

# KAMARAJ COLLEGE (Autonomous)

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(Affiliated to Manonmaniam Sundaranar University, Tirunelveli)

(3 Pages)

Reg. No:.....

Question Code: 26E00310

Course Code : 24USCH41

UG Degree - End Semester Examinations, April 2026

Fourth Semester

B.Sc., CHEMISTRY

Instrumental Methods of Chemical Analysis

(For those who joined in July 2024 onwards)

Time : 3Hours

Maximum : 75 Marks

## PART - A (10 × 1 = 10 Marks)

Answer ALL Questions

Choose the correct answer :

CO:1 1. Mass is a

- K:1
- (a) Vector quantity (b) Changes with gravity  
(c) Scalar quantity (d) Can have zero value

CO:1 2. SI unit of electric current is represented as

- K:2
- (a) E (b) C  
(c) V (d) A

CO:2 3. In AAS the most stronger absorbed light is called as

- K:1
- (a) Resonance line (b) Base line  
(c) Stokes line (d) Anti stokes line

CO:2 4. The filler gas used in HCl

- K:2
- (a) Oxygen (b) Neon  
(c) Nitrogen (d) Hydrogen

CO:3 5. Which of the following molecules exhibit IR Spectra?

- K:2
- (a) H<sub>2</sub> (b) N<sub>2</sub>  
(c) NO (d) CO

CO:3 6. Which of the following instrument is used for IR Spectroscopy?

- K:1
- (a) Mass spectrometer (b) Chromatograph  
(c) Fourier Transform Infrared Spectrometer (d) UV - vis spectrometer

- CO:4 7. In a TG Curve, the horizontal portions indicate  
K:2 (a) Weight loss (b) Weight gain  
(c) No weight change (d) Decrease in temperature
- CO:4 8. The term polarography used when the polarisable electrode used  
K:1 is  
(a) SCE (b) DME  
(c) Pt (d) Cu
- CO:5 9. Solvent extraction is a \_\_\_\_\_ analytical technique.  
K:1 (a) Separating (b) qualitative  
(c) quantitative (d) identification
- CO:5 10. Discuss  $R_f$  travelled by the solute/distance travelled by the solvent  
K:2 is given by  
(a)  $R_f$  (b)  $K_D$   
(c)  $K_P$  (d)  $R_G$

**PART - B (5 X 5 = 25 Marks)**

**Answer ALL Questions choosing either (a) or (b).**

**Answer should not exceed 250 words.**

- CO:1 11. (a) Illustrate the following: i) Accuracy ii) Precision.

K:3 **(OR)**

- (b) Calculate the standard deviations of a data with scores 79, 85, 88, 90, 72, 89 and 92.

- CO:2 12. (a) Lay out the principle and instrumentations of AAS.

K:4 **(OR)**

- (b) Explain the following terms: i) Total consumption burner ii) Premix burner

- CO:3 13. (a) Explain Absorption laws.

K:4 **(OR)**

- (b) Illustrate the principle and selection rule IR Spectroscopy.

- CO:4 14. (a) Lay out the principle involved in TGA.

K:4 **(OR)**

- (b) Investigate the principle of DSC.

- CO:5 15. (a) Illustrate the mechanism of separation in TLC.

K:3

**(OR)**

- (b) Express the principle and development of chromatogram in Gas Chromatography.

**PART - C (5 X 8 = 40 Marks)**

**Answer ALL Questions choosing either (a) or (b).**

**Answer should not exceed 500 words.**

- CO:1 16. (a) Explain the various types of errors. Write the methods used  
K:6 to minimize errors.

**(OR)**

- (b) Explain the term: i) Confidence limit ii) Q - test iii) F - test

- CO:2 17. (a) Explain the different atomization techniques. Explain any  
K:6 two in detail.

**(OR)**

- (b) Outline the different methods of background correction.

- CO:3 18. (a) Point out the applications of UV- vis spectroscopy.

K:4

**(OR)**

- (b) Diagram the single and double beam IR Spectrometer.

- CO:4 19. (a) Explain the following with neat diagram: i) TGA curve for  
K:4 Calcium Oxalate ii) TGA curves for Calcium acetate and Silver nitrate.

**(OR)**

- (b) Outline the principle and experiment set up in Polarography. Mention its applications in qualitative analysis.

- CO:5 20. (a) Design briefly the classification of Chromatography.

K:6

**(OR)**

- (b) Explain the principle, preparation of column and choice of solvent system in column Chromatography.