Section (B): (25 Marks)

Answer ***all*** the following questions:

First question: Answer **Only Three** from the following: (12 Marks)

(a) Calculate the wavelength in nanometer of the third line in the emission spectrum of Balmer series of the hydrogen atom ($R_H = 109678\ cm^{-1}$). (4 Marks)

(b) Give reason for each of the following: (4 Marks)

i- He_2 does not exist.

ii- PCl_5 does not obey octet rule.

iii- The bond energy in H_2^+ ion is lower than that in H_2 molecule.

iv- While bond angles in CH_4 is 109.5°, its 104.5° in H_2O.

(c) Using molecular orbital theory, draw the energy level diagrams for O_2^{2-} and B_2, calculate the bond order and predict the magnetic properties for each of them. (4 Marks)

(d) Based on VSEPR theory, draw the geometrical shapes for XeF_4 and PCl_3 molecules. (4 Marks)

Second question: Answer **Only Three including (a)** from the following: (13 Marks)

(a) Draw the Lewis structures for each of the following: SO_4^{2-} and $POCl_3$ then calculate the formal charge for each atom in both of them. (5 Marks)

(b) According to Slater's rule, calculate the effective nuclear charges for the outermost electron in C and Ne atoms. (4 Marks)

(c) Put true (√) or false (x) for each of the following sentences: (4 Marks)

i-The bond angle of AsH_3 molecule is smaller than that of BF_3 molecule.

ii-According to the VSEPR theory, molecular geometry can be predicted from the number of bonding electron pairs and lone pairs.

iii- The bond order in O_2^- is 2.

iv- The hybrid orbitals for C in acetylene is sp^3.

(d) Choose the correct answer: (4 Marks)

i- The hybrid orbitals for S in SH_6 is.....

(a) sp^3d^2 (b) sp (c) sp^3d (d) sp^3

ii- Which of the following is the correct set of quantum numbers for the outermost electron of aluminum atom?

(a) $n = 3, \ell = 3, m_\ell = 2, m_s = -1/2$ (b) $n = 3, \ell = 2, m_\ell = 0, m_s = -1/2$

(c) $n = 3, \ell = 1, m_\ell = 0, m_s = +1/2$ (d) $n = 3, \ell = 0, m_\ell = 1, m_s = -1/2$

iii- In which of the following, the central atom is surrounded by 4 electron pairs:

(a) $CHCl_3$ (b) NH_3 (c) H_2O (d) all

iv- The geometrical shape of SF_4 is

(a) tetrahedral (b) square planer (c) seesaw (d) triangle bipyramidal

(Atomic numbers: H = 1, He = 2, B = 5, C = 6, N = 7, O = 8, F = 9, Ne = 10, Al = 13, P = 15, S = 16, Cl = 17, As = 33, Xe = 54)

Good Luck

Dr. AbdelRahman A. Dahy, Dr. Soliman A. Soliman, Dr. Ahmed M. Kamal

4-In line 10, the word" which' refers to.....

A-their ability B-reading vocabulary

C-idiomatic expression D-learning process

5-According to the passage, what is impressive about the way children learn vocabulary?

A-They learn words before they learn grammar

B-They learn even very long words

C-They learn words quickly

D-They learn most of the words in high school

111-Choose the correct answer.

1-After eating its f[ll , the monkey decided .....home some food.

a)-to carry b) carrying

2-The higher return you hope to achieve the more you must risk.....

a) to lose b) losing

3-When Nick lived in Asia .he missed.....Christmas with his family

a)to celebrate b) celebrating

4-The students.....to submit their reports by the end of this week.

a) have asked b)are asked c)has asked d) are asking

5-The teacher .....the student for lying.

a) has been punished b) punished c-)is punished d) was punished

6-Letters by the postman at 8': 00 a.m every day.

a) deliver b) delivered c)are delivered d)were delivered

7-As the patient cold not walk he .....home in a wheel chair.

a) has carried b) has been carrying c) was carried d)was carrying

8-All the halls .....at the moment.

A) paint b)are painting c)are painted d)are being painted

9- It .....since yesterday

a)is raining b) has been raining c) have been raining d) was raining

10-Jason remembered .....into me at a party two years ago.

A)to move b) moving

1V- Translation.

Translate the first two sentences of the above comprehension passage.

