٨- إضافة شكل جديد إلي الأشكال الحالية التي تقوم الشركة حاليا بانتاجها أو تسويقها
٩- توزيع السلعة في أكبر عدد ممكن من المناطق الجغرافية ومتاجر التجزئة.
١٠- اختيار عدد محدود من الوسطاء لتوزيع منتجاتها وذلك علي أساس مجموعة من المعايير الموضوعية.
١١- جهود غير شخصية لعرض السلع والخدمات والأفكار وترويجها بواسطة جهة معينة مقابل أجر مدفوع
١٢- العرض الشفهي والشخصي لسلعة أو خدمة أو فكرة علي العميل بهدف اقناعه بها وحثه علي شرائها.
١٣- نشر المعلومات بالطرق غير الشخصية عن السلع والخدمات والأفكار والمنشات.
١٤- أوجه النشاط التسويقية التي تستهدف اثارة الطلب علي سلع وخدمات المنشاة

السؤال الثالث: قارن بين كل مما يلي:
١- الاستراتجيات المتبعة في تقسيم السوق إلي قطاعات وشروط تطبيق تقسيم السوق بنجاح
٢- أنواع دوافع الشراء.
٣- سياسات تسعير المنتجات الجديدة.
٤- مراحل تطور مفهوم التسويق.
٥- منافع التوزيع.

السؤال الرابع: اكتب في النقاط التالية:
١- تكلم عن مراحل القرار الشرائي.
٢- أهمية التسويق.

مع تمنياتي للجميع بالنجاح والتفوق،،،،،،،،،،،،،

Assiut University Faculty of Science Chemistry Department	2017	January, , Time: 2 hrs Marks: 50
Final Exam. of Physical and Inorganic Chemistry (250 - CH)		

Section I (Inorganic Chemistry) (25 Marks)

1) a) Explain the reasons for Five only from the following:

i)The Unexpected high boiling point of HF.
ii)SO_3 is an acidic Oxide
iii)$PCl_5$is known but NCl_5 is not
iv)Na_2CO_3 is soluble in water but $CaCO_3$ is not.
v)KO_2 is used in space capsules.
vi) NH_3 is quite poisonous.

b) How you can prepare (three) only from the following:
H_2, NH_3, HI, Na.

c) In each pairs of acids, state which is stronger and why?
H_2SO_4 and H_2SO_3, HClO and HIO, H_3PO_3 and H_3PO_4.

2) a) Choose the correct answer and comment:
i) Which solution of the following reagents gives a precipitate when CO_2 is bubbled into it (KOH, NaOH, $Ba(OH)_2$).
ii) Which one of the following species contains an odd number of electrons: (CO, NH_4^+, NO)
iii) The compound which contains hydrogen bond (CH_4, H_2S, H_2O).
iv) The species which contains paramagnetic properties is (NO, O_2, N_2)

b) How does diborane react with ammonia

c) Give three examples of Freon's and how do they damage environment?

See the Next Page

4)- *A- complete the following equations* (**Four only**)---------- (**10** marks)

1- Pyrrole + CrO_3 /H_2SO_4 → a

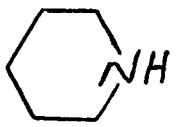
2- Aniline + CH_3COCl → a + Br_2 → b + H_2SO_4 70 % → c + d

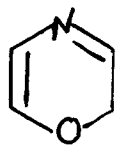
3- Andole + $KMnO_4$ /AcOH → a + b

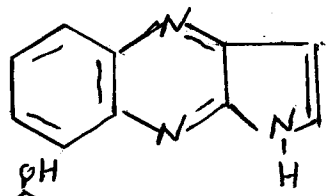
4- Benzoic acid + $SOCl_2$ → a + b + c

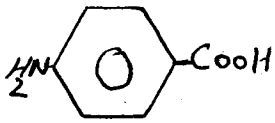
5- Toluene + Cl_2 (sun light) →

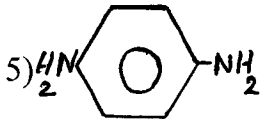
5 - *A- Write the name of the following compounds .....(10 marks).*

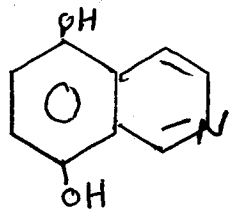
1) 

2) 

3) 

4) 

5) 

6) 

B- Draw the structural formula of the following compounds:

Benzothiophene * 2-Methyl imidazole * *p*- Crezole

p- Bromo-acetanilide * Benzoquinone * 5-Hydroxyisoquinoline

Tetrahydrofurane

****

Good Luck

Prof. Dr Osama Shehata Moustafa

3. Choose the correct answer: **(10 marks)**

1- Which one of these reagents can be used to convert 2-butanone to n-butane.
(a) $NaBH_4/ H^+$ (b) NH_2NH_2/KOH (c) $LiAlH_4/H^+$ (d) **None of them**

2-The reaction of an aldehyde with 1St amines resulted in the formation of:
(a) **Imines** (b) **Amides** (c) **Enamines** (d) **None of them**

3- Which one of these compounds would gave the Iodoform reaction ?
(a) **Cyclohexanone** (b) **2-Butanone** (c) **1-Butyraldeyhde** (d) **Phenyl ethyl ketone**

4-The B_{Ac} hydrolysis of an alkyl ester is considered as ?
(a) **Reversible reaction** (b) **Irreversible reaction** (c) SN_1 **reaction** (d) **None of them**

5- The $PhCH=CHCOCH_3$ was a product of crossed aldol reaction beyween:
(a) $PhCOCH_3/ PhCHO$ (b) $PhCHO/ CH_3CHO$ (c) $PhCOCH_3/ CH_3CHO$ (d) $PhCHO/ CH_3COCH_3$

6- The reaction of methyl acetate (CH_3COOCH_3) with NH_2OH/ H^+, the product will be:
(a) **An oxime** (b) **acetamide** (c) **hydroxamic acid** (d) **No reaction occurs**

7- Addition of ethylene glycole to an aldehyde resulted in the formation of:
(a) **acetal** b) **hemiacetal** c) **cyclic acetal** d) **no reaction occurs**

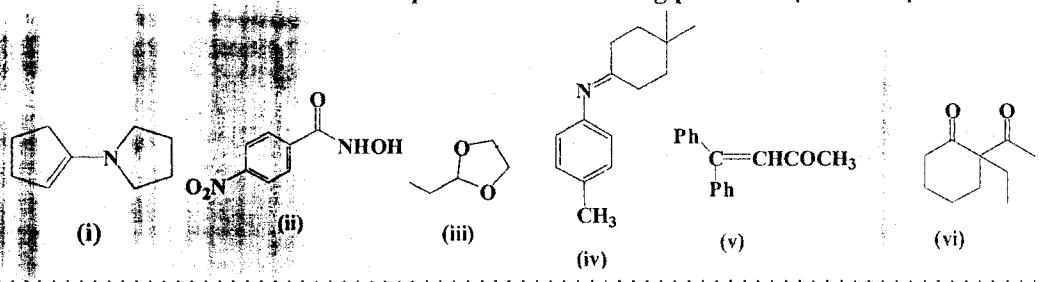
8- Which of these esters will undergoes an A_{Al} mechanism
(a) $C(CH_3)_3$-$COOCH_3$ (b) $C(CH_3)_3OCOCH_3$ (c) $CH_3CH_2COOCH_3$ (d) **None of them**

9- The final product of the reaction between $CH_3COOC_2H_5$ with **2 mole** of CH_3MgBr and hydrolysis:
(a) $CH(CH_3)_2CH_2OH$ (b) CH_3COCH_3 (c) $C(CH_3)_3OH$ (d) **None of them**

10- The product of the reaction between CH_2O and **PhCHO** in basic media and then hydrolysis gave:
(a) $PhCO_2H/ CH_3OH$ b) $HCO_2H/ PhCH_2OH$ c) $CH_3OH/ PhCH_2OH$ d) $PhCO_2H/ HCO_2H$

****

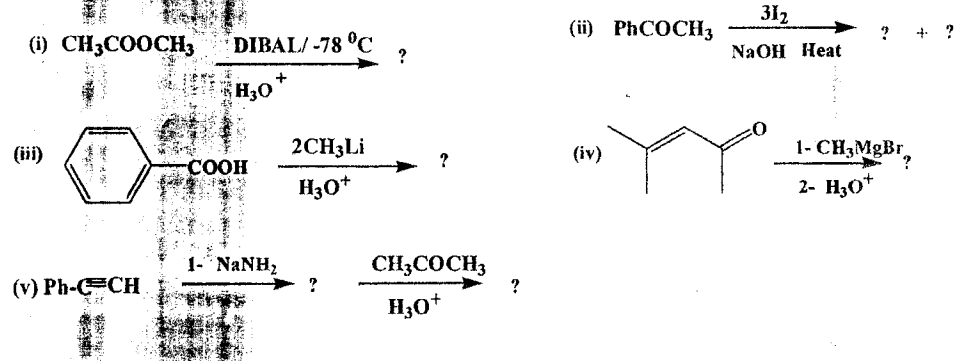
4. Draw the structures of the reactants needed to produce the following products. (5 marks)



