الجامعة التكنولوجية
قسم هندسة البناء والإنشاءات
المرحلة الأولى

العـدد : ٢٥٦
التاريخ : ١٦/٦/ 2016

الى / السيد معاون رئيس القسم

م/ الاجابة النموذجية لمادة (الكيمياء)

تحية طيبة .....

نرفق لكم طياً نسخة من الأسئلة الخاصة بمادة الكيمياء و للإمتحان النهائي للفصل الدراسي الثاني – الدور الأول و للعام الدراسي 2015 – 2016 و الذي تم اجراءه بتاريخ 2016/6/15 مع الاجابة النموذجية الخاصة بها.

مع التقدير

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مسؤول المرحلة الأولى
١٥/٦/ 2016

نسخة منه الى/
- ملف اللجنة الامتحانية

University of Technology
Building and Construction Engineering Department
Final Exam 2015-2016

Subject: Chemistry
Class: First
Examiner: B. QASIM, I. ISMAIL and A. ABDULRAZZAK

Year: First
Time: 3 Hours
Date: 15 / 06 / 2016

Note: Answer Four questions only. (For each question 12.5 points)

Q1): **A)** Calculate the number of moles of 40% HCl presents in 250ml of solution having specific gravity 1.19?

B) How many grams you need to prepare 500ml 0f 0.5N Na_2CO_3 solution?

Q2): Calculate Mole fraction of each solute and solvent of solution containing 18gm of Glucose ($C_6H_{12}O_6$) dissolved in 900ml of water (Density of water is 1gm/ml)?

Q3): **A)** What is the concentration (V/V %) for solution prepared by dissolving 20ml H_2SO_4 in 100ml of water?

B) Calculate the **Equivalent weight** (Eq.wt) for the following substances:

1) H_2SO_4 2) AgCl

Q4): What volume of concentrated 63% HNO_3 having specific gravity 1.51 is needed to prepare 400ml of 1M solution?

Q5): **A)** What is the hydroxide ion concentration of 5.2×10^{-2}M NH_3 solution, when K_b is 1.75×10^{-5}?

$NH_3 + H_2O \rightleftharpoons NH_4^+ + OH^-$

B) 10.6gm of KCl dissolved in 600 ml of water, what is the molar concentration of this solution?

Atomic weight (A.wt):

Na= 23, S= 32, H= 1, Cl= 35.5, O=16, C= 12, Ag= 107, N= 14, K= 39

Good Luck

حلول اسئلة مادة الكيمياء العامة للعام الدراسي c.10 - c.16 / الدور الاول

Q1: A): $\text{Molarity (M)} = \frac{\text{Sp.gr} * \% * 1000}{\text{M.wt}_{HCl}}$

$= \frac{1.19 * \frac{40}{100} * 1000}{36.5} = 13.04 \text{ Mole/Liter}$

$M = \frac{\text{no. of moles}}{V(\text{Liter})}$

$\therefore \text{no. of moles} = M * V(\text{Liter})$

$= 13.04 * \frac{250}{1000} = 3.26 \text{ moles}$

B): $\text{Normality (N)} = \frac{wt}{Eq.wt} * \frac{1000}{V(ml)}$

$Eq.wt = \frac{M.wt}{n} = \frac{106}{2} = 53$

$\therefore 0.5 = \frac{wt}{53} * \frac{1000}{500}$

$wt = \frac{0.5 * 53 * 500}{1000} = 13.25 \text{ gm}$

م.د. بشار حسين قاسم

م. ايمان اسماعيل

Q2: Mole fraction (X_{solute}) = $\frac{\text{No. of moles of solute}}{\text{Moles of solute + moles of solvent}}$

Moles of solute ($C_6H_{12}O_6$) = $\frac{wt}{M.wt} = \frac{18}{180} = 0.1$ moles

Moles of solvent (H_2O) = $\frac{wt}{M.wt} = \frac{900}{18} = 50$ moles

Mole fraction solute = $\frac{0.1}{0.1 + 50} = 0.002$

Mole fraction solvent = $\frac{50}{50 + 0.1} = 0.998$

or $1 - 0.002 = 0.998$

Q3: A): $V/V\% = \frac{\text{Volume of solute (ml)}}{\text{Volume of solution (ml)}} * 100$

$= \frac{20}{20 + 100} * 100 = 16.66\%$

B): 1) Eq.wt H_2SO_4 = $\frac{M.wt\ H_2SO_4}{2} = \frac{98}{2} = 49$

2) Eq.wt $AgCl$ = $\frac{M.wt\ AgCl}{1} = \frac{142.5}{1}$

Q4: $\text{Molarity (M)} = \frac{\text{Sp.gr} * \% * 1000}{\text{M.wt}}$

$= \frac{1.51 * \frac{63}{100} * 1000}{63} = 15.1$

$M_1V_1 = M_2V_2$

$15.1 * V_1 = 1 * 400$

$V_1 = 26.49 \text{ ml}$

Q5: A) $NH_3 + H_2O \rightleftharpoons NH_4^+ + OH^-$

$K_b = \frac{[NH_4^+][OH^-]}{[NH_3]}$

$[NH_3] = C_b$

$[NH_4^+] = [OH^-]$

$\therefore K_b = \frac{[OH^-]^2}{C_b}$

$[OH^-] = \sqrt{K_b C_b} = \sqrt{1.75 * 10^{-5} * 5.2 * 10^{-2}} = 9.1 * 10^{-7}$

B): $M = \frac{wt}{M.wt} * \frac{1000}{V(ml)}$

$= \frac{10.6}{74.5} * \frac{1000}{600}$

$M = 0.236 \text{ mole/Liter}$