Department of Chemistry		Date: 21/12/2017
Faculty of Science		Time: Two hours

Final Examination in Analytical Chemistry (C-205) For 2nd level Students
(Industrial Chemistry Program)

Answer the following questions:

First question: Answer *two only* from the following: **(12 Marks)**

1. What is the buffer capacity and at what pH it has a maximum value?
2. List three different methods for argentometric titrations and describe only one of them.
3. Derive a titration curve for the titration of 50 mL of 0.1 M acetic acid (K_a= 1.75 x 10^{-5}) with 0.1 M sodium hydroxide.

Second question: Answer *two only* from the following: **(14 Marks)**

1. Define each of the following:

   Buffer solution, Titration error, Multidentate ligands, Digestion
2. Describe three general methods for performing EDTA titrations.
3. What pH is required to just precipitate iron (III) hydroxide (K_{sp} = 4.0 x 10^{-38}) from a 0.1 M $FeCl_3$ solution?

Third question: Answer *two only* from the following: **(12 Marks)**

1. What are the optimum conditions for the precipitation process?
2. Give reason:
   a. Multidentate ligands are preferable than unidentate ligands for complexometric titration.
   b. Mohr method for determining of chloride should be performed at neutral or slightly alkaline solutions.
3. How many milliliters of barium chloride solution containing 90 g of $BaCl_2.2H_2O$ per liter are required to precipitate the sulfate as $BaSO_4$ from 10 g of pure $Na_2SO_4.10H_2O$?

   (Atomic mass: Na=23, Cl= 35.5, H=1, Ba=137.32, S=32, O=16)

Fourth question: Choose the correct answer: **(12 Marks)**

1. What is the pH of 0.001M NaOH (aq) at 298 K?

   a) 1.0 b) 8.0 c) 3.0 d) 11.0
2. Which quantity is directly measured in a titration?

   a) Mass b) Volume c) Concentration d) density

انظر خلفه باقي الاسئلة...

3. K_{sp} of Ag_3PO_4 equals:

a) $[3Ag^+]^3 [PO_4^{3-}]$ b) $[Ag^+]^3 [PO_4^{3-}]$

c) $[Ag^+] [PO_4^{3-}]^3$ d) $[3Ag^+] [PO_4^{3-}]$

4. Gravimetry has the following advantages:

a) Sensitivity and selectivity b) Occlusion and inclusion

c) Accuracy and precision d) Simplicity and time saving

5. The dilution of a buffer solution with a small amount of water will:

a) lower the pH b) raise the pH

c) not change the pH significantly d) change the [A-]/[HA] ratio

6. Of the following solutions, which has the greatest buffering capacity?

a) 0.543 M NH_3 and 0.555 M NH_4Cl b) 0.087 M NH_3 and 0.088 M NH_4Cl

c) 0.234 M NH_3 and 0.100 M NH_4Cl d) 0.100 M NH_3 and 0.455 M NH_4Cl

7. As the K_{sp} decreases, the infection of the titration curve

a) Increases b) Decreases c) Not affected

8. On the gravimetric determination of Ca^{2+} the most satisfactory form to be weighed is:

a) $CaCO_3$ b) CaO c) $CaC_2O_4.H_2O$ d) CaC_2O_4

9. A Brønsted-Lowry base is

a) producer of OH^- ions b) electron-pair donor

c) proton acceptor d) electron-pair acceptor

10. If the degree of supersaturation is (Q) and the solubility of precipitate is (S); then, according to vonWiemarn equation, the relative supersaturation equals to:

a) (Q-S)/S b) (S-Q)/Q c) (S-Q)/S d) (Q-S)/Q

11. The K_a of Hydrochloric acid is

a) 1.0 b) 1.0×10^{-14} c) 1.0×10^{-7} d) extremely large

12. If we titrate 100 ml of 0.1 M NaCl solution by 0.1 M $AgNO_3$ and the K_{sp} for AgCl is 1.2×10^{-10}, then pCl at equivalence point equals:

a) 3.3 b) 4.96 c) 7.6 d) 7.08

Good Luck....

Examiner: Dr. Mohamed Kotb

Assiut University
Faculty of Science
Chemistry Department

Dec. 2017
Time allowed: 2 hrs.

