



BHAVAN'S BHAGWANDAS PUROHIT VIDYA MANDIR, NAGPUR CURRICULUM PLAN (2019-20)

STD: XI SUBJECT : CHEMISTRY

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BHAVAN'S B.P. VIDYA MANDIR, NAGPUR

CURRICULUM PLAN

SESSION: 2019-2020

SUBJECT: CHEMISTRY

STD: XI

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BHAVAN'S J.P. VIDYA MANDIR, NAGPUR
CURRICULUM PLAN 2019-2020
SUBJECT :- CHEMISTRY
STD :- XI

MONTH	WEEKLY DATES	NO. OF PERIODS	TOPICS	SUB TOPICS	PERIODS REQUIRED	PRACTICALS/ EDUCOMP MODULES	ASSIGNMENTS / EVALUATION	LEARNING OUTCOMES
June	4th week 18-22	6	1. SOME BASIC CONCEPTS OF CHEMISTRY	Importance and scope of chemistry	1	Practicals: Crystallisation	Extra questions are discussed based on the concept taught	Students will be able to: Understand the properties of matter, explain various Laws of chemical Combination and .Daltons atomic theory.
				Nature of matter	1			
				Laws of chemical combination	1	Educomp Module: Laws of chemical combination		
				Dalton's atomic theory	1	Mole concept and molar masses		
				Concepts of elements, atoms and molecules	1			
				Atomic and molecular masses	1			
				Mole concept and molar masses	1			
				Percentage composition	1			
June	5th week 24-29	7	1. SOME BASIC CONCEPTS OF CHEMISTRY	Empirical and molecular formula	1	Educomp Module: Bohr's atomic model	Extra questions are discussed based on the concept taught	Students will be able to: Understand Mole concept and determine empirical and molecular formulae of compounds.
				Chemical reactions	1			Perform the stoichiometric calculations
				Stoichiometry and calculations based on stoichiometry	2			They will understand the importance of Bohr's atomic model
				Bohr's model and its limitations	1			
			2. STRUCTURE OF ATOM	Concept of shells and subshells	1			
				Dual nature of matter and light	1			

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July	1st week 1-6	7	2. STRUCTURE OF ATOM	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 orbital- Aufbau principle, Pauli exclusion principle and Hund's rule Electronic configuration of atoms stability of half-filled and completely filled orbitals	1 1 1 1 1	Educomp Module: Dual nature of matter, Shapes of s, p and d orbitals Practicals: Melting point (2 expts)	Assignment sheet for chap 2 is discussed.	Understand nature of electromagnetic radiation and Planck's quantum theory. State de Broglie relation and Heisenberg uncertainty principle. Define atomic orbitals in terms of quantum numbers. State Aufbau principle, Pauli exclusion principle and Hund's rule
July	2nd week 8-12	6	2. STRUCTURE OF ATOM 3. CLASSIFICATION OF ELEMENTS & PERIODICITY IN PROPERTIES	Exercise Modern periodic law and the present form of periodic table Periodic trends in properties of elements -atomic radii, ionic radii, inert gas radii, Ionization enthalpy, electron gain enthalpy, electronegativity, valency. Nomenclature of elements with atomic number greater than 100	1 1 1 1 1	Educomp Module: Periodic table Practicals: Boiling point(2 expts)	Assignment sheet for chap 3 is discussed.	Students will understand the periodic law, significance of atomic number and electronic configuration as the basis for periodic classification. Classify elements into s, p, d, f blocks; Recognise periodic trends; compare reactivity of elements; explain relationship between ionisation enthalpy and metallic character and understand and apply electronegativity and electron gain enthalpy

