CLASS - XI

SEMESTER – II

SUBJECT : CHEMISTRY (CHEM)

FULL MARKS : 35 **CONTACT HOURS : 60 HOURS**

COURSE CODE : THEORY

Sub-topics

UNIT No.	TOPICS	CONTACT HOURS	MARKS
Unit - 1	**Thermodynamics:** Concepts of system (including types of system), surroundings. Work, heat, energy, extensive and intensive properties, state function, Zeroth law of thermodynamics and definition of temperature. The first law of thermodynamics – internal energy change (ΔU) and enthalpy change (ΔH), Enthalpy of bond dissociation, combustion, formation, atomization, ionization, solution and sublimation. Transformation of state. Hess's law of constant heat summation, Born Haber Cycle and its application. 2nd law of thermodynamics, the introduction of entropy as a state function, Gibbs energy change for spontaneous and non-spontaneous processes, criteria for equilibrium.	**12**	**07**
Unit - 2	**Equilibrium:** Equilibrium in physical and chemical processes, dynamic nature of equilibrium, law of mass reaction, equilibrium constant, factors affecting equilibrium – Le Chatelier's principle; ionic equilibrium, ionization of acids and bases, strong and weak electrolytes, degree of ionization of polybasic acids, acid strength, concept of pH Henderson Equation. Hydrolysis of salts (elementary idea). Buffer solutions, solubility product, common ion effect (with illustrative examples).	**10**	**06**
Unit - 3	**Redox Reactions:** Concept of oxidation and reduction, redox reactions, oxidation number, balancing redox reactions in terms of loss and gain of electrons and change in oxidation number, applications of redox reactions in permanganometry and dichromatometry	**05**	**03**
Unit - 4	**Organic Chemistry: Some basic principles:** General introduction, classification and IUPAC nomenclature of organic compounds. Electronic displacements in a covalent bond: inductive effect, resonance and hyperconjugation. Homolytic and Heterolytic fission of a covalent bond: free radicals, carbocations, carbanions electrophiles and nucleophiles, types of organic reactions. Elementary idea of addition, elimination and substitution reactions.	**12**	**07**

UNIT No.	TOPICS	CONTACT HOURS	MARKS
Unit - 5	**Hydrocarbons: Classification of hydrocarbons** Alkanes – Nomenclature, isomerism, conformations (ethane only), physical properties (up to 6 carbons) and chemical reactions including halogenations, free radical mechanism, combustion and pyrolysis. Alkenes – Nomenclature, structure of double bond (ethene), geometrical isomerism, physical properties (up to 3 carbons) methods of preparation; chemical reactions; addition of hydrogen, halogen, water hydrogen halides (Markovnikov's addition and peroxide effect), ozonolysis, oxidation, mechanism of electrophilic addition. Alkynes – Nomenclature, structure of triple bond (ethyne), physical properties (up to 3 carbons) preparation, chemical reactions; acidic character of Alkynes, addition reaction of – hydrogen, halogens, hydrogen halides and water. Aromatic hydrocarbons; Introduction, IUPAC nomenclature; Benzene; resonance aromaticity; chemical properties; mechanism of electrophilic substitution – nitration, sulphonation, halogenations, Friedel-Crafts alkylation and acylation, carcinogenicity and toxicity.	**14**	**08**
Unit - 6	**Environmental Chemistry:** Environmental pollution – air, water and soil pollution (cause and effects), Primary and secondary pollutants (solid and liquid), chemical reactions in the atmosphere, smog, pollution due to industrial wastes; solid waste management (elementary idea only), SPM, RSPM, green chemistry as an alternative tool for reducing pollution. Water preservation and protection, Strategy for control of environmental pollution.	**07**	**04**