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 $CaCl_2$ is higher than $AlCl_3$.
   iii. Cesium salts are harder than lithium salts.
   iv. Hellium is diatomic.
   v. O_3 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- Conductance of graphite and diamond.
   iii- The acidic strength of HF and HI.
   iv- Oxidation states of oxygen and group VI elements.
   v-   Na, Al , Cl (hardness , electro negativity, solubility).

2) Answer the following :

A) Give reasons for the following statements: (**answer four only**)
                                                          (12Marks)
   i-   CO is toxic for human beings
   ii- Boric acid behaves as strong monobasic acid in presence of glycerol.
   iii- Pb(+II) is more stable than pb(+IV).
   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…..
   ii- Fertilizers contains three main ingredients: 1…..2……3…..

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

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 $CaCl_2$ is higher than $AlCl_3$.
  iii. Cesium salts are harder than lithium salts.
  iv. Hellium is diatomic.
  v. O_3 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- Conductance of graphite and diamond.
  iii- The acidic strength of HF and HI.
  iv- Oxidation states of oxygen and group VI elements.
  v- Na, Al , Cl (hardness , electro negativity, solubility).

2) Answer the following :

  A) Give reasons for the following statements: **(answer four only)**
                                                       (12Marks)
  i- CO is toxic for human beings
  ii- Boric acid behaves as strong monobasic acid in presence of glycerol.
  iii- Pb(+II) is more stable than pb(+IV).
  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…..
    ii- Fertilizers contains three main ingredients: 1…..2……3…..

  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

Answer the following questions:

1- Answer <u>Two Only</u> from the following: (17 Marks)

(a) Drive kinetic equation for determination the specific rate constant and half-life time for the following reactions:

$$2A \xrightarrow{\ K_2\ } Products$$

$$3A \xrightarrow{\ K_3\ } Products$$

(b) Discuss the collision theory of bimolecular reactions

(c) The decomposition of acetone dicarboxylic acid has the rate constant, $k = 2.46 \times 10^{-5}$ at 273 °K and 163×10^{-5} at 303 °K. Find the value of ΔE^* ($R = 1.987$)

2- Answer <u>Two Only</u> from the following: (16.5 Marks)

(a) In an irreversible change of temperature, show that the total entropy change of the universe increases.

(b) Discuss the electrochemical method used for determination of both standard free energy change and the equilibrium constant. Calculate $\Delta G°$ and K for the following reaction: $Zn + Cu^{++} \rightleftharpoons Zn^{++} + Cu$ ($E° = 1.1$ Volt)

(c) Show graphically how to calculate W, Q, ΔE and ΔH for the following processes
   (i) Constant pressure and reversible expansion of a gas
   (ii) Constant volume and reversible change of a gas

3- Answer <u>Two Only</u> from the following: (16.5 Marks)

(a) Show how Lechatelier's principle can be explained in a quantitative way through the relation between equilibrium constant and temperature

(b) Consider the reaction : N_2 (g) $+ O_2$ (g) $\rightleftharpoons$ 2NO (g)
   if the enthalpy of formation of NO is 21.6 Kcal.mol^{-1} and the entropies for NO, N_2 and O_2 are 54.34, 45.77 and 49.01 cal.mol^{-1}K^{-1} respectively. Calculate the free energy change and the equilibrium constant of the reaction at 298 °K.

(c) Drive an expression for the efficiency of heat engine

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

Examiners: Prof. Temerk and Prof. Gabr

Answer the following questions:

1- Answer <u>Two Only</u> from the following: (17 Marks)

(a) Drive kinetic equation for determination the specific rate constant and half-life time for the following reactions:

$$2A \xrightarrow{\quad K_2 \quad} \text{Products}$$

$$3A \xrightarrow{\quad K_3 \quad} \text{Products}$$

(b) Discuss the collision theory of bimolecular reactions

(c) The decomposition of acetone dicarboxylic acid has the rate constant, $k = 2.46 \times 10^{-5}$ at 273 °K and 163×10^{-5} at 303 °K. Find the value of ΔE^* (R = 1.987)

2- Answer <u>Two Only</u> from the following: (16.5 Marks)

(a) In an irreversible change of temperature, show that the total entropy change of the universe increases.

(b) Discuss the electrochemical method used for determination of both standard free energy change and the equilibrium constant. Calculate $\Delta G°$ and K for the following reaction: $Zn + Cu^{++} \rightleftharpoons Zn^{++} + Cu$ (E° = 1.1 Volt)

(c) Show graphically how to calculate W, Q, ΔE and ΔH for the following processes
   (i) Constant pressure and reversible expansion of a gas
   (ii) Constant volume and reversible change of a gas

3- Answer <u>Two Only</u> from the following: (16.5 Marks)

(a) Show how Lechatelier's principle can be explained in a quantitative way through the relation between equilibrium constant and temperature

(b) Consider the reaction : $N_2 (g) + O_2 (g) \rightleftharpoons 2NO (g)$
   if the enthalpy of formation of NO is 21.6 Kcal.mol^{-1} and the entropies for NO, N_2 and O_2 are 54.34, 45.77 and 49.01 cal.mol^{-1}K^{-1} respectively. Calculate the free energy change and the equilibrium constant of the reaction at 298 °K.

(c) Drive an expression for the efficiency of heat engine

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

Examiners: Prof. Temerk and Prof. Gabr

The Final Physical Chemistry II (C-232)Examination for Second Level Students

Answer all the following questions (I, II, III):

I) Phase Rule: (17 Marks)

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) The ternary system $MgCl_2 – CaCl_2 – H_2O$ at 0 °C in which the hydrates $MgCl_2. 6 H_2O$ and $CaCl_2. 6 H_2O$ are formed.

B) What are the main differences between the phase diagram of Ag – Pb system and that of KI – water system? (4 Marks)

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

i) A saturated solution of sugar has the number of phases and components equal to .... and .... respectively.

ii) Heating of solids above their transition point is known as ...., while cooling of liquids below their freezing points is called ....

iii) Ferric chloride reacts with water to form ....hydrates, whereas sodium chloride and water react to form.................... .

II) Electrochemistry: Answer the following questions: (17 Marks)

A) Answer **Only Two** from the following:

1- Write briefly on Corrosion process, and metal protection.

2- Calculate pH value of H^+ if $E_{H_2} = 0.12$ V.

3- Prove that secondary electrode potential is anion dependent.

B) Answer the following questions:

1- In the following cell: $Zn / Zn^{2+} // H^+ / H_2$ .pt.

i) Write the cell reaction. ii) Calculate E°_{cell} if $E^{\circ}_{Zn} = -0.762$ volt.

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

Write the type of the cell and E_{cell} for each of the following cases:

i) Cd^{2+} ions in both electrodes have the same concentrations.