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July	3rd week 15-20	7	4. CHEMICAL BONDING AND MOLECULAR STRUCTURE	Valence electrons, ionic bond, covalent bond Bond parameters Lewis structure Polar character of covalent bond, covalent character of ionic bond Valence bond theory, Resonance	1 2 1 1 1 1	Practicals: Volumetric analysis (2 expts) Educomp Module: Resonance	Extra questions are discussed based on the concept taught	Differentiate between ionic and covalent bonds, draw Lewis structure for various covalent molecules. Apply bond parameters in understanding dissociation enthalpy and shapes of molecules Explain VBT and predict directional properties of covalent bonds
July	4th week 22-27	7	4. CHEMICAL BONDING AND MOLECULAR STRUCTURE	Geometry of covalent molecules, VSEPR theory Concept of hybridization, involving s, p and d orbitals and shapes of some simple molecules	2 2 3	Educomp Module: Geometry of molecules Hybridisation	Extra questions are discussed based on the concept taught	Describe VSEPR theory and predict geometry of molecules. Predict hybridisation and draw shapes of simple covalent molecules. Describe MOT homonuclear diatomic molecules
July	5th week 29-31	3		Molecular orbital theory of homonuclear diatomic molecules(qualitative idea only) Hydrogen bond.	2 1	Educomp Module: Molecular orbital theory Practicals: Volumetric analysis(2 expts)		
Aug	1st week 1-3	3	12. ORGANIC CHEMISTRY - SOME BASIC PRINCIPLES & TECHNIQUES	General introduction Methods of purification	1 2	Practicals: Volumetric analysis(2 expts) Educomp Module: Purification methods	Assignment sheet for chap 4 is discussed	Apply the concept of hydrogen bonding in understanding melting point, boiling point and solubility of substances. Understand and apply the techniques of purification of organic compounds.

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Aug	2nd week 2-9	5	12. ORGANIC CHEMISTRY - SOME BASIC PRINCIPLES & TECHNIQUES	Qualitative analysis Quantitative analysis	2 3	Practicals: Salt analysis Groups 0		Write reactions involved in qualitative analysis & understand the principles involved in quantitative estimation.
Aug	3rd week 13-16	3	12. ORGANIC CHEMISTRY	Classification and IUPAC nomenclature of organic compounds.	3	Practicals: Salt analysis Groups 1	Periodic test-I: 13-8-19 (Ch 1 & 2)	They will be able to name(IUPAC) and write structures of organic compounds
Aug	4th week 19-23	5	12. ORGANIC CHEMISTRY - SOME BASIC PRINCIPLES & TECHNIQUES	Electronic displacements in a covalent bond: inductive effect, Electromeric effect Resonance Hyper conjugation. Homolytic and heterolytic fission of a covalent bond: free radicals, carbocations, carbanions.	1 1 1 1 1	Educomp Modules : Electronic displacement in covalent bonds.	Application based question on inductive effect and resonance will be discussed in the class. Assignment sheet for ch- 12 is discussed.	Understand the concept of organic reaction mechanism and explain the influence of electronic displacements on structure and reactivity of organic compounds.
Aug	5th week 26-31	6	13. HYDROCARBONS	electrophiles and nucleophiles, Types of organic reactions Classification of Hydrocarbons Aliphatic Hydrocarbons: Alkanes - Nomenclature, isomerism, conformation (ethane only) Physical properties	2 1 2 1	Educomp Module: quantitative analysis of C,N, O, S,P and halogen.	Numericals based on quantitative analysis will be discussed.	Students will define and give eg. of different types of isomers. Students will be able to draw conformers of ethane

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Sept.	1st week 3-5	3	13. HYDROCARBONS	Chemical reactions including free radical mechanism of halogenation, Combustion and pyrolysis. Alkenes - Nomenclature, structure of double bond (ethene), geometrical isomerism	1 1	Practicals: Salt analysis Groups 2	Extra questions are discussed based on the concept taught	Gain knowledge about the methods of preparation & properties of alkanes and alkenes.	
Sept	2nd week 9-14	5		Physical properties, methods of preparation Chemical reactions: addition of hydrogen, halogen, water, hydrogen halides (Markownikov's addition and peroxide effect) Ozonolysis, oxidation, mechanism of electrophilic addition. Alkynes - Nomenclature, structure of triple bond (ethyne), physical properties	1 2 1 1	Practicals: Salt analysis Groups 2		Distinguish between alkanes & alkenes on the basis of their properties Apply their knowledge of chemical properties in conversions.	
Sept	3rd week 16-20	5			Revision				
HALF YEARLY EXAMS-23/09/19 TO 12/10/19									
Octo ber	3rd week 14-19	5	13. HYDROCARBONS	Methods of preparation Chemical reactions: acidic character of alkynes, addition reaction of - hydrogen, halogens, hydrogen halides and water. Aromatic Hydrocarbons: Introduction IUPAC nomenclature Benzene: resonance, Aromaticity	1 1 1	Practicals: Salt analysis Groups 3 Educomp module: Resonance in benzene	Extra questions are discussed based on the concept taught	Will be able to explain the mechanism of the addition products of alkenes & alkynes.	

