

## **1.2 Pharm. Analysis II (Instrumental and market Sample Analysis, Q.C. including Statistical A.C.)**

1. Advantage and limitations of chemical methods of analysis and instrumental methods of analysis.
2. Visible Spectrophotometry and colorimetry: Introduction, Theory of Spectrophotometry and deviation from Beer's law, Instrumentation, colorimeters, non-recording and recording spectrophotometry, applications of colorimetry and spectrophotometry, Spectrophotometric titrations.
3. U.V. Spectroscopy: Introduction, origin and theory of UV spectra, choice of spectra, choice of solvents, instrumentation, applications.
4. Infrared Spectroscopy: Introduction, origin and theory of infrared spectra, instrumentation, sample handling, absorptions of common functional groups, applications.
5. Nuclear magnetic resonance spectroscopy: Introduction and theory, instrumentation and sample handling, chemical shift, spin-spin coupling, applications and limitations.
6. Quantitative determination of carbon, hydrogen, oxygen, nitrogen elements, alcohol and alkaloidal content.
7. Refractometry: Introduction, theory, instrumentation, specific and molar refraction, variables affecting refractive measurements, applications.
8. Polarimetry: Introduction, optical activity, specific rotation, polarization, applications.
9. Measurement of pH: Detection and determination of pH, instrumentation.
10. Potentiometry: Introduction, instrumentation, types of potentiometric titrations, advantages.
11. Chromatography: Introduction, principle, experimental details and applications of paper, thin layer, gas, liquid, non-exchange chromatography, introduction to HPLC.
12. Quality of a dosage form: Statistical methods of quality control, sampling, automated assays, automated process controls.
13. Radiochemical methods of analysis & their application, Radio tracer techniques and Radio immunoassays.

### **PRACTICALS**

1. Analysis of some important drugs.
2. Analysis of some carbohydrates.
3. Determination of pH by pH meter.
4. Potentiometric titrations involving acid base, precipitation, redox titration.

5. Determination of refractive index by refractometry.
6. Analysis of dosage form Tabs, inujs, caps, ointment as per pharmacopoeia.
7. Determination of water content by IR moisture Balance and Karl Fischer apparatus
8. Paper chromatography (Ascending and descending type).
9. Thin Layer chromatography.

**Books Recommended:**

1. K.A. Connors, A text book of Pharm. Analysis.
2. A.I. Vogel, A textbook of quantitative chemical analysis, ELBS, London.
3. Willard, Instrumental Analysis.
4. Ewing, Method of instrumental analysis.
5. Chatwal and Anand. Instrumental methods of analysis.
6. L.G. Chatlan, Chem. Chemistry.
7. Beckett and Stanlake, Pract. Pharmaceutical Chemistry, Part-II.
8. D.C. Garatt, The quantitative analysis of drugs, Champann and Hill Ltd., London.