ر امتحان م

	Tanta University	Kinetic theory of gases		
	Faculty of Science	First Term (2013-2014)	Course code: CH 2103	
	Chemistry Department	12 Jan. 2014	Total Ass. Marks:50	
	2nd Chemistry students		Time allowed: 2 Hours	

1. Complete the following sentences (21 marks)

1. The collision cross section is.............

2. For non-linear CH_4 the molar heat capacity at constant pressure is ....

3. According to ....a gas on warming, should take up energy in all its degrees of freedom.

4. Adjacent laminar sheets experience friction as they slide past one another. This frictional force is proportional to ....and ....

5. The mean free path is defined as .... and determined by the equation ......

6. The volume excluded per mole of gas (b), is given by.......

7. **5 atmosphere** is the same as ....mm Hg.

8. Poiseuille's equation for gases is..........

9. Effusion of gases is defined as.........

10. The viscosity of gas ...... by increasing the temperature, this is because ....

11. According to the kinetic theory of gases, the collisions with the container walls comprise ....

2. Put true or false and correct the false one (10 marks)

1. The density of the atmosphere increases with increasing altitude.

2. The kinetic theory of gases relates gas viscosity coefficient η to molecular diameter by $\eta = \dfrac{mc^-}{2\sqrt{2}\,\pi d^2}$

3. The escaping of air through the punctured tire is considered an example of diffusion.

4. In the right angle collision the molecules are headed in the same direction.

5. According to equipartition energy, the average energy for each rotational degree of freedom is 1 KT.

باقى الأسئلة فى الخلف

3. Select the right answer (10 marks)

1. The pressure exerted by a gas on its container is directly proportional to
a) The volume of the container.
b) The absolute temperature of the gas.
c) The number of molecules of gas in the sample.
d) The Celsius temperature of the gas.

2. Under similar conditions which of the following gases will effuse four times as quickly as oxygen?

   d) CH_4 c) N_2 b) H_2 a) He

3. In the kinetic gas equation, $1/3NmX^2$, hence X is:

a) Relative speed.   c) Average speed.
b) None of them.   d) Root mean square speed

4. Which of the following is not the postulate of the kinetic theory of gases?

a) Gas molecules are in a random motion.
b) The molecular collisions are perfectly elastic.
c) Pressure of gas is due to molecular impact on the walls of the container.
d) The gaseous molecules are perfectly elastic.

5. As the radius of molecule increases the mean free path.
a) Unchanged   c) Increases
b) None of them   d) Decrease

4. Answer the following (9 marks)

a. 2 moles of NH_3 are enclosed in a 5 liter flask at 27°C. Calculate the pressure of NH_3 using Van der Waals equation. (For ammonia $a = 4.17$ litre^2 atm.mole^{-2}, $b = 0.0371$ litre mole^{-1})

b. The rms speed of an atom is 1.36×10^3 at 25°C. Identify the gas from its molar mass.

c. Under the same conditions of temperature and pressure, does CO_2 or N_2 effuse faster? Calculate the relative rates at which they effuse.

****

Best wishes ---- Dr. Eman Fahmy Aboelfetoh

Tanta University
Faculty of science
Department of Physics
Examination for second year students of chemistry group . (credit hour system)
Course title: Crystallography and x-ray   Course code :ph2191
Date: 23/1/2014   assessment marks : 50
Time allowed : 2 hours

Answer the following questions :

First question :

1- Define and explain by drawing the following:

a- the axis of rotation .

b- the center of symmetry .

c- the plane of symmetry.

d- the unit cell .

e- primitive and non-primitive cells .

second question :

a- Write the Miller indices for the plane LMN which has the intersections occur at 2,2 and 3/2 with the axes X , Y , Z and another plane perpendicular to y-axis and parallel to x and z- axis.

b- Write short notes about the following :-

1- Ionic crystals.   2- Van Der Waals crystals.   3- point defects.

Third question :

a- Explain how the X-rays are produced in Roentgen's experiment .

b- Explain by drawing how the characteristic radiation are produced .

fourth question :

a- From the studying of the diffraction of X-rays

- Derive the Bragg's law .

b- Explain how to identify substances by using the X-ray power photographs .

[I]. Compare between the pair of the following. *(20 Marks)*

    1- Diamond and Graphite.

    2- Trimethylamine $(CH_3)_3N$ and trisilyamine $(SiH_3)_3N$.

    3- Beryllium hydride and beryllium halides.

    4- Ortho and Para hydrogen.