Physical and Inorganic Chemistry
(250CH)

Section (I)

Answer the following:

1- a- Explain the reason for **(Five only)** from the following: (5 Marks)

I) Concentrated solution of HF acid is not kept in glass bottle.
II) SO_2 used as oxidizing and reducing agents .
III) CO_2 is an acidic oxide.
IV) Cesium ions conduct electricity more than lithium ions.
V) KCl is soluble in water but $CaCO_3$ is not.
VI) CO is a poisonous gas.

b- How you can prepare **(Three only)** from the following: (4.5 Marks)
H_2 , NH_3 , HI , urea

c- What products are formed when each of group (I) metals burnt in oxygen? How do these products react with water? (3 Marks)

2- a- Choose the correct answer and comment **(Three only)** (6 Marks)

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 element which has the maximum number of oxidation state (C, N, Cl)
IV) The compound which contains hydrogen bond (CH_4 , H_2S , H_2O)

b- In each pairs of acids, state which is stranger and why? HF and HI, H_2SO_4 and H_2SO_3, HClO and HIO. (3 Marks)

c- Give three examples of Freon's and how do they damage the environment .(3.5Marks)

See the Next Page

Section II (Physical Chemistry) **(Marks: 25)**

Answer the following questions

I) Choose the correct answer: **(Marks: 10)**

1) Under Isothermal expansion of an ideal gas:

$\Delta S^{\#}$ **increase as the volume a) decrease b) increases c) cconstant**

2) For irreversible Isothermal processing of an ideal gas:

ΔG^{*}**=.... a)** $\succ 0.00$ **b)** $\prec 0.00$ **c** ΔR

3) $\Delta E = ... - .....$ **a)** $Q - H$, **b)** $Q - W$, **c)** nRT, **d)** $nRdT$

4) $\Delta H = \Delta E + ...$ **a)** ΔF, **b)** ΔR, **c)** ΔW, **d)** ΔC_p

5) In carnot cycle, the maximum work done $W_m = ...$

6) ΔS **under isothermal expansion of ideal gas is equal:**

a) $nRT \ln \frac{V_2}{V_1}$, **b)** $nR \ln \frac{V_2}{V_1}$, **c)** $C_P \ln T$, **d)** $C_V \ln P$

7) $\frac{-d(LnK_{eq})}{dT} = ...$ 8) $\frac{-d(LnK_{eq})}{d(\frac{1}{T})} = ...$ 9) $\frac{P_1}{P_2} = ...$ 10) $\Delta G^{\#} = \Delta G^{\#0} + ...$

II) Show, how can you calculate the $\Delta S^{\#}$ **of n mo;es of an**

III) ideal gas when it is expanded isothermally at:

Variable V, P, and T **(Marks: 3)**

IV) Consider a hypothetical reaction between gases:

$$aA + bB \xleftrightarrow{K_1 / K_2} cC + dD$$

Describe, how you can determine the relation between: **(Marks: 4)**

$\Delta G^{\#}$,.. $\Delta G^{\#0}$,.. *and* K_{eq}

V) When gaseous ozone (O_3) **is formed from molecular oxygenby the**

reaction: $3O_2 \longleftrightarrow 2O_2$ **What is** K_{eq} **(Marks: 3)**

if : $\Delta G^{\#0}. = 39.1 Kcal.mol$, $R = 1.98..al/mol.\deg$ **at: 250, 300, and 400 K**

VI)) The equilibrium constants (K_p**)) for the reaction:** **(Marks: 5)**

$$2HI_{(g)} \xleftrightarrow{K_{eq}} H_{2(g)} + I_{2(g)}$$

are: $K_{P1} = 2.18x10^{-2}$ **at** $T_1 = 764K$ **and** $K_{P2} = 1.64x10^{-2}$ **at** $T_2 = 667K$

Find: 1) $\Delta H^{\#0}$ $\Delta G_1^{\#0}$ ..*and* $\Delta G_2^{\#0}$ for the reaction

Good Luck

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

Assiut University
Faculty of Science
Chemistry Department

Jan 2017

Time Allowed: 3 hrs

Physical Chemistry Examination (C-203) for Second Level Students

Section (A) (17 Marks)

Answer Three Only from the following:

a) Drive the kinetic equation to determine the specific 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 theory of absolute reaction rate

d) At 25 °C the specific rate constant for the hydrolysis of ethyl acetate by NaOH is 6.36 mol^{-1} min^{-1}. Starting with concentrations of base and ester 0.02 mol L^{-1} at 25 °C, what proportion of ester will be hydrolyzed in 10 min?

Section (B) (16.5 Marks)

Answer Three Only from the following:

a) Discuss the relation between ionic strength and the catalytic activity of homogeneous catalytic reaction

b) Drive the kinetic equations for a bimolecular homogeneous catalytic reaction

c) Write short notes on the following:

(i) Selectivity in heterogeneous catalysis (ii) Mixed catalyst

(iii) Promotion and promotors

d) Discuss the kinetics and mechanism of catalytic thiosulphate oxidation by both iodide and molybdate catalysts

Section (C) (16.5 Marks)

Answer the following questions:

1) Complete the following sentences:

(i) Slip motion many times is ..... for plasticity of crystals

(ii) Anion vacancy with trapped electron is .....

(iii) Interstitial atom occupies ..... Position in crystal lattice

(iv) Paramagnetic results from a permanent .....

(v) Addition of cation with higher valence into ionic solid with lower valence creates ...

