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

4th level (Zoology, Botany, Chemistry and Biochemistry)
Date:16/5/ 2015
Time allowed: 2 hours
Full Mark: 60 Marks

Answer the Following Questions:

Q1) Explain, what do you meant by (choose 5 only): **(15 marks)**

a) **Essential Limit and Toxic Limit for metal ions in water.**
b) **BOD and COD.**
c) **Types of organic pollutants.**
d) **Chemical speciation.**
e) **Heavy metals and trace element.**
f) **Applications of water reuse.**

Q2) Characterize the biochemical effect of each of the following and suggest antidotes for each: **(10 marks)**

a) **Carbon monoxide.**
b) **Cyanide.**

Q3) a) Discuss the mechanism of toxic chemicals on enzymes. (10 marks)
b) Write a note on methyl isocyanate (MIC). (10 marks)

Q4) Write short notes on each of the following: **(15 marks)**

a) **Incineration method of waste disposal.**
b) **Sanitary landfill method for waste disposal.**
c) **Main steps for anaerobic treatments for organic waste and biogas generation.**

Best wishes for success,

Prof. Dr. I. Kinawy, Prof. Dr. M. El-Defrawy, Dr. W. Abo El-Maaty and Dr. H. Moustafa

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

جامعة المنصورة
كلية العلوم
قسم النبات
المنصورة - مصر

Final Examination in Microbiology
Second Term: May. 2014

Educational Year: 4th Level Program : **Chemistry-Botany**
Subject: **B 419** Course: **Mineral nutrition & physiology of Microorganisms**
Time: 2 hrs Date: **19 / 5 /2015** Full mark: **60** Question mark: **20**

Answer the following questions:

Question one

- **Explain** each of the following:

a. Passive and active transport of ions across plasma membrane (10 marks)

b. Apoplasmic and symplasmic transport across roots (10 marks)

Question Two

A. Write an account on occurrence, availability, functions and deficiency symptoms **of N & P.** (10 marks)

B. Discuss in details the apical growth mechanism in fungi (10 marks)

Question Three

a. **Explain** briefly with **illustrations** fungal adaptations for nutrient capture (10 marks)

b. **Discuss** with **illustration** the effect of substrate concentration on the specific growth rate (Monod plot) (10 marks)

With our best wishes,

Examiners: **Prof. Mohammad A. Abas** **Ass. Prof. Mervat H. Hussein**

Mansoura University
Faculty of Science
Botany Department

جامعة المنصورة
كلية العلوم
قسم النبات

Final Examination in Botany
Second-Semester: May 2015

Educational Year: Fourth Level **Program (Branch): Chemistry/Botany**
Subject: B (421) **Course(s): Biotechnology**
Time: 2 h **Date: 23 / 5 /2015** **Total Marks: 60 marks**
Answer the following questions:

Q1: Answer the following questions: (20 marks, 5 marks each)

a- What is a bioreactor? Differentiate between the types of bioreactors according to mode of action.
b- What is the role of *in-vitro* regeneration in multiplication of medicinal plants?
c- What are the main steps of production of ethanol from sugar cane?
d- Write what you know about production of bioplastics from starch.

Q2: A- Complete the following sentences with the suitable words: (10 marks)

1- The cell theory stated that.....
2- Green manures are..... while compost is.....
3- Organic farming is.....
4- Agitator consists of ..... and .....
5- Advantages of drum-rotating reactor are.....

B- Mention if the sentence is true or false and why? (10 marks)

1- Particle bombardment involves transfer of DNA under electric shock.
2- Roof-top farming refers to the cultivation of plants in complete nutrient solutions.
3- E10 gasohol indicates that gasoline is 10% while ethanol is 90%.
4- Spargers are needed in the bioreactor to control pressure inside the tank.
5- The cryopreservation of *in-vitro* cultures of medicinal plants is a long-term conservation method in liquid nitrogen at –196 °C.

Q3: Answer the following questions: (20 marks, 5 marks each)

1- Differentiate between the two types of air-lift bioreactors.
2- Differentiate between bioethanol and biobutanol?
3- From what you have studied about the bioreactor, what are the functions of baffles and probes?
4- Write what you know about biodiesel and biopetroleum from algae?