[II]. Which of the following statements is true and which is wrong and correct the wrong? *(20 Marks)*

    1- Water has an abnormally high volatility than the other hydrides of gp (VI).

    2- $GaCl_3$, $AlCl_3$ are covalent when anhydrous. But, in solution become ionic with acidic character.

    3- Lithium tetrahydroaluminate is a powerful reducing agent in aqueous solutions.

    4- The hydrides of group V become difficult to prepare, their stability decreases and electron donor increase down the group.

    5- Despite the existence of PH_5, the PCl_5 does not exist.

    6- Li and alkaline earth metals are react directly with C and form metal carbide.

    7- Cs ion is the less hydrated and moves slowly in group I of Alkaline Earth Metals.

    8- Pb (+II) is stable and common than (+IV) due to shielding effect.

    9- The bond energy in F_2 is abnormally low.

   10- Fluorine does not form oxyacid.

[III]. Mention the important use and applications of each of the following. *(20 Marks)*

    1- Metal hydrides   2- halides of carbon   3- Alkali metals

[IV]. Draw the structure only of the following. *(20 Marks)*

    1- Boric acid, cyclic polyborate anion and Borazine.

    2- The structure types of SO_3.

    3- One dimensional silicones.

    4- Sulphurous acid, sulphuric acid and peroxosulphuric acid.

    5- Oxyacids of halogens.

[V]. Choose the correct answer from the following: (20 Marks)

1- What is the anhydride of H_3PO_3?

    A) PO_3 B) HPO_3 C) P_4O_6 D) P_4O_{10}

2- Which one of the following oxides has amphoteric behavior?

    A) Na_2O B) N_2O_5 C) P_4O_6 D) Al_2O_3

3- Oxidane is ....hydrides.

    A) Ionic   B) Molecular (electron-precise)

    C) Molecular (electron-rich)   D) Molecular (electron-deficient)

4- What are the oxidation states of Cl in Chloric acid and Perchloric acid, respectively?

    A) +3; −5   B) −3; +5   C) +5; +7   D) −5; -7

5- Which of the following compound is ionic?

    A) PCl_5 B) CCl_4 C) PbF_4 D) $PbBr_4$

6- The basic structural building block in silicates is the .... in which the central silicon atom is

    ....hybridized.

    A) SiO_4 trigonal pyramid; sp^3 B) SiO_3 trigonal pyramid; sp^2

    C) SiO_4 tetrahedron; sp^3 D) SiO_4 tetrahedron; sp^2

7- What are the oxidation states of P in the phosphorus acid and phosphoric acid, respectively?

    A) +3, +5   B) −3, −5   C) +5, +3   D) −5, −3

8- Write the balanced reaction for the formation of phosphoric acid from phosphorus

    pentaoxide with water.

    A) $2\ PO + H_2O \rightarrow 2\ HPO$ B) $P_4O_{10} + 6\ H_2O \rightarrow 4\ H_3PO_4$

    C) $2\ P_4O_{10} + 6\ H_2O \rightarrow 4\ H_3PO_4$ D) $P_4O_{10} + H_2O \rightarrow H_3PO_4$

9- Which property is not a characteristic of metals?

    A) Metals have high ionization energies.   B) Nearly all metals are solids at 25 °C.

    C) Metal oxides are basic.   D) Metals are good conductors of heat.

10- What are the oxidation states of oxygen in the following compounds? K_2O_2 CaO CsO_2.

    A) −2, −1, −½   B) −1, +2, −1   C) −1, −2, −½   D) +2, +1, −½

Good Luck

Examiner	Dr. Mohamed Mansour El-bendary

2

كمل د. حاتم

اجب عن الاسئلة الاتية:

