



Maharashtra State Board of Secondary & Higher Secondary School, Pune

Department of Chemistry

Subject: Chemistry (55)

Standard: Eleven

Faculty: Science

Syllabus

XI Chemistry (Theory & Practical)

Theory Index

Sr. No.	Unit/Topic
1	Some Basic Concepts of Chemistry
2	Introduction to Analytical Chemistry
3	Basic Analytical Techniques
4	Structure of Atom
5	Chemical Bonding
6	Redox Reactions
7	Modern Periodic Table
8	Elements of group 1 and 2
9	Elements of group 13, 14 and 15
10	States of Matter
11	Adsorption and Colloids
12	Chemical Equilibrium
13	Nuclear Chemistry and Radioactivity
14	Basic Principles of Organic Chemistry
15	Hydrocarbons
16	Chemistry in Everyday Life

Syllabus

Chapter No.	Area	Units and Subunits
1.	General Chemistry	1. Some Basic Concepts of Chemistry Introduction of some basic concepts of chemistry, nature of chemistry, properties of matter and their measurement, laws of chemical combination, Dalton's atomic theory, atomic and molecular masses, mole concept and molar masses, moles and gases.
2.		2. Introduction to Analytical Chemistry Introduction of analytical chemistry, analysis, mathematical operation and error analysis, determination of molecular formula, chemical reactions and stoichiometric calculations, limiting reagent, concentration of solution, use of graph in analysis.
3.		3. Basic Analytical Techniques Introduction of some analytical techniques, purification of solids (fractional crystallization), methods of separation (crystallization method, simple distillation method, chromatography method), solvent extraction, chromatography method (adsorption chromatography, partition chromatography).
4.		4. Structure of Atom Subatomic particles, atomic number and atomic mass number, isotopes, isobars and isotones, drawbacks of Rutherford atomic model, Bohr's atomic model, Bohr's model for hydrogen atom, quantum mechanical model of atom.
5.	Inorganic Chemistry	5. Chemical Bonding Introduction of chemical bonding, Kossel-Lewis approach to chemical bonding (octet rule, formal charge, limitations of the octet rule), valence shell electron pair repulsion theory (VSEPR), valence bond theory (VBT), molecular orbital theory (MOT), parameters of covalent bond, dipole moment, resonance.
6.		6. Redox Reactions Introduction of redox reactions, oxidation number, balancing redox reactions in terms of loss and gain of electrons, redox reaction and electrode potential.
7.		7. Modern Periodic Table Introduction of periodic table, structure of the modern periodic table, periodic table and electronic configuration, blockwise characteristics of elements, periodic trends in elemental properties.
8.		8. Elements of group 1 and 2 Hydrogen, alkali metals and alkaline earth metals, some important compounds of elements of S-block.
9.		9. Elements of group 13, 14 and 15 Electronic configuration of elements of groups 13, 14 and 15, trends in atomic and physical properties of elements of groups 13, 14 and 15, chemical properties of the elements of the groups 13, 14 and 15, catenation, allotropy, molecular structures of some important compounds of the group 13, 14 and 15 elements, chemistry of notable compounds of elements of groups 13, 14 and 15.