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October	4th week 21-23	3	13. HYDROCARBONS	Chemical properties: mechanism of electrophilic substitution. Nitration, sulphonation, Halogenation, Friedel Craft's alkylation and acylation	1 1 1	Educomp module: Directive influence of functional group of monosubstituted benzene.		Gain knowledge on preparation & properties of aromatic compounds. Predict the directive influence of the substituents in mono substituted benzene ring.

DIWALI VACATIONS-25/10/19 TO 31/10/19

Nov	1st & 2nd week 1-6	8	5. STATES OF MATTER	Directive influence of functional group in monosubstituted benzene. Carcinogenicity and toxicity. Exercise Three states of matter, intermolecular interactions Types of bonding, melting and boiling points Role of gas laws in elucidating the concept of the molecule Boyle's law, Charles law, Gay Lussac's law, Avogadro's law,	1 2 1 1 1 2	Educomp Module: Intermolecular forces	Extra questions are discussed based on the concept taught	Students will understand the types of intermolecular forces.
Nov	3rd week 11-16	5	5. STATES OF MATTER	Ideal behaviour, empirical derivation of gas equation Avogadro's number, ideal gas equation, Kinetic theory. Deviation from ideal behaviour	1 2 2	Educomp Module: Andrews experiment on liquefaction of CO ₂	Extra questions are discussed based on the concept taught	They will be able to write postulates of kinetic theory of gases.
Nov	4th week 18-23	7	5. STATES OF MATTER contd..	Liquefaction of gases Critical temperature, kinetic energy and molecular speeds (elementary idea) Liquid State: vapour pressure, viscosity and surface tension	2 3 2	Practicals: Salt analysis Groups 4	Periodic test-2 date-18/11/19 Ch-13& Ch-5 (including-5.7)	They will understand the properties of liquids like surface tension and viscosity. Also learn about Critical

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				(qualitative idea only, no mathematical derivations)			Assignment sheet for ch 5 is discussed	temperature, kinetic energy and molecular speeds.
Nov	5th week 25-30	2	6.THERMODYNAMICS	Concepts of System and types of systems, surroundings Work, heat, energy	1 1	Educomp Module: System and Surroundings	Extra questions are discussed based on the concept taught	Students will be able to define system, surrounding, work, heat energy
Dec	1st week 2-7	7	6.THERMODYNAMICS(contd..)	Extensive and intensive properties state functions. First law of thermodynamics -internal energy and enthalpy Heat capacity and specific heat Measurement of AU and AH Hess's law of constant heat summation Enthalpy of bond dissociation, combustion, formation, atomization, sublimation, phase transition, ionization, solution and dilution.	1 1 1 1 2	Practicals: Salt analysis Groups 5	Application based questions will be given as assignment.	Students will be able to define extensive and intensive properties and give examples, define internal energy, enthalpy, and heat capacity State and apply Hess's law of constant heat summation. Calculate enthalpy changes for various types of reactions.
Dec	2nd week 9-14	7	6.THERMODYNAMICS(contd..)	Second law of Thermodynamics (brief introduction). Introduction of entropy as a state function Gibb's energy change for spontaneous and non-spontaneous processes Criteria for equilibrium Third law of thermodynamics (brief introduction).	1 1 1 1 1	Practicals: Salt analysis Groups 6		Explain entropy and apply it to predict the spontaneity of reaction. Will be able to relate Gibb's energy and spontaneity and also equilibrium constant State II and III law of thermodynamics.

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			7 EQUILIBRIUM	Exercise Equilibrium in physical processes Equilibrium in chemical processes and dynamic nature of equilibrium	1 1	Educomp module: Equilibrium in physical processes		State the law of equilibrium and understand its dynamic nature in physical and chemical processes
Dec	3rd week 16-20	3	7 EQUILIBRIUM (contd..)	Law of mass action Equilibrium constant Factors affecting equilibrium- Le Chatelier's principle	1 1 2 3			.Quote examples to explain equilibrium. List the characteristics of equilibrium. Explain various factors that affect equilibrium

CHRISTMAS VACATION-23/12/19 TO 01/01/2020

Jan	1st week 2-4	3	7 EQUILIBRIUM contd....	ionic equilibrium- ionization of acids and bases	3		Extra questions are discussed based on the concept taught	Apply the formula in solving numericals. Classify acids and bases as weak or strong in terms of ionisation constants. Describe pH scale. Apply the knowledge of buffer solutions in practicals.
Jan	2nd week 6-10	5	7 EQUILIBRIUM contd....	Strong and weak electrolytes Degree of ionization Ionization of poly basic acids Acid strength, concept of pH Henderson Equation	1 1 1 1 1	Practicals: pH experiments of acids & bases of different strengths.		Calculate solubility product constant and apply in qualitative analysis of salt.