2) Write an account on two only of the following:

(i) Edge dislocation in solids (ii) Non-stoichiometric of solid compounds

(iii) Point defects in solids

3) Explain by equations how are the holes within NiO can be changed by doping with cations of lower and higher valences

---------- GOOD LUCK ----------

Examiners: Prof. Temerk , Prof. Gaber and Prof. Said

Chemistry Department

Jan 2018

Faculty of Science

Time: 2h

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

Answer the following questions

1.a) Complete the following equations: (4 Marks)

i) $TiCl_4 + 2H_2O \rightarrow$ +

ii) $BiCl_3 + H_2O \rightarrow$ +

iii) $2NH_4VO_3$ (heating) $\rightarrow$ + +

iv) $Cu^{2+} + 2I^- \rightarrow$ +

b) Suggest only one method for the preparation of **FOUR** of the following :

TiO_2, Cr_2O_3, Mn, iron(II) oxide in the laboratory, Ni . (8 Marks)

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

b) i)Give an equation for the quantitative preparation of B_2H_6 and then draw its structure. ii) Why O-O bonds in O_3 have considerable double bond. (8 Marks)

3. a) "Meta-and pyrophosphoric acids are produced from H_3PO_4". Give the equations of formation and structures of the three acids. (3 Marks)

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

i) Rapid darkness of freshly precipitated $Mn(OH)_2$. ii) BCl_3 fumes in air.

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

iv) Chromium is resistant to corrosion.

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

vi) Anhydrous $ZnCl_2$ can not be obtained by evaporation.

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

Faculty of Science
Chemistry Department

January 2018
Time: 2 Hours

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

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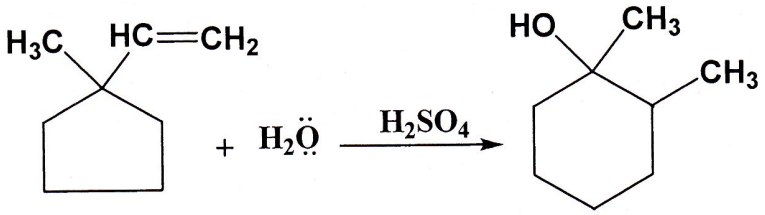
Answer the following questions:

First Question:

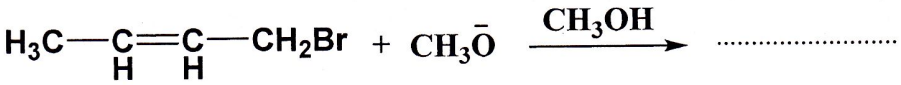
1) Complete the mechanism for the following reaction? (Show all arrows) (15 Marks)



2) Which step is the rate-determining step?
3) What is the electrophile in the first step?
4) How many intermediates are there in the reaction?
5) Why does the rearrangement occur?
6) What is the nucleophile in the second step?

Second Question: (15 Marks)

1) Give the products of the following reaction:



a) Under conditions that favor an S_N2 reaction.
b) Under conditions that favor an S_N1 reaction.

2) Give the major and minor products obtained from an E2 reaction of each of the following alkyl halides with hydroxide ion.
   a) CH_3-CHF-CH_2CH_3. b) CH_3-CHBr-CH_2CH_3.

3) Three alkenes are formed from E1 reaction of 3-bromo-2,3-dimethylpentane.
   a) Suggest a reaction mechanism.
   b) Give the structures of the alkenes, and rank them according to the amount that would be formed.

Third Question: Give the mechanism for the formation of 2-chlorobutane from the reaction of butane with Cl_2/UV and answer the following related questions: (10 Marks)

1) Is the reaction product optically active or not? Explain your answer
2) Use Fisher projection to assign the configuration of the products.
3) What side products would be obtained from the termination steps?

Fourth Question: Choose the correct answer of *Only Five* of the following: (10 Marks)

1) An E2 elimination reaction is

a) One step	b) More than one step	c) Concerted
d) Second order	e) First order	f) a,b and c
g) a,c and d	h) a,c and e	

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2) One of the following compounds readily undergoes S_N2 and S_N1 reactions, is it?

a) $(CH_3)_3CBr$ b) $CH_2=CH-CH_2Br$

c) CH_3-CH_2Br d) $CH_2=CH-Br$

3) Which of the following bases is most likely to promote E2 rather than E1:

a) CH_3O^- b) HO^-

c) $(CH_3)_3CO^-$ d) H_2O

4) The typical reaction of 2-bromo-2-methylpropane with aqueous KOH is.

a) S_N1 reactions b) S_N2 reactions c) E2 reactions

d) E1 reactions e) a and d f) b and c

5) Addition of Grignard reagents to aldehydes is

a) Free radical addition b) Electrophilic addition c) Nucleophilic addition

6) A typical reaction of the olefinic bond is

a) Free radical addition b) Nucleophilic substitution c) Electrophilic addition

d) Electrophilic substitution e) a and d f) a and c

Examiner: **Prof. Dr. Hassan El-Sherief.**

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Assiut University
Faculty of Science
Chemistry Department