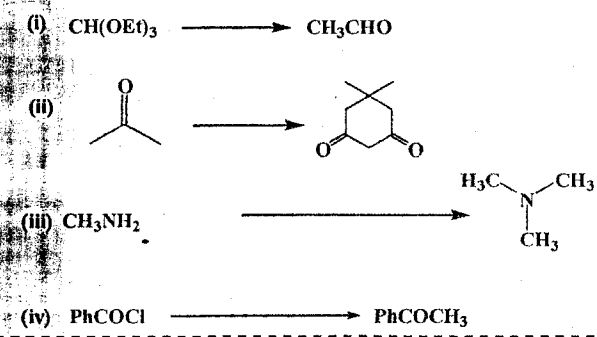
****

5. Answer the following

(i) Complete the following reactions (Only four). (4 marks)



(ii) By equations show how can you carry out the following transformation (Only three) (6 marks)



3. Choose the correct answer: **(10 marks)**

1- Which one of these reagents can be used to convert 2-butanone to n-butane.
(a) $NaBH_4/ H^+$ (b) NH_2NH_2/KOH (c) $LiAlH_4/H^+$ (d) **None of them**

2-The reaction of an aldehyde with 1^{St} amines resulted in the formation of:
(a) **Imines** (b) **Amides** (c) **Enamines** (d) **None of them**

3- Which one of these compounds would gave the Iodoform reaction ?
(a) **Cyclohexanone** (b) **2-Butanone** (c) **1-Butyraldeyhde** (d) **Phenyl ethyl ketone**

4-The B_{Ac} hydrolysis of an alkyl ester is considered as ?
(a) **Reversible reaction** (b) **Irreversible reaction** (c) SN_1 **reaction** (d) **None of them**

5- The $PhCH=CHCOCH_3$ was a product of crossed aldol reaction beyween:
(a) $PhCOCH_3/ PhCHO$ (b) $PhCHO/ CH_3CHO$ (c) $PhCOCH_3/ CH_3CHO$ (d) $PhCHO/ CH_3COCH_3$

6- The reaction of methyl acetate (CH_3COOCH_3) with NH_2OH/ H^+, the product will be:
(a) **An oxime** (b) **acetamide** (c) **hydroxamic acid** (d) **No reaction occurs**

7- Addition of ethylene glycole to an aldehyde resulted in the formation of:
(a) **acetal** b) **hemiacetal** c) **cyclic acetal** d) **no reaction occurs**

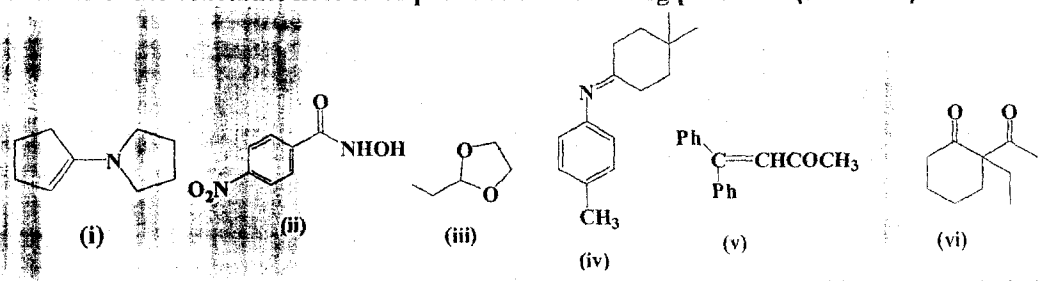
8- Which of these esters will undergoes an A_{Al} mechanism
(a) $C(CH_3)_3$-$COOCH_3$ (b) $C(CH_3)_3OCOCH_3$ (c) $CH_3CH_2COOCH_3$ (d) **None of them**

9- The final product of the reaction between $CH_3COOC_2H_5$ with **2 mole** of CH_3MgBr and hydrolysis:
(a) $CH(CH_3)_2CH_2OH$ (b) CH_3COCH_3 (c) $C(CH_3)_3OH$ (d) **None of them**

10- The product of the reaction between CH_2O and **PhCHO** in basic media and then hydrolysis gave:
(a) $PhCO_2H/ CH_3OH$ b) $HCO_2H/ PhCH_2OH$ c) $CH_3OH/ PhCH_2OH$ d) $PhCO_2H/ HCO_2H$

****

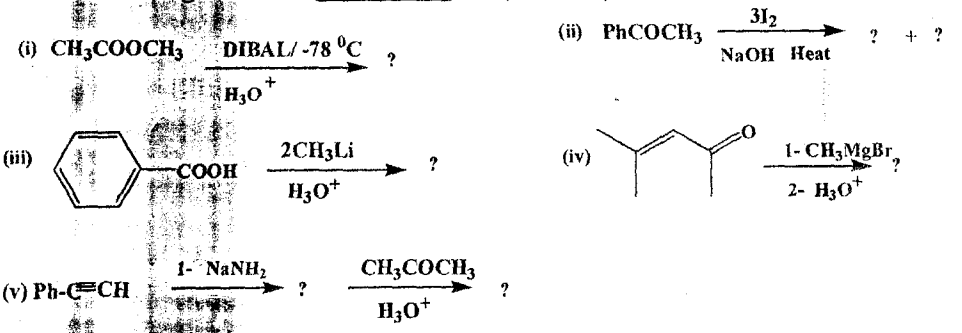
4. Draw the structures of the reactants needed to produce the following products. (5 marks)



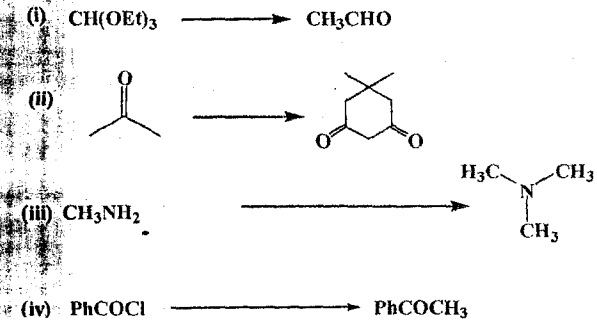
****

5. Answer the following

(i) Complete the following reactions (Only four). (4 marks)



(ii) By equations show how can you carry out the following transformation (Only three) (6 marks)



Assiut University

Faculty of Science
Chemistry Department
Final Examination for 2nd (Industrial Program)Polymer Chemistry (211 C)

Date: Wednesday, 18/01/2017 Time: 2 hours.

Answer Five only from the following Questions: (50 points)

1) a) Which are these polymers are: Natural , Synthetic , or Both:
Meat, Fiberglass, Silk, PVC, Hair, Leather , DNA&, Dacron, Rubber, Cement, Clothes, Paints, Foams, Cellulose, Potatoes, Toys .
b) What is the HIPS ? draw its structure?

2) a) Which of these polymers are: branched, linear or crosslinked: Polyethylene, Polypropylene , Polyisoprene , Polyester, Polystyrene , Polybutadiene , Nylon.
b) Three things that make polymers are different. Discuss?

3) a) " Carbon Fibers..... the wonder polymer..... stronger than the steel". Show by equations the steps of production of this polymer.
b) What is the difference between Cellulose and Starch according to its Monomers?

4) Show by equations how can you prepare the following polymers:
i) Polyethyleneterephthalate. ii) Nylon 6,6 iii) Polystyrene

5) a) In the free radical vinyl polymerization, discuss by equations the steps of polymerization ?
b) What are the type of Initiators , give an example for each one ?

6) a) Explain by equations the Cationic Vinyl polymerization?
b) Mention and draw the types of Copolymers?

Good Luck

Examiner:

Prof. Dr. Kamal I Aly

Assiut University **Jan, 2017**
Faculty of Science **Time: 2Hours.**
Chemistry Department

First Semester Final Examination Inorganic Chemistry (C - 220)
Subject : Inorganic Chemistry (C – 220)

Answer the following questions : **(50 Marks)**

1) Answer the following : **(12 Marks)**

A) Mark with (x) for the wrong statement or (√) for the correct statements of the following and ***explain why*** **(answer four only)**

i. Xenon reacts with fluorine depending on the F_2/Xe ratio
ii. Boiling point of NaCl is higher than $AlCl_3$.
iii. Cesium salts conducts electricity more than lithium salts.
iv. Hellium is diatomic.
v. H_2O_2 act as a strong oxidizing agent.

