

B.Sc. Forensic Science: Semester-V

FST503: Chemistry - V

Teaching Scheme	Examination Scheme
Lectures: 3 hrs/Week	Class Test -12 Marks
Tutorials: 1 hr/Week	Teachers Assessment - 6 Marks
Credits: 4	Attendance - 12 Marks
	End Semester Exam - 70 marks

Course Objective: After completion the student will know about-

- The states of matter and their properties
- Thermodynamics and its laws
- Electrochemistry and related theories
- Nuclear chemistry and radioactivity

Unit 1: Gaseous State

Kinetic theory of gases, ideal gas laws based on kinetic theory. Collision in a gas- mean free path, collision diameter, collision number. Behaviour of real gases - the van der Waal's equation. Critical phenomena - critical constants of a gas and their determination, the van der Waals equation and critical state, Principle of corresponding states.

Unit 2: Liquid State

Surface tension of liquids - capillary action, experimental determination of surface tension, temperature effect on surface tension. Viscosity of liquids, experimental determination of viscosity coefficient, its variation with temperature.

Unit 3: Thermodynamics

First Law of thermodynamics and internal energy, state and state functions, sign convention for heat and work, nature of work, path dependence of heat and work. Enthalpy, heat changes at constant volume and constant pressure, heat capacities (CV, CP) and their relationship for ideal gases. Thermodynamic quantities (w, q, ΔU , ΔH) for isothermal and adiabatic reversible expansion of ideal gases and their comparison. Change in internal energy (ΔU) and enthalpy (ΔH) of chemical reactions, relation between ΔU and ΔH , variation of heat of reaction with temperature (Kirchhoff's equation).

Unit 4: Electrochemistry

Arrhenius theory of electrolytic dissociation, Hydrolysis of salts, hydrolysis constant, buffer solutions, indicators and theory of acid-base indicators. Migration of ions: transference number and its determination by Hittorf methods. Conductance of electrolyte solutions, molar conductance of electrolyte and its splitting into ionic molar conductance, Kohlrausch law of independent migration of ions, ionic mobility. Application of conductance measurements: determination of degree of dissociation and dissociation constant of weak electrolytes/acids, solubility of sparingly soluble salts, and Conductometric titrations.

Unit 5: Nuclear Chemistry

Nucleus and its classification, nuclear forces, nuclear binding energy, stability of nucleus. Radioactivity: Radioactive elements, general characteristics of radioactive decay, decay kinetics (decay constant, half-life, mean life period), units of radioactivity.

Head

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