

KATHMANDU UNIVERSITY
End Semester Examination
July/August, 2024

Marks Scored:

Level : B.Pharm.

Year : II

Exam Roll No. :

Time: 30 mins.

Course : CHEM 212

Semester : II

F. M. : 20

Registration No.:

Date : 08 AUG 2024

SECTION "A"

[20 Q. × 1 = 20 marks]

Choose and mark [X] in the most appropriate option.

- Which of the following statement is NOT true?
 Relative error is "the absolute error divided by the magnitude of the measured quantity"
 Accuracy is the measure of how closely a measured quantity agrees with the true value
 A determinate error which varies with the sample size in such a way that the relative error remains constant
 Precision provides a measure of systematic error
- Researcher I obtains a mean value of 15.59% and a standard deviation of 0.08 for the purity of a sample. Researcher II obtains corresponding values of 13.12% and 0.03. The true percentage purity is 12.50. Compared to Researcher I, Researcher II is
 Less accurate but more precise More accurate and more precise
 Less accurate and less precise More accurate but less precise
- Gravimetric factor of Cl in AgCl is
 0.752 0.247 143.32 4.04
- _____ is an example of lyophobic precipitate.
 Ferric hydroxide Silver chloride
 Aluminium hydroxide Silicic acid
- What will be the molarity (in mol/L.) of KMnO_4 which contains 119 g in 3 litres of solution?
 0.25 0.75 158 0.50
- What will be the pOH of the solution in which $[\text{H}_3\text{O}^+] = 0.01$?
 1 12 2 14
- In the titration of Fe^{2+} with Ce^{4+} , the equilibrium potentials developed by the Fe^{3+} - Fe^{2+} and the Ce^{4+} - Ce^{3+} couples will be equal
 Only at the equivalence point Only halfway to the equivalence point
 Throughout the titration Never
- Indicator methyl orange can be used for which of the following titration?
 0.1M acetic acid and 0.1 M sodium hydroxide
 0.1M difluoroacetic acid and 0.1 M potassium hydroxide
 0.1M oxalic and 0.1 M sodium hydroxide
 0.1M hydrochloric acid and 0.1 M sodium carbonate

KATHMANDU UNIVERSITY
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Level : B.Pharm.
Year : II
Time : 2 hrs. 30 mins.

08 AUG 2024

Course : CHEM 212
Semester : II
F. M. : 55

SECTION "B"

[5 Q. × 5 = 25 marks]

Attempt *ANY FIVE* questions.

- 1 a. A chemist analyzes a sample of iron are furnished by the National Institute of Standards and Technology and obtains the following results: $\bar{x}=10.32$, $s=0.03$, $n=10$. The NIST value for this sample is 10.60% Fe. Are the results significantly different at the 95% probability level? (tabulated t at d.f. 9 is 2.262) [3]
b. A sample of dichloroacetic acid (formula weight 128.94), weighing 6.447 gm is dissolved in 500ml of solution. At this concentration the acid is about 45% dissociated:
$$\text{Cl}_2\text{CHCOOH} \rightleftharpoons \text{H}^+ + \text{Cl}_2\text{CHCOO}^-$$

Calculate the formality of the dichloroacetic acid and the molarities of the two species Cl_2CHCOOH and $\text{Cl}_2\text{CHCOO}^-$. [2]
- 2 a. 50.0 ml of 0.50 M hydrochloric acid is titrated with 0.50 M sodium hydroxide. Calculate the pH of solution after addition of 5 ml, 25 ml and 50 ml of titrant. [3]
b. 50.0ml of 0.010M M^{2+} is titrated with 0.010M EDTA. Calculate the value of K_{eff} so that when 49.95 ml of titrant has been added, the reaction is essentially complete and the pM changes by 2.00 units on the addition of two more drops (0.10ml) of titrant. [2]
- 3 a. A 2.165 g sample of a copper ore is dissolved, and excess KI added to liberate I_2 . The I_2 required 31.43 ml of 0.0978 M $\text{Na}_2\text{S}_2\text{O}_3$ for titration. Calculate the percentage of copper in the ore. (AW Cu= 63.54) [3]
b. While using adsorption indicator, illustrate the function of dextrin? Why must the pH be controlled in such case? [2]
- 4 a. What is the optimum pH for EDTA titration? What happens if the pH is low or very high? At what condition K_{eff} approaches K_{abs} ? [3]
b. 50.0ml of 0.04M Fe^{2+} is titrated with 0.05M Ce^{4+} in sulfuric acid solution. Calculate the potential of solution at the start of the titration and at the equivalence point. ($E^0\text{Ce}=1.44\text{V}$, $E^0\text{Fe}=0.68\text{V}$) [2]
- 5 a. Define specific conductance. Draw and explain conductometric titration curve for strong acid and weak base. [3]
b. 25.0 ml of 0.60 M acetic acid is titrated with 0.60 M sodium hydroxide. Calculate the pH of solution at the equivalence point? [2]
- 6 a. 0.4852 g sample of iron ore is dissolved in acid, and iron is oxidized to the +3 state and then precipitated as the hydrous oxide, $\text{Fe}_2\text{O}_3 \cdot x\text{H}_2\text{O}$. The precipitate is filtered, washed, and ignited to Fe_2O_3 , which is found to weigh 0.2481 g. Calculate the percentage of iron in the sample (AW Fe= 55.85). [3]

P.T.O.

- b. Draw well labelled diagram of a glass electrode. Also write cell representation for it. [2]

SECTION "C"
[5 Q. × 6 = 30 marks]

Attempt *ANY FIVE* questions.

- 7 a. What is propagation of error? Show how determinate & indeterminate errors are transmitted into the result. [3]
b. What is coprecipitation? How it can be minimized? [3]
- 8 a. List and give examples of four types of chemical reactions which can be used as the basis of titrimetric analysis. [3]
b. What are true redox indicators? Show that how much potential (at least) is needed to bring about a change in color of a true redox indicator? [3]
- 9 a. Explain why carbonate error occurs and how it can be minimized in laboratory? [3]
b. Define (i) Poised solution (ii) Specific indicator (iii) Redox couple [3]
- 10 a. What is a reference electrode? Show the clear sketch and representation of the saturated calomel electrode. [3]
b. Write short note on indicators for EDTA titration. [3]
- 11 a. What are various applications of EDTA titration? [3]
b. With a labeled diagram of typical polarogram explain about, residual current, and half wave potential. [3]
- 12 a. What is amperometric titration? Draw different types of curves used in amperometric titration. [3]
b. Differentiate between metallic electrode of first kind and an electrode of second kind. [3]
- 13 a. Define postprecipitation. What are the different types of errors which might occur during drying and ignition of precipitates? [3]
b. Write short note on Volhard method of formation of colored complex? [3]