DEPARTMENT OF SCHOOL EDUCATION

TAMIL NADU

Syllabus

2020 - 21

STANDARD - 11

QB365-Question Bank Software

State Council of Educational Research and Training
Chennai 600 006

SYLLABUS 2020-2021

STANDARD: 11 SUBJECT : CHEMISTRY

UNIT	CONTENT	
1. Basic Concepts of Chemistry and Chemical Calculations	1.4	Mole Concept
	1.4.1	Avogadro Number
	1.4.2	Molar Mass
	1.4.3	Molar volume
	1.5	Gram Equivalent Concept
	1.5.1	Equivalent Mass of Acids, Bases,Salts, Oxidising Agents and Reducing Agents
	1.6	Empirical Formula and Molecular Formula
	1.6.1	Determination of Empirical Formula from Elemental Analysis Data
	1.6.2	Calculation of Molecular formula from Empirical Formula
	1.7	Stoichiometry
	1.7.1	Stoichiometric Calculations Calculations based on Stoichiometry
	1.7.2	Limiting Reagents
	1.8	Redox Reactions
	1.8.1	Oxidation Number
		Rules to calculate Oxidation Number
		Calculation of oxidation number using the above rules
		Redox reactions in terms of Oxidation Number
2. Quantum Mechanical Model of Atom	2.1	Introduction to atom model
	2.1.1	Bohr atom model
	2.1.2	Limitations of Bohr's atom
	2.2	Wave particle duality of Matter
	2.2.1	Quantisation of angular momentum and De-Broglie Concept
	2.2.2	Davison and Germer Experiment
	2.3	Heisenberg Uncertainty Principle

	2.5	Quantum numbers
		Principal quantum number (n)
		Azimuthal quantum number (l) or subsidiary quantum number
		Magnetic quantum number (m)
		Spin quantum number (s)
	2.5.1	Shapes of atomic orbitals and its diagrams only
	2.5.2	Energies of orbitals
	2.6	Filling of orbitals
	2.6.1	Aufbau principle
	2.6.2	Pauli's Exclusion Principle
	2.6.3	Hund's rule of maximum multiplicity
	2.6.4	Electronic Configuration of atoms
	2.6.5	Stability of half filled and completely filled orbitals
		Symmetrical distribution of electron
		Exchange energy
3. Periodic Classification of Elements	3.2.1	Modern Periodic Table
	3.3	Nomenclature of Elements with Atomic Number Greater than 100
	3.4	Grouping of Elements based on Electronic Configurations
	3.4.1	Variation of Electronic Configuration along the periods
	3.4.2	Variation of Electronic Configuration in the Groups
	3.5	Periodic Trends in Properties
	3.5.1	Atomic radius
	3.5.2	Ionic radius
	3.5.3	Ionisation energy
	3.5.4	Electron Affinity
	3.5.5	Electro negativity:
	3.6	Periodic trends in chemical properties
	3.6.1	Anomalous properties of second period elements: Diagonal Relationship
	3.6.2	Periodic Trends and Chemical Reactivity:

4. Hydrogen	4.1	Introduction
	4.1.1	Position in Periodic Table
	4.1.2	Isotopes of Hydrogen
	4.1.3	Ortho and Para - Hydrogen:
	4.2.3	Preparation of Deuterium: Electrolysis of heavy water:
	4.2.4	Preparation of Tritium:
	4.3.3.	Chemical properties Deuterium
	4.3.4	Properties of Tritium
	4.5	Compounds of Hydrogen
	4.5.1	Water
	4.5.4	Hard and Soft Water Temporary Hardness and its removal: Permanent Hardness:
	4.6	Heavy Water:
	4.6.1	Chemical properties of heavy water:
	4.6.2	Uses of heavy water:
	4.8	Hydrides
		Ionic (Saline) hydrides:
		Covalent (Molecular) hydrides:
		Metallic (Interstitial) hydrides:
5. Alkali and Alkaline earth metals	5.1	s-block elements
	5.2	Alkali metals:
	5.2.1	General characteristics of alkali metals:
	5.2.2	Distinctive behaviour of lithium
	5.2.3	Chemical properties of alkali metals
	5.2.4	Uses of alkali metals:
	5.3	General characteristics of the compounds of alkali metals
	5.5	Alkaline earth metals
	5.5.1	General characteristics of alkaline earth metals Physical state
	5.5.2	Distinctive behavior of beryllium
	5.5.3	Chemical properties of alkaline earth metals
	5.5.4	Uses of alkaline earth metals such as Mg,Ca
	5.6	General characteristics of the compounds of the alkaline earth metals
	5.6.4	Plaster of paris preparation and uses

