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**Department of : chemistry**

**College of : science**

**University of : Salahaddin**

**Subject: practical molecular and atomic spectroscopy and automated analysis**

**Course Book – 4th stage**

**Lecturer's name : Wrea Mohammed Ibrahim**

**Academic Year: 2022/2023**

**Question bank**

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| University of Salahaddin Analytical Chemistry 4th Stage  College of Science Practical Examination Date:  Chemistry Department Time: 60 min.  Q1/ What are requirements of ion exchange resin. [5mark]  Q2/ What is the flame source in flame photometry? On what factor the flame is dependence? [10mark]  Q3/ What is the reference electrode? For what it be used? Give an example for it that you were used in the laboratory; draw the shape of this electrode. [25mark]  Q4/ Compare with diagram and reaction between conductometric titration of (HCl & NaOH) and (CH3COOH & NaOH). [25mark]  Q5/ Answer with chemical reaction only. [30mark]  1- Conversion of chromium and manganese to Cr6+ and Mn7+ respectively in steel sample.  2- How can you separate (Cl- & I-)? by using AgNO3 and NH3 (complex formation).  3- Identification each ions in the separation of (Cu2+ , Fe3+ & Ni2+) by paper chromatography.  Q6/ What is (bases of separation) for the following separation techniques? [5mark]  1) masking & demasking 2) chromatography 3) distillation 4) extraction 5) controlling pH  -----------------------------------------------------------------------------------------------  University of Salahaddin Analytical Chemistry 4th Stage  College of Science Practical Examination Date:  Chemistry Department Time: 60 min.  Q1/ A potentiometric titration of acetic acid with NaOH gave the following data:  C:\Users\Chemistry\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.Word\Untitled.png  From these data:  1- Find the normality of 50mL (acetic acid) if you know the normality of NaOH is (0.02N).  2- Find the pKa value for acetic acid. [36 mark]  Q2/ Draw a graph between absorbance and wavelength showing effect of time in the determination of ascorbic acid by spectrophotometric method. [14 mark]  Q3/ Discuss the followings: [50 mark]  1- In the determination of Aspirin the absorbance were measured at 530nm.  2- Phenol must be converted to the anion before titrating with NaOH in the determination of phenol by conductometric method.  3- Extraction system.  4- Continuous extraction.  5- Extraction of Uncharged Metal Chelates  --------------------------------------------------------------------------------------  University of Salahaddin Practical Instrumental Analysis 4th Stage  College of Science Final Examination Date:  Chemistry Department Time: 90 min.  Q1/ Explain the followings: [50 mark]  1-In the determination of phenol by conductometric method at the beginning the conductance varies very little.  2-Standard addition method is better than direct calibration curve.  3-Absorbance decrease by increasing the concentration of ascorbic acid in the spectrophotometric determination of ascorbic acid.  4-Flame photometry is applied for a limit number of elements.  5-Using salt bridge in electrochemical cell.  Q2/ A sample contain calcium, how can you determine calcium in this sample by flame photometry? Write in detail with necessary diagrams. [30 mark]  Q3/ A 100ppm (250mL) stock solution of ascorbic acid was prepared (How prepared)?, from this stock solution 5,10,15,20 and 25mL were placed in five volumetric flask then completed to 50mL with water. The absorbance of each volumetric flask were measured the results are shown in the table below. Find the concentration of ascorbic acid in the unknown.  C:\Users\Chemistry\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.Word\2.png    [35 mark]  Q4/ Answer the followings: [35 mark]  1-How selectivity increased in quantitative analytical methods (in general)?  2-Separate Fe(II) and Cu(II) in a sample (use a reducing agent and 1,10-phenanthroline as a reagent).  3-Hydrochloric acid used with the mobile phase for separation Fe3+, Cu2+ and Ni2+ by paper chromatography. Why?  4-In paper chromatography the paper must be handled from the side edges or with gloves. Why?  5-What are main stages in the performance of ion exchange experiments?  6-What is the relation between partition coefficient (Kd) and extraction efficiency? How can you increase extraction efficiency?  7-Explain the extraction of Ion-association Complexes.  University of Salahaddin Practical Instrumental Analysis 4th Stage  College of Science Final Examination Date:  Chemistry Department Time: 90 min.  Q1/ Describe the following preparations: [60 mark]  a)A solution (900 mL) of 3M HNO3 from the commercial reagent that is 70.5% (w/w) HNO3 and has a specific gravity of 1.42 .  b)A solution (500mL) contain (70 ppm) of Ca2+ from pure Ca3(PO4)2 .  Q2/ Discuss the followings: [ 35 mark]  1-Limitation of flame photometry. [16 mark]  2-Detection the end point in potentiometric titration. [10 mark]  3-Calibration of a pH-meter before use. [9 mark]  Q3/ Draw the absorption spectrum for a solution containing both dichromate and permanganate ion. [20 mark]  Q4/ Define the followings:  Combined glass electrode - Atomization - Separation  [15 mark]  Q5/ Give short notes on the followings: [20 mark]  1-Uses of potentiometric method [12 mark]  2-Factors affecting on conductivity[8 mark]  Q6/ Answer the followings: [50 mark]  a)Using the fume of concentrated ammonia solution in the separation of Fe3+, Cu2+ and Ni2+ by paper chromatography. Why? [12 mark]  b)What are Retention factor (Rf - value) and partition coefficient (Kd)? [10 mark]  c)What are properties of extracting solvent? [15 mark]  d)What are applications of ion exchange chromatography? [8 mark]  e)Write about batch extraction method. [5 mark]  [At. Wt. for Ca = 40 , P = 31 , O = 16 , N = 14 , H = 1 mol/L ] |