Best Wishes

Prof. Mohammed N. A. Hasaneen *Dr. Heba M. M. Abdel-Aziz*

Mansoura University
Faculty of Science
Chemistry Department
Subject: Inorganic Chemistry
Code: (Chem 425)

Final Exam
Fourth year of Botany & Zoology
Date: 26/5/2015
Time Allowed: 2 hrs.
Marks: 80

Answer the following questions

[1] Write *short notes on the following:* *(7 Marks)*

a) Lanthanide contraction.

b) One application of Lanthanide or Actinide elements.

[2] Complete the following: *(12 Marks)*

1) Monazite sand which is the source of lanthanides contains.....,.....,.....

2) The oxidation states of the actinides vary between ..., ..., ..., ... and .....

3) Lanthanide elements are sometimes used as biological ..... for drugs in ..... and animals.

4) Magnetic properties of La^{3+} and Ce^{4+} have no ..... electrons, and are .....

5) The elements Pa, U, Np, Pu and Cm have very ..... lines in their absorption spectra.

6) The actinides all have an oxidation state of (.....), like the .....

7) The white color of Th(IV) compounds is associated with the absence of .....or ..... electrons.

8) ThI_2 is probably ....., $2I^-$ and $2e^-$ in a conduction band.

9) Protactinium (Pa) found in ..... and ores form Zaire.

10) At higher pH values, ... ion hydrolyses and polymerizes via hydroxyl bridges.

11) ..... rods are used to make sure that the reaction does not get out of control.

12) The rare earth complexes with neutral organophosphorus extractants have synthesized $[Nd(NCS)_3(Ph_3PO)_4]$ complex with the coordination number .....

[3] Complete the following equations: *(9 Marks)*

1) $2Ln + 6H_2O \rightarrow$ ..... + ...

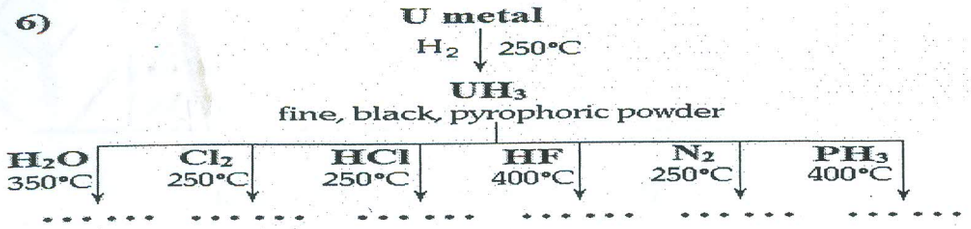
2) $LnCl_3.6H_2O \xrightarrow{heat}$ ..... + ... + ...

3) $Ce_2(C_2O_4)_3 + 2O_2 \rightarrow$ ..... + ...

4) $Th(NO_3)_4.5H2O + NaOH \rightarrow$ ..... + ...

5) $^{232}_{90}Th \xrightarrow{n\,\gamma} ^{233}_{90}\text{.....} \xrightarrow[22\ min]{\beta} ^{233}_{91}\text{.....}$

6)



[4] Choose the correct answer to each of the following questions: *(12 marks)*

1) What type of elements are the lanthanides and actinides?

a) mostly metals and a few nonmetals. b) mostly nonmetals and a few metals.

c) all metals. d) all nonmetals.

2) NdI_2 resembles LaI_2 as

a) both of them is covalent. b) both of them is ionic, contain Ln^{3+}, $2I^-$+ė.

c) both of them is non-stiochiometric. d) ii & iii

Please turn over

3) Lanthanoids are
a) 14 elements in the sixth period (atomic no. = 58 to 71) that are filling 4f sublevel.
b) 14 elements in the sixth period (atomic no. = 90 to 103) that are filling 4f sublevel.
c) 14 elements in the seventh period (atomic no. = 58 to 71) that are filling 4f sublevel.
d) 14 elements in the seventh period (atomic no. = 90 to 103) that are filling 4f sublevel.**4)**

4) The 14 lanthanide elements are energetically favorable to move the single 5*d* electron into the 4*f* level in most of the elements, but not in the cases of
a) La, Gd and Lu. b) Pr, Gd and Lu. c) Nd, Gd and Lu. d) Ce, Gd and Lu.