|	
السؤال الاول	عملة معدنية احد وجهيها T والاخر H رميت مرتين اذا كان الحدث A يمثل ظهور H في الرمية الأولى و B حدث بمثل ظهور H في الرمية الثانية. أوجد الاتي:- $1- P(A^C)$ $2- P(A \bigcap B)$ $3- P(A \bigcap B^C)$ $4- P(A \backslash B)$ هل الحدثان A و B مستقلان ام لا ؟
السؤال الثاني	وعاء I يحتوي على 4 كرات بيضاء و 4 كرات سوداء ووعاء II يحتوي على 3 كرات بيضاء و 3 كرات سوداء. بطريقة عشوائية تم سحب كرة واحدة من الوعاء الاول I , 2 كرة سحبت من الوعاء الثاني II ,نفرض ان a ترمز إلى عدد الكرات السوداء التي سحبت من الوعاء I , نفرض أن b ترمز إلى عدد الكرات البيضاء من الوعاء II . اكتب كل النتائج الممكنة (a, b) ثم احسب الاحتمال المرافق لكل منها. عرف المتغير العشوائي X((a, b)) = a b . ثم أوجد دالة كثافة الاحتمال $f_X(x)$ لكل قيم X.
السؤال الثالث	زهرة نرد رميت خمس مرات . نفرض أن X متغير عشوائي يرمز إلى كم 5 سوف تظهر. أوجد دالة التوزيع التراكمية $F_X(x)$. ثم أوجد دالة كثافة الاحتمال $f_X(x)$.
السؤال الرابع	نفرض ان زهرة نرد رميت مرة واحدة . أوجد التوزيع الاحتمالي ثم اوجد المتوسط μ والتباين σ^2 للتوزيع الاحتمالي.
السؤال الخامس	إذا كانت درجة الحرارة X و Y هي ناتج التفاعل الكيميائي وكانت النتائج كمايلي: X: 3 5 7 9 11 Y: 4 6 8 10 12 1- أوجد قوة الارتباط الخطي ونوعه بين درجة الحرارة وناتج التفاعل الكيميائي. 2- هل درجة الحرارة هي المؤثر الوحيد على ناتج التفاعل الكيميائي أم لا ؟ وماهي نسبة التأثير ان وجدت ؟

مع تمنياتي للجميع بالنجاح و التوفيق

Tanta University, Faculty of Science, Department of Chemistry
Final Examination of (Organic Chemistry 1) for (2nd year student's credit Hours)
January 2014   **Course Code: CH2109**   **Time Allowed: 2hrs**

Section A: Simple aromatic compounds

1- Complete the following equations and name each product:
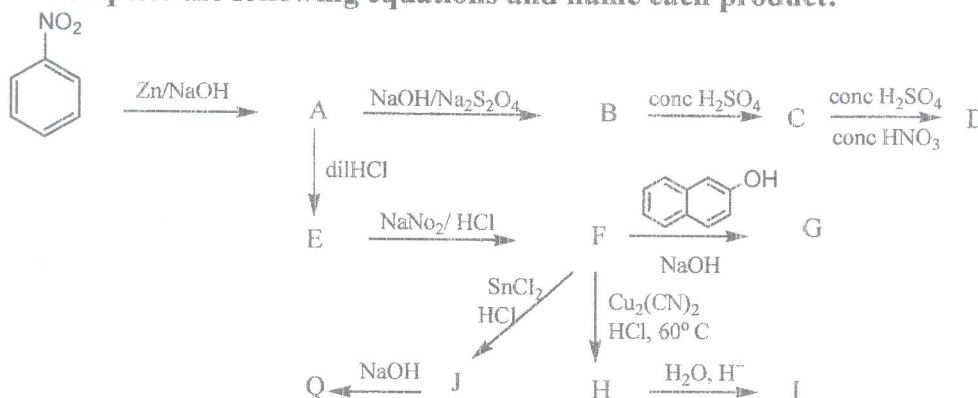
2- Give short note about the following with proposed mechanism:

a- Phenol- formaldehyde resins   b- Claisen condensation

c- Reimer- Tiemann reaction   d- Hoffman's reaction

3-How to prepare the following compounds from benzene

a- mistylene   b- sulphanilamide   c- Anisole   d- Methyl orange

4- Put right or wrong and true the wrong for the following (give reason):

a- Picric acid has weak acid character than *p*- cresol.

b- The diazonium salts can't couple with amines.

c- *p*-Toluidine has weak basic character than *p*-chloro aniline.
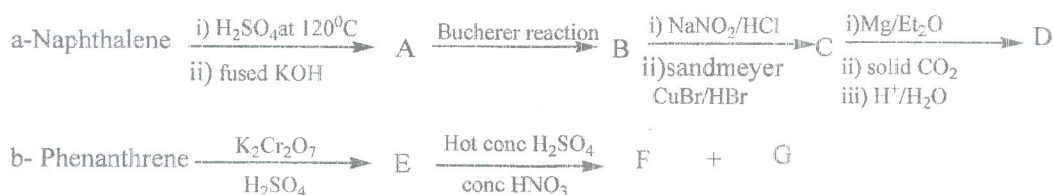
Section B: Polynuclear Hydrocarbons

1- Give short note about the following:

a- Prove the structure of phenanthrene.   b- Pschorr synthesis

c- Intra rearrangement of hydrazobenzene by HCl.

d- Reduction of naphalene and anthracene.

e- The effect of both hot acetic anhydride and warm conc H_2SO_4 on biphenic acid

f- Sulphonation reaction of naphalene and anthracene.