6. Gaseous State	6.1	Introduction
	6.2	The Gas Laws
	6.2.1	Boyle's law : Pressure volume relationship
	6.2.2	Charle's law volume - temperature relationship
	6.2.3	Gay - Lussac's law (pressure temperature relationship)
	6.2.4	Avogadro's Hypothesis
	6.3	Ideal gas equation
	6.4	Mixture of gases - Dalton's law of partial pressure
	6.4.1	Graham's law of diffusion
7. Thermodynamics	7.1	Introduction
	7.2	System and Surroundings
	7.2.1	Types of System
	7.2.2	Properties of System
	7.2.3	Thermodynamic Processes
	7.3	Zeroth law of Thermodynamics
	7.4	First Law of Thermodynamics
	7.4.1	Mathematical Statement of the First law
	7.5	Enthalpy
	7.5.1	Relation between enthalpy 'H' and 'U' Internal energy
	7.5.2	Enthalpy changes for different types of reactions and phase transitions;
	7.6	Thermochemical equations Heat of Combustion
	7.8	Hess's law of constant heat summation
	7.9	Lattice energy Born Haber Cycle
	7.10	Need for second Law Second law of Thermodynamics
		Spontaneity and Randomness
		Standard Entropy Change
		Standard Entropy of formation
		Entropy change accompanying change of phase
	7.11	Gibbs Free Energy
	7.11.1	Criteria for spontaneity of a process
	7.12	Third law of Thermodynamics

8. Physical and Chemical Equilibrium	8.3	Chemical equilibrium
	8.4	Dynamic nature of equilibrium
	8.5	Homogeneous and heterogeneous equilibria
	8.5.1	Homogeneous equilibrium
	8.5.2	Heterogeneous equlibrium
	8.6	Law of mass action
	8.6.1	Equilibrium constant (Kp and Kc)
	8.6.2	Relation between Kp and Kc
	8.6.3	Equilibrium constants for heterogeneous equilibrium
	8.7	Application of equilibrium constant
	8.7.1	Predicting the extent of a reaction
	8.7.2	Predicting the direction of reaction
	8.7.3	Calculation of concentration of reactants and products at equilibrium only HI ,PCl_5
	8.8	Le-chatelier's principle
	8.8.1	Effect of concentration
	8.8.2	Effect of pressure
	8.8.3	Effect of temperature
	8.8.4	Effect of catalyst
	8.8.5	Effect of inert gas
9. Solutions	9.1	Introduction
	9.2	Types of Solutions
	9.3	Expressing Concentration of solutions
	9.3.1	Standard solutions and working standard
	9.3.2	Advantage of using standard solutions
	9.4	Solubility of the solutes
	9.4.1	Factors influencing the solubility
	9.5	Henry's Law
	9.5.1	Limitations of Henry's law
	9.6	Vapour pressure of Liquid
	9.7	Vapour pressure of Liquid Solutions