B) Compare between the following and ***explain why*** **(answer four only)** **(12 Marks)**

i- Portland cement and aluminia cement.
ii- Differences in acidity between HOCl and $HClO_4$.
iii- The acidic strength of HF and HBr.
iv- Oxidation states of oxygen and group VI elements.
v- Li, Ga , F (hardness , electro negativity, solubility).

2) Answer the following :

A) Give reasons for the following statements: **(answer four only)** **(12arks)**

i- Boric acid behaves as strong monobasic acid in presence of glycerol.
ii- CO is toxic for human beings
iii- Tl(+I) is more stable than Tl(+III).
iv- Freons causes damage to the ozone layer .
v- HF is kept in glass containers.

B) Complete the following statements: **(12 Marks)**

i- Great reactivity of fluorine is due to 1.....2.....
ii-Factors influencing complex formation are 1.....2.....3.....
iii-The balanced equation for the reaction between MnO_4^- and N_2H_4 in alkaline solution to produce MnO_2 and N_2 is .....

C) Show by equations how can you prepare the following : **(2 Marks)** **(answer four only)**

i- Urea ii- SO_2 iii- CO vi- H_2O_2 v- HF

"Good Luck "

Examiners

Dr Dina M. Fouad

Assiut University
Faciuty of Science
Chemsitry Department

Jan. 2017
Time : 3 hours

Final Exam. for the (Sec. Level & 212C)

Write the name of all compounds

*Answer for **(4 only)*** from the following questions:

1) *A- What mining by* (give examples):---------- (**10** marks)

Keto & Enol form, Quinone, Anhydride, Hydrazone, Anilide, Mezo, Xylene.

B- *Comperative between the following pairs*: (**Three only**):

1- Oxidation of Quinoline & Isoquinoline by $KMnO_4$.

2- Electophilic & Nucluophilic substitution.

3- Pyrrole & Pyridine. 4- Diazine & Diazole . 5- Amide & Emide.

2) *A-Give examples for the following reactions* (**Three only**)--(**10** marks):
1- Condensation reaction. 2- Oxidation & Reduction reaction
3- Esterification reaction. 4- Polymerization reaction.

B- Write one method to prepare the following compounds:
Thiazole * Phenazine * Gamexane* Salicylic acid.

3) *A- How do you convert* : (**Two only**)---------- (**10** marks):
1- Acetylene → Benzoic Acid. 2- Aniline → phenol
3- Sucinaldehyde → Thiophene

B-Write on **one only**:
1- Typs of the synthesis of quinoxaline derivatives
2- The relation between furfural & benzaldhyde

********** أنظر خلفة **********

Assiut University January 2017

Faculty of Science /Chemistry department Time allowed: 2 hours

Final exam in 210c Course (reaction mechanism and carbonyl compounds) for second level students

Answer the following questions :.....(15 marks)

1. Chose the correct answer for the following question:

i. bromination of benzene in the presence of $AlBr_3$ is:
   a. electropehelic addition b. nucleophelic substitution
   c. electrophilic substitution.

ii. C bearing the LG in SN reaction needs to be:
   a. SP3 b. SP2 c. SP

iii. In an S_N1 reaction: a.
   a. The rate determining step is the loss of the leaving group to form the intermediate carbocation.
   b. *bimolecular* reaction. c. The reaction pathway is single step.

iv. In an S_N2 reaction: The transition state has 5 groups around the central C atom.
   a. The reaction pathway is multi steps.
   b. C. the reaction product in optically active compounds mainly racemic mixture.

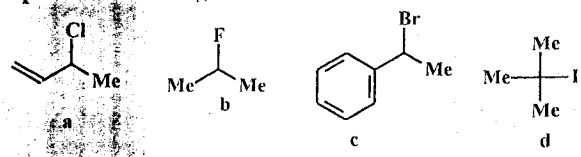
v. The E1cB including:
   a. Formation of carbocation and then elimination of proton.
   b. Elimination of leaving group at the same time of elimination of proton.
   c. Elimination of proton firstly followed by the elimination of leaving group.

vi. Which compound produces only one alkene when treated with sodium methoxide?
   a. 2-chloro-2-methylpentane b. 3-chloro-3-ethylpentane
   b. c. 3-chloro-2-methylpentane d. 2-chloro-4-methylpentane
   c. e. 2-chloro-3-ethylpentane

vii. Molecularity of the elementary reaction is:
   a. a number of molecules or ions involved in the formation of activated complex
   b. the order of the reaction
   c. a number of steps takes place by the reaction from reactants to give products

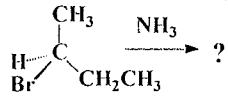
viii. Nucleofuge is:
   a. a leaving group during nucleophilic substitution reaction
   b. an attaking group during nucleophilic substitution reaction
   c. an intermediate formed during nucleophilic substitution reaction

ix. Which the most reactive compound in an S_N1 reaction.



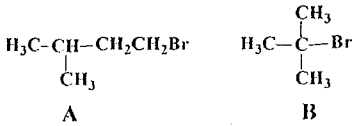
a b c d

x. Which of the following statements describes the nucleophilic substitution product obtained from the following reaction of S-2-bromobutane with ammonia in a non-polar solvent?



a. This reaction yields R-2-aminobutane as the major substitution product
b. This reaction yields S-2-aminobutane as the major substitution product
c. This reaction yields a racemic mixture as the major substitution products

xi. Which of the following compounds will react faster in a S_N1 reaction



A B

a. A b. B c. Both compounds will have the same reaction rate

Assiut University
Faculty of Science
Chemistry Department

Date: Monday 02/01/2017
Time : 03 Hours
Course No.: 210C

Final Exam. for Second Level Chemistry Students (Reaction mechanism & Carbonyl compounds)
(210C) First term ,2016/2017)

Answer the Following Questions (50 Marks)

Part A : Reaction mechanism (25 Marks)

Question One: (13 Marks)

(a) Mark Five Only (√) or (X) for the following sentences and then correct the wrong one: (5Marks)

1. Intermediates are chemical species produced in one step and consumed in a subsequent step.

2. Carbanions are stabilized by alkyl substituents.

3. 1-bromo-2-methylcyclopentane gives 1-methylcyclopentene as major product in the presence of $NaOCH_3$ via E1 mechanism

4. Cyclopentene reacts with bromine forming cis-1,2-dibromocyclopentane

5. DMSO is a suitable solvent for S_N^2 mechanism

6- The molecularity of an elementary reaction is the number of molecules or ions involved in the formation of one activated complex

(b) For the following reaction, suggest a reaction mechanism and explain how can you confirm your mechanism? (3 Marks)

$(CH_3)_2C{=}CH{-}CH_2Cl + NaOH \rightarrow (CH_3)_2C{=}CH{-}CH_2OH$ (15%) + $(CH_3)_2C(OH){-}CH{=}CH_2$ (85%)

(c) Choose the correct answer from the following sentences: (5Marks)

1- Methyl bromide reacts with CH_3ONa / CH_3OH via

a. S_N2 mechanisme , c. S_N1 mechanisme

b. E1 mechanisme , d. E2 mechanisme

2- Isotops used to find out :

a. type of intermediats , b. which bond is broken , c. type of the reagent (Nu^-,E^+)

3- The correct name for the compound $(CH_3)_2CH.CH(CH_3).CH_2.CH{:}CH_2$ is:

a. 4-methyl-4-isopropylbut-1-ene , b. 4,5-dimethylhex-1-ene , c. 2,3-dimethylhex-5-ene

انظر بالخلف

Assiut University

Faculty of Science
Chemistry Department

Final Examination of Organic Chemistry (211C) for 2nd level Students
(Petroleum Geology Section)

Date: Tuesday , 10/1/2017 **Time: 2 hours.**

Answer the following questions: **(50 Marks)**

1-Draw the chemical structure of the following compounds: **(4×2 Marks)**

a) Quinoxaline
b) p-Methylacetophenone
c) Picric acid
d) Pent-3-enoic acid

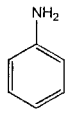
2- Using the resonance theory, explain why the hydroxyl group in phenol is an activating group and ortho-para director, while the nitro group in nitro benzene is a deactivating group and meta director. **(3 Marks)**

3- Illustrate by equations how can you prepare Five Only of the following: **(5×3 Marks)**

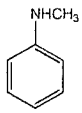
a) Benzene to dinitrobenzene
b) Malonic ester to adipic acid
c) Benzene to p-nitroaniline
d) Allyl alcohol to acrylic acid
e) Pyrrole to 1,3-butadiene
f) Acetoacetic ester to 2-butanone

4- Complete the following equations:- **(16 Marks)**

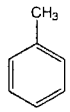
a) $CH_2\text{-}COOH$ / $CH_2\text{-}COOH$ $\xrightarrow{Ac_2O}$? $\xrightarrow{NH_3}$?

b)  $\xrightarrow{H_2SO_4}$? $\xrightarrow[HNO_3]{H_2SO_4}$? $\xrightarrow{NaOH}$?

c) $CHOCH_2CH_2CHO \xrightarrow{P_2S_5}$?

d)  $\xrightarrow{HNO_2}$?

e) $CH_3CH{=}CHCOOC_2H_5 \xrightarrow{Na/C_2H_5OH}$? $\xrightarrow{LiAlH_4}$?

f)  $\xrightarrow[heat]{2Cl_2}$? $\xrightarrow{H_2O/NaCO_3}$?

