

CLASS XI CHEMISTRY 2020-21

Unit No.	Title	No. of Periods	Marks
Unit I	Some Basic Concepts of Chemistry	10	11
Unit II	Structure of Atom	12	
Unit III	Classification of Elements and Periodicity in Properties	06	04
Unit IV	Chemical Bonding and Molecular Structure	14	21
Unit V	States of Matter: Gases and Liquids	9	
Unit VI	Chemical Thermodynamics	14	
Unit VII	Equilibrium	12	
Unit VIII	Redox Reactions	04	
Unit IX	Hydrogen	04	16
Unit X	s -Block Elements	5	
Unit XI	p -Block Elements	9	
Unit XII	Organic Chemistry: Some basic Principles and Techniques	10	18
Unit XIII	Hydrocarbons	10	
	Total	119	70

Unit I: Some Basic Concepts of Chemistry (12 Periods)

BAL BHARATI PUBLIC SCHOOL, NOIDA
CHEMISTRY (2020-21)
CLASS – XI

MONTH	UNIT/ TOPIC	SUB TOPICS	LEARNING OUTCOMES	INNOVATIVE PEDAGOGY/INTER DISCIPLINARY APPROACH	PRACTICALS/ ACTIVITIES
APRIL/ MAY	CH-1 Some Basic Concepts in Chemistry	<ul style="list-style-type: none"> • Importance and scope of chemistry • Nature of matter, • laws of chemical combination, Dalton's atomic theory:concept of elements, atoms and molecules. Atomic and molecular masses. • Mole concept and molar mass; percentage composition,empirical and molecular formula; • chemical reactions, stoichiometry and calculations based on stoichiometry 	<ul style="list-style-type: none"> • laws of chemical combination • Mole concept and molar mass; percentage composition, • empirical and molecular formula; • chemical reactions, • stoichiometry based calculations 	Pedagogy-Learning by doing, contextual learning	Basic Laboratory Techniques; Cutting glass tube and glass rod Bending a glass tube Drawing a glass jet Boring a cork
	CH-2 Structure of Atom	<ul style="list-style-type: none"> ➤ Bohr's model and its limitations ➤ concept of shells and subshells ➤ dual nature of matter and light, de Broglie's relationship, Heisenberg's uncertainty principle, concept of orbitals, quantum numbers, shapes of s, p and d orbitals, ➤ rules for filling electrons in orbitals - Aufbau principle ➤ Pauli exclusion principle, and Hund's rule, electronic configuration of atoms, stability of half filled and completely filled orbitals. 	<ul style="list-style-type: none"> • Bohr's model and its limitations • de Broglie's relationship • Heisenberg's uncertainty principle • concept of orbitals • quantum numbers, shapes of s, p and d orbitals • rules for filling electrons in orbitals - 	Pedagogy- Computational Thinking, Context based learning Preparation of model of Aafbau Principle ,Hund rule and stability of half filled and full filled orbitals by using small colorful thermocol balls /beads and matchsticks	Preparation of pure crystals of copper sulphate & alum from their crude samples. Preparation of solution of different strengths to understand the concept of molarity

				,glue,straws etc.	
JULY	CH-3 Classification of Elements & Periodicity in Properties	<ul style="list-style-type: none"> ➤ Modern periodic law and the present form of periodic table ➤ periodic trends in properties of elements - atomic radii, ionic radii, ionization enthalpy and electron gain enthalpy, electro negativity, valence. ➤ Nomenclature of elements with atomic number greater than 100. 	<ul style="list-style-type: none"> • Modern form of periodic table • periodic trends in properties of elements. • Nomenclature of elements with atomic number greater than 100. 	Pedagogy - Teaching in conversational mode rather than in the modes of authoritarian monologue.	Conceptual questions and worksheet
	CH-4 Chemical Bonding and Molecular Structure	<ul style="list-style-type: none"> ➤ Valence electrons, Ionic bond, Covalent bond : bond parameters. ➤ Lewis structure, polar character of the covalent bond, covalent character of ionic bond, ➤ valence bond theory ,resonance, geometry of covalent molecules, ➤ VSEPR theory, concept of hybridization, ➤ involving s, p and d orbitals and shapes of some simple molecules molecular orbital; theory of homo nuclear diatomic molecules ➤ (qualitative idea only), Hydrogen bond. 	<ul style="list-style-type: none"> • Ionic bond, Covalent bond : bond parameters. polar covalent bond, • covalent character of ionic bond, valence bond theory resonance, • geometry of covalent molecules <ul style="list-style-type: none"> • VSEPR theory, • concept of hybridization molecular orbital theory • Hydrogen bond. 	<p>Conceptual questions, worksheet based on reasoning questions and numerical</p> <p>The hybridization of orbitals (sp³,sp²,sp)can be shown by making Rangoli using different colours . Lobe can be drawn in different colours Similarly the LCAO in MOT can be shown by making charts using different colours or animation using graphics.</p>	<p>Preparation of standard solution of oxalic acid</p> <p>Preparation of standard solution of Sodium bicarbonate</p>
AUGUST	CH-5 States of matter	<ul style="list-style-type: none"> ➤ Three states of matter- Intermolecular interactions, type of bonding, melting and boiling points. ➤ Gas Laws-Boyle's law, Charle's law, 	<ul style="list-style-type: none"> • Intermolecular interactions, • Role of gas laws in derivation the 	Pedagogy – Content attainment approach,Context	Determination of strength of given solution of sodium hydroxide by titrating

