**University of Salahaddin - Erbil Analytical Chemistry**

**College of Agriculture Time : 3 hours  
Department of Field Crops Date : / / 2019**

**First Class Students Model No. (1)**

**Final Examination.First Semester (2018-2019)**

**ــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــSend Back The Question Sheet Upon Completing Your Answer. You Should Draw Correct and Precise Figures**

**ـــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــ**

**Q1-A)** Define Solution , Heterogeneous mixture with examples . **Explain** the importance of Solutions, then enumerate **( six)** importantcharacteristics of solutions. **(16 marks)**

**Q1-B)** What is the (F) concentration of NaCl **(by two methods)** when 0.1753 g NaCl (M.wt=58.44 is dissolved in sufficient H2O to give 240 ml of this solution. **(10 marks)**

ـــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــ

**(Q2.a)** **Select** the correct **word** to complete the following sentences. **(12 marks)**

**(Oxygen, dilute, solvent, acetic, volume, standardization, stop, precipitation, Mohr, 5%, thiocyanate, chloride)**

1. ………………and CO2 are essential to blood chemistry.
2. A solution consisting a small concentration of solute is said to be ………………..
3. The dissolving medium is called the …………………
4. Glacial …………………… acid contain less than 1% water.
5. A volumetric method is one in which the analysis is completed by measuring the ……………..
6. The process whereby the concentration of a standard solution is determined is called ………………
7. The end point signal tells the analyst to ………….. adding reagent and recording the volume.
8. Volumetric analysis based on the formation of a slightly soluble precipitate are called …………………………. titration.
9. ……………… method has been widely applied to the titration of Cl- and Br-.
10. In mohr method the chromate ion …………… is the indictor.
11. The …………… concentration must be 10-5 in Volhard method.
12. At equilibrium ……………….. concentration at the end point in Volhard should be 1.6 \*10-3 mol/l.

**(Q2.b)** calculate the **( p value)** for each ion in a solutionthat is 2.0 \* 10-3 *M* inNaCl and 5.4 \* 10-4 *M* in HCl **(10 marks)**

**Q3-A)** **Enumerate( 8)** desirable characteristics of volumetric reactions.  **(18 marks)**

**Q3-B)** A solution of Ba(OH)2 was standardized by titration against (0.1280 N) HCl. Exactly 31.76 ml of the base is required to neutralize (46.25ml of acid) what is (N) of Ba(OH)2?  **(8 marks)**

ـــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــ

**Q4.a)** **Prove:** The mole fraction of **28%** solution of **H2SO4**, which contains 28g H2SO4 and 72g of H2O is equal to **( 1), at.wt, H=1, S=32, O=16 (10 marks)**

**Q4 .b)** **Explain** with **details and equations** **Volhard method** according to: **(16marks)**

**1-** Basic principles of the method.

**2-** Enumerate and explain three steps to prevent the Ag ion present in AgCl from reaction with SCN ion.

**3-** When I- is analyzed the indicator is not added until AgI is precipitated completely.

**4-** When (Br-) & (I-) are titrated with Ag+, it is no need to filtration.

**5-** The titration must be carried out in acid solution.

ـــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــــ

**Best wishes for you…**

**Prof.(Ass.)/ Dr. Dheyaa J. Yaqoob**

**5 / Jan /2019**