


Name:			
Enrolment No:			
UPES End Semester Examination, May 2024			
Course: Fundamentals of Analytical Chemistry Program: MSc Chemistry Course Code: CHEM 7059		Semester: II Time : 03 hrs. Max. Marks: 100	
Instructions: 1. Attempt all questions. 2. Internal choices are given for Q9&Q11.			
SECTION A (5Qx4M=20Marks)			
S. No.		Marks	CO
Q 1	Elaborate Lambert and Beers law with details.	4	CO2
2	Mention the importance of variance in analytical chemistry and determine the variance of the following results. 1.2; 1.21; 1.22; 1.23; 1.24 and 1.25.	4	CO1
3	Explore the use of DMG as a precipitating agent with an example. Use appropriate chemical reactions	4	CO2
4	Differentiate between the following. (i) End point and equivalence point. (ii) Primary standard and secondary standard solution	4	CO3
5	Specify of any two significant tests of validating analytical results and give their formulas.	4	CO1
SECTION B (4Qx10M= 40 Marks)			
Q 6	Evaluate how chloride ions from a contaminated sample can be determined using a precipitant by gravimetric method. Use appropriate chemical reactions.	10	CO2
7	Calculate the pH of a solution obtained by mixing 225 ml of 0.2N hydrochloric acid with 50 ml of 0.1N sodium hydroxide. Show all steps.	10	CO3
8	150 ml of 0.2M nitric acid was added in excess of 1.3415 g of calcium carbonate. The excess acid was back titrated with 0.105M sodium hydroxide. It required 75.5 ml of the base to reach the end point. Determine the percentage of calcium carbonate present in the sample.	10	CO3
9	The application of standard solutions is the key factor in analytical chemistry. Write a short note on primary and secondary standards citing some examples along with their importance.	10	CO1

	<p>OR</p> <p>Predict with neat sketch(es) the process of performing conductometric titration of strong acid and strong base with necessary explanations.</p>		
<p>SECTION-C (2Qx20M=40 Marks)</p>			
Q 10	<p>(A). Mention the advantages of redox indicators and give few examples with their structures.</p> <p>(B). Explore redox-titration curves for titration between strong-acid and strong base</p>	10+10	CO1
11	<p>(A). Explore the method of determination of calcium in a sample using complexometric titration.</p> <p>(B). Elaborate the principles and application of following analytical techniques. (i) DTA (ii) TG</p> <p style="text-align: center;">OR</p> <p>(A) Elaborate the various components of thin layer chromatography and how chromatogram will be evaluated for qualitative analysis of dyes.</p> <p>(B). A 5 ml of a sample of water when treated with required 10 ml of N/15 HCl using methyl orange indicator gives color change but did not give any color change in phenolphthalein indicator. Determine the type of extent of alkalinity (in mg/litre) is present in the sample.</p>	10 + 10	CO2