

الجامعة التكنولوجية

قسم هندسة البناء والإنشاءات

المرحلة الأولى



العدد : 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

أ.م.د. قيس جواد فريح

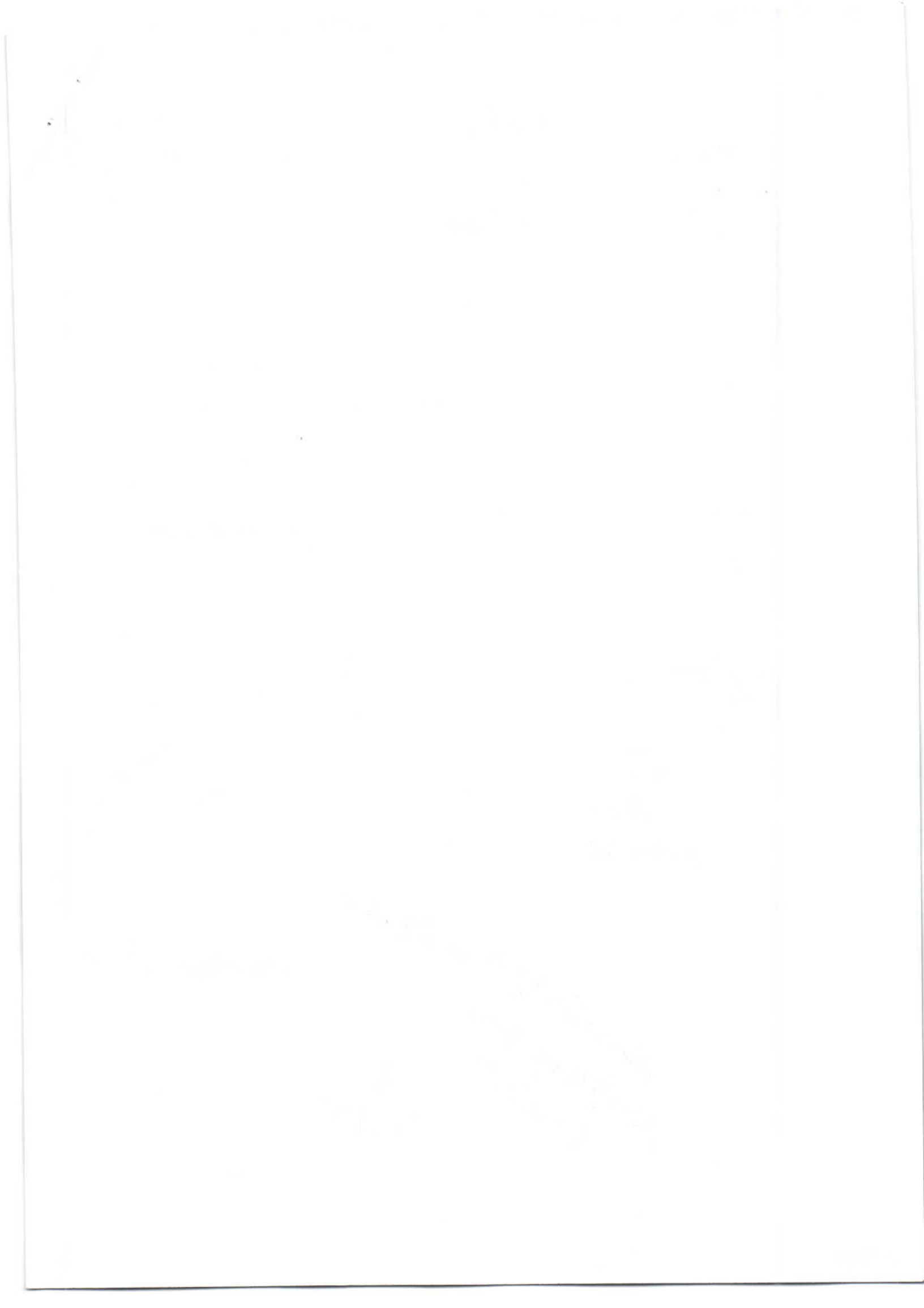
مسؤول المرحلة الأولى

2016 / ٥ / ١٥

نسخة منه الى /

• ملف اللجنة الامتحانية

حصة الاستاذة / ا.م.د. فريح جواد قيس
الاجابة النموذجية
الامتحان النهائي
١٦ / ٦ / 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 of 0.5N Na_2CO_3 solution?

Q2): Calculate Mole fraction of each solute and solvent of solution containing 18gm of Glucose ($\text{C}_6\text{H}_{12}\text{O}_6$) dissolved in 900ml of water (Density of water is 1gm/ml)?

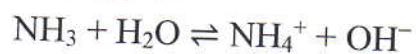
Q3): A) What is the concentration (V/V %) for solution prepared by dissolving 20ml H_2SO_4 in 100ml of water?

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 $5.2 \times 10^{-2}\text{M}$ NH_3 solution, when K_b is 1.75×10^{-5} ?



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



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

$$\text{Moles of solute} = \frac{\text{wt}}{\text{M.wt}} = \frac{18}{180} = 0.1 \text{ moles}$$

(C₆H₁₂O₆)

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

(H₂O)

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

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

or $1 - 0.002 = 0.998$

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

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

B): 1) Eq.wt H₂SO₄ = $\frac{\text{M.wt H}_2\text{SO}_4}{2} = \frac{98}{2} = 49$

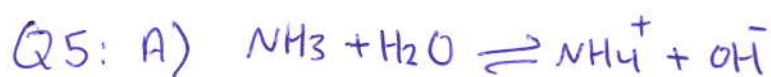
2) Eq.wt AgCl = $\frac{\text{M.wt AgCl}}{1} = \frac{142.5}{1}$

$$\begin{aligned}
 \text{Q4: } \text{Molarity (M)} &= \frac{\text{Sp. gr} \times \% \times 1000}{\text{M. wt}} \\
 &= \frac{1.51 \times \frac{63}{100} \times 1000}{63} = 15.1
 \end{aligned}$$

$$M_1 V_1 = M_2 V_2$$

$$15.1 \times V_1 = 1 \times 400$$

$$V_1 = 26.49 \text{ ml}$$



$$K_b = \frac{[\text{NH}_4^+][\text{OH}^-]}{[\text{NH}_3]}$$

$$[\text{NH}_3] = C_b$$

$$[\text{NH}_4^+] = [\text{OH}^-]$$

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

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

$$\begin{aligned}
 \text{B): } M &= \frac{\text{wt}}{\text{M. wt}} \times \frac{1000}{V(\text{ml})} \\
 &= \frac{10.6}{74.5} \times \frac{1000}{600}
 \end{aligned}$$

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