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

3- Arrange the following potentials according to the reducing and oxidizing agent

(+ 0.34, - 0.76 , - 0.44 , + 0.55 , - 0.22 , + 0.22 ,+0.44)

C) Calculate the hydrogen ion concentration in the following cell if $E_{cell} = 0.48$ V

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

(X)   0.244 V

D) Write electrolysis product of each of the following solutions: Na_2SO_4 ,NaOH and $CuCl_2$.

أنظر خلفه باقى الأسئلة،،،،   Turn over ———————→

III) Colloids: (16 Marks)

A) Define *Only Three* from the following terms: (3 Marks)

    i) Micelles   (Give an example).   ii) Golden number.
    iii)Emulgent (Give an example).   iv) Thixotropy.

B) Complete *Only Three* from the following: (3 Marks)

   i)   The coagulation capacity of an electrolyte depends upon ………………

   ii) Lyophilic colloids are more stable than the Lyophobic, due to ……………..

   iii) Osmotic pressure of the colloid solution is directly proportional to………..

   iv) The type of emulsion obtained depends on ………………and………………….

C) Describe a method for the preparation of the following: (3 Marks)

   i) Arsenous sulphide sol.   ii) Sol of ferric hydroxide.

   iii) Gold sol by chemical method.

D) Explain briefly each of the following: (7 Marks)

   i) The main differences between elastic and non-elastic gel. (Give an example).

   ii) The origin of charge on colloidal particles.(Give an example).

   iii)How oil in water emulsion can be converted to water in oil emulsion?

-- Good Luck ------------------------------------

Prof. Dr. Maher M. A. Hamed.

Dr. M. H. Wahdan

Dr. Rasha M. Kamal

إجب علي جميع الأسئلة التالية:

السؤال الأول: اكتب في النقاط التالية:

١ـ معوقات الاتصالات.

٢ـ مقومات الاتصال الفعال.

٣ـ عوامل نجاح الاتصال غير اللفظي.

٤ـ خصائص ومقومات الكتابة الفعالة.

السؤال الثاني: أنماط أو أشكال الاتصالات التنظيمية:

١ـ وسائل الاتصال.

٢ـ أنواع الاتصالات.

٣ـ الاتصال اللفظي والاتصال غير اللفظي.

٤ـ الأسس العلمية في إعداد وكتابة التقارير.

مع تمنياتي للجميع بالنجاح والتوفيق،،،،،،،،،،،

د/ سناء مصطفي محمد

Final Exam of Industrial Method of Analysis
For 2nd Level Student

Section I   (25 Marks)   *(Examinar: Prof. Nagwa Abo El-Maali)*

Answer of the following questions:

I- Discuss in details how you can perform GC analysis of mixture of Petrochemicals.**(10 Marks)**

II-Answer **only one** of the following:

    A) Compare between the followings: (15 Marks)

1) Sensitivity and selectivity.   3) ppm and ppb.
2) Resolution and Specificity.

    B) Complete: (15 Marks)

1- Chromatography is a technique used to separate and identify ...., it works by allowing the molecules present in the mixture to distribute themselves between ....and .... medium. Molecules that spend most of their time in the mobile phase are carried along ....

2- Chromatography basically involves the separation of mixtures due to ....
....

3- The different Kinds of Chromatography are ...., ..., ...

4- The retention time is..,
While the theoretical plate is defined as ....

5- The general factors increasing resolution are ....

Section II (25 Marks)   *(Examinar: Dr. Ahmad Abo Markeb)*

Answer the following questions: **(25 Marks)**

A)   Write (True) or (False) in front of the following statements: (5 Marks)

1) Reference and indicator electrodes are mainly used in potentiometry.
2) Conductometric titrations require indicators to find out the end point.
3) The rate of decrease of intensity of monochromatic light with the thickness of the medium is directly proportional to the intensity of the incident light according to Beer's Law.

4) Molar conductance is the conductance of the body of uniform length (l) and uniform cross section area (A).
5) The energy required for σ- σ^* transition is less than for n- σ^* transition.

<div dir="rtl">

باقى الأسئلة فى الخلف

</div>

B) Calculate the pH at zero, 10, 25, 50 and 60 mL titrant in the titration of 50 mL of 0.1 M CH$_3$COOH with 0.1 M NaOH (K$_a$ = 1.75 x 10^{-5}).   **(5 Marks)**

C) Sketch <u>only three</u> curves of the following conductometric titrations: **(3 Marks)**

    1) NH$_4$OH with HCl.
    2) NaOH with HCl.

    3) CH$_3$COOH with NaOH.
    4) HCl with NaOH.

D) Define the following terms: **(4 Marks)**
    1) Auxochrome
    2) Hyperchromic shift

    3) Equivalent conductance
    4) Red shift

E) A sample of hexane contaminated with benzene had an absorbance of 0.070 at 256 nm in a cuvette with a 1.0 cm path length. Find the concentration of benzene in mg/L. (M.Wt. of benzene is 78.11 g/mol, ε = 201 M^{-1}.cm^{-1}).   **(4 Marks)**

F) Discuss briefly the applications of the following: **(4 Marks)**
    1) Conductometric titrations.
    2) Potentiometric titrations.

Good Luck

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

Answer <u>Only Four</u> questions: **(50 Marks)**

1-a- Explain the volhard titration of chloride. This method must be used in acid solution. Explain why?

b- Explain the principles of chelation titration indicators.

c- A divalent metal M^{2+} reacts with a ligand L to from a 1:1 complex
$$M^{2+} + L = ML^{2+}.$$
Calculate the concentration of M^{2+} in a solution prepared by mixing equal volumes of 0.2M M^{2+} and 0.2M L ($K_f=1.0 \times 10^{18}$).

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

b- Calculate the potential of a solution obtained by reacting 10 ml each of 0.2M Fe^{2+} and 0.2M Ce^{4+}.
$$(E°Fe^{3+}, Fe^{2+}=0.77V \quad ; \quad E°Ce^{4+}, Ce^{3+}=1.61V)$$

c- The iron (II) in an acidified solution is titrated with a 0.0206M solution of potassium permanganate.
$$5Fe^{2+}+MnO_4^-+8H^+=5Fe^{3+}+Mn^{2+}+4H_2O$$
If the titration required 40.2 mL , how many milligrams iron are present in the solution (At.wt Fe=55.84).
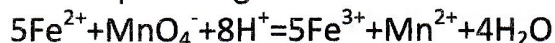
3-a- Calculate the equilibrium concentrations of the different species in a 0.01M solution of sulfurous acid , H_2SO_3 , at pH 4.00.
$$(K_{a1}=1.3 \times 10^{-2} \quad , \quad K_{a2}=5 \times 10^{-6})$$

b- Define the following: i- ionic strength.   ii- peptization.

c- Calculate the pH of a 0.1 M solution of aniline , $C_6H_5NH_2$, a weak base. ($K_b=4.0 \times 10^{-10}$).