Jan:2018
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- Define the following: Chelating agent , Chelatometric titration , Conditional formation constant.

b- Explain the principles of chelatometric titration indicators.

c- The formation constant for the lead – EDTA chelate(pby^{2-}) is $1.1x10^{18}$. Calculate the conditional formation constant at pH10. ($k_{a1}=1.0x10^{-2}$, $k_{a2}=2.2x10^{-3}$, $k_{a3}=6.9x10^{-7}$, $k_{a4}=5.5x10^{-11}$)

2)a- Write briefly on: Liebig titration of cyanide ion.

b- Describe the ways in which the end point of redox titrations may be detected visually.

c- Exactly 33.31 ml of $KMnO_4$ solution were required to titrate a 0.1278 g sample of primary standard $Na_2C_2O_4$. What is the molarity of $KMnO_4$ solution? (At.wts.Na=23 , C=12 , O=16).

3)a- Explain the Volhard titration of chloride. This method must be used in acid solution. Why?

b- Calculate the pCL in a solution obtained by reaction 50 ml each of 0.1 M NaCl and 0.1 M $AgNO_3$. [$Ksp(AgCl)=1.2x10^{-10}$].

c- A 0.3516 g sample of a commercial phosohate detergent was ignited at a red heat to destroy the organic matter. The residue was then taken up in hot HCl, which converted the P to H_3PO_4. The phosphate was precipitated as $MgNH_4PO_4.6H_2O$ by addition of Mg^{2+} followed by aqueous NH_3. After being filtered and washed , The precipitate was converted to $Mg_2P_2O_7$ by ignition at 1000°C. This residue weighed 0.2161 g. Calculate the percent P in the sample.
(At.wts.Mg=24 , P=31 , O=16)

أنظر خلفه باقي الأسئله

4)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 buffer solution is 0.2 M in acetic acid and in sodium acetate. Calculate the change in pH upon adding 1.0 ml of 0.1 M HCl to 10 ml of the buffer solution.(pK_a=4.76).

c- Define the ionic strength , and find the ionic strength of a mixture containing 0.02 M KBr and 0.01 M Na_2SO_4.

5)a- Write briefly on:

i- Arrhenius acid – base theory. Ii- Acid – base indicators.

b- Define the following:

i- Digestion. ii- Co-precipitation. iii- Autoprotolysis.

c- 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)

Good Luck

Examiners: Prof.Dr.Hassan Sedaira , Prof.Dr.Elham Y.Hashem

Assiut University
Faculty of Science
Chemistry Department

Jan:2018
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- Define the following: Chelating agent , Chelatometric titration , Conditional formation constant.

b- Explain the principles of chelatometric titration indicators.

c- The formation constant for the lead – EDTA chelate(pby^{2-}) is $1.1x10^{18}$. Calculate the conditional formation constant at pH10. ($k_{a1}=1.0x10^{-2}$, $k_{a2}=2.2x10^{-3}$, $k_{a3}=6.9x10^{-7}$, $k_{a4}=5.5x10^{-11}$)

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(At.wts.Mg=24 , P=31 , O=16)

أنظر خلفه باقي الأسئله

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Good Luck

Examiners: Prof.Dr.Hassan Sedaira , Prof.Dr.Elham Y.Hashem

Chemistry Department
Faculty of Science
Assiut University

Jan 2018
Time two hours

Final Exam for second level Students, Applied Industrial Chemistry Program
Electrochemistry (C209), 1st semester

($F=96485\ C\ mol^{-1}$, $R=8.314\ J\ K^{-1}\ mol^{-1}$, $A= 0.509\ (mol\ kg^{-1})^{1/2}$)

Answer ***Only Five*** from the following questions:

1) (i) Describe the constituents, electrodes and cell reactions of the Daniel (Zn-Cu) cell. *(5 marks)*

(ii) Calculate the standard free-energy change at 25°C for the following reaction: *(5 marks)*

$2Co^{3+}(aq) + 2Cl^{-}(aq) \rightarrow 2Co^{2+}(aq) + Cl_2(g)$, where $E°_{Co+3/Co+2}=+1.82V$, $E°_{Cl2/Cl-}=+1.36V$.

2) (i) Explain the types of solid electrolytes. *(5 marks)*

(ii) A metal object is to be gold-plated by an electrolytic procedure using aqueous $AuCl_3$ electrolyte. *(5 marks)*

Calculate the number of moles of gold deposited in 3.0 min by a constant current of 10 A.