5- Low reactivity of aryl halides toward nucleophilic substitution. Why? **(5 Marks)**

6- Give the equation THREE ONLY which represents of the following: **(3 Marks)**

a) Reimer-Tiemann reaction
b) Friedel-Crafts acylation
c) Aldol condensation
d) [4+2 cycloaddition]

GOOD LUCK

Prof. Dr. Kamal I. Aly and Dr. Mohamed Gamaleldin

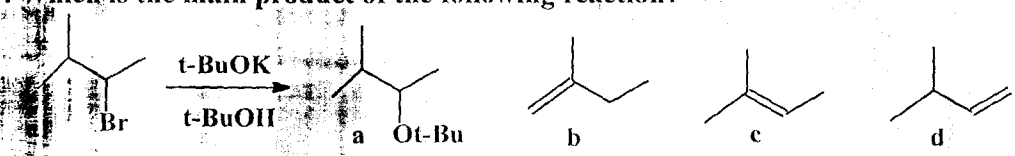
xii. Which of the following cannot react as a nucleophile?

a) CH_3OH b) CH_3O^- c) $CH_3O^+H_2$ d) CH_3OCH_3

xiii. Which of the following statements regarding the E1 mechanism is wrong?

a) Reactions by the E1 mechanism are unimolecular in the rate-determining step.
b) b) Reactions by the E1 mechanism are generally first order.
c) c) Reactions by the E1 mechanism usually occur in one step
d) Reactions by the E1 mechanism are multi-step reactions

xiv. Which is the main product of the following reaction?

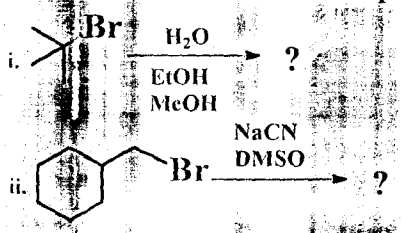


xv. Which of the following statements regarding mechanisms of elimination reaction is wrong?

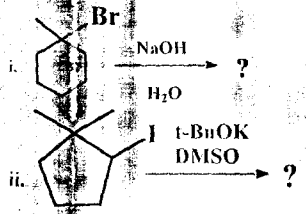
a) The E1 mechanism does not require a base.
b) The E2 mechanism generally occurs under highly basic conditions
c) The E2 mechanism is stereospecific
d) The E1cB mechanism is usually unimolecular in the rate-determining step but leads to a second order rate law.

2. Answer the following:.....(10 marks)

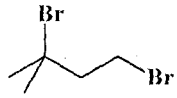
a. Predict the major substitution product(s) of the following reactions and determine if they are formed from SN1 or SN2 pathways.



b. Predict the major elimination product of the following reactions and indicate if they are from E1 or E2 pathways.



c. For the following dibromo alkane determine which position will react faster (be more reactive) under S_N1 and S_N2 conditions. Explain your answer.



Good luck
Adel M. Kamal

Assiut University
Faculty of Science
Chemistry Department

Date: 9th Jan 2017

Time: 2 hours

C-205 Analytical Chemistry Exam for Industrial Chemistry Student's Program

Answer ***Five only*** from the Following Questions: *(50 Mark)*

1- Define the following Terms: *(10 Marks)*
Accuracy- Precision- Recovery- Ionic Strength- Buffer solution.

2- Write Henderson- Hasselbalch equation for an acid and a base. *(10 Marks)*

3- Construct the titration curve resulting from the titration of 50.00 mL of 0.020 00 M MES (pKa=6.27) with 0.100 0 M NaOH. *(10 Marks)*

4- A) CO_2 dissolves in water to form carbonic acid as follows:
$CO_2\ (g) + H_2O \Longleftrightarrow H_2CO_3\ (aq)$ $K_H = 3.4 \times 10^{-2}$
At a CO_2 pressure of 0.0046 atmospheres, what is the concentration of the carbonic acid in water? *(5 Marks)*

B) 1.435 g sample of dry $CaCO_3$ and $CaCl_2$mixture was dissolved in 25.00 mL of 0.9892 M HCl solution. What was $CaCl_2$ percentage in original sample, if 21.48 mL of 0.09312 M NaOH was used to titrate excess HCl? *(5 Marks)*

5- Write short note on:
Components of Quality assurance- The Objective of Quality assurance- Factors influencing the quality of analytical data- Gravimetric Analysis. *(10 Marks)*

6- A) Consider the monoprotic dissociation of carbonic acid:
$H_2CO_3 \Longleftrightarrow H^+ + HCO_3^-$ $Ka = 4.68 \times 10^{-7}$
What is the pH? *(5 Marks)*

B) A mixture containing only Al_2O_3 (FM 101.96) and Fe_2O_3 (FM 159.69) weighs 2.019 g. When heated under a stream of H_2, Al_2O_3 is unchanged, but Fe_2O_3 is converted into metallic Fe plus H_2O (g). If the residue weighs 1.774 g, what is the weight percent of Fe_2O_3 in the original mixture? *(5 Marks)*

Good Luck

Examiner: Prof. Dr. Nagwa Abo El-Maali

(c) α,β-Unsaturated aldehyde (d) α,β-Unsaturated ketone

(iii) Cyclohexanone reacts with hydroxylamine to form the corresponding

(a) Enamine (b) Hyrdazone (c) Oxime (d) Imine

(iv) Cyanide reacts rapidly with carbonyl compound via the base catalyzed to form

(a) Hemiacetal (b) Enolate (c) Yilide (d) Cyanohydrine

(v) Aldehyde reacts with Grignard reagent to make

(a) Alcohols (b) Ketones (c) Acids (d) all of them

(iv) The reaction is a nucleophilic substitution in which an enolate react as nucleophile

(a) Crossed Cannizaro (b) Cannizaro reaction (3) Claisen reaction

(c) What products, would you expect from the reaction of phenyl magnesium bromide with Three only from the following :- (3 Marks)

(i) Ethyl formate (ii) Acetonitrile (iii) Acetyl Chloride (iv) Carbondioxide

GOOD LUCK

الممتحنين : ا.د. زينب عبد الحميد حزين د. اميمه سعد د.احمد فكرى د. عوض إبراهيم

Chemistry Department Jan 2017

Faculty of Science Time: 2h

Assiut University (207C course, Inorganic Chemistry, Industrial program)

Answer the following questions

1. a) Suggest a method for the preparation of FOUR of the following compounds and metals: H_2 – TiO_2 – Mn - CrO_2Cl_2 – Zn - AuCl . (8 Marks)

   b) Complete the following equations: (4 Marks)

   i) SO_2 + PCl_5 → +

   ii) XeF_6 + $3H_2O$ → +

   iii) $2NH_4VO_3$ (heating) → + +

   iv) $Cu(OH)_2$ (heating) → +

2. a) Define the lanthanide contraction and its consequences on the lanthanides chemistry. (4 Marks)

   b) Give the industrial method used for the preparation of hydrogen peroxide and sulphuric acid and then draw the structure of both. (8 Marks)

3. a) "$Fe(OH)_2$, NiS and $Mn(OH)_2$ are oxidized by air after precipitation". Give the chemical formula of the oxidized form for each. (3 Marks)

   b) Give reasons for **FIVE** of the following: (10 Marks)

   i) Solutions of Be salts are acidic (give an equation). ii) BCl_3 fumes in air.

   iii) Ga, In and Tl form monovalent ions while B and Al do not.

   iv) Chromic sulphide does not precipitate from H_2S solutions.

   v) $FeSO_4.7H_2O$ forms a dark greenish brown compound with NO gas.

   vi) The first ionization potential of copper is higher than that of alkalis.

