



LOYOLA COLLEGE (AUTONOMOUS) CHENNAI – 600 034

B.Sc. DEGREE EXAMINATION – CHEMISTRY

FIRST SEMESTER – NOVEMBER 2024

UCH 1502 – ANALYTICAL CHEMISTRY



Date: 13-11-2024

Dept. No.

Max. : 100 Marks

Time: 09:00 am-12:00 pm

SECTION A - K1 (CO1)

Answer ALL the Questions

(10 x 1 = 10)

1. Define the following

- a) Antidote
- b) Mole fraction
- c) Gravimetric factor
- d) Chromatography
- e) Thermogram

2. Match the following

- | | |
|------------------------|-----------------------|
| a) Pulverised charcoal | -- Adsorbent |
| b) Sodium hydroxide | -- Universal antidote |
| c) EBT | -- Secondary standard |
| d) Silica | -- Thermogram |
| e) Exothermic reaction | -- Indicator |

SECTION A - K2 (CO1)

Answer ALL the Questions

(10 x 1 = 10)

3. True or False

- a) The significant figure of 3.607 is three.
- b) Analyte is a solution of unknown concentration.
- c) Mohr method uses ferric ions as indicator for the estimation of chloride ions.
- d) Benzoic acid can be purified by distillation process.
- e) In DTA, the difference in temperature is plotted against temperature.

4. Fill in the blanks

- a) Ethers cannot be stored for a longer period of time as it forms _____.
- b) The _____ of a solution is the amount of moles of solute per litre of solution.
- c) The increase in temperature will _____ the solubility.
- d) The direct conversion of a solid into the gaseous state on heating without passing through the liquid state is called _____.
- e) The change in the weight of the substance is recorded as a function of temperature is called _____.

SECTION B - K3 (CO2)

Answer any TWO of the following

(2 x 10 = 20)

- 5. Elaborate the first aid procedures in case of accidents in chemistry laboratory
- 6. Derive Henderson equation of a base buffer.
- 7. Explain the principle and procedure involved in the determination of chloride by Volhard's method.
- 8. (a) Discuss the principle, working and advantages of column chromatography. (5)

	(b) Describe the instrumentation involved in thermal gravimetric analysis with a neat sketch. (5)
SECTION C – K4 (CO3)	
Answer any TWO of the following (2 x 10 = 20)	
9.	(a) Calculate the mean, median, standard deviation of the following six titre values: (6) 21.6, 19.7, 19.8, 20.9, 22.5 and 21.4. (b) List the different methods of eliminating errors. (4)
10.	(a) Explain the quinonoid theory of indicators for methyl orange indicator. (5) (b) Discuss the principle and working of steam distillation with a neat diagram. (5)
11.	(a) Calculate the molar solubility of PbSO_4 , if the solubility product is 1.6×10^{-8} . (6) (b) Compare co-precipitation and post precipitation. (4)
12.	(a) Explain the factors affecting the size and shape of a thermogram. (5) (b) Draw and explain the DTA curve of Calcium oxalate monohydrate. (5)
SECTION D – K5 (CO4)	
Answer any ONE of the following (1 x 20 = 20)	
13.	(a) Summarize the different types of errors with examples. (10) (b) Discuss the neutralization and precipitation titration with example. (10)
14.	(a) Compile the role of adsorption indicators in argentometric titrations using Fajan's method. (10) (b) What are drying agents? Mention its properties. (5) (c) Describe the TGA curve of $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$. (5)
SECTION E – K6 (CO5)	
Answer any ONE of the following (1 x 20 = 20)	
15.	(a) Mention the safety rules to be followed in a chemistry laboratory. (10) (b) What are metal ion indicators? Explain the significance of metal ion indicator for the estimation of zinc. (10)
16.	(a) Explain the different steps followed in gravimetric analysis and its advantages. (10) (b) Draw and discuss the TGA curve of silver nitrate. (5) (c) Discuss the process of recrystallization in purification of compounds. (5)
