

## B.Sc. Third Year Industrial Chemistry

### COMPULSORY PAPERS

#### Paper I – Industrial Chemical Analysis.

1. **Sampling** procedures, sampling of bulk materials, techniques of sampling – solids, liquids and gases. Collection and processing of data.
2. **Chromatography:** Principles, working and applications of – paper chromatography, TLC, GLC, HPLC.
3. Particle size determination, rheological properties of liquids, plastics and their analysis.
4. **Modern Instrumental Methods of analysis –**
  - UV-visible spectroscopy
  - IR spectroscopy and non-dispersive IR
  - Raman spectroscopy,
  - NMR Spectroscopy,
  - Electron spin resonance spectroscopy
  - Atomic absorption spectroscopy
  - Flame photometry
  - Neutron diffraction
  - X-ray fluorescence
  - Ion chromatography

## Paper IV – Chemical Process Economics and Entrepreneurship.

1. Factors involved in project cost estimation, methods employed for the estimation of capital investment. Capital formation, elements of cost accounting. Interest and investment costs, time value of money equivalence.
2. Depreciation, methods of determining depreciation. Some aspects of marketing, pricing policy, profitability criteria, economics of selecting alternatives, variation of cost with capacity, break-even point, optimum batch sizes, production scheduling etc.
3. Need, scope and characteristics of entrepreneurship, special schemes for technical entrepreneurs development (STED), exposure to demand based, resource based, service based. Import substitute and export promotion industries, criteria for principles of products selection and developments.
4. Choice of technology: plant and equipments. Techno-economic feasibility of the projects. Plant layout and process planning for the project.
5. Financial Institutions, their procedure and incentives, financial ratio and their significance. Books of accounts, financial statements and Funds flow analysis. Energy requirement and utilization.
6. Resources management: men, machine and materials. Creativity and Innovations. Problem solving approach. Strength, weakness, opportunity and threat (SWOT) techniques.
7. Quality control, quality assurance and testing of the product. Packaging and advertising. After sales service.
8. Sickness in small scale Industries and their remedial measures. Licensing and registration. Important provisions of Factory Act, sales of goods Act, partnership Act.

### Practical\*\*:

1. Synthesis of common industrial compounds involving two step reactions, e.g. 4-bromo aniline, 3-nitroaniline, sulphanilamide, 4-amino benzoic acid, 4-nitro benzoic acid, dihalobenzenes, nitrohalobenzenes, paracetamol, oils of winter green.
2. Determination of acid value, Iodine value and saponification value.
3. Instrumental methods of analysis – colorimeter, flame photometer.
4. Preparation of urea formaldehyde resin.
5. **Industrial analysis** – analysis of common raw materials as per the industrial specifications such as phenol, aniline, formaldehyde, hydrogen peroxide, acetone, etc.
6. Limit tests for chlorine, heavy metals, arsenic of drugs.
7. Determination of sulphate ash, loss on drying of drugs.
8. Identification of drugs by TLC.