4. a) give the nomenclature of the following complexes: (6 Marks)

   $[Co(NH_3)_4Cl_2]^+$, $[Ag(CN)_2]^-$, $[Cr(NH_3)_3Cl_3]$

   b) Give two methods for the preparation of metal carbonyls and then draw the mode of bonding between CO and the metals and the corresponding molecular orbital diagrams. (7 Marks)

Examinar: Prof. Dr. Aref A. M. Aly

Assiut University **Date: 10/1/2017**
Faculty of Science **Time: 3 hours**
Chemistry Department

The Final Physical Chemistry-2 Examination (C-232) for 2nd Level Students

Answer the following questions:

I- Colloids:

1- Explain what is meant by **Only Three** from the following terms (Give an **example** for each one): (**4.5** Marks)

i) **Associated Colloids.** ii) **Peptization by ions.**

iii) **Protective colloids.** iv) **Salting out** of an emulsified substance.

2- Describe a method for the preparation of **Only Three** from the following: (**4.5** Marks)

i) **Colloidal mercury.** ii) **Cream from milk.**

iii **Gold sol by the reduction method** iv) **Calcium acetate gel.**

3-a) Give the **structure** of the colloidal ion of **SiO_2 sol in water.** (**2/3** Mark)

b) Write **a short note** on **Only Two** from the followings: (**3** Marks)

i) The **physical properties** of sols. ii) **Purification of sols** by **electro- dialysis** methods.

iii **The behavior of platinum sol under an applied electric potential difference.**

4-a) **Give reasons** for **Only One** from the following:- (**2** Marks)

i) The amount of electrolyte required to precipitate a given sol depends on the nature of the electrolyte added. Give an example.

ii) The breaking of oil in water emulsion stabilized by sodium soap through addition of sulphuric acid.

5- Complete Only Two from the following:- **(2 Marks)**

i) ..... is **a common thixotropic gel ,** and **the dispersed phase in emulsions** are generally ..... **charged.**

ii) ..... **sol** can be **obtained by change of solvent,** whereas ..... can be obtained by **hydrolysis.**

iii) **Edible jelly** can be **obtained by** ..... , whereas ..... can be **obtained by Bredig's arc method.**

II- Phase Rule

a) Explain briefly **Only Two** from the following: (10 Marks)

i- Sodium sulphate-water system.

ii- The two component system magnesium and zinc forming an intermetallic compound with congruent melting point.

iii- Three component liquid system with one partially miscible pair.

b) Compare between the phase diagram of water system with that of sulphur system. (3 2/3 Marks)

Assiut University

Physical Chemistry of Applied Industrial Chemistry for 2nd Level Students (Chem.203)
(Chemistry Major))
Time : 3 h
Date: Jun. 2016
Day: 4/1/2017

Faculty of Science
Chemistry Department

Answer the Following Questions:

Section (I)

Answer the following questions: **(17 Marks)**

a) Derive the kinetic equation for determination the rate constant for the following reaction.

$$A + B \xrightarrow{K_2} \text{Products}$$

b) Discuss the effect of temperature on the reaction velocity.
c) Discuss the collision theory of bimolecular reactions.
d) At 25°C the half-life period for the decomposition of N_2O_5 is 5.7 hr and is independent of the initial pressure of N_2O_5 calculate (i) the specific rate constant and (ii) the time required for the reaction to go 90% to completion.

Section (II)

Answer Three questions only for the following: **(16.5 Marks)**

a) Discuss two features only which characterize heterogeneous catalytic processes.
b) Derive the relation between the ionic strength and rate constant for a given reaction.
c) Discuss the different steps in heterogeneous catalytic reactions and then show how the diffusion steps become the rate determining steps.
d) Write short notes on:
   i) Catalyst poisoning ii) Structural promoters

Section (III)

Answer Three only for the following: **(16.5 Marks)**

1) Define the following terms:
   i) Ionization energy (ii) F- center (iii) Schottky and Frenkel defects
   (iv) Periodic lattice (v) Point defects (vi) center of symmetry
2) Discuss how the electrical conductivity of NiO semiconductor be changed by addition of Al^{3+} and Li^{+} ions.
3) Prove an empirical law that be used for calculation of the specific heat of solids.
4) Explain the non-stoichiometry of solid compounds.

(Good Luck)

Prof. Y. M. Temerk , Prof. R. M. Gabr and Prof. Abd El-Aziz A. Said

c) Complete each of the following: (3 Marks)

i- The addition of salt to ice results in considerable lowering of temperature due to ..... .
ii- In order to completely define three component system, ... variables are required namely, ...
iii- A saturated solution of sodium chloride has phases and components equal to ..... and ....., respectively.

III- Electrochemistry :

Answer the following questions: (16 2/3 Marks)

1- Calculate the pH of hydrogen ion in the following cell if $E_{cell} = 0.48$ V

$$Pt, H_2 / H^+ // Cl^-, Hg_2Cl_2 / Hg$$

(X) 0.244 V

2- Write briefly with drawing on **One Only** of the following:

a) Weston cell, b) Non-metallic electrode.

3- Calculate the ionic concentration and pH of the H^+ solution if $E_{H2} = 0.24$ V.

4- From the following cell: $Zn / Zn^{2+} // Zn^{2+} / Zn$

a- The type of the cell is .....

b- The type of the cell in case of

1- Zn^{2+} ions in both electrodes have the same concentrations.

2- Zn^{2+} ions concentration in one of them is 10^{-3} M and the other is 1 M.

3- Calculate E°_{cell} for the above cell.

5- For the following electrochemical reaction: $Cd_{(s)} + Cu^{2+} \rightleftharpoons Cd^{2+} + Cu_{(s)}$

a- Draw the cell.

b- Calculate the cell potential at standard conditions knowing that $E^\circ_{Cd} = -0.4$ V and $E^\circ_{Cu} = 0.34$ V.

c- Calculate the cell potential if $Cd^{2+} = 10^{-3}$ M and $Cu^{2+} = 10^{-2}$ M.

d- Calculate ΔG° and ΔG for the above concentrations.

---------- **Good Luck** ----------

Prof. Dr. Maher M. Girgis .
Prof. Dr. Maher M. A. Hamed .
Dr. Mustafa H. Wahdan.

Assiut university **January 2017**
Faculty of science **Time 2 hours**
Chemistry Departement

Final examination in Organic chemisty 211C for non chemistry students (the chemistry of aliphatic compounds and some selected aromatic compounds)

Answer the following questions---------- 50 marks

Question1 Answer five only of the following---------- 17.5 marks

a-provide the structure and name of the product of the following reaction
1,3-butadine +acrolein----------→?

b-By means of equations convert succinic acid to N-bromosuccinimide

c-Prepare 2-pentanone from ethyl acetoacetate(EAA)

d-Effect of heat on maleic and fumaric acid at mild temparture(140C°)

e-What the structure of the product of the following reaction
CH3CH2CHO +PhMgBr/ether----------→? + $H3O^{+}$----------→?

f-Use ethyl malonate(DEM) for the synthesis of heterocyclic compounds

Question 2 Answer five only of the following----------17.5 marks

a-Complete and propose a mechanism for the following reaction
Cyclohexyl bromide +alc.KOH/heat----------→?

b-What the products would you expect from the following reaction
(CH3)3CBr+EtOH/H2O----------→?

c-Reaction of 2-methylpropene with HBr and give the type of the reaction

d-Give the structure of compound A and B in the following synthesis
Calcium adipate/heat----------→A + HCN----------→B

e-Put the sign(√)on the right sentence and the sign(x)on the wrong one
i-Allenes classified as conjugated dienes , ii-methyl vinyl ketone forms the cyanohydrin compound when reacts with HCN , iii-CH3 group classified as weak deactiving group

f-Define the following terms i- Isomerism ii-Nuclophile

Question 3 Answer five only of the following---------- 15 marks

a-What the mechanism of the following reaction?
PhH +Cl2/AlCl3----------→PhCl

b-What the sandmeyer reaction?

c-Complete the following sequence reactions
PhSO3Na^{+}+KCN/fusion----------→? + $H3O^{+}$----------→?

d-Give the nitration products of the following compounds
i-Methyl benzoate ii-phenyl acetate

e-1,2dinitrobenzene can undergoes nuclophilic displacement when reacts with nuclophile. Give example

f-Complete and give the name of the following reaction
PhH+CH3CH2COCl/ALCl3----------→?