أنظر خلفه باقي الأسئله

4-a- Write briefly on:-

  i- Bronsted acid-base theory.   ii- Buffer solutions.

  b- The total phosphate concentration in a blood sample is determined to be 3.0×10^{-3}M. If the pH of the blood sample is 7.45 , what are the concentrations of $H_2PO_4^-$ and HPO_4^{--} in the blood? (pK_{a2}=7.12).

  c- Calculate the pH of water containing 0.15M KCl at 25°C , where the ionic strength is 0.1M (γH^+=0.83 , γOH^-=0.76).

5-a- Define the following: i- co- precipitation.   ii- post-precipitation.

  b- An acetic acid – sodium acetate buffer of pH 5.00 is 0.10 M in sodium acetate. Calculate the pH after the addition of 10 ml of 0.1M NaOH to 100ml of the buffer. (pK_a=4.76).

  c- A hydrochloric acid solution was standardized by titration with sodium carbonate solution. The results gave the volumes of 10.22 , 10.30 , 10.26 and 11.23 ml. Which one (s) of these points can be rejected at 90% confidence interval using Q-test? For all remaining points calculate the mean , the standard deviation and the relative standard deviation if Q_{tab} is 0.76.

Good Luck

Examiner:Prof.Dr.Hassan Sedaira
       Prof.Dr.Elham Y.Hashem

Answer the following questions:

1- Answer <u>Two Only</u> from the following: (16.5 Marks)

   (a) Drive the relation between the enthalpy change and temperature

   (b) Drive the relation between pressure and volume for adiabatic process

   (c) For the reaction: $N_2O(g) \longrightarrow N_2(g) + \frac{1}{2} O_2(g)$

   $\Delta H = -19.5$ kcal.mol^{-1} and $\Delta S = 18$ cal.mol^{-1} K^{-1}

   where for the reaction: $H_2O(l) \longrightarrow H_2O(g)$

   $\Delta H = 9590$ cal.mol^{-1} and $\Delta S = 25.7$ cal.mol^{-1} K^{-1}

   Explain how the free energy as a function can provide a criterion for spontaneity and equilibrium positions for the above reactions

2- Answer <u>Two Only</u> from the following: (16.5 Marks)

   (a) State the third low of thermodynamics and show how it can be applied for calculation of absolute entropy of a compound and ΔS for any chemical reaction

   (b) Drive the relation between equilibrium constant and temperature

   (c) Discuss the electrical method used for determination of free energy change

3- Answer <u>Two Only</u> from the following: (17 Marks)

   (a) Drive the relation between enthalpy change of a reaction and its enthalpies of formation of both reactants and products.

   (b) Drive the relation between free energy change and equilibrium constant

   (c) Drive the relation between enthalpy change and internal energy change for gaseous reaction

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

Examiner: Prof. Gabr

Answer the following questions:

1- Answer <u>Two Only</u> from the following: (16.5 Marks)

   (a) Drive the relation between the enthalpy change and temperature

   (b) Drive the relation between pressure and volume for adiabatic process

   (c) For the reaction: $N_2O(g) \longrightarrow N_2(g) + \frac{1}{2}O_2(g)$

      $\Delta H = -19.5$ kcal.mol^{-1} and $\Delta S = 18$ cal.mol^{-1} K^{-1}

      where for the reaction: $H_2O(l) \longrightarrow H_2O(g)$

      $\Delta H = 9590$ cal.mol^{-1} and $\Delta S = 25.7$ cal.mol^{-1} K^{-1}

      Explain how the free energy as a function can provide a criterion for

      spontaneity and equilibrium positions for the above reactions

2- Answer <u>Two Only</u> from the following: (16.5 Marks)

   (a) State the third low of thermodynamics and show how it can be applied
       for calculation of absolute entropy of a compound and ΔS for any
       chemical reaction

   (b) Drive the relation between equilibrium constant and temperature

   (c) Discuss the electrical method used for determination of free energy
       change

3- Answer <u>Two Only</u> from the following: (17 Marks)

   (a) Drive the relation between enthalpy change of a reaction and its
       enthalpies of formation of both reactants and products.

   (b) Drive the relation between free energy change and equilibrium
       constant

   (c) Drive the relation between enthalpy change and internal energy change
       for gaseous reaction

-- GOOD LUCK --

Examiner: Prof. Gabr

Special program
Industrial Chemistry
Final Exam 2018

Chemical Manufacturing Process
Time: 2 Hours

Assiut University   **Faculty of Science**

Answer the following questions:

Question NO. 1   (20 %).

a- What are the main classifications of chemical products?

b- What are the types of chemical processes?

c- Give a flow chart describes the anatomy of chemical process

d- Compare between batch and continuous processes

Question NO. 2   (30 %).

a- Define chemical reactor. What are the main requirements for satisfying the design of industrial chemical reactor?

b- What are the principle types of reactors? What are the advantages and disadvantages of each of them?

c- Explain with clear sketches the fluidized bed reactor.

Question NO. 3   (30 %).

a- How could separation screen (sieve) size be defined? What are the main types of them?

b- Explain the theory of the following separators:(Illustrate your answers with sketches)

   i)   Hydrocyclone.   iv) Floatation separators

   ii) Rake classifiers   v) Magnetic separators

   iii) Tables

Question NO. 4   (20 %).

a- What is the block flow process diagram? What is the format recommended for laying out BFDs

b- Describe the following process flow diagram
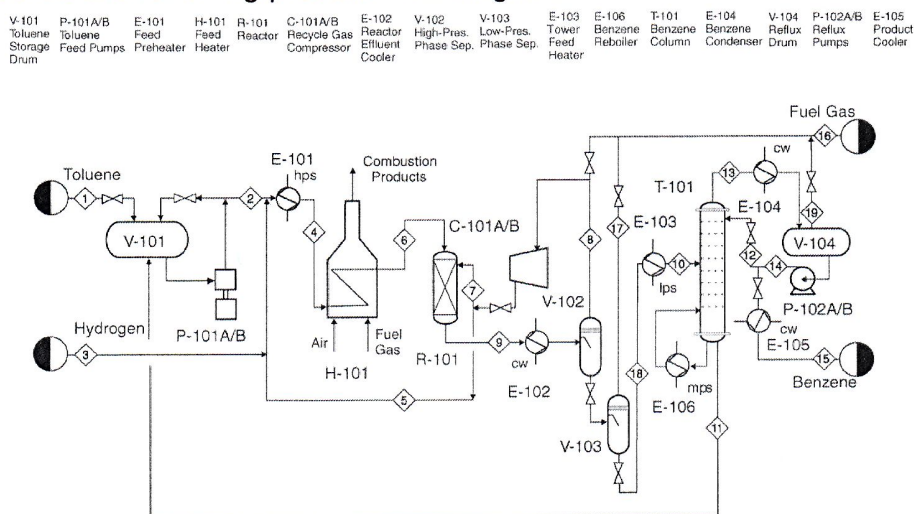
-- END--

Best Wishes
Dr. M.S.Aboraia

Chemistry Department
Faculty of Science
Assiut University

May, 2018
Time: 3 hours
50 Marks

Final Exam of Green Chemistry (214C) for the 2ⁿᵈ Level Students

Answer all of the following questions: (50 Marks)

1]- Choose the correct answer for *ten* only of the following (Tabulate your answer)? (10×1.5 = 15 M)

1- Which of the following is the correct name?

