**University of Salahaddin - Erbil Analytical Chemistry**

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

**First Class Model No. (2)**

**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)** A 0.804 g sample an iron ore was analyzed by dissolving in acid, reducing all Fe+3 to Fe+2 condition, and titrating with (47.2ml, 0.112 N) KMnO4. The results of analysis are needed in terms of percent Fe as well as percent Fe2O3? (At.wt Fe = 55.9, O = 16.) .  **(12 marks)**

**Q1-B)** What wt of standard K2Cr2O7 (**M.wt = 294.2)** by **(two methods)** is needed to prepare 2.0 L of 0.1N of the reagent? **(n=6 electrons).** **(10 marks)**

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**Q2-A)** Enumerate 5 important requirements which are wanted for a material to be primary standard. **(18 marks)**

**Q2-B)** Calculate the equivalent wt., of the organic acid if 550 mg is dissolved in 50 ml of (0.105 N) NaOH required 17.3 ml (0.102 N) HCl to reach eq.point ?  **(10 marks)**

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**Q3-A)** an analyst wishes to prepare a standard solution of NaCl (about) 3g of NaCl are dissolved in 500 ml H2O. What is (N) NaCl ? Assuming (685.2 mg) AgNO3 requires 38.23 ml of NaCl solution? **(M.wt NaCl = 58.44)**.  **(13 marks)**



**Q3-B)** The titanium content of an alloy is determined by dissolving the sample, reducing Ti+4 Ti+3 and titrating with KMnO4. **Calculate the percentage of titanium** in the alloy. If an alloy sample weighing = 403.2 mg and 27.45 ml (0.02631) N KMnO4 were required to reach the endpoint. A blank solution requires (0.08 ml) of the KMnO4 to produce (e.p.)**, (At. wt Ti= 47.90).**  **(12 marks)**



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**Q4) Answer only one of the following: (25 marks)**

1. **Explain** **Mohr method with details and equations according to**:

**1)** Basic principles of the method and type of indicator used.How does the end point being signed **(the color).**

**2)** The AgCl precipitate tends to form first in the titration mixture before Ag2CrO4 precipitate.

**3)** Calculate the chromate concentration required to initiate precipitation of Ag2CrO4  . Ksp = (1.1 \* 10-12) and a value corresponding to a silver ion concentration of 1.35 \* 10-5 molar .

**4)** The Alkaline medium is not allowed here.

**5)** Attention must be paid to the acidity of the medium.

**6)** What is the importance of addition of either NaHCO3 or of borax to the solution mixture .

1. Consider the titration of (50) ml (0.1) F NaCl with (0.1) F AgNO3. Ksp AgCl = 1.82 \* 10-10 (mol2/L2) at 25°C. **Calculate** **both ( p Cl ) and ( p Ag)** when (zero, 10, 49.95, 50, 52.5) ml of AgNO3 were added. Draw two figures for pCl and pAg with volume respectively.

**Best wishes for you…**

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

**5 / Jan /2019**