GOOd Luck

Prof.Dr.Sh.M.Radwan Sh M Rad

Assiut University
Faculty of Science
Chemistry Department

Jan:2017
Time:2 hrs

Final Examination of Introductory Quantitative Analysis(C-240)
For Second Level Students

Answer **Four** Questions Only: (12.5 marks for each question)

1)a- Write briefly on:-
(i) Bronsted acid- base theory.
(ii) Acid- base indicators.
b- An acetic acid- sodium acetate buffer of pH 5.00 is 0.1 M in sodium acetate. Calculate the pH after the addition of 10 ml of 0.1M NaOH to 100 ml of the buffer. (pK_a=4.76)

2)a- Define the following:-
Equivalence point – End point – Autoprotolysis – Electrode potential.
b- Tris (hydroxymethy) amino methane (Tris) is a weak base used to prepare buffers in biochemistry. What wright of Tris must be taken with 100 ml of 0.5 M HCl to prepare 1L of a pH 7.4 buffer?
(For Tris M.wt=121.135 , pK_b=5.92)

3)a- Write briefly on:-
(i) Substitution titrations.
(ii) Detection of the end point in a redox titration.
b- What volume of 0.155 M H_2SO_4 is required to titrate 0.293 g of 90.0% pure LiOH? (At.wts Li=6.93 , O=16 , H=1)

4)a- Explain the principles of adsorption indicators.
b- Chloride in a brine solution is determined by Volhard method. A 10.0 ml aliquot of the solution is treated with 15.0 ml of standard 0.1182 M $AgNO_3$ solution. The excess silver is titrated with standard 0.101 M KSCN solution , requiring 2.38 ml to reach the red $Fe(SCN)^{2+}$ end point. Calculate the concentration of chloride in the brine solution , in g/L (At.wt Cl=35.5)

5)a- An amine , RNH_2 , has a pK_b of 4.20. What is the pH of a 0.20 M solution of the base.
b- A solution is 10^{-3} M in $Cr_2O_7^{2-}$ and 10^{-2} M in Cr^{3+}. If the pH is 2.0 , calculate the potential of the half-reaction.($E°\ Cr_2O_7^{2-}, Cr^{3+}$=1.33V)
c- Calculate the potential of a solution obtained by reacting 10 ml each of 0.20 M Fe^{2+} and 0.20 M Ce^{4+}.
($E°\ Fe^{3+}, Fe^{2+}$=0.77V , $E°\ Ce^{4+}, Ce^{3+}$=1.61V).

Good Luck"""""

Examiner: Prof.Dr.Hassan Sedaira

Fourth Question: Choose the correct answer of the following: (15 Marks)

i) Which of the following statement describes the formation of 3-bromo-1-butene from the reaction of HBr with 1,3-butadiene?

a) kinetic product
b) thermodynamic product
c) 1,4-addition product
d) 1,2-addition product
e) a and d
f) b and c

ii) One of the following compounds readily undergoes S_N1 reactions due to stability of its carbonium ion. Is it

a) CH_3Cl
b) CH_3CH_2Cl
c) $CH_2=CH-Cl$
d) $CH_2=CH-CH_2Cl$

iii) The S_N2 reaction is

a) more than one step
b) concerted reaction
c) second order reaction
d) one step reaction
e) a, b and c
f) b, c and d

iv) In the acid-catalyzed dehydration of alcohols, which of the following is most easily dehydrated?

a) $(CH_3)_3C-CH_2OH$
b) $(CH_3)_3C-OH$
c) $(CH_3)_2CH-CH_2OH$
d) $(CH_3)_2CHOH$

v) A typical reaction of the olefinic bond is

a) electrophilic substitution
b) nucleophilic substitution
c) electrophilic addition
d) nucleophilic addition

vi) An E1 elimination reaction is

a) more than one step
b) one step
c) concerted
d) first order
e) a and d
f) a and c

vii) In S_N2 reaction the order of the reactivity of alkyl halides is

a) primary allyl > 3° > 2° > 1°
b) 3° > primary allyl > 2° > 1°
c) primary allyl > 1° > 2° > 3°
d) 1° > 2° > primary allyl > 3°

viii) All the following factors favored an E2 reaction except:

a) strong base
b) high temperature
c) obey Zaitsev's rule
d) low temperature
e) regioselective

ix) A pair of enantiomers is identical with each other with respect to following properties except:

a) chemical reactivity
b) melting point
c) direction of rotation of light
d) solubility in a given solvent
e) density

x) Carbocations reacted by following reactions except

a) rearrangement
b) accept a proton to form alkane
c) accept a nucleophile
d) loss a proton to form alkene

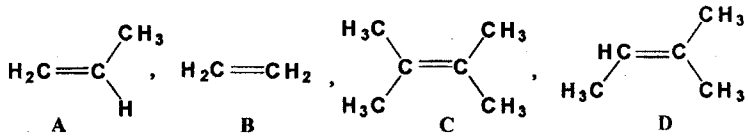
Examiner: Prof. Dr. Hassan El-Sherief.

4- Which of the following statements apply to S_N2 reaction of alkylhalides ?
a. Rate = k [base] , b. Rate = k [RX] , c. Rate = k [base][RX]

5- Which compound produces only one alkene when treated with sodium methoxide ?
a. 2-chloro-2-methylpentane , c. 3-chloro-2-methylpentane
b. 3-chloro-3-methylpentane , d. 2-chloro-4-methylpentane

Question Two: (12 Marks)

(a) Arrange the following according to the given property inside the rectangle: (3 Marks)

1- 

Inreasing the Stability

2- Br^-, F^-, I^-, Cl^-
A B C D

Inreasing the Basiity

3- CH_3Cl, $(CH_3)_3CCl$, CH_3CH_2Cl, $(CH_3)_2CHCl$
A B C D

Tendency to S_N1

(b) Discuss by equations the reaction mechanism of acid-catalyzed hydrolysis of methyl vinyl ether.

write the name of this reaction and the name of selectivity. (3 Marks)

(c) 1-bromo-2-methyl cyclohexane undergoes a sterospecific elimination in the presence of potassium tertiary butoxide and tertiary butyl alcohol. The *cis* isomer gives regioselectively ,the Zaitsev's product according to Hammond's postulate. (4 Marks)

1- What is the meaning of:
i. Regioselective and sterospecific reactions
ii. Hammond's postulate that predicts the major product
iii. Zaitsev's rule

2- Give a reaction mechanism for the elimination reaction of *cis*-1-bromo-2-methyl cyclohexane and explain it by the energy diagrams?

(d) Suggest a reaction mechanism for the addition of HBr to Propene in the presence and absence of peroxide? (2 Marks)

Section (B) Carbonyl compounds: (25 marks)

Question Three:-

(a) Which of the following is true for 3-Methylbutanal: (5 Marks)

(i) This compound may be classified as ketone.

(ii) An Aldol reaction takes place on treatment with NaOH solution.

(iii) There is no reaction with LiAlH4 in ether.

(iv) An excess of CH_3MgBr /ether reacts to give 4-methyl-2-pentanol.

(v) Wolff-Kishner reduction gives butane.

جامعة أسيوط كلية العلوم شعبة كيمائية صناعية	امتحان مادة التسويق	امتحان الدور الأول ٢٠١٧ الامتحان ورقتان

أجب على جميع الأسئلة التالية:

السؤال الأول:

أ- في شكل جدول حدد عما إذا كانت كل من السلع التالية سلع ميسرة (استقرابية) أو سلع خاصة علل إجابتك؟

١- آلة العود أو الكمان
٢- مناديل الورق كلينكس
٣- أحذية كوتشي
٤- سجائر تباع في السوق الحرة فقط
٥- ماكينات تصوير زيروكس

ب- حدد المشترى الأخير أو المشترى الصناعي في كل مما يلي معللا إجابتك:-

١- بقال يشتري ثلاجة كهربائية لحفظ بعض المنتجات التي تباع في متجره.
٢- بقال يشتري ثلاجة كهربائية لحفظ بعض المنتجات التي تباع في منزله.
٣- بقال يشتري آلة حاسبة لتقديمها هدية لابنه.
٤- مستشفي يشتري عقاقير طبية لاستخدامها في حجرة عمليات المستشفي.
٥- مستشفي يشتري بعض الأدوية لبيعها داخل المستشفي.

السؤال الثاني: أكتب المصطلح العلمي الدال على هذه العبارة:-

١- العملية التي يقوم من خلالها الفرد باختيار وتنظيم وتفسير المعلومات التي يتلقاها .
٢- قوي داخلية دافعة توجه سلوك الشخص نحو تحقيق أهدافه.
٣- تغيير في سلوك الشخص الناتج من سلوكه السابق في مواقف مماثلة.
٤- المعرفة والأحاسيس والمشاعر الايجابية أو السلبية نحو شيء ما
٥- التكوين أو الهيكل الداخلي للشخص حيث ترتبط فيها التجربة والسلوك بطريقة منظمة
٦- مجموعة من المنافع والاشباعات التي يتوقع أن يحصل عليها المشتري نتيجة شرائه لهذا المنتج
٧- إضافة منتجات جديدة إلي المنتجات التي تقوم الشركة حاليا بإنتاجها أو تسويقها.