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Jan	3rd week 13-18	5	7.EQUILIBRIUM contd...	Hydrolysis of salts (elementary idea) Buffer solution Solubility product Common ion effect (with illustrative examples). Exercise	1 2 1 1 1	Practicals: Shift in equilibrium of $\text{Fe}(\text{CNS})_3$ –Effect of concentration	Assignment sheet for chap 7 is discussed	Explain common ion effect and its application.
Jan	4th week 20-25	7	8.REDOX REACTION	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	1 1 1 3 1	<i>Practicals: Change in pH of weak acid & weak base on addition of common ion</i>	Periodic test-3: 20/1/20 Ch.6 & Ch. 7 (including-7.8.5)	Define the terms oxidation, reduction, oxidant and reductant. Explain mechanism of redox reactions by electron transfer process.
Jan	5th week 27-31	6	8.REDOX REACTION (contd..) 9.HYDROGEN	Applications of redox reactions. Position of hydrogen in periodic table, occurrence, isotopes Preparation, properties and uses of hydrogen Hydrides-ionic covalent and interstitial; Physical and chemical properties of water Heavy water, hydrogen peroxide - preparation, reactions and structure and use; hydrogen as a fuel.	1 1 1 1 1 1 1	Educomp module: Structure of hydrogen peroxide.	Assignment sheet for chap 8 is discussed Exercise questions will be discussed Exercise questions will be discussed	Balance chemical equations using oxidation number and half reaction method.Apply the concepts of redox reactions in terms of titrations.

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Feb	1st & 2nd week 1-7	7	10. S-BLOCK ELEMENTS	Group 1 and Group 2 Elements 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. Preparation and Properties of Some Important Compounds: Sodium Carbonate, Sodium Chloride, Sodium Hydroxide and Sodium Hydrogencarbonate,	1 2 2 1 1	Educomp module: Properties of group 1&2.	Assignment sheet for chap 9 is discussed	Describe the general characteristics of alkali and alkaline earth metals and compounds. Understand the anomalous behaviour of lithium and beryllium
Feb	3rd week 10-15	7	10. S-BLOCK ELEMENTS	Biological importance of Sodium and Potassium. Calcium Oxide and Calcium Carbonate and their industrial uses, biological importance of Magnesium and Calcium	1	Practicals: Detection of elements	Textual questions will be discussed.	Give equation for the properties of alkali and alkaline earth metals and preparation of their compounds. Understand the biological significance of sodium, potassium, magnesium and calcium
			11.P-BLOCK ELEMENTS	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	1 1			Describe the general characteristics of group 13, 14 and 15 elements. Understand anomalous

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				Boron - physical and chemical properties, some important compounds, Borax, Boric acid, Boron Hydrides, Aluminium: Reactions with acids and alkalis, uses Group 14 Elements: General introduction, electronic configuration, occurrence, variation of properties, oxidation states Trends in chemical reactivity, anomalous behaviour of first elements. Carbon-catenation, allotropic forms, physical and chemical properties;	1 1 1			behaviour of boron carbon and nitrogen. Understand allotropic forms of carbon. Write balanced chemical equations of chemical reactions involved. List uses of group 13, 14 and 15 elements and their compounds.

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Feb	4th week 17-22	4	11.P-BLOCK ELEMENTS	Uses of some important compounds: oxides. Important compounds of Silicon and a few uses: Silicon Tetrachloride, Silicones, Silicates and Zeolites, their uses.	2	Practicals: Detection of elements	Assignment sheet on reasoning questions will be given.	Students will be able to : Correlate and compare preparation, properties and structure of elements from group 13&14
			14.ENVIRONMENTAL CHEMISTRY	Environmental pollution - air, water and soil pollution, chemical reactions in atmosphere, smog, major atmospheric pollutants, acid rain, ozone and its reactions, effects of depletion of ozone layer Greenhouse effect and global warming- pollution due to industrial wastes, green chemistry as an alternative tool for reducing pollution, strategies for control of environmental pollution. PORTION COMPLETION-17 FEB 2020	2	Educomp Module: Industrial Pollution. Acid Rain. Ozone Layer. Educomp module; Green House effect. Global Warming. Green Chemistry	