A   B
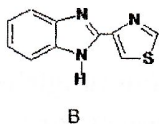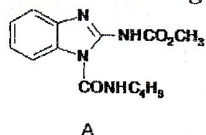
a) A. Dimethirimol; B. Thiabendazole
b) A. Thiabendazole; B. Dimethirimol
c) A. Benomyl; B. Thiabendazole
d) A. Thiabendazole; B. Benomyl

2- In the present equations, which of the following statements most accurately describe the process?

$$SO_2 + \cdot OH + M \rightarrow HOSO_2 + M$$
$$HOSO_2 + O_2 \rightarrow HO_2 + SO_3$$
$$SO_3 + H_2O + M \rightarrow H_2SO_4 + M$$

a) Oxidation of SO_2 in gas and aqueous phase
b) Oxidation of SO_2 in coal-fired power plants
c) Injected into the atmosphere
d) Oxidation of SO_2 in rich fossil fuels

3- Which of the following reactions represent the hydrogen removal by the hydroxyl radical from the troposphere layer?

a) $NH_3 + HO^\cdot \rightarrow H_2N^\cdot + H_2O$
b) $CO + HO^\cdot \rightarrow CO_2 + H$
c) $CH_4 + HO^\cdot \rightarrow H_3C^\cdot + H_2O$
d) a & c

4- Dimethomorph fungicide which is a mixture of 50:50 E-and Z-isomers belong to

a) 1,4-Oxathiins
b) Benzimidazoles
c) Morpholines
d) Acylalanines

5- Consider the following reactions, which type of reaction best explains what has occurred?

$$Cl + CH_4 \longrightarrow HCl + CH_3$$
$$ClO + NO_2 \longrightarrow ClONO_2$$

a) Inactivation of chlorine atom
b) Chlorine reacts directly with ozone
c) Synthesis of carbon dioxide
d) Revolution of chlorine

6- Choice the correct reagents in the following synthesis applied in the synthesis of Ibuprofen:
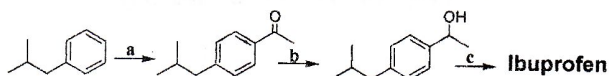
a) *a:* Ac_2O/HF, *b:* H_2/Catalyst, *c:* CO/Pd-Cat.
b) *a:* Ac_2O/HF, *b:* CO/Pd-Catalyst, *c:* H_2/Cat.
c) *a:* H_2/Catalyst, *b:* CO/Pd-Catalyst, *c:* Ac_2O/HF
d) *a:* CO/Pd-Catalyst, *b:* Ac_2O/HF, *c:* H_2/Cat.

7- Contact herbicides excised as quaternary salts of bipyridyls, however, the shown structure is

a) Rimsulfuron
b) Diquat
c) Trifluralin
d) Paraquat

8- Which of the following statements would not be valid choice for the catalytic oxidations of alcohol in water as solvent?

a) Polar, inert and clean solvent
b) Facile product separation
c) Cheap, available, odorless and colorless
d) Flammable and toxic

9- Dithiocarbamates are long-acting and synthesized by reaction of amines in the following sequences

a) *a:* CS_2, b: oxidation
b) *a:* reduction, *b:* CS_2
c) *a:* oxidation, *b:* CS_2
d) None of the above

10- The most important reactive intermediate of daytime atmospheric chemical phenomena is

a) $HO^\cdot$
b) $H_3C^\cdot$
c) $HOO^\cdot$
d) $O^\cdot$

11- Among the given set of solvents, the most preferred solvent in synthesis of pharmaceutical drugs industry is:

a) Benzene
b) Ethanol
c) Cyclohexane
d) Dichloromethane

12- In the second step of Dow process for (2,4-D) synthesis, the solution must be kept alkaline and 50% molar excess of 2.4-dicholorphenol in order to

a) Minimize formation of $HOCH_2CO_2Et$
b) Maximize formation of $HOCH_2CO_2Na$
c) Minimize formation of $HOCH_2CO_2H$
d) Maximize formation of $HOCH_2CH_2OH$

<div dir="rtl">باقي الأسئلة في الصفحة التالية</div>

2]- Provide a brief account for *four* only of the following: (4×2.5 = 10 M)

a) Hydrogen abstraction reactions of (OH˙) radical

b) Dioxins and Furans Herbicides

c) Carbamate insecticides

d) Reactions responsible for ozone hole

e) Dobson unit and particulate matter

f) Synthesis of Benomyl and Dimethirimol fungicides

3]- Answer *three* only of the following questions: (3×5 = 15 M)

a) Outline the troposphere oxidation of CH_4 into $HCHO$?

b) Describe by equations the synthesis of Thiram & Captan fungicides?

c) Outline the microbial degradation products of DDT insecticide?

d) Detail by equations the Dow process for the manufacture of (2,4-D) and (MCPA)?

4]- Answer *two* only of the following questions: (2×5 = 10 M)

a) Show by equation the reactions of hydroxyl radical with O_2, CH_4, O_3 and NH_3?

b) Write the name and chemical structure for *five* only of the following compounds?

    [Parathion - Trifluralin -Paraquat – Prochloraz- DDT – Carboxin]

c) Outline the oxidation mechanism of RCH=CHR in smog?

أنتهت الأسئله مع أطيب التمنيات

Prof. Dr. Yasser A. Elossaily

Assoc. Prof. Hassan A. Kotb

2

Assiut University
Faculty of Science
Chemistry Department

Date: 9/5/2018
Time : 03 Hours
Course No.: 210C

==

Final Exam. for Second Level Chemistry Students (Reaction mechanism & Carbonyl compounds)
Sec. term ,2017/2018

Answer the Following Questions (50 Marks)

Part I : Reaction Mechanism (25 Marks)

Question One: (15 Marks)

(a) Mark <u>Seven Only</u> ($\sqrt{}$) or (X) for the following sentences: (7Marks)

1- 1-Bromo-1-phenylethane reacts with 6M NaOEt giving 1-phenylethene via E1 mechanism .

2- A reaction involving a carbocation, the transition states structur look like the intermediate.

3- Reaction of bromine with trans-2-butene is stereospecific electrophilic addition reaction.

4- Carbanion stabilized by alkyl substituents by inductive effect and hyperconjugation

5- E2 mechanisme need high concentration of good nucleophile.

6- Regioselectivity is defined as which functional group will react.

7- S_N2 mechanisme go faster with ROH as solvent.

8- E1cB reaction takes place through carbocation intermediate.

