Assiut University
Faculty of Science
Chemistry Department

Sep. 2022
Time : 2 hours

Final Exam. Of General Chemsitry(105 C) for 1 st Level Student

(Summery Term)

Section A :Organic Chemistry ***(25 Marks)***

Answer the following questions:

A- Write Mark (√) for the right statement and(×)for the wrong statement (8 Marks):- مع تصويب الأخطاء

1- The molecular weight of alkyl group more than the same saturated alkane .(.....)

2- **Cis** compounds less active than **Trans** compounds... (....)

3- Convert benzene to cyclohexane through addition of $3H_2$... (....).

4- $NH_2 - (CH_2 - CH_2)_3 - CH_3$ - called – pentyl amine ... (....).

5- Addition of ($2H_2$) to furane give tetrahydrofurane... (....).

6- The C-Cl bond is apolar covalent pond..... (....).

7- Heterolytic bond fission of a covalent bonds gave carbocatins and carboanions ... (....).

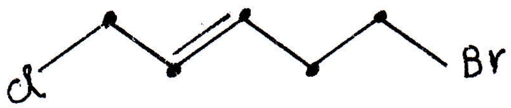
8- Addition of H_2O to ethylene gave methyl alchole ... (....).

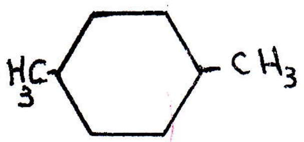
2)- A- Write the name of the following compounds (8 Marks):-

1- $CH_3- C \equiv C - C_3H_7$

2- $CH_2 = C (Br) - CH_2 - C (Cl) = CH_2$

3- $CH_3 -C (Cl_2)- CH_3$

4- 

5- 

B - Draw the structural formula of (3 ***only****)from the following compounds*

1,2 -Dimethyl-1-cyclohexene ; Neo-pentylchloride ;

Ter.(3°)- butanol ; Mezo-tartaric acid

3)- A- complete the following equations ***(Three only)****---------- (9 Marks)*

1- $CH_2 = CH\text{-}CH = CH_2 + HBr \rightarrow$? + ?

2- $(CH_3)_2C = CH - CH_3 + O_3 \rightarrow$? $+ H_2/Zn \rightarrow$? + ?

3- C_6H_{14} (Thermal cracking/Homolytic fission) $\rightarrow$? $\rightarrow$? + ?

4- $CH_3\text{-}CH = CH_2 + H_2SO_4$ (conc.) $\rightarrow$? + H-OH $\rightarrow$? + H_2SO_4

B-Write on ***two*** *only: -*

Toutamerism of Acetone ; Markownikoffs rule ; Resonance of benzene.

C)- Write the type of hybrization and number of(σ, π) in the following compounds.) **Three only**

$CH_3 - CH_3$; $CH_3\text{-}CH{=}CH_2$; $CH_2 = CH_2$; $HC \equiv CH$

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Prof.Dr Osama Shehata Moustafa

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Section (B): Inorganic part

Answer the following questions:

Question 1: Put (T) for the correct answer or (F) for the wrong statement (Answer only 5 points) (5 Marks).

1. Most of the chemical reactions are reversible.
2. When the rate of the forward reaction (R_f) becomes equal to the rate of the reversible reaction (R_r), the reaction goes to completion.
3. If the stoichiometric coefficients in the balanced equation are multiplied by 2 the new K_c will be the old K_c raised to the corresponding power 3.
4. For reactions involving gases, it is better to use the partial volume instead of the molar concentration.
5. By knowing the value of K_c we can determine the extent to which a particular reaction can take place.
6. A very small value of K_p means that the formation of products can take place.
7. Lowering the temperature of an equilibrium system shifts the equilibrium in the direction of the exothermic reaction (forward direction).
8. If $\Delta n > 0$, addition of an inert gas at constant pressure will decrease the formation of products.

Question 2: Answer only 5 points from the following (20 Marks).

1. What is the molarity of NH_4NO_3 solution has a pH = 5.2? (K_b $NH_4OH = 1.8x10^{-5}$)
2. What is the pH value of a solution prepared by dissolving 0.0155 mole $Ba(OH)_2$ in water to give 735 ml aqueous solution? Assume that $Ba(OH)_2$ is completely dissociated.
3. What is the solubility of Ag_2SO_4 in 1 M aqueous Na_2SO_4 solution? ($K_{sp} = 1.4x10^{-5}$)
4. What is the molar solubility of $Mg(OH)_2$ in 1 M NH_4Cl ($K_{sp} = 1.8x10^{-11}$, $K_b = 1.8x10^{-5}$)
5. A solution of 0.45 g of urea in 22.5 g of water gave a boiling point elevation of 0.17°C. What is the molal elevation constant of water. (M. Wt. of urea = 60 g/mol).
6. An aqueous solution containing 1 g of sorbitol in 100 g of water is found to have a freezing point of – 0.102 °C. What is the molar mass (molecular weight) of sorbitol (K_f = 1.86 °C /mol).

*B - Draw the structural formula of (**3 only**)from the following compounds*

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Ter.(3°)- butanol ; Mezo-tartaric acid

*3)- A- complete the following equations (**Three only**)---------- (9 Marks)*

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3- C_6H_{14} (Thermal cracking/Homolytic fission) $\rightarrow$? $\rightarrow$? + ?

4- $CH_3\text{-}CH=CH_2 + H_2SO_4$ (conc.) $\rightarrow$? + H-OH $\rightarrow$? + H_2SO_4

*B-Write on **two** only: -*

Toutamerism of Acetone ; Markownikoffs rule ; Resonance of benzene.

*C)- Write the type of hybrization and number of(σ; π) in the following compounds.)**Three only***

CH_3-CH_3 ; $CH_3\text{-}CH=CH_2$; $CH_2=CH_2$; $HC\equiv CH$

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