

SCA-S 905

**Andhra University**  
**Department of Inorganic and Analytical Chemistry**  
**M.Sc. (Final) Chemistry Syllabus for 4<sup>th</sup> Semester**  
**Specialization - Analytical Chemistry**  
**Paper - IV: Instrumental Methods of Analysis — II**  
(Effective from 2008-09 Admitted batch)

**Unit – I: Spectroanalytical Methods of Analysis**

- (a) *Flame photometry*: theory, instrumentation, combustion flames, detectors, and analysis of Na, K, Ca, Mg
- (b) *Atomic Absorption Spectrometer*: theory, instrumentation, flame and non-flame techniques, resonance line sources, hollow cathode lamp, instrumentation, chemical and spectral interferences, applications with special reference to analysis of trace metals in oils, alloys and toxic metals in drinking water and effluents
- (c) *Inductively coupled plasma spectrometer (ICP-AES, ICP-MS)*: principles, instrumentation, plasma, AES detectors, quadrupole mass spectrometers, difference between the two detectors, analysis methods for liquids and solids, applications in the analysis of trace and toxic metals in water, geological and industrial samples.
- (d) *Arc and Spark spectrographic Direct analysis of solid for metals.*

**Unit – II Thermal methods of Analysis**

- (a) Thermo gravimetry-theory, instrumentation, applications with special reference to  $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$ ,  $\text{CaC}_2\text{O}_4 \cdot 2\text{H}_2\text{O}$ ,  $\text{CaCO}_3$ ,  $(\text{COOH})_2 \cdot 2\text{H}_2\text{O}$
- (b) Differential thermal analysis-principle, instrumentation, difference between TG and DTA, applications with special reference to the clays and minerals, coals (fuels)
- (c) Differential scanning calorimetry-principle, instrumentation, applications to inorganic materials like chlorates and per chlorates, ammonium nitrate. Organic compounds and Drugs.

**Unit- III : Electro analytical Methods of Analysis - 1**

- (a) *Voltametry and polarographic analysis* : principle of polarography, residual current, migration current, diffusion current, half-wave potential, Ilkovic equation, instrumentation, Dropping mercury electrode (DME), advantages and disadvantages of DME, qualitative and quantitative analysis of inorganic ions-Cu, Bi, Pb, Cd, Zn, AC polarography, pulse polarography
- (b) *Anode stripping voltametry*: principle, instrumentation, Hanging mercury drop electrode, application in the analysis of Pb and Cd in environmental samples, principle of cathode stripping voltametry.

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