10.	Physical Chemistry	10. States of Matter Introduction of states of matter: gaseous and liquid states, Intermolecular forces, characteristic properties of gases, the gas laws, ideal gas equation, kinetic molecular theory of gases, deviation from ideal behavior, liquefaction of gases and critical constant, liquid state.
11.		11. Adsorption and Colloids Introduction of adsorption, adsorption, types of adsorption, factors affecting adsorption of gases on solids, adsorption isotherms (Freundlich and Langmuir adsorption isotherm), applications of adsorption, catalysis, adsorption theory of heterogeneous catalysis, colloids.
12.		12. Chemical Equilibrium Introduction of chemical equilibrium, equilibrium in physical processes, equilibrium in chemical processes-dynamic equilibrium, Law of mass action and equilibrium constant, homogeneous and heterogeneous equilibria, reversible reactions and dynamic equilibrium, characteristics of equilibrium constant, applications of equilibrium constants, Le Chaterlier's Principle and factors altering the composition of equilibrium, industrial application.
13.		13. Nuclear Chemistry and Radioactivity Introduction: nuclear chemistry is a branch of physical chemistry, classification of nuclides, nuclear stability, radioactivity, radioactive decays, modes of decay, nuclear reactions, applications of radio isotopes.
14.	Organic Chemistry	14. Basic Principles of Organic Chemistry Introduction of basic principles of organic chemistry, structural representation of organic molecules, classification of organic compounds, nomenclature of organic compounds, isomerism, theoretical basis of organic reactions.
15.		15. Hydrocarbons Alkanes, alkenes, alkynes (isomerism, conformations, industrial preparation, physical properties, chemical properties and uses), aromatic hydrocarbons (benzene).
16.		16. Chemistry in Everyday Life Chemistry in everyday life, basics of food chemistry, compounds with medicinal properties, cleansing agents.

Practical Index

Sr. No.	Practical's Name
Introduction to Chemistry laboratory	
1	Introduction to apparatus used in chemistry laboratory.
Basic Chemistry laboratory techniques	
2	Study of burner, operating pinch cock stopcock and handling of concentrated acid containers.
Quantitative Analysis (Long Experiments) (Compulsory)	
3	To determine concentration in terms of molarity of NaOH by titrating it against (0.05M) standard solution of oxalic acid.
4	To determine concentration in terms of molarity of HCl by titrating it against (0.05M) standard solution of sodium carbonate.
Qualitative Analysis (Long Experiment) (Any four water soluble salt)	
	Detection of one basic radical (cation) and one acidic radical (anion) qualitatively from given inorganic salt.
5	The given inorganic salt no. 1 contains 1) Basic radical.....2) Acidic radical..... 3) Formula of the salt.....
6	The given inorganic salt no. 2 contains 1) Basic radical.....2) Acidic radical..... 3) Formula of the salt.....
7	The given inorganic salt no. 3 contains 1) Basic radical.....2) Acidic radical..... 3) Formula of the salt.....
8	The given inorganic salt no. 4 contains 1) Basic radical.....2) Acidic radical..... 3) Formula of the salt.....
9	The given inorganic salt no. 5 contains 1) Basic radical.....2) Acidic radical..... 3) Formula of the salt.....
Surface Chemistry (Short Experiments) (Any Two)	
10	To prepare colloidal solution of starch.
11	To prepare colloidal solution of ferric hydroxide [Fe(OH) ₃]
12	Study of role of emulsifying agent in stabilizing the emulsion of an oil.
Chemical Equilibrium (Short Experiments) (Any One)	
13	Study the shift in equilibrium position between ferric ions and thiocyanate ions by increasing the concentration of either of the ions.
14	Study the shift in equilibrium position between [Co(H ₂ O) ₆] ²⁺ ions and chloride ions by increasing the concentration of either of the ions.

Experiment based on pH change (Short Experiments) (Any One)	
15	Study of the pH change in the titration of strong base (0.1 M NaOH) and strong acid (0.1 M HCl) using universal indicator.
16	Determination of the pH and nature of solution of some salts using pH paper or universal indicator. (NH ₄ Cl, Na ₂ CO ₃ , CH ₃ COONa, NaCl, unknown salt)
Characterization and purification of chemical substances	
17	Determination of melting point of given organic solid.
18	Determination of boiling point of given organic liquid.
19	Crystallisation of an impure sample of copper sulfate or benzoic acid.
List of Activities (Any four)	
1	Preparation of 100 ml. of 0.1 M standard oxalic acid solution.
2	Determination of pH of different fruit juices by using pH paper or universal indicator.
3	Calibration of pipette by burette.
4	To obtain pure water from impure water containing ink by simple distillation method.
5	Checking the adulteration in given food materials.
6	To determine pH of HCl solution of various concentrations by using pH paper or universal indicator.
7	To determine pH of NaOH solution of various concentrations by using pH paper or universal indicator.