(b) Choose the correct answer of the following sentences ; (8 Marks)

1- Which of the following anions would be the best leaving group for a substitution or elimination ?

a. H_3C^- ,   b. HO^- ,   c. Br^-

2- Which of the following mechanism feature carbocation intermediate ?
a. S_N1 only   ,   b. S_N2 only   ,

c. E1 only   ,   d. E2 only   ,

e. both S_N2 and E2   ,   f. both S_N1 and E1

3- Which of the following statements apply to first order reaction of alkylhalides ?
a. Rate = k [base]   ,

b. Rate = k [RX]   ,

c.   Rate = k [base][RX]

<div dir="rtl">انظر الصفحة التالية ←</div>

4- The most stable of the following isomeric alkenes would be:

5- Methyl bromide reacts with $(CH_3)_3COK$ / t.ButOH via :

a. E1 mechanisme   ,   c. S_N1 mechanisme

b. E2 mechanisme   ,   d. S_N2 mechanisme

6- Benzyne is :

a. nucleophilic reagent   ,   b. electrophilic reagent   ,   c. intermediate

7- The reaction of 1-butene 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

8- Which of the following is most readily undergoes an E2 reaction with CH_3CH_2ONa ?

a. CH_3I b. CH_3CH_2I c. $(CH_3)_3CI$ d. CH_3OCH_3

Question Two: (10 Marks)

1- By equations show and name the product which result when 1-bromo-3-phenylpropane react with sodium acetate in DMF. Give a detailed mechanism, name of this reaction and types of selectivity for the production of the product.   (2 Marks)

2- Complete the following equation. Give the mechanism ($S_N1, S_N2, E1, E2$) by which the product is formed. Also predict the relative amounts of products (major, minor).   (2Marks)

$(CH_3)_3CBr$ + CH_3CH_2ONa / 50°C / CH_3CH_2OH → ?

3- Show by equations the mechanism of the following reactions and then explain it by the energy diagram   (4 Marks)
a.   cis-1-bromo-2-methylcyclopentane + EtONa/EtOH →

b.   1,3-Butadiene + Cl_2 ⟶
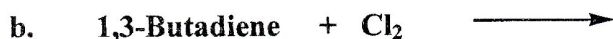
4- Define the following :   (2 Marks)

a. Reaction mechanism

b. Hyperconjugation

←—— انظر الصفحة التالية

2

Part 2 Carbonyl Compound

Question three Answer five only of the following ----------- 12.5 marks

a-Effect of dil. NaOH/heat then acidifaction on a mixture of PhCHO and CH2O

b-Complete the following equation and give the type of the reaction

$$CH_3CH_2COCH_3 \xrightarrow[\text{ii H3O}^+ \text{ work up}]{\text{i- CH3Li/ether}} ?$$
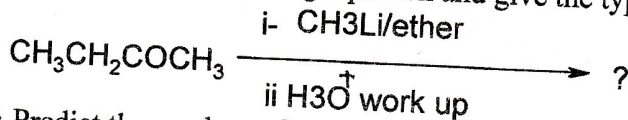
c-Predict the product of the following reaction and name the product

$$PhCHO + CH_3OH(xs) \xrightarrow{\text{HCl/heat}} ?$$

d-Give the structure of the product of the following reaction

$$Cyclohexanone + HS(CH_2)_3SH \xrightarrow{BF_3/\text{ether}} ?$$
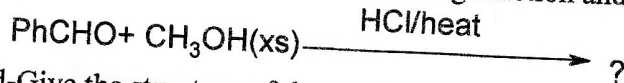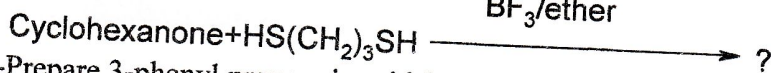
e-Prepare 3-phenyl propanoic acid from diethyl malonate

f-Assign the structure of compound A and B in the following reaction

$$CH_3COCH_2CO_2Et \xrightarrow{\text{i-HO(CH2)2OH/H}^+} A \xrightarrow[\text{ii- H3O}^+]{\text{i-LiAlH4}} B$$
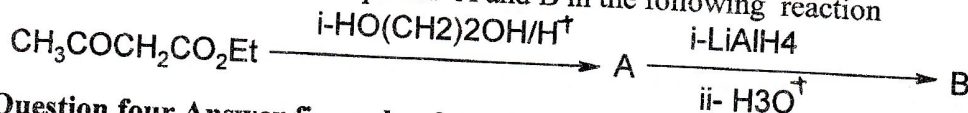
Question four Answer **five** only of the following------------------ 12.5 marks

a-Give the structure of the product of the following reaction

$$PhCHO + PhNH_2 \xrightarrow{\text{EtOH/heat}} ?$$
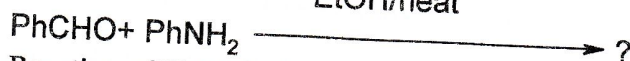
b-Reaction of PhCOCH3 with Br2 in acetic acid and suggest a mechanism

c-Draw the structure of aldol addition product of propanal and propose a mechanism

d- Put the sign(√) on right sentence and sign (x) on the wrong one

i-PhCHO can form enamine when reacts with secondary amines

ii-CH3CHO is reactive than CH2O in nucleophilic addition reactions

iii-Diethyl Oxalate can undergo self claisen condensation

e-What is the product that obtained from the following reaction

$$Cyclohexanone \xrightarrow[\text{ii-H3O}^+]{\text{i-BrCH2CO2Et/Zn/PhH}} ?$$
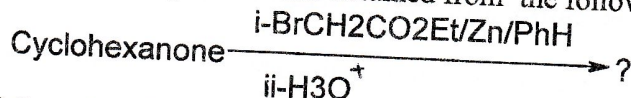
f-Complete the following a sequence of the following reaction
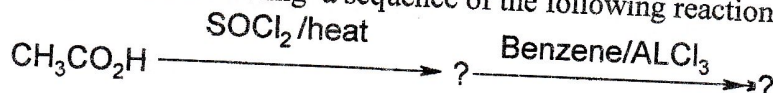
$$CH_3CO_2H \xrightarrow{SOCl_2/\text{heat}} ? \xrightarrow{\text{Benzene/ALCl}_3} ?$$

Faculty of Science

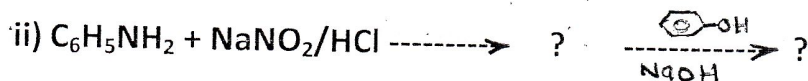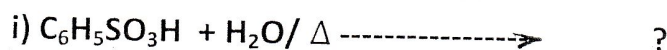Chemistry Department   (May 2018)   Time: 2 hr.