Best Wishes

Professor.Abutaleb

Assiut University
Faculty of Science
Chemistry Department

Jan. 2017
Time: 2 hours

First Semester Examination
Subject: General Chemistry (*C-100*)
Students: First level "Credit Hours System"

Section (A): (25 Marks)

Answer ***All*** the following questions:

First question: Answer **Only Three** from the following: (15 Marks)

(a) State Avogadro's law and derive it from kinetic gas equation.

(b) Compare between physisorption and chemisorption.

(c) i- What is meant by **Only Three** from the following:—

Amorphous solid, Tyndall effect,
Critical state, Electrode potential.

ii- How would you prepare **Only Two** from the following colloidal sol:
Gold, Arsenious sulphide, Sulphur.

(d) Give reason for **Only Four** from the following:

i- Solids are rigid and have a definite volume and shape.
ii- The vapor pressure of ether is higher than that of ethyl alcohol.
iii- Magnesium will displace hydrogen gas from dilute acid solution while copper doesn't react.
iv- The hydrogen gas has Z/P curve above the ideal behavior.
v- The charge on the colloidal particles.

Second question: Answer **Only Two** from the following: (10 Marks)

(a) Consider the cell reaction:

$$2\ Al_{(s)} + 3\ Cu^{2+}_{(aq)} \rightarrow 2\ Al^{3+}_{(aq)} + 3\ Cu_{(s)}$$

where $E^{\circ}_{Cu/Cu2+} = +0.34$ V, $E^{\circ}_{Al/Al3+} = -1.66$ V.

Write the (i) Anode and cathode reactions.
(ii) Cell representation.
(iii) Predict whether the reaction is feasible or not.
(iv) Calculate the cell potential (emf) at 25 °C when $[Al^{3+}] = 0.1$ M and $[Cu^{2+}] = 0.01$ M.

(b) Calculate the pressure exerted by 32.0 gm of methane (molar mass = 16) in 500 ml container at 27 °C using both ideal gas and Van der Vaals equations ($a = 2.253$ atm. $L^2\ mol^{-2}$, $b = 0.0428$ L mol^{-1}, $R = 0.821$ atm. $K^{-1}mol^{-1}$).

(c) i- Write the cell reaction and emf equation for the following cell:

$$Cd/Cd^{2+}\ //\ H_2SO_4/H_2\ (1\ atm, gas), Pt$$

ii- 25 ml of SO_2 gas diffuses in 75 sec. What volume of O_2 gas will diffuse in 90 sec. at the same condition (molar masses, $SO_2 = 64$, $O_2 = 32$)?

Prof. Maher M. A. Hamed, Prof. Z. A. Ahmed and Prof. M. H. Wahdan

Please turn over for Section (B) ⟶

Assiut University
Faculty of Science
Chemistry Department

January, 2017
Time: 2 hr.

Final Examination For 1st year Students (General Chemistry II, 105C, Industrial Chemistry Group).

Section A (Organic Chemistry)

1- Choose the correct answer (answer 5 only) **(5 Marks)**

a) What could be the name of a compound that has the general formula ROH?
i) Acid, ii) Ester, Ketone, iii) Alcohol

b) Which formula represents a saturated hydrocarbon?
i) C_2H_2, ii) C_2H_4, iii) C_2H_6, iv) C_2H_5

c) Which compound is an isomer of ethanol?
i) Ethene, ii) Methyl formate, iii) Methyl acetate, iv) dimethyl ether.

d) In a molecule of C_3H_6, the total number of covalent bonds is:
i) 6, ii) 7, iii) 8, iv) none.

e) Which compound is an ester? i) ROR, ii) ROOR, iii) RCOOR

f) A molecule of propene is similar to a molecule of propane in that they both have the same: i) Structural formula, ii) Molecular formula, iii) Number of carbon atoms.

2- Proene reacts with hydrogen bromide to produce 2- bromopropane as a major product.

i) Outline the mechanism of the reaction **(3 Marks)**

ii) Explain why 2- bromopentane is the major product **(2 Maks)**

3- Complete the following equations:

i) 2-Butene +HBr ----->

ii) 1,2-dimethylcyclohexene + H_2 (Pd/C catalyst) ---> **(4 Marks)**

4- a) Ozonolysis of an alkene produces equal amount of acetaldehyde and formaldehyde respectively. Deduce the alkene structure. **(3 Marks)**

b) In which compound is carbon more oxidized: sodium carbonate or sodium acetate **(3 Marks)**

c) Explain by using a mechanism the synthesis of methyl bromide from methane. **(5 Marks)**

انظر خلفة

Examiner: Prof. Ali Ahmed Abdel-Hafez

Assiut University
Faculty of Arts

Department of English

First Year
Faculty of Science
Industrial Chemistry
English Language

(2016---20١7)

Attempt the following questions.