انظر الورقة الثانية،،،

(b) Starting with ethyl aceto acetat or diethylmalonate show by equations, how to synthesis Two only of the following :- **(2 Marks)**

(i) Acetyl cyclohexane. **(ii) Cyclopentane-1-carboxylic acid.**

(iii) 2,2-Dimethyl-3-oxobutanoic acid.

(c) Show by equations the reaction mechanism of Three only of the following:- **(3 Marks)**

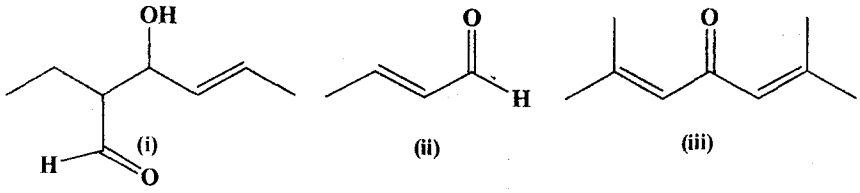
(i) $PhCOOH + CH_3OH \xrightarrow{H^+}$

(ii) $PhCOCH_3 + 3I_2 \xrightarrow{NaOH}$

(iii) Cyclohexanone + Excess $C_2H_5OH \xrightarrow{H^+}$

(iv) $PhCHO \xrightarrow{NaOH}$

(d)Write the IUPAC name of Two Only from the following :- **(2 Marks)**



Question Four:-

(a) Complete Five only of the following :- **(5 Marks)**

(i) $CH_2(CN)_2 \xrightarrow{H_3O^+}$? $\xrightarrow{C_2H_5OH/H^+}$?

(ii) $CH_3\text{-}C{\equiv}CH \xrightarrow[H_2SO_4/H_2O]{HgSO_4}$? $\xrightarrow[NaOH]{Benzaldehyde}$? + ?

(iii) $PhCH_2COOH \xrightarrow{PCl_5}$? $\xrightarrow{NH_3}$? $\xrightarrow{Br_2/NaOH}$?

(iv) $PhCH_2Cl \xrightarrow{NaCN}$? $\xrightarrow[hydrolysis]{H_2O/H^+}$?

(v) $CH_3CH_2CH_2CHO \xrightarrow{K_2Cr_2O_7/H^+}$? $\xrightarrow{PCl_5}$? $\xrightarrow{C_2H_5NH_2}$?

(vi) $PhCH{=}CHCH_2CH_3 \xrightarrow[\triangle]{Conc.\ KMnO_4}$? + ?

(b) Choose the correct answer for Five only of the following :- **(5 Marks)**

(i) Conversion of a carboxylic acid to primary alcohol is known as.....reaction.

(a) Reduction **(b) Oxidation** **(c) Esterification** **(d) Addition**

(ii) Two molecules of acetaldehyde react with each other in heating solution of NaOH to form

(a) β-Hydroxy aldehyde **(b) α-Hydroxy aldehyde**

Chemistry Department **Jan 2017**
Faculty of Sinece **Time 2 hours**
Assiut University

Final exam in Electrochemistry C209, 1st semester , second level students

($F = 96485\ C\ mol^{-1}$, $R = 8.314\ J\ K^{-1}\ mol^{-1}$, $A = 0.509 / (mol\ kg^{-1})^{1/2}$, $Cr = 52\ g\ mol^{-1}$, $Ca = 40.1\ g\ mol^{-1}$, $Mg = 24.3$, $Cl = 35.45$, $E°(Ni^{2+}/Ni) = -0.25$ V, $E°(Pb^{2+}/Pb) = -0.13$ V, $E°(Al^{3+}/Al) = -1.66$ V, $E°(Cu^{2+}/Cu) = 0.34$ V, $E°(Zn^{2+}/Zn) = -0.76$ V $E°(H^{+}/H) = 0.0$ V*)*

Section I

Answer Only TWO from the following questions: **(15 marks for each)**

1-a) Balance the following redox reaction in acidic solutions: $Fe^{2+} + Cr_2O_7^{2-} \longrightarrow Fe^{3+} + Cr^{3+}$

b) The exchange current density for the evolution of hydrogen at platinum is 3.0×10^2 mA m^{-2}. Using the polarization resistance equation calculate the current density at 298 K for an overpotential 10 mV?

c) How many minutes would be required to electroplate 25.0 grams of chromium by passing a constant current of 4.80 amperes through a solution containing $CrCl_3$?

2- a) Predict whether $Pb^{2+}(aq)$ can oxidize Al(s) or Cu(s) under standard state conditions. Calculate E° for each reaction at 25°C, indicate your answer by chemical equations.

b) Using the Debye-Hukel limiting law, calculate the value of $\gamma_\pm$ in 5×10^{-3} m solution of $Ca(NO_3)_2$.

c) Complete the following :(i) Cathode is the .....at which .....occurs. (ii) In a galvanic cell, a ..... chemical reaction generates..... (iii) Hydration is the process in which .....

iv) Electrolyte is an ..... conductor where it conduct the electricity through the .....

v) The amount of ..... changed during electrochemical reaction is proportional to the amount of ..... passed.

3-a) What is the ionic strength of a solution containing 5 g/L $MgCl_2$?

b) Consider a galvanic cell that uses the reaction $Zn(s) + 2\ H^+(aq) \rightarrow Zn^{2+}(aq) + H_2(g)$
Calculate the cell potential at 25°C when $[H^+] = 1.0$ M, $[Zn^{2+}] = 0.001$ M, and $P_{H2} = 0.1$ atm.

c) Define the types of solid electrolytes, give an example for each type.

Section II

Answer the following questions:

a) Describe the energy profile of electrode reaction $Ag^+_{(aq)} + e^- = Ag_{(s)}$, in absence and in application of $\Delta\Phi$ potential to reduction process. Estimate the electrochemical rate equation for this electrode reaction. **(10 marks)**

b) Consider a voltaic cell based on the following cell reaction: $Ni(s) + At_2(s) \rightarrow Ni^{2+}(aq) + 2At^-(aq)$
Given that the standard cell emf is 0.55 V, what is the standard reduction potential for astatine? **(5 marks)**

c) Describe the components of the polarization cell. **(5 marks)**

Best wishes

الاستاذ الدكتور/ ابوالحجاج عبدالعزيز هرماس

Faculty of Science | January 2017

Chemistry Department | Time: 2 Hours

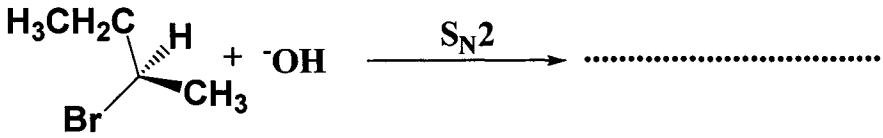
Final Examination of Organic Chemistry (201C) for 2nd Level Students

Industrial Chemistry

==========

Answer the following questions:

First Question: Complete the following equation and answer the related questions: (15 Marks)



(*R*)-2-Bromobutane

1) Write a reaction mechanism.
2) Draw its reaction coordinate diagram.
3) Is the reaction product optically active or not?
4) Use Fischer projection to assign the configuration of both reactant and product.

Second Question: Complete **Five Only** of the following equations and illustrate the major product.

(10 Marks)

i) $CH_2=CH-CH_2CH(Br)-CH(CH_3)-CH_3 \xrightarrow{E_2} (A) + (B)$

ii) $(CH_3)_2CH-CH=CH_2 + HBr \longrightarrow (A) + (B)$

iii) $CH_3-CH(F)-CH2-CH_3 \xrightarrow{E_2} (A) + (B)$

iv) $CH_3Br + Mg \xrightarrow{\text{dry ether}} (A) + CH_3CHO \longrightarrow (B) \xrightarrow{H^+} (C)$

v) $(CH_3)_2C=CH-CH_2-CH=CH_2 + HBr \longrightarrow (A) + (B)$

vi) $(CH_3)_2-C(OH)-CH_2OH + H_2SO_4 \longrightarrow (A) + (B)$

Third Question: Complete the following equation and answer the following related questions: (10 Marks)

$$(CH_3)_2C=CH_2 + HBr \xrightarrow{\text{peroxide}}$$

a) Write its reaction mechanism.
b) What side products would be obtained from the termination steps.