Final Examination for Applied Industrial Chemistry Students

(Chem 202C, Organic Chemistry)

Section A (Aromatic Chemistry)   (25 Marks)

1) a) Complete <u>four only</u> of the following equations: (9 Marks)

i) $C_6H_5SO_3H$ + H_2O/ Δ ---------------$\longrightarrow$?

ii) $C_6H_5NH_2$ + $NaNO_2$/HCl ---------$\longrightarrow$?   -OH ?
                                                            NaOH

iii) C_6H_5OH + CH_3COCl ------------$\longrightarrow$?

iv) $C_6H_5SO_2Cl$ + HNR_2 --------------$\longrightarrow$?

v) C_6H_5CHO + H_2NR -------------$\longrightarrow$?
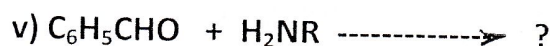
b) Starting with benzene outline the syntheses of <u>three only</u> of the following compounds: (6 Marks)

i) Phenol   ii) Benzoic acid   iii) Acetophenon

iv) m-Bromo benzenesulfonic acid

2) a) Predict the expected product would be obtained of <u>three only</u> of the following reactions: (6 Marks)

i) Benzene with CH_3Cl/$AlCl_3$ ii) Benzoic acid with Soda lime

iii) Acetophenone with Zn(Hg)/ HCl   v) Toluene with $3Br_2$

b) i) Which is more basic: aniline or methyl amine ?   (2Marhs)

  ii) Which is more acidic: phenol or 2,4,6-trinitrophenol ? (2Marks)

أنظر خلف الورقة من فضلك

Section B (Heterocyclic Chemistry)   (25 Marks)

1- Answer the following:

a) Draw the structure of the following compounds: (7 Marks)
   Furan – quinoline – indole – pyrimidine - isoxazole,
   benzothiazol – 1,2,3-triazole.

b) Marks (only six) of the following as ($\sqrt{}$) or (X):   (6 Marks)
   i) Pyrimidines are not aromatic heterocycles.
   ii) 1,3-Azoles are very reactive towards electrophilic attack.
   iii) 1,2 - Azoles are more basic than 1,3- azoles.
   iv) Isoxazole and isothiazole are basic heterocycles.
   v) Quinoline nucleus is a benzene ring fused to Pyrrole ring
   vi) Acetylene has acidic character.
   vii) Thiophene is stable to Lewis acids.

2- a) Show by equations and mechanisms the preparation of the following :
                                             (6 Marks)
   i) The Paal – Knorr synthesis of thiophene.
   ii) Robinson-Gabril synthesis of oxazole.

b) Complete (only six) of the following equations: (6 Marks)
   i) Furan + HCHO/HN(CH_3)$_2$ in HCl ------------$\rightarrow$?
   ii) 2,5- Dimethylthiophene + EtBr (AlCl$_3$) -----------$\rightarrow$?
   iii) Isoxazole + Br$_2$ -------------$\rightarrow$?
   iv) Pyridine + H$_2$O$_2$ (AcOH) ------------$\rightarrow$?
   v) 2-Methylquinoline + CH$_3$Br/KNH$_2$ -----------$\rightarrow$?
   vi) Imidazole + HNO$_3$/H$_2$SO$_4$ --------------$\rightarrow$?
   vii) Thiophene + CH$_3$COCl (SnCl$_4$) -------------$\rightarrow$?

-------------------------   Good Luck   -----------------------------------

Prof. Abdo El Said Abdel Rahman, Prof. Ali Ahmed Abdel Hafez

Final exam. Of Organic Chemistry(Aromatic &Heterocyclic Chemistry 212C) for 2nd level Students

----

<u>Answer the following:</u>   **Section(A) Aromatic Chemistry**   (**25 marks**)

1- a)Complete <u>Six Only equations</u> from the following:-   (9 marks)-

i) Benzene + $(CH_3)_2CHCl$ $\xrightarrow{AlCl_3}$? $\xrightarrow{H_2O_2/ (O)}$? $\xrightarrow{\text{Diazonium Chloride}}$?

ii) Benzene Sulfonic acid+ NaOH(aqu.) $\longrightarrow$? $\xrightarrow{NaCN/Fusion}$? $\xrightarrow{H^+/H_2O}$?

iii) p-Toluene sulphonyl chloride $\xrightarrow{NH_3}$? $\xrightarrow{NaOCl/\triangle}$? $\xrightarrow{NaOH}$?

iv) Aniline + HONO $\xrightarrow{0^OC}$? $\xrightarrow{H_2O/\triangle}$? $\xrightarrow[AlCl_3/CuCl]{CO/HCl}$?

v)Benzaldehyde + Cl_2 $\xrightarrow{\triangle}$? $\xrightarrow{NH_3}$? $\xrightarrow{NaOBr}$?

vi)Toluene + Cl_2 $\xrightarrow{Boiling}$? $\xrightarrow[\triangle]{aqu.NaOH}$? $\xrightarrow[C_4H_9OCl/Py.]{(O)}$?

vii) Resorcinol + HCN/HCl $\xrightarrow{ZnCl_2}$? $\xrightarrow{H_2O/\triangle}$? $\xrightarrow{H_2NNH_2}$?

viii) Cyanobenzene +CH_3MgCl $\xrightarrow{Ether}$? $\xrightarrow{H_2O/H^+}$? $\xrightarrow{HCN}$?
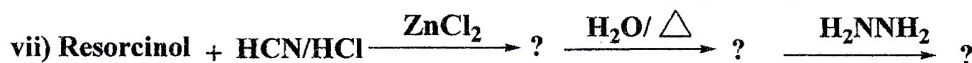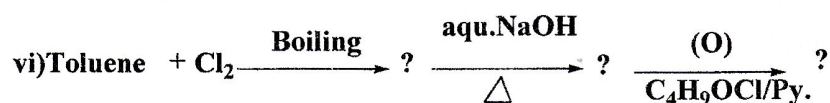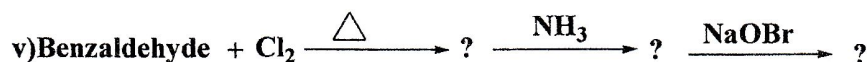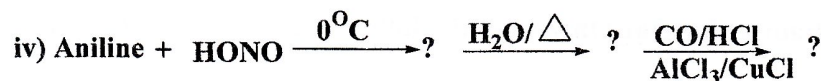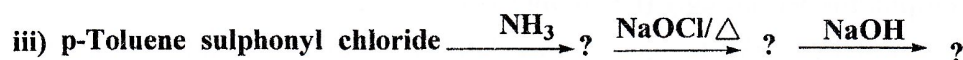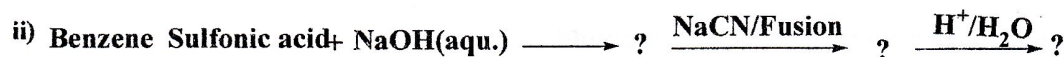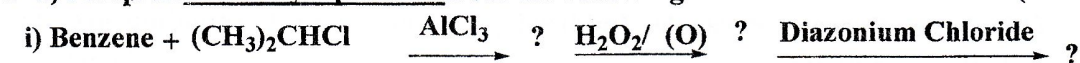
b)Hydroxy group is an activating group in electrophilic reaction and <u>o-p</u>-director while nitro group is deactivating one and meta-director. How can you explain this statement?