1-Write a paragraph on one only of the following topics.

(1)-The advantages and disadvantages of modern technology

(2)-The dangers of pollution

11-Comprehension.

Having no language ,infants cannot be told what they need to learn. Yet by the age of three they will have mastered the basic structure of their native language and will be well on their way to communicative competence. Acquiring their language is a most impressive intellectual feat. Students of how children learn language generally agree that the most remarkable aspect of this feat is the rapid acquisition of grammar. Nevertheless the ability of children to conform grammatical rules is only slightly more wonderful than their ability to learn words. It has been reckoned that the average high school graduate in the United States has a reading vocabulary of 80.000 words , which includes idiomatic expressions and proper names of people and places. This vocabulary must have been learned over a period of 16 years .From the figures , it can be calculated that the average child learns at a rate of about 13 new words per day. Clearly a learning process of great complexity goes on at a rapid rate in children.

Questions. (1)-Which is the main subject of the passage?

A-Language acquisition in children B-Teaching languages to children
C-How to memorize words D-Communicating with infants

(2)-The word"feat"in line 5 is closest in meaning to

A- Experiment B-Idea C-Activity D-Accomplishment

(3)-The word"reckoned"in line 9 is closest in meaning to

A- suspected B-estimated C-proved D-said

→

Assiut University
Faculty of Science
Chemistry Department

Jan. 2017
Time: 2 hours

First Semester Examination
Subject: General Chemistry (***C-100***) for Group 8
Students: First level "Credit Hours System"

Section (A): (25 Marks)

Answer ***All*** the following questions:

First question: Answer **Only Three** from the following: (15 Marks)

(a) State Avogadro's law and derive it from kinetic gas equation.

(b) Compare between physisorption and chemisorption.

(c) i- What is meant by **Only Three** from the following:

Amorphous solid, Tyndall effect,
Critical state, Electrode potential.

ii- How would you prepare **Only Two** from the following colloidal sol:

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(d) Give reason for **Only Four** from the following:

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(a) Consider the cell reaction:

$$2\ Al_{(s)} + 3\ Cu^{2+}_{(aq)} \rightarrow 2\ Al^{3+}_{(aq)} + 3\ Cu_{(s)}$$

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(iv) Calculate the cell potential (emf) at 25 °C when $[Al^{3+}] = 0.1$ M and $[Cu^{2+}] = 0.01$ M.

(b) Calculate the pressure exerted by 32.0 gm of methane (molar mass = 16) in 500 ml container at 27 °C using both ideal gas and Van der Vaals equations ($a = 2.253$ atm. $L^2\ mol^{-2}$, $b = 0.0428$ L mol^{-1}, $R = 0.821$ atm. $K^{-1}mol^{-1}$).

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ii- 25 ml of SO_2 gas diffuses in 75 sec. What volume of O_2 gas will diffuse in 90 sec. at the same condition (molar masses, $SO_2 = 64$, $O_2 = 32$)?

Prof. Maher M. A. Hamed

Please turn over for Section (B) ⟶

Section (B): (25 Marks)

Answer ***all*** the following questions:

First question: Answer Only Three from the following: (12 Marks)

(a) Calculate **the wavelength** in nanometer of the third line in the emission spectrum of Balmer **series of the** hydrogen atom ($R_H = 109678\ cm^{-1}$). (4 Marks)

(b) Give **reason for each** of the following: (4 Marks)

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iv- **While bond** angles in CH_4 is 109.5°, its 104.5° in H_2O.

(c) Using molecular orbital theory, draw the energy level diagrams for O_2^{2-} and B_2, **calculate the** bond order and predict the magnetic properties for each of them. (4 Marks)

(d) Based on VSEPR theory, draw the geometrical shapes for XeF_4 and PCl_3 **molecules.** (4 Marks)

Second question: Answer **Only Three including (a)** from the following: (13 Marks)

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(b) According to Slater's rule, calculate the effective nuclear charges for the outermost electron in C and Ne atoms. (4 Marks)

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iv- The hybrid orbitals for C in acetylene is sp^3.