		<p>Avagadro's law and Gay Lussac law</p> <ul style="list-style-type: none"> ➤ Ideal gas equation. Kinetic energy and molecular speed (Elementary Idea) ➤ Derivation from ideal behavior, 	<p>concept of the molecule,</p> <ul style="list-style-type: none"> • Boyle's law. Ideal behaviour, • Deviation from ideal behaviour, 	<p>based learning ,On line assessment and quizzes</p>	<p>it against standard solution of oxalic acid</p>
	<p>CH-6 Thermodynamics</p>	<ul style="list-style-type: none"> ➤ Concepts of system, types of systems, surroundings. ➤ Work, heat, energy, extensive and intensive properties, state functions. First law of thermodynamics - Internal energy and enthalpy ➤ heat capacity and specific heat, measurement of ΔH and ΔU, Hess's law of constant heat summation ➤ enthalpy of bond dissociation, combustion, formation, atomization, sublimation, ➤ Phase transition, ionization, solution and dilution ➤ second law of thermodynamic Introduction of entropy as a state function, free energy change for equilibrium. ➤ Third law of Thermodynamics (Chief discription) 	<ul style="list-style-type: none"> • Concepts of systems & surroundings. • Work, heat, energy, extensive and intensive properties, state functions. • First law of thermodynamics - Internal energy and enthalpy, heat capacity and specific heat • measurement of ΔH and ΔU, Hess law • Introduction of entropy as a state function • free energy change for equilibrium. • Third law of Thermodynamics 	<p>Pedagogy- Computational Thinking, Context based learning</p> <p>Numerical, to understand the concepts of Thermo Chemistry, First law of Thermodynamics, Enthalpy and Gibb's Energy etc.</p>	
<p>OCTOBER</p>	<p>CH-7 Equilibrium</p>	<ul style="list-style-type: none"> ➤ Equilibrium in physical and chemical processes, dynamic nature of equilibrium law of mass action, equilibrium constant ➤ factors affecting equilibrium-Le 	<ul style="list-style-type: none"> • Equilibrium in physical and chemical processes, • dynamic nature of equilibrium 	<p>Pedagogy- Computational Thinking, Context based learning</p>	<p>Determination of strength of given solution of hydrochloric acid by titrating it against</p>

		<p>Chatelier's principle</p> <ul style="list-style-type: none"> ➤ ionic equilibrium-ionization of acids and bases, strong and weak electrolytes, ➤ degree of ionization, ionization of polybasic acids, acidic strength concept of pH Henderson Equation ➤ Hydrolysis of salts (elementary idea) <p>Buffer solutions, solubility product. Common ion effect (with illustrative examples).</p>	<ul style="list-style-type: none"> • law of mass action, equilibrium constant, factors affecting equilibrium-Le Chatelier's principle, • Ionic equilibrium-ionization of acids and bases • strong and weak electrolytes • degree of ionization • concept of pH , Hydrolysis of salts (elementary idea) • Buffer solutions • solubility product • Common ion effect 	Numerical based on Equilibrium constant, dissociation constant, pH etc.	standard solution of sodium bi carbonate
AUGUST	CH-8 Redox Reaction	Concept of oxidation and reduction, redox reaction, oxidation number, balancing redox reactions in terms of gain or loss of electron and change in oxidation number	<ul style="list-style-type: none"> • Concept of oxidation and reduction, • redox reaction, oxidation number, balancing redox reactions, 	Pedagogy – Content attainment approach, understanding of redox reaction and understanding the concept of balancing ,assessment and quizzes	Salt analysis
	CH-9 Hydrogen	<ul style="list-style-type: none"> ➤ Position of hydrogen in periodic table ➤ Occurrence, isotopes, preparation, properties and uses of hydrogen ➤ Hydrides - ionic, covalent and interstitial; physical and chemical 	<ul style="list-style-type: none"> • Position of hydrogen in periodic table, • occurrence, isotopes, preparation, properties and uses 		Salt analysis