(5 marks)

2-a)Give <u>Only Three</u> Formulas structures& nams the main organic products expected from the mono nitrated of: (5 marks)

i)Benzotrichloride   ii)<u>p</u>-Cresol   iii)<u>p</u>-Toluidine

iv)<u>o</u>-Nitroacetanilide   v)<u>m</u>-Hydroxybenzaldehyde

b)By equations only how can you prepar <u>Three</u> of the following: (6 marks)

i)<u>m</u>-Dichlorobenzene from Benzoic acid .   ii)Indigotin from <u>o</u>-Toluidine.

iii)Asprine from phenol.   iv)Catechol from Toluene

الامتحان في ثلاث صفحات

Section (B) Aromatic Heterocyclic Compounds (25 marks)

3-a) Show by equations, how retrosynthesis strategy can be used for the synthesis

Two Only of the following:- (4 marks)

a)   b)   c)
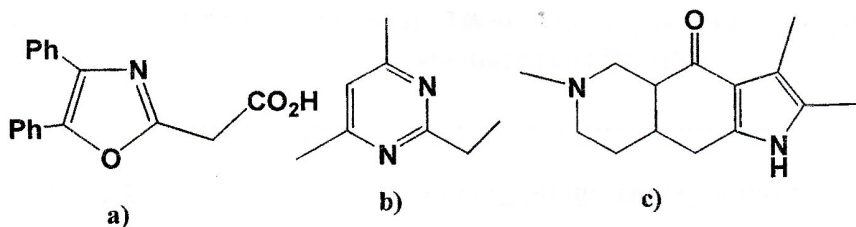
b) Furan, Thiophene, Pyrrole, Pyrazole, Imidazole, Pyridine, and Pyramidine are the famous heterocyclic compounds   (6 marks)

i) Give the chemical structure of these compounds.

ii) Arrange these compounds ascendingly (low to high) according to

(1) Basicity   (2) Aromaticity   (3) Reactivity toward electrophilic substituation reactions

c) Write the full detailed mechanism for **One Only** from the following:-   (2 mark)

i)   ii)
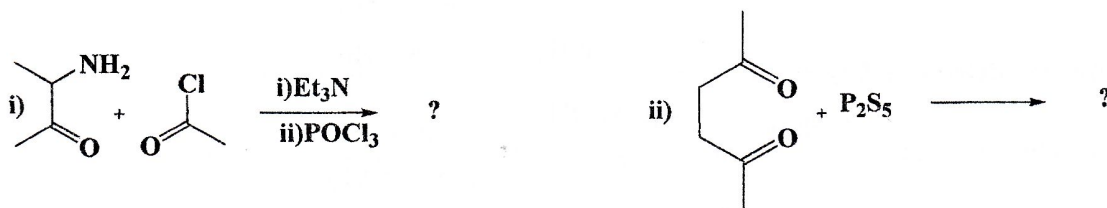
4-a) Explain by equations _Five Only_ from the following;-   (5 marks)

   i)Fischer synthesis of Indole.

   ii)The electrophilic substitution reaction of pyridine occures manily at C_3.

   iii)Synthesis of 2,5-dimethylpyrrole by using Paal-Knorr Synthesis

   iv)Aniline and glycerol is heated in nitrobenzene / H_2SO_4.

   v) 2-Methyl furan is treated with acetyl nitrate.

   vi) Hantzsch synthesis of thiazole .

الامتحان فى ثلاث صفحات

b) Write the systematic name for Three Only of the following:- (3 mark)
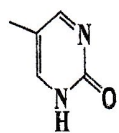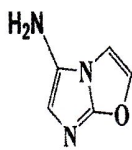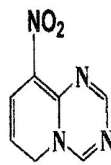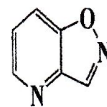
a)   b)   c)   d)

c) Complete Five Only of the following equations:- (5 marks)

i-

+ (methyl ethyl ketone) $\xrightarrow{\text{ZnCl}_2}$? + ?

ii-

C_2H_5O—C(=O)—CH$_2$—C(=O)—OC_2H_5 + (PhCHO) + NH_3 $\xrightarrow[\text{ii)HNO}_3]{\text{i)Et}_2\text{NH}}$?

iii-

(isoquinoline) $\xrightarrow{\text{HNO}_3/\text{H}_2\text{SO}_4}$?

iv-

(2-methyloxazole) $\xrightarrow[\substack{\text{ii)Ph}_2\text{CO} \\ \text{ii)H}_3\text{O}^+}]{\text{i)n-BuLi}}$?

v-

(aniline, NH$_2$) $\xrightarrow{\text{NaNO}_2/\text{HCl}}$? $\xrightarrow{\text{NaN}_3}$? EtO_2C—≡≡≡—CO_2Et $\longrightarrow$?

vi-

(4,5-diphenylthiazole) + $OHCNMe_2$ + CH_2O $\longrightarrow$?
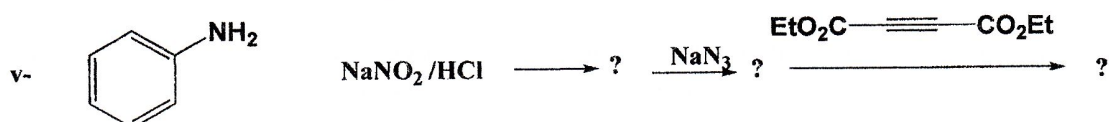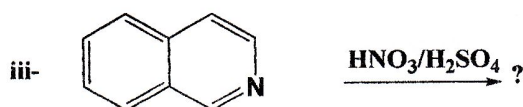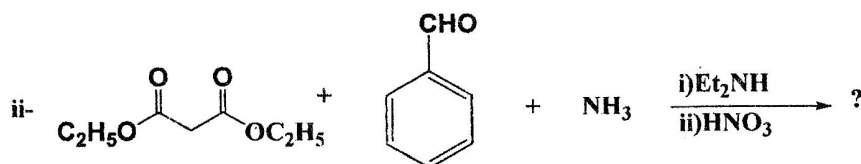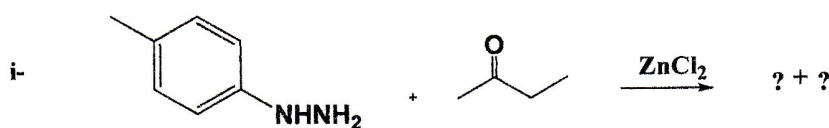
GOOD LUCK

الممتحنين: ا.د. عبده السيد   ا.د. عادل كمال   ا.د. زينب حزين   د.وليد احمد   د. عوض سيد
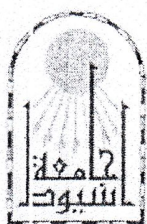
FINAL MEDICAL BIOCHEMSITRY EXAM
Second year Industrial Science