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i- The hybrid orbitals for S in SH_6 is.....

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(Atomic numbers: H = 1, He = 2, B = 5, C = 6, N = 7, O = 8, F = 9, Ne = 10, Al = 13, P = 15, S = 16, Cl = 17, As = 33, Xe = 54)

Good Luck

Dr. AbdelRahman A. Dahy

Section B (Nonorganic Chemistry)

1- Answer *Only Two* from the following : (8 Marks)

a)The following system is at equilibrium. In which direction (right or left) will the position shift with the following changes:

$$2NO(g) + O_2(g) \rightleftharpoons 2NO_2(g)$$

i) Reducing the volume of the mixture to one-half of its original value.

ii) Decreasing the pressure of the mixture.

b) Define each of the following terms:

i) Buffer solution with example, ii) The molality, iii) Arrhenius acid

c) The boiling point of chloroform was raised by 0.323°C when 1.029 g of a substance was dissolved in 70 g of it. Calculate the molecular weight of the substance. (K_b for chloroform is 3.9 °C /mol).

2- Answer *Only Two* from the following : (8 Marks)

a) At 18°C, the solubility of CaC_2O_4 in water is 0.00067g/100 ml. Calculate its solubility product (Ca=40, C=12, O=16).

b) Define each of the following terms:

i) Molal elevation constant, ii) Buffer capacity, iii) Diprotic acids with example

c) Calculate the pH of : i) 0.5M CH_3COOH. (K_a of $CH_3COOH = 1.75x10^{-5}$).

ii) 0.25M CH_3COONa solution. ($K_w = 1x10^{-14}$).

3- Answer *Only Two* from the following : (9 Marks)

a) Calculate the solubility of Ag_2SO_4 in 1M aqueous Na_2SO_4 solution. $K_{sp} = 1.4x10^{-5}$

b) What will happen when a small amount of HCl is added to a buffer solution of ($CH_3COOH + CH_3COONa$)?

c) 0.035 moles of SO_2, 0.5 moles of SO_2Cl_2, and 0.08 moles of Cl_2 are combined in an evacuated 5.0 L flask and heated to 100°C. What is Q before the reaction begins? Which direction will the reaction proceed in order to establishequilibrium? $SO_2Cl_2(g) \rightleftharpoons SO_2(g) + Cl_2(g)$ (K_c = 0.078 at 100°C).

..... Good Luck .....

Examiner: Dr. Rasha Mohamed Kamal

Final Term Exam (Math I - Group 7) **Assiut University**

Department of Industrial Chemistry **Faculty of Science**

First year student 1st Term (Math 100) **Department of Mathematics**

Time & Points & Date: 2 Hours & 50 Points & Wednesday, 4 January 2017

Answer the following questions

1-a) Express $\frac{2x^2-x+1}{(x+1)(x-1)^2}$ **as a sum of partial fractions.** **[7 points]**

b) Estimate $\sqrt[3]{25}$ **from the binomial expansion, giving your answer to three decimal places.** **[6 points]**

2-a) Discuss the convergence (or divergence) of the following series:

$$\sum_{r=3}^{\infty} \frac{1}{(r+1)(r+2)}$$ **[7 points]**

b) Apply the Gauss-Jordan method to determine if the following system is solvable or not: **[6 points]**

$$x + y + z = 3$$

$$2x + 3y + 4z = 9$$

$$4x + 5y + 6z = 16$$

3-a) Let $f: X = \{x: x \in \mathbb{R},\ x \geq 2\} \to Y = \{x: x \in \mathbb{R},\ x \geq 1\}$ **be defined by** $f(x) = x^2 - 4x + 5$. **Find the inverse** f^{-1}, **if it exists.** **[6 points]**

b) Use the sandwich theorem to evaluate $\lim_{x\to 0} x \sin\frac{1}{x}$. **[6 points]**

c) Determine whether the function $f(x) = x\sqrt{16 - x^2}$ **is continuous on** $[-4, 4]$ **or not. Justify your answer.** **[6 points]**

d) Find y' **if** **[6 points]**

(i) $x^3 = y^4 + \sin y + 1$ **(ii)** $y = (1 + x^2)e^{\tan^{-1} x}$

Dr. A.M.Saddeek ,,, With best wishes ,,, Signature Saddeek