecule and analysis it to its irreducible components by taking the internal coordinates (change in bond length and bond angle) as a basis set. **(10 marks)**

B- Consider you have three compounds with the same molecular formula (AB_4) but with different geometries. Name and draw the different geometries and show how you can determine which of them belongs to D_{4h} point group. **(10 marks)**

You are provided with the character table behind

Good Luck: Dr. Hany Moustafa

C_{2V} character table:

C_{2V}	E	C_2	σ_{xz}	σ_{yz}
A_1	1	1	1	1
A_2	1	1	-1	-1
B_1	1	-1	1	-1
B_2	1	-1	-1	1