	9.7.1	Vapour pressure of binary solution of liquids in liquid
	9.7.2	Vapour pressure of binary solution of Solids in liquid
	9.8	Ideal and non ideal solutions
	9.8.1	Ideal solution
	9.8.2	Non ideal Solutions
	9.9	Colligative properties
		Relative lowering of vapour pressure
		Elevation of boiling point
		Depression in freezing point
		Osmosis and Osmotic pressure
10. Chemical Bonding	10.1	Introduction
	10.1.1	Kossel - Lewis approach to chemical bonding & Octet rule
	10.2	Types of Chemical Bonds
	10.2.1	Covalent bonds
	10.2.2	Representing a covalent bond by Lewis dot structure
	10.2.3	Formal charge
	10.2.4	Lewis structure for exception to octet rule
	10.3	Ionic (or) Electrovalent bond
	10.5	Bond Parameters
	10.5.1	Bond length
	10.5.2	Bond order
	10.5.3	Bond angle
	10.5.4	Bond enthalpy
	10.5.5	Resonance
	10.5.6	Polarity of bonds Partial ionic character in covalent bond
	10.6	VSEPR Theory and its applications
	10.7	Valence Bond Theory
	10.7.1	Salient features of VB Theory
	10.8	Orbital Overlap
	10.8.1	Sigma and pi bonds
	10.8.2	Formation of H_2, HF, F_2, O_2.molecules

	10.9	"Hybridisation
	10.9.1	Types of Hybridisation Sp, sp^2, sp^3
		Bonding in Ethylene
		Bonding in Acetylene"
	10.10	Molecular Orbital Theory Salient features
	10.10.1	Linear Combination of atomic orbitals
	10.10.2	Bonding in some Homonuclear diatomic molecules H_2, Li_2, B_2, C_2, N_2, O_2
	10.10.3	Molecules and CO_2, NO_2 molecules
11. Fundamentals of Organic Chemistry	11.1	Introduction
		Characters of organic compounds
	11.2	Classification of organic compounds
	11.2.1	Based on structure
	11.2.2	Classification based on Functional groups
	11.3	Nomenclature of organic compounds
	11.3.1	IUPAC Rules for Nomenclature of organic compounds
	11.5	ISOMERISM in organic compounds
	11.5.1	Constitutional Isomerism
	11.5.2	Sterio Isomerism
	11.5.3	Geometrical Isomerism
	11.5.4	Optical Isomerism
12. Basic Concepts of Organic Reactions	12.1	Introduction
	12.1.1	Fundamental concepts or Organic reaction mechanism
	12.1.2	Fission in covalent bond
	12.1.3	Nucleophiles and Electrophiles
	12.1.5	Electron displacement effects in covalent bond
13. Hydrocarbons		Introduction
	13.1	Introduction and classification of alkanes
	13.2.1	Preparation of alkanes
	13.2.2	Physical properties
	13.2.4	Chemical properties
	13.3.1	General method of preparation of Alkenes
	13.3.2	Physical properties of Alkenes

	13.3.3	Chemical properties of Alkenes (No Mechanisms)
	13.3.4	Uses of Alkenes
	13.5	Aromatic Hydrocarbons
	13.5.2	Aromaticity
	13.5.3	Structure of Benzene
	13.5.4	Sources and preparation of Benzene
	13.5.5	Physical properties
	13.5.6	Chemical properties of Benzene compounds
	13.5.7	Directive influence of functional group and mono substituted Benzene
14. Haloalkanes and Haloarenes	14.1	Introduction
	14.2	Classification of organic Halogen compounds
	14.3	Haloalkanes
	14.3.1	Nomenclature
	14.3.2	Nature of C - X bond in haloalkane
	14.3.3	Haloalkanes preparation
	14.3.4	Physical Properties
	14.3.5	Chemical Properties of Haloalkanes
	14.3.6	Uses of Haloalkane
	14.4	Organo Metallic Compounds
	14.4.1	Preparations
	14.4.2	Uses of Grignard Reagents
	14.5	Haloarenes
	14.5.1	Nomenclature of Haloarenes
	14.5.2	Nature of C - X bond in haloarenes
	14.5.3	Methods of Preparation
	14.5.4	Physical Properties
	14.5.5	Chemical Properties
	14.5.6	Uses of choloro benzene

PRACTICAL

STANDARD: 11	SUBJECT : CHEMISTRY
Sl.No	Topic
Salt Analysis	
1	Lead Nitrate
2	Copper Sulphate
3	Ferric Chloride
4	Zinc Sulphide
5	Aluminium Nitrate
6	Calcium Carbonate
7	Ammonium Bromide
8	Magnesium Phosphate