		<p>properties of water, heavy water;</p> <ul style="list-style-type: none"> ➤ hydrogen as a fuel 	<p>of hydrogen,</p> <ul style="list-style-type: none"> • hydrides <p>water, heavy water;</p>		
	CH-10 S- Block Elements	<ul style="list-style-type: none"> ➤ General Introduction, electronic configuration, occurrence, anomalous properties of the first element of each group, ➤ diagonal relationship, trends in the variation of properties (such as ionization enthalpy, atomic and ionic radii), ➤ trends in chemical reactivity with oxygen, water, hydrogen and halogens, uses. 	<ul style="list-style-type: none"> • Anomalous properties of the first element of each group, • diagonal relationship, trends in the variation of properties (such as ionization enthalpy, atomic and ionic radii), trends in chemical reactivity with oxygen, water, hydrogen and halogens, uses. 	<p>Pedagogy – Crossover learning, Content attainment approach, assessment and quizzes</p> <p>Cooperative learning</p>	Salt analysis
	CH-11 P-Block Elements	<ul style="list-style-type: none"> ➤ General introduction to p-block elements ➤ Group 13 elements: General introduction, electronic configuration, occurrence, Variation of properties, oxidation states, trends in chemical reactivity, ➤ anomalous properties of first element of the group; Boron-physical and chemical properties, some important compounds: borax, boric acids, boron hydrides. 	<ul style="list-style-type: none"> ➤ Group 13 & 14 elements : General introduction, anomalous behaviour of first element, 	<p>Pedagogy – Content attainment approach, Conceptual clarity, Inquiry and discovery based learning, assessment and quizzes</p>	Salt Analysis

		<p>Aluminum: uses, reactions with acids and alkalis.</p> <ul style="list-style-type: none"> ➤ Group 14 elements : General introduction, electronic configuration, occurrence, Variation of properties, oxidation states, trends in chemical reactivity, ➤ anomalous behavior of first element, Carbon-catenation, allotropic forms, physical and chemical properties, uses of some important compounds: oxides. ➤ Important compounds of silicon and a few uses: silicon tetrachloride, silicones, silicates and zeolites & their uses. 		<p>Different minerals can be collected by the students from surroundings and identification of the shapes and colour of these crystals. All mineral (quartz,mica, zeolite) have different type of silicate unis .</p>	
CH-12 Organic chemistry -Some Basic Principles and Techniques	<ul style="list-style-type: none"> ➤ General introduction, methods of purification, methods of qualitative and quantitative analysis, ➤ classification and IUPAC nomenclature of organic compounds ➤ Electronic displacements in : a covalent bond Inductive effect, electromeric effect, resonance and hyper conjugation. ➤ Homolytic and heterolytic fission of a covalent bond : free. radicals, carbocation and carbanion; electrophiles and nucleophiles, types of organic reactions. 	<ul style="list-style-type: none"> ➤ General introduction, methods of purification methods of qualitative and quantitative analysis, ➤ classification and IUPAC nomenclature of organic compounds ➤ Electronic displacements in : a covalent bond ,Homolytic and heterolytic fission of a covalent bond : free. radicals, carbocation and carbanion; electrophiles and 		Salt Analysis	

			nucleophiles, types of organic reactions.		
	<p>CH-13</p> <p>Hydrocarbons</p>	<ul style="list-style-type: none"> ➤ Classification of hydrocarbons Alkanes - Nomenclature, Isomerism conformation (chemically) physical properties, chemical reactions ➤ Alkenes - Nomenclature, structure of double bond (ethyne) geometrical isomerism, physical properties, 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, methods of preparation; chemical reactions: acidic character of alkynes, ➤ addition reaction of hydrogen, halogen, hydrogen halides and water. ➤ Introduction, IUPAC Nomenclature, Benzene, resonance, Aromaticity, Chemical Properties; Mechanism of electrophilic substitution ; Nitration, sulphonation, Halogenation, Friedel Craft Reactions, Directive influence of functional group in monosubstituted benzene, Carcinogenicity and toxicity 	<ul style="list-style-type: none"> • Alkanes - Isomerism conformation, physical & chemical properties including free radical, • mechanism of halogenation, combustion and pyrolysis. • Alkenes -structure of double bond (ethene) geometrical isomerism, methods of preparation; physical & chemical properties, addition of reactions (Markovnikov's addition and peroxide effect),. • Alkynes - Nomenclature, structure of triple bond (ethyne), methods of preparation; physical & chemical properties, acidic character of alkynes, addition reactions 	<p>Pedagogy-</p> <p>Mechanism of reactions by using audiovisual aids</p>	<p>Salt Analysis</p>

Sports Integrated Activity__ In competitive sports some athletes use performance enhancing drugs which is unethical. These drugs act on the central nervous system to modulate mental function and behaviour, increasing an individual's sense of excitement and decreasing the sense of fatigue. Students are to find the names of such drugs with chemical name and formula, adverse effect etc.

REFERENCE BOOKS-NCERT CLASS XI (Part-1 &Part-2)

PRADEEP NEW COURSE CHEMISTRY CLASS XI (Vol & Vol II)

COMPREHENSIVE PRACTICAL CHEMISTRY CLASS XI