3) (i) Explain the chemical composition and the discharging process of the *Leclanché* battery. *(5 marks)*

(ii) What is the electrode reduction potential of copper electrode in 0.01M $CuSO_4$ solution at 25°C, $E°_{Cu2+/Cu}= +0.34$ V. *(5 marks)*

4) (i) Find the emf of the cell described by the cell diagram *(5 marks)*

$Ni \mid Ni^{2+}$ (0.750 M) $\parallel Cu^{2+}$ (0.0500 M) $\mid Cu$ (where $E°_{Cu+2/Cu}=+0.34V$, $E°_{Ni+2/Ni}=-0.25V$)

(ii) Derive mathematical form of salt activity (a_{salt}) of the following: KBr, $CaCl_2$, $AlCl_3$. *(5 marks)*

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

(ii) Complete and balance the following redox equation:

$MnO_4^- + SO_3^{2-} \rightarrow Mn^{2+} + SO_4^{2-}$ (acidic solution) *(5 marks)*

6) (i) Using Debye – Huckel Limiting Law drive an equation to estimate the dissociation constant (K_a) of an acid. *(5 marks)*

(ii) A voltaic cell is constructed with two Zn^{+2} - Zn electrodes. The two cell compartments have $[Zn^{+2}] = 2.0$ M and $[Zn^{+2}] = 5.0 \times 10^{-3}$M. (a) Which electrode is the anode of the cell? (b) What is the $E°_{cell}$? (c) What is the emf of the cell? (d) For each electrode, predict whether the $[Zn^{+2}]$ will increase, decrease or stay the same as the cell operates. *(5 marks)*

مع اطيب التمنيات بالتوفيق..

الاستاذ الدكتور/ أبوالحجاج عبدالعزيز هرماس

Assiut University
Faculty of Science
Chemistry Department

Dec, 2017
Time: 2 Hours.

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

Answer Only five of the following : **(50 Marks)**

1- Using the balanced chemical equations clarify the following chemical processes: **(10 Marks)**

a) Heating BaO in excess of O_2 at 400-500°C.
b) Heating NH_4Cl.
c) Burning Aluminium in air (thermite reaction).
d) Burning NH_3 in O_2.

2- Write the reason(s)for the following : **(10 Marks)**

a) In pure water beryllium salts are acidic.
b) Boric acid acts as a strong acid in the presence of glycerol.
c) The hydration energies of Group (IIA) ions are greater than for Group (IA) ions.
d) Graphite conducts electricity.

3- Complete the following equations: **(10 Marks)**

a) $Li_3N + 3H_2O \rightarrow$ .....
b) $2Al + NaOH + 6H_2O \rightarrow$ .....
c) $3PbS + 4O_3 \rightarrow$ .....
d) $F_2 + 3H_2O \rightarrow$ .....

4- Give One method for obtaining the following compound : **(10 Marks)**

a) H_2 b) CO c) H_2O_2 d) XeF_2, XeF_4, XeF_6 from Xe

5- Explain the following statements : **(10 Marks)**

a) KO_2 is used in space capsules and submarines.
b) H_2O has a high boiling point.
c) HF cannot be handled in glass vessels.
d) Oxygen is never more than divalent while sulphur can form four or six bonds.

6- What is the meaning of the following : **(10 Marks)**

a) Temporary hardness of water.
b) Diagonal relationships in periodic table.
c) Water gas and producer gas.
d) Calthrate compounds (which are known of noble gases).

Good Luck

Examiners:
Prof. Dr. Ahmed. H. Osman **Prof. Dr. Dina. M. Fouad**

Assiut University

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

Date: Sunday, 24/12/2017 Time: 2 hours.

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

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

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

3) 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 ?

4) a) Compare between the step-growth and chain-growth polymerization?
   b) What is the HIPS ? draw its structure?

5) a) Explain the advantage and disadvantages for the Bulk, Emulsion and Suspension Polymerization?
   b) Three things that make polymers are different. Discuss?

Good Luck

Examiner:

Prof. Dr. Kamal Ibrahim Aly

المادة:أليات السوق عدد الصفحات: صفحة واحدة زمن الامتحان: ساعتين	كلية العلوم- جامعة أسيوط قسم: الكيمياء الصناعية امتحان دور يناير ٢٠١٨	لجنة الممتحين ١- د. سناء مصطفي محمد ٢- د. إيمان علي عبد المطلب

أجب عن جميع الأسئلة التالية: (ويرجي الالتزام بترتيب الأسئلة)

السؤال الأول (أ): أكتب المصطلح العلمي الدال علي هذه العبارات علي تكون الإجابات في شكل جدول: رقم العبارة واسم المصطلح

١- هي تلك البيانات التي تم جمعها وتسجيلها ونشرها وتحليلها سواء داخل المنظمة أو خارجها.
٢- هو المتغير الذي يشير ألي السبب المحتمل في علاقة السبب والنتيجة في التجربة.
٣- هو المتغير الذي نقيس أثر المتغير التجريبي عليه.
٤- هي عبارة عن الموضوعات أو الوحدات التي لا تتعرض للمتغير التجريبي.
٥- هو عبارة عن مجموعة من الموضوعات التي لها خاصية مشتركة أو أكثر.
٦- هو عملية اختبار الفروض التي بنيت عليها الدراسة.
٧- تعتمد فكرة هذا المقياس علي امكانية إعادة تنظيم البيانات في مراتب متتالية تبدأ بأصغرها وتنتهي بأكبرها.
٨- مجموعة من الأسئلة التي تم صياغتها للحصول علي المعلومات المطلوبة للبحث.
٩- المجموعة التي تمثل اهتماما لدي الباحث ويرغب في دراستها أو دراسة خصائصها.
١٠- هو عبارة عن سجل لجميع عناصر المجتمع الذي سوف تؤخذ منه العينة.