2- Try the following conversions:

a- Biphenyl from cyclohexanone   b- Benzidine from fluorobenzene

c- 9- Methyl anthracene from phthalic anhydride.

3- Complete the following equations and name the final product:

		TANTA UNIVERSITY
		FACULTY OF SCIENCE
	كلية ؟ علوم	DEPARTMENT OF CHEMISTRY
	Final EXAM FOR (SECOND LEVEL)STUDENTS	January 2014
COURSE TITLE	PRINCIPLE OF ANALYTICAL CHEMISTRY	
COURSE CODE	CH2105 TIME ALLOWED : 2 HOURs	Total marks : 100

Answer the following questions: (each item 4 degree)

I)   **Write on the following:**

1- Primary standard substance.   2- Molality.

3- Mole fraction.   4- Acid-base indicator.

5- Bronsted theory.   6- Solubility product.

7- Nernst equation.   8- Structure of EDTA.

9- Importance of titration curve.   10- Masking agent.

II)   **Calculate the pH values of the following:**

1- 20 ml of 0.1 NaOH added to 50 ml of 0.05 N acetic acid ($Ka =10^{-5}$).

2- 50 ml of 0.1 NaOH added to 100 ml of 0.05 N HCl ($Ka =10^{-5}$).

3- 50 ml of 0.1 NaOH added to 100 ml of 0.05 N acetic acid ($Ka =10^{-5}$).

III)   **Calculate the pCl values of the following:**

1- 100 ml of 0.1 AgCl (S.P of AgCl = 10^{-10}).

2- 10 ml of 0.1 $AgNO_3$ added to 100 ml of 0.1 NaCl.

IV)   **What are the indicators used for the following titration?**

1- HCl added to NH4OH.   2- NaOH added to acetic acid.

3- Mohr's method.   4- Fajan's Method.

5- EDTA titration.

V)   **How can you determine the following mixtures using EDTA?**

1- $Zn^{+2} + Mg^{+2}$ 2- $Ca^{+2} + Mg^{+2}$ 3- $Zn^{+2} + Mg^{+2} + Cu^{+2}$

VI)   **Complete the following equations and mention the reducing and oxidizing agents:**

1- $Fe^{+2} + MnO_4^- + H^+ \longrightarrow$

2- $Cr_2O_7^{-2} + Fe^{+2} + H^+ \longrightarrow$

With all best wishes

Prof. Dr. Mohamed Youssry El sheikh

Answer the following questions:

1- How you can transfer primary alcohol to secondary and tertiary alcohol

2- Explain the mechanism of Aldol Condensation, give an example.

3- Hel-Volhard- Zelinsky reaction

4- Preparation of β –hydroxy acids by reformatsky reaction

5- Conversion of Acetaldehyde to lactic acid

6- Effect of heat on β – hydroxyl butyric acid

7- Effect of nitrous acid on secondary amines

8- By equations, explain how you can prepare primary alcohol from Grignard reaction.

9- Write the structure and names of the products of dehydration of sec-Butanol in presence of sulfuric acia at 180 oC

10- Explain Markonkov's Rule, give an example.

اطيب امنياتنا بالتوفيق والنجاح

ا.د :الرفاعى قناوى

يار

TANTA UNIVERSITY
FACULTY OF SCIENCE
DEPARTMENT CHEMISTRY

FINAL EXAMINATION FOR   2ND YEAR STUDENTS OF CHEMISTRY

	COURSE TITLE:	Aliphatic Compounds	عضويه 2		COURSE CODE: CH 2111
DATE:	JANUARY 5TH 2014	TERM: FIRST			TIME ALLOWED: 2 HOURS

Answer the following questions:

1- How you can transfer primary alcohol to secondary and tertiary alcohol

2- Explain the mechanism of Aldol Condensation, give an example.

3- Hel-Volhard- Zelinsky reaction

4- Preparation of β –hydroxy acids by reformatsky reaction

5- Conversion of Acetaldehyde to lactic acid

6- Effect of heat on β – hydroxyl butyric acid

7- Effect of nitrous acid on secondary amines

8- By equations, explain how you can prepare primary alcohol from Grignard reaction.

9- Write the structure and names of the products of dehydration of sec-Butanol in presence of sulfuric acia at 180 oC

10-   Explain Markonkov's Rule, give an example.

اطيب امنياتنا بالتوفيق والنجاح

ا.د :الرفاعى قناوى