Date 20-5-2018	No of Pages:2	Time allowed :2 hrs	Total marks:50

Answer the following question:

1. Write on the following

   ♦ Exposure entry routes of Chemical Hazards, Controls and Examples of chemical exposure symptoms [4-marks]

   ♦ Proteoglycan   [2-marks]

   ♦ Sickle Cell anaemia   [2-marks]

2. Compare between the following: [2–marks each]

   • Diffusion and osmosis

   • Areolar and Dens connective tissue
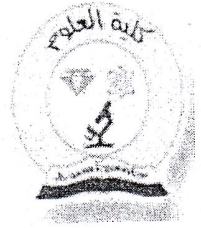
3. Underline on the following: [2-marks each]

1- Calcium

2- Plasma Membrane

3- Job Hazards

4- Important industrial material

5- Air Contaminants

4. Illustrate only with Diagram Immunoglobulin A: [3 marks]

5-Explain briefly TheErgonomic Hazards : [4 marks]

6- Explain briefly the structure of plasma membrane: [4 marks]
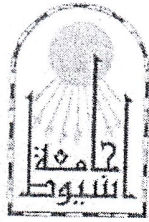
Dr Naglaa Kamal Idriss

Assistant Professor of Medical Biochemistry

Faculty of Medicine Assiut University

9
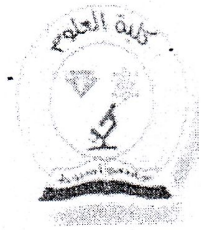
7. Choose the correct answer: [1 mark each]

♦ Which of these is not a component of the plasma membrane?

a. desmosomes

b. phospholipids

c. cholesterol

d. glycolipids

♦ Glucose entered the cell via

a. facilitated diffusion

b. active transport

c. simple diffusion

d. endocytosis

♦ Which of the following is NOT always found on membranes?

1. Carbohydrate
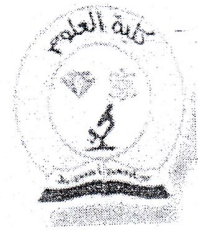
2. Lipid

3. Pneumothorax

4. Protein

♦ **When vesicles in cytoplasm combine with plasma membrane excreting hormones and other materials out of cell than this process is called**

a. exocytosis

b. endocytosis

c. excretion

d. engulfing

♦ **Waxes are the compounds which are extremely**

a. hydrophilic

b. hydrophobic

c. sticky ends

d. Blunt ends
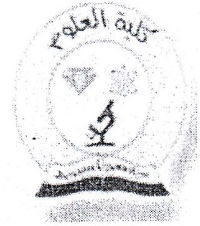
4

♦ The type of diffusion in which the molecules move from higher concentration to lower concentration is called

a. osmosis

b. intracellular diffusion

c. lateral diffusion

d. flip flop

♦ Types of endocytosis include

a. phagocytosis

b. pinocytosis

c. Packing

d. Both A and B

♦ A type of movement which does not requires energy is called

A. Active transport

♦ The type of diffusion in which the molecules move from higher concentration to lower concentration is called

a. osmosis

b. intracellular diffusion

c. lateral diffusion

d. flip flop

♦ Types of endocytosis include

a. phagocytosis

b. pinocytosis

c. Packing

d. Both A and B

♦ A type of movement which does not requires energy is called
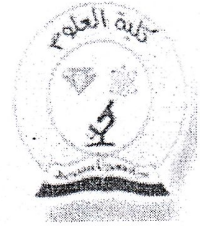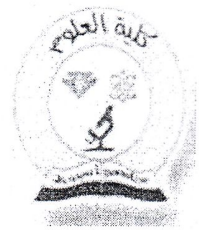
A. Active transport

B. Facilitate diffusion

C. Passive transport

D. Movement against the concentration gradient

♦ **Which of the following controls is an example of an engineering control for protection against chemicals?**

   a. Ventilation

   b. Respirators

   c. Training

   d. Signage

♦ **Iron is a component of**

   a. Hemoglobin

   b. Ceruloplasmin

   c. Transaminase

   d. Transferase

♦ **Which of the following immunoglobulin is the most abundant immunoglobulin in newborns?**

   a. IgA
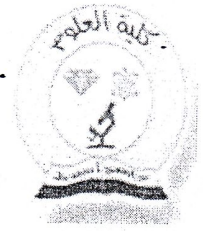
b. IgM

c. IgG

d. IgD

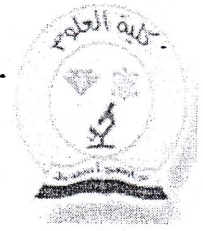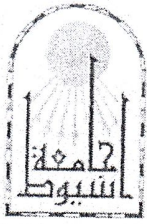♦ **Which of the following immunoglobulin is produced early in the primary response to infection?**

a. IgE

b. IgA

c. IgG

d. igM

♦ **Which of the following immunoglobulin is the main host defense against parasititc infections**

a. Secretory IgA
b. IgG
c. IgM
d. IgE

♦ **Which of the following is an example of a physical health hazard?**

a. Asbestos
b. Noise

b. IgM

c. IgG

d. IgD

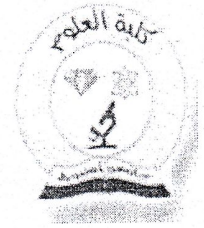♦ Which of the following immunoglobulin is produced early in the primary response to infection?

a. IgE

b. IgA

c. IgG

d. igM

♦ Which of the following immunoglobulin is the main host defense against parasititc infections

a. Secretory IgA
b. IgG
c. IgM
d. IgE

♦ Which of the following is an example of a physical health hazard?

a. Asbestos
b. Noise

c. Silica

d. Lead

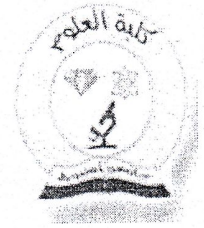♦ **The tissue which is found in abdomen, around kidneys and under skin is called**

a. nerve tissues

b. skeletal tissues

c. cardiac tissues

d. adipose tissue

♦ **Which of the following strategies is considered the first line of defense for controlling occupational health hazards?**

a. Inspections and audits
b. Engineering controls
c. Administrative controls
d. Personal Protective Equipment

♦ **Which of the following is one of the first signs of oxygen deficiency?**

a. increased heart beat
b. increased breathing rate
c. increased concentration
d. decrease breathing rate

c. Silica

d. Lead

♦ **The tissue which is found in abdomen, around kidneys and under skin is called**

a. nerve tissues

b. skeletal tissues

c. cardiac tissues

d. adipose tissue

♦ **Which of the following strategies is considered the first line of defense for controlling occupational health hazards?**

a. Inspections and audits
b. Engineering controls
c. Administrative controls
d. Personal Protective Equipment

♦ **Which of the following is one of the first signs of oxygen deficiency?**

a. increased heart beat
b. increased breathing rate
c. increased concentration
d. decrease breathing rate