Assiut University
Faculty of Science
Chemistry Department

Jan:2017
Time:3 hrs

Physical Chemistry Examination(230 –C) For Second Level Students

---

Answer the following questions:

1) Answer **Only Three** from the following: (16.5 marks)

a) Derive kinetic equation for determination the specific rate constant and the half life time for the following reaction: $3A \xrightarrow{K_3} \text{products}$.

b) Discuss the theory absolute traction rates.

c) Discuss the half change method for determination the order of reaction.

d) At 378.5°C the half–life period for the first order thermal decomposition of ethylene oxide is 363 min ,and the energy of activation of the reaction is 52,000 cal mol^{-1}.From these date estimate the time required for ethylene oxide to be 75% decomposed at450°C.

2) Answer **Only Six** from the following: (33.5 marks)

a) Drive an expression for the efficiency of Carnot's engine working between two temperatures T_1 andT_2.

b) A certain substance has a molar heat capacity Cp given by:
$Cp(s)=5\times10^{-3}T^2$ where $0<T<50K$, $Cp(s)=6$ where $50\leq T<200$ K and $Cp(liq)=7$ where $200<T<500$ K , all in cal mol^{-1} K^{-1}.At the melting point , 200 K , ΔH of fusion=600 cal mol^{-1}.
i) Calculate the molar entropy of this substance in the liquid state at 400 K.
ii) Calculate the molar enthalpy of fusion, entropy of fusion , and Gibbs free energy of fusion at 130 K.

c) Two moles of CO_2 gas at O°C is cooled down to $CO_{2(liq)}$ at -78.6 °C. The cooling is carried out reversibly and irreversibly by placing the sample in liquid nitrogen at -196°C. Calculate the values of the entropy changes for the process given that $\Delta H_{(cond)}$=-23.2 J mol^{-1} at -78.6 °C and $C_p=32+0.02T - 23\times10^{-6}T^2$.

d) Given for formic acid that ΔH_{fus}=2701 cal mol^{-1} at its melting point ,- 17.2°C and ΔH_{vap}=6210 cal mol^{-1} at its boiling point , 128°C. Calculate the entropy change when 138 gm of the vapor is condensed at 128.0°C and changed to a solid at -17.2°C , all under constant pressure of 1 atm.(molar heat capacity of formic acid is 26 cal mol^{-1} deg^{-1} and M.wt of formic acid=46).

e) Given the two half – reactions with their standard potentials:
$Cu \leftrightarrow Cu^{2+} + 2e$ -0.34V. and $Zn^{2+} + 2e \leftrightarrow Zn$ -0.76V.
Find $\Delta G°$, is the reaction spontaneous? (F=96.485 KJ mol^{-1} K-1 V^{-1})

f) What weight of ice is melted at 0°C by the heat liberated by condensing 180 g of super heated steam at 150°C (b.p of water=100°C , heat of vaporization =540 cal g^{-1} , heat of fusion of ice =80 cal g^{-1}, specific heat od steam=1.6 cal g^{-1} $degree^{-1}$.

g) Calculate the internal energy change of the reaction : $2Cl_{2(g)}+7O_{2(g)} \leftrightarrow 2Cl_2O_{7(g)}$ at25°C, given that the gases are ideal. The enthalpy ΔH , for the formation of $Cl_2O_{7(g)}$ is 63.4Kcal mol^{-1} at 25°C.(R=1.986 cal mol^{-1} K^{-1}).

Examiners: Prof.Y.Temerk ; Prof.A.El-Awad.

Section II (Mark: 25)

Answer the following questions

I) Choose the correct answer: (Mark: 10)

1) At constant P: $\Delta S^{\#} = ..$ a) $nC_V \ln\frac{T_2}{T_1}$, b) $nC_V \ln\frac{T_1}{T_2}$, c) $nC_P \ln\frac{T_2}{T_1}$, d) zero

2) If $\Delta H^{\#)}$ is negative, thus, K is: a) decrease, b) increase, c) zero, with T

3) If $\Delta H^{\#}$ is positive , so $d\ln K$ is: a) negative, b) Positive, c) zero, d) ∞

4) If dT, is positive, thus, the reaction: a) endothermic, b) exothermic, c) 0.0

5) If $\Delta G^{\#o}$ is a negative, corresponds to: a) lower K, b) large K, c) costant K

6) Under adiabatic expansion of an ideal gas: $\Delta Q = ...$ a) ΔW b) ΔE, c) *Zero*

7) For reversible process : $\Delta G^{\#} =..$ a) Q_{rev}, b) Q_{irrev} c) Zero d) $\succ$ *zero*

8) For irreversible process: $\Delta G^{\#} = ...$ a) ΔQ, b) $\Delta H^{\#}$ c) < 0.00

9) $\ln K = \frac{.....}{.....} + \frac{.....}{.....}$, 10) $\frac{d(\ln K)}{dT} = \frac{-.....}{.....}$

II -a) Show, how can you calculate the work done (W) in each operation, maximum work (W_{max}), and efficiency (η) during Carnot cycle

II-b) Show that under adiabatic conditions for the expansion of an ideal gas: $PV^{\gamma} = Constant$ (Mark: 6)

III-a) Prove that the equilibrium constant (K) for the chemical reaction is affected by the change in temperature (T):

$$aA + bB \overset{K}{\longleftrightarrow} cC + dD$$

III-b) for decomposition of gaseous $H_2O_{2(g)}$ according to the reaction:

$$H_2O_{2(g)} \overset{k_1/k_{-1}}{\longleftrightarrow} H_2O_{(g)} + \frac{1}{2}O_{2(g)} \quad \text{if:} \quad \Delta G^{\#0} = -29.9\ kcal\ mol^{-1}$$

What is the value of the K of this reaction at: $T = 320.K$ (Mark: 6)

IV) The K for the reaction: $2NO_{2(g)} \overset{K}{\longleftrightarrow} N_2O_{4(g)}$ is:

$K_1 = 8.5.$, at $T = 320.K$, $\Delta H^{\#0} = -13.75\ kcal/mol$, and $R = 1.98 cal/mol - \text{deg}$

Calculate: (i) $K_2.$,at $T = 273.K$,

(ii) $\Delta G^{\#0}$, (iii) $\Delta S^{\#0}$ at $T = 310\ K$ (Mark: 3)

Good Luck

Examiners: Prof. Dr. Amna S A Zidan, Prof. Dr. Seddique M Ahmed

Assiut university **January 2017**
Faculty of science **Time 2 hours**
Chemistry Departement

Final examination in Organic chemisty 211C for non chemistry student (the chemistry of aliphatic compounds and some selected aromatic compounds)

Answer the following questions---------- 50 marks

Question1 Answer five only of the following---------- 17.5 marks

a-provide the structure and name of the product of the following reaction
1,3-butadine +acrolein---------->?

b-By means of equations convert succinic acid to N-bromosuccinimide

c-Prepare 2-pentanone from ethyl acetoacetate(EAA)

d-Effect of heat on maleic and fumaric acid at mild temparture(140C°)

e-What the structure of the product of the following reaction
CH3CH2CHO +PhMgBr/ether---------->? + H_3O^+---------->?

f-Use ethyl malonate(DEM) for the synthesis of heterocyclic compounds

Question 2 Answer five only of the following----------17.5 marks

a-Complete and propose a mechanism for the following reaction
Cyclohexyl bromide +alc.KOH/heat---------->?

b-What the products would you expect from the following reaction
$(CH_3)_3CBr$ +EtOH/H_2O---------->?

c-Reaction of 2-methylpropene with HBr and give the type of the reaction

d-Give the structure of compound A and B in the following synthesis
Calcium adipate/heat---------->A + HCN---------->B

e-Put the sign(√)on the right sentence and the sign(x)on the wrong one
i-Allenes classified as conjugated dienes , ii-methyl vinyl ketone forms the cyanohydrin compound when reacts with HCN , iii-CH3 group classified as weak deactiving group

f-Define the following terms i- Isomerism ii-Nuclophile

Question 3 Answer five only of the following---------- 15 marks

a-What the mechanism of the following reaction?
PhH +Cl_2/$AlCl_3$---------->PhCl

b-What the sandmeyer reaction?

c-Complete the following sequence reactions
$PhSO_3Na$+KCN/fusion---------->? + H_3O^+---------->?

d-Give the nitration products of the following compounds
i-Methyl benzoate ii-phenyl acetate

e-1,2dinitrobenzene can undergoes nuclophilic displacement when reacts with nuclophile. Give example

f-Complete and give the name of the following reaction
PhH+CH_3CH_2COCl/$ALCl_3$---------->?

GOOd Luck

Prof.Dr.Sh.M.Radwan