السؤال الثاني: علق علي مدي صحة أو خطأ العبارات:

١- هناك بعض الحقائق التي يجب أن يضعها معد التقرير في ذهنه.
٢- عند القيام بجمع بيانات البحث التسويقي يجب التأكد من عدة أمور مهمة.
٣- هناك عدة اعتبارات يجب ان تراعي عند تحديد حجم العينة.
٤- يجب اختبار قائمة الاستقصاء قبل تعميمها علي المستقصي منهم.
٥- هناك بعض الاعتبارات المتعلقة بصياغة السؤال.

السؤال الثالث: قارن بين كل من:

١- مستويات القياس.
٢- أنواع العينات.
٣- الأخطاء في مرحلة جمع البيانات.

انتهت الاسئلة،،،،

مع تمنياتي للجميع بالنجاح والتوفيق،،،،،،

Assiut University
Faculty of Science
Chemistry Department

Date: January 2018
Time: 2 h.

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

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

Question No. 1: **(30 Marks)**

1-By equations, how can you carry out FIVE ONLY of the following transformations, using any organic or in-organic reagents? (15 Marks)

a) Benzene to picric acid
b) Allyl alcohol to acrylic acid.
c) Pyrrole to 1,3-butadiene
d) Malonic acid to succinic acid.
e) Benzene to phenol
e) Ethyl acetoacetate (EAA) to 2-pentanone

3- Claisen condensation is used for synthesis of Acetoacetic ester (EAA). Discuss this sentence using equations and the reaction mechanism. (5 Marks)

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

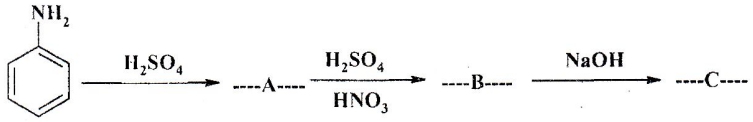
a) *p*-Chlorobenzene sulfonic acid
b) Methyl vinyl ketone
c) Sulfanilamide
d) Barbituric acid

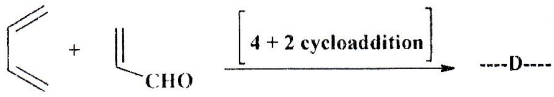
4- Specify the following groups as activating or deactivating groups? (6 Marks)

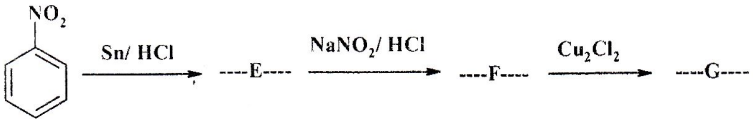
i) CN ii) NO_2 iii) SO_3H iv) OCH_3 v) CHO vi) $NHCOCH_3$

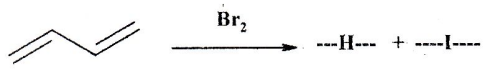
Question No. 2: **(20 Marks)**

1- Complete FOUR ONLY the following equation: (12 Marks)

a) 

b) 

c) 

d) 

e) $HCHO + CH_3COCH_3 \xrightarrow{NaOH}$ ----J---- $\xrightarrow{-H_2O}$ ----K----

2- *N*-Bromosuccinimide is an important reagent for bomination of organic compounds. Explain this statement giving only one example. (4 Marks)

3- Why the electrophilic substitution reactions of chlorobenzene (e.g. nitration) afforded *o*- and *p*-chloronitrobenzene, in spite of inductive effect of chloride ion. Illustrate your answer by drawing the resonating structures. (4 Marks)

GOOD LUCK

Examiner Dr/ Remon M. Zaki

Assiut university
Faculty of science
Chemistry department

January 2018
Time allowed: 3 hours

Final exam in 210 C course for second level's students

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Answer the following questions: ....Part 1(Reaction Mechanism)....................(25 marks).

1. Chose the correct answer for the following questions: ....(14 marks).

1. which of the following is not nucleophile: a. CH_3-CH_3; b. CH_2=CH_2; c. CH_3CH_2OH; d. H_2O

2. we can describe E2 Mechanism by:

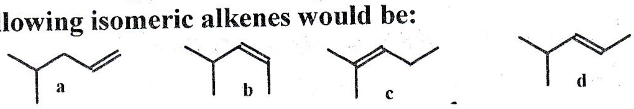
a. it is a bimolecular reaction.

b. it is including two steps and two transition states.

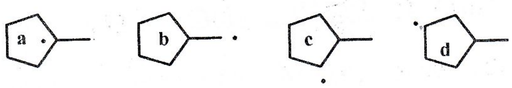
c. it is always accompanied to S_N1 reaction.

d. it give racemic mixture if we beginning with one enantiomer (R or S).

3. The most stable of the following isomeric alkenes would be:



4. Which of the following radicals is the most stable?



5. Which of the following is polar aprotic solvent?

a. CH_3OH b. CH_3CH_2OH c. CH_3COCH_3

6. Which of the following statements regarding the E2 mechanism is wrong?

a) Reactions by the E2 mechanism are always bimolecular.
b) Reactions by the E2 mechanism are generally second order
c) Reactions by the E2 mechanism usually occur in one step
d) Reactions by the E2 mechanism usually occur in two steps.

7. The reaction of an ketones with hydrogen cyanide is an example of _____ reaction.

a. a nucleophilic substitution b. an electrophilic addition
c. an electrophilic substitution d. a nucleophilic addition

8. The reaction of alkenes with HBr in the presence of peroxide is an example of:

a. a nucleophilic addition b. an electrophilic addition
c. an electrophilic substitution d. a free radical addition

9. 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) Reactions by the E1 mechanism are generally first order.
c) Reactions by the E1 mechanism usually occur in one step.
d) Reactions by the E1 mechanism are multi-step reactions

10. 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 second order rate law.

11. Which of the following statements regarding regioselectivity of elimination reactions is wrong?

a) More substituted, more stable alkenes are generally formed preferentially by both E1 and E2 mechanisms.
b) Substrates with a poore nucleofuge tend to give the less substituted alkenes.
c) Sterically hindered, bulky bases tend to give the less substituted alkenes.
d) Reactions by the E1 mechanism are generally less regioselective than those by the E2 mechanism.

12. The E1cB mechanism including:

a) Carbineum ion as intermediate. b) carboanion intermediate

c) 2nd order rate law d) has one step

13. Which of the following statements regarding the S_N1 mechanism is true

a) Reactions by the S_N1 mechanism are always bimolecular.

b) Reactions by the S_N1 mechanism are generally second order

c) Reactions by the S_N1 mechanism usually occur in one step

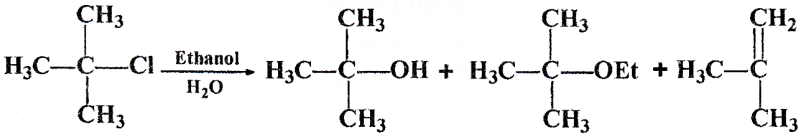
d) Reactions by the S_N1 mechanism usually occur in two steps

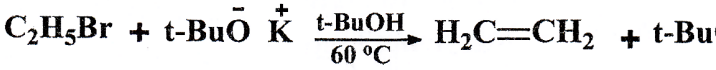
14. Many nucleophilic addition reactions of aldehydes and ketones are catalyzed by acid or base. Bases catalyze hydration by:

a. making the carbonyl group more electrophilic b. shifting the equilibrium of the reaction

c. making the carbonyl group less electrophilic d. converting the water to hydroxide ion, a much better nucleophile

IIa. Look at the following equations and answer the followed questions:.....(6 marks):

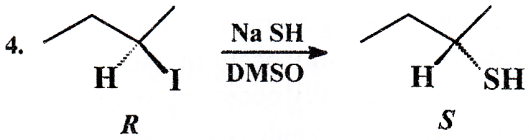




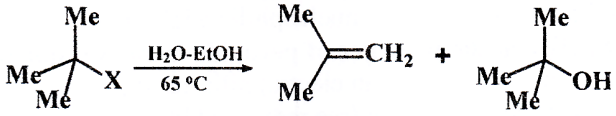
1. Suggest a mechanism for the above equations and mention the type of mechanism (S_N1, S_N2, E1 or E2).

2. Draw a reaction energy coordinate profile.

b. 2-Iodo pentane reacts with sodium sulfide in DMSO; explain the reaction mechanism with showing the type of this reaction



III. Give reason of the following:.....(5 marks).

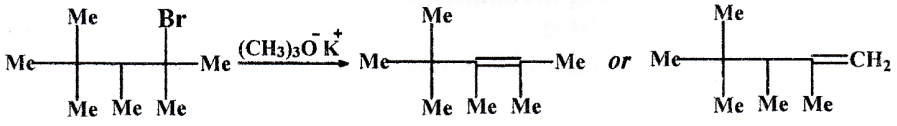


36% **64%**

a. **In the above equation the X = halogen. If the halogen is changed from Cl to Br or I. the rate of reaction or types and percent of products not change.**

b. **In the E1cB the intermediate is carboanion while in E1 is carbocation.**

c. **In the probability of reactions proceeds according to S_N1 and S_N2. The protic solvent make the reaction S_N1 and aprotic make it proceeds S_N2.**



A **B** **C**

d. **In the above elimination reaction, which product is formed with giving reason.**

e. **The free radical carbon was considered as electrophile.**

Good Luck

Pro. Dr. Adel M. Kamal

Prof. Dr. Omima Said

Part 2 (Carbonyl Chemistry) 25 Marks

Answer the following question

First Question

A. Put (√) for the correct statement and (X) for the wrong one. *(answer in a table)* **12 Marks**

1. Substitution at α-carbon of carbonyl compounds always gives a racemic mixture ( )
2. Markonikov and anti-Markonikov hydration of propene give acetone. ( )
3. Unsubstituted amides have higher melting points than the substituted ones. ( )
4. Electrostatic charges, whether positive or negative, are more stable when they are 'spread out' over a larger area of the molecule. ( )
5. Ozonolysis of 3-Hexene gives only Propionaldehyde ( )
6. Tertiary alkyl halides are preferable for forming phosphorous ylides. ( )
7. "Dess-Martin Periodinane" reagent can oxidize benzyl alcohol to benzaldehyde. ( )
8. It is preferable to prepare acetal from carbonyl compounds in acidic medium. ( )
9. Aceylation can be used for protecting amines. ( )
10. Aldehydes and ketones react with secondary amines to form enamines. ( )
11. The biological activity of penicillin antibiotics due to the presence of β-lactam. ( )
12. α,β-unsaturated carbonyl compounds more active towards electrophiles than alkenes. ( )
13. Grignard reagents can be prepared in protic solvents. ( )
14. Valeric acid is the common name of Pentanoic acid. ( )
15. In transesterfaction, the used alcohol has boiling point higher than the formed one. ( )
16. The common name of 5-hydroxypentanoic acid is 5-pentanolide. ( )
17. Carboxylic acid reacts with amine forming amide easily in the presence of DCC. ( )
18. Diazomethan can convert the carboxylic acid to esters. ( )
19. Carbamates can be obtained from amines with alkyl chloroformate. ( )
20. Catalytic hydrogenation of nitrile by Raney nickel gives primary amine. ( )
21. Robinson annulation is a ring-forming reaction that combines a Michael reaction with an intramolecular aldol reaction. ( )
22. Kinetic enolate can be formed by using LDA in aprotic solvent. ( )
23. Benzaldehyde can give Aldol condensation reaction. ( )
24. All methyl ketones can give iodoform with I_2 and NaOH. ( )

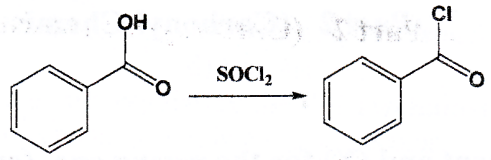
B. How can you perform, *Only Two*, the following chemical conversions? **4 Marks**

1. Diethyl malonate to 1,6-hexanedinitrile
2. Ethyl acetoacetate to 1,1-Diethylcylcohexane
3. Tertiary butyl bromide to 2,2-dimethylpropanal

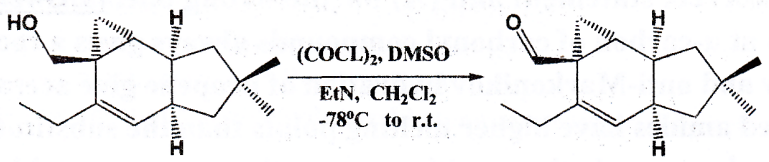
Second Question

A. Give the mechanism, *Only Two*, of the following chemical conversions **4 marks**

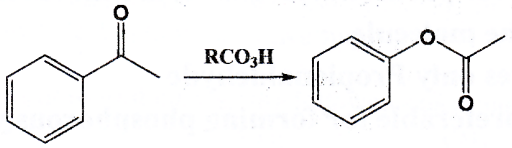
1-



2-



3-



B. Give the reason (*briefly*), *Only Three*, of the following? **3 Marks**

1. **1,3-Dithian can be used to prepare aldehydes and ketones.**
2. **pK_{a1} is lower than pK_{a2} for dicarboxylic acids.**
3. **Enolization of β-dicarbonyl compounds has a higher rate.**
4. **Aldehydes are more reactive than ketones towards nucleophiles.**

C. Give the ascending order (low to high) of the following, *Only Two*, according the given property *inside the brackets*. **2 Marks**

1. **Oxalic acid , Succinic acid , Malonic acid , Adipic acid** (*Acidity*)
2. **Acetamide , Acetyl chloride , Acetic acid , Acetic anhydride** (*Acyl substituation*)
3. **Acetaldehyde , Formaldehyde , Acetone , Trichloroacetaldehyde** (*Hydration rate*)

GOOD LUCK, *Dr. Awad Said*