5) Which of the following lanthanoid ions is diamagnetic? (At. nos. Ce = 58, Sm = 62, Eu = 63, Yb = 70)
a) Ce^{2+} b) Sm^{2+} c) Eu^{2+} d) Yb^{2+}

6) The actinoids exhibits more number of oxidation states in general than the lanthanoids. This is because
a) the 5f orbitals are more buried than the 4f orbitals. b) the actinoids are more reactive than the lanthanoids.
c) there is a similarity between 4f and 5f orbitals in their angular part of the wave function.
d) the 5f orbitals extend further from the nucleus than the 4f orbitals.

Section (B)

1. Apply the VBT and CFT on the complex $[Mn(H_2O)_6]Cl_2$. Determine the number of unpaired electrons, degree of distortion and the CFSE (Δ_o=7800Cm^{-1}) [Mn Z=25]
[10 Marks]

2. Which complex of the following pairs has the larger value of Δ_o and explain the reason :
[8 Mars]

i) $[Co(H_2O)_6]^{3+}$ and $[Rh(H_2O)_6]^{3+}$
ii) $[Co(H_2O)_6]^{2+}$ and $[Co\ (H_2O)_6]^{3+}$
iii) $[Co\ Cl_6]^{4-}$ and $[Co\ Cl_4]^{2-}$
iv) $[Co(NH_3)_6]^{3+}$ and $[Co\ F_6]^{3-}$

3. Comment on the following : **[12 Marks]**
i) The $[Ni\ (CN)_4]^{2-}$ is diamagnetic while $[NiCl_4]^{2-}$ is paramagnetic according to VBT. [Ni=28]
ii) Cobalt (III) ion (3d6) is more stable in ammonia solution than in aqueous solution
iii) The geometry of complexes depends on the coordination **no** (4,5 and 6)
iv) Solid CrF_3 contains Cr(III) in an octahedral, all Cr-F distances are the same. However in MnF_3 the Mn-F distances are not equals. (Cr Z=24, Mn=25)

4. **a)** Calculate the CFSE in KJmol^{-1} of both $[Fe(NH_3)_6]^{3-}$, Δ_o = 20000 Cm^{-1} and $(CoCl_4)^{2-}$, Δo=21000 Cm^{-1}. Assume P=14000 Cm^{-1} and that 1 KJ mol^{-1} =83 Cm-1. (Fe=26,Co=27) **[5 Marks]**
b) Write briefly on limitations of – VBT **[5 Marks]**

Prof. Dr. Nagwa Nawar **Prof. Dr. G.M. Abu El-Reash**

Mansoura University **Faculty of Science** **Chemistry Department** **Subject : Chemistry** **Course(s) : Carbohydrates** **Code : Org. Chem. (434)**		**Second Term** **4th Level Students** **Date : 30 /05/2015** **Time Allowed : 2 hours** **Full Marks : 80 Marks**

Answer All The Following Questions

Question 1 [25 Marks]

A- Draw the Haworth projections for the following sugars. [10 Marks]

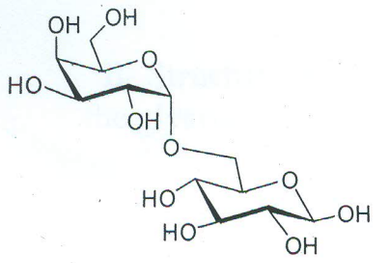
i) D-Glucuronic acid
ii) Methyl-β-D-allopyranoside
iii) Lactose
iv) Raffinose
v) 3-Deoxy-D-idose

B- How can you synthesize L-ascorbic acid from D- glucose ?[6 Marks]

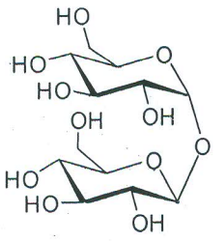
C- Using Ruff method , how can you convert D-talose to D-lyxose ? [5Marks]

D- Comment : Reduction of D-galactose leads to optically inactive alditol. [4Marks]

Question2 [23 Marks]



(1)



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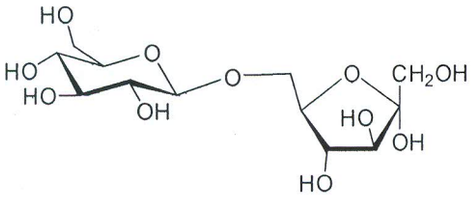

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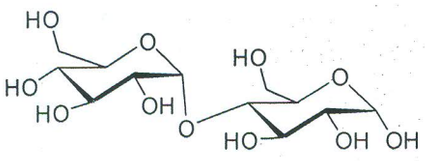

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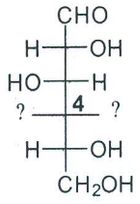


(5)

A- Describe the glycosidic bond in the disaccharides **(1) ,(2) & (3).** [6 Marks]

B- Classify sugars **(1) ,(2) & (3)** as reducing or nonreducing sugars . Do they undergo mutarotation ? [6 Marks]

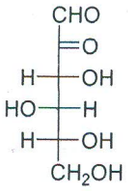
C- The disaccharide maltose found in malt has structure **(4)**. Show how can you elucidate the point of attachment in this sugar. [6 Marks]

D- Structure **(5)** represents partial structure of D-Glucose. Show how can you elucidate the stereochemistry at carbon atom number **4** . [5 Marks]

Question 3 [32 Marks]

A- Complete the following equations [21 Marks]

(i) D-altrose $\xrightarrow{3PhNHNH_2}$ ---------- $\xrightarrow[\Delta]{CuSO_4}$ ---------- ; ---------- $\xrightarrow{PhN=NCl}$ ----------

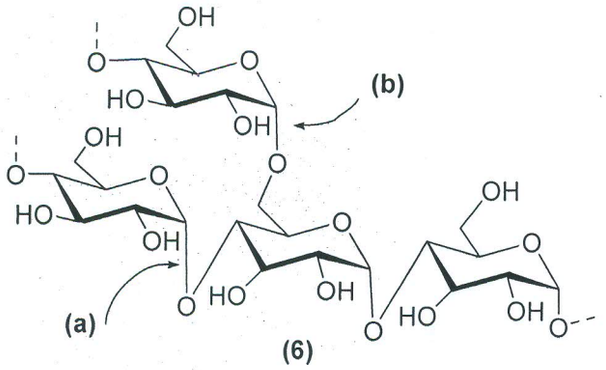
(ii) 

$\xrightarrow{Zn / HCl}$ ---------- $\xrightarrow{OH^-}$ ----------

(iii) α-D- galactopyranose $\xrightarrow{CH_3OH / HCl}$ ---------- ; $\xrightarrow{Acetone / HCl}$ ----------

(iv) ---------- $\xleftarrow{HNO_3}$ D-mannose $\xrightarrow[2) \text{ pyridine }, \Delta]{1) Br_2 / H_2O}$ ----------

B- Structure **(6)** represents partial structure of starch . Describe the glycosidic bonds **(a)** & **(b)** .Name the monosaccharide unit. [5 Marks]



C- Prove the ring size in D-Glucose using Jackson & Hudson (periodic acid oxidation). [6 Marks]

----------*With our best wishes*----------

Examiners

A.Prof.Eman Keshk *Dr.Soha M.Abdelmageed* *Dr.Eman Helmy*

Mansoura University
Faculty of Science
Botany Department
Course code: B420
Course title: Plant Geography, Flora & Plant Community

Program: Chemistry& Botany
2nd Semester (2014/2015)
Final–Term Exam
Time allowed: 2 hours
Full Mark: 60 Marks

Answer The Following Questions:

Q.1 Write in detail on <u>Two Only</u> of the following: **(20 marks)**

A- The Western Mediterranean coast of Egypt.
B- The habitat types and characteristic vegetation in the Egyptian Deserts.
C- Sinai region.

Q.2 A- Compare and contrast between Wadi El-Natrun Depression and Siwa Oasis with particular reference to: location, climate, habitat types and vegetation. **(10 marks)**

<u>B- Discuss in brief Two Only of the following:</u> **(10 marks)**

1. Definition and elements of phytogeography.
2. Altitudinal and latitudinal distribution of Plants.
3. Disseminules and properties of disseminules carried by wind.

Q.3 <u>Write short notes on the following :</u> **(20 marks)**

1) Endemism.
2) Terrestrial habitats of plants.
3) Theory of tolerance of plants.
4) Continuous inter-continental distribution of plants.

Best wishes

Examiners:

Prof. Ibrahim A. Mashaly **Dr. Mohamed Abd El-Aal**