



LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

B.Sc. DEGREE EXAMINATION – CHEMISTRY

FIRST SEMESTER – APRIL 2022

UCH 1502 – ANALYTICAL CHEMISTRY

(21 BATCH ONLY)

Date: 23-06-2022

Dept. No.

Max. : 100 Marks

Time: 09:00 AM - 12:00 NOON

SECTION A

Answer ALL the Questions

1. Define the following	(5 x 1 = 5)
a) universal antidote	K1 CO1
b) molality	K1 CO1
c) gravimetric factor	K1 CO1
d) retention factor	K1 CO1
e) DTA	K1 CO1
2. Answer all the Questions	(5 x 1 = 5)
a) Indicate the number of significant figures in the following i) 19.50 ii) 0.00600	K1 CO1
b) Identify a suitable indicator for the titration of (i) HCl vs Na ₂ CO ₃ (ii) Cl ⁻ vs Ag ⁺	K1 CO1
c) Recall solubility product	K1 CO1
d) List the characteristic of a solvent to be used for recrystallization.	K1 CO1
e) Recognize the term 'reaction interval' in thermal analysis.	K1 CO1
3. Match the following	(5 x 1 = 5)
a) Indeterminate error ---- Alumina	K2 CO1
b) Primary standard ---- Heat evolved or absorbed	K2 CO1
c) Gravimetry ---- Random error	K2 CO1
d) TLC ---- Oxalic acid	K2 CO1
e) DTA ---- Weight of precipitate	K2 CO1
4. Choose the correct answer for the following	(5 x 1 = 5)
a) The median for 10.20,10.08,10.01,10.10 and 10.05 is (i) 10.20 (ii) 10.08 (iii) 10.01 (iv) 10.05	K2 CO1
b) The pH of 0.001 N HCl is (i) 4 (ii) 3 (iii) 2 (iv) 1	K2 CO1
c) Which of the following is an example of adsorption indicators? (i) Eosin (ii) Phenolphthalein (iii) Methyl red (iv) Ninhydrin	K2 CO1
d) Select the correct statement from the following. i) Paper chromatography is a type of partition chromatography ii) A special quality paper is used in paper chromatography iii) Chromatographic paper contains water trapped in it, which acts as a stationary phase iv) All of the mentioned	K2 CO1
e) In thermogravimetric analysis, the property measured is (i) change in weight (ii) heat evolved (iii) heat absorbed (iv) change of temperature	K2 CO1

SECTION B

Answer any TWO of the following in 100 words

(2 x 10 = 20)

5.		Calculate the mean, median, standard deviation, average deviation and coefficient of variation for the following five titre values. 19.6, 20.5, 19.2, 19.0, and 20.4 mL.	K3	CO2
6.	a.	Examine the acid-base theory of indicators. (5)	K3	CO2
	b.	Apply a suitable titrimetric method for the estimation of Zn using EDTA as a titrant. (5)		
7.	a.	Write any two organic precipitating agents with their structure. (5)	K3	CO2
	b.	Illustrate the various factors affecting the solubility of a compound. (5)		
8.	a.	Explain the various steps involved in recrystallization. (5)	K3	CO2
	b.	Illustrate the factors that affect the thermograms. (5)		

SECTION C

Answer any TWO of the following in 100 words (2 x 10 = 20)

9.	a.	Infer the general rules to be followed in the storage and handling of chemicals. (5)	K4	CO3
	b.	Analyze the DTA curve of calcium oxalate monohydrate. (5)		
10.	a.	Illustrate the different types of titrations with suitable examples. (8)	K4	CO3
	b.	Calculate the pH of 0.1 N NaOH. (2)		
11.	a.	Distinguish coprecipitation from post precipitation. (5)	K4	CO3
	b.	Explain Von Weimarn ratio. (5)		
12.		Outline the principle, technique, and applications of ion-exchange chromatography. (5)	K4	CO3

SECTION D

Answer any ONE of the following in 250 words (1 x 20 = 20)

13.	a.	Explain the different types of errors and formulate various methods of minimizing errors. (10)	K5	CO4
	b.	Derive Henderson equation for an acidic buffer and mention its significances. (10)		
14.	a.	Calculate the molar solubility of PbSO_4 if the solubility product is $1.6 \times 10^{-8} \text{ mol}^2 \text{ Lit}^{-2}$. (5)	K5	CO4
	b.	Write and explain the principle involved in steam and fractional distillation techniques for the purification of liquids. (10)		
	c.	Explain the TGA curve of calcium oxalate monohydrate. (5)		

SECTION E

Answer any ONE of the following in 250 words (1 x 20 = 20)

15.	a.	Summarize the importance of MSDS of a chemical. (7)	K6	CO5
	b.	Distinguish molarity from molality. Calculate the normality and molarity of a solution containing 12.6 g of oxalic acid dihydrate crystals in 1 Litre of water. (7)		
16.	a.	Write the principle and procedure involved in the estimation of chloride ions by Volhard's method. (7)	K6	CO5
	b.	Examine the column chromatographic technique for the separation of components in the mixture. (7)		
	c.	Summarise the principle and instrumentation involved in the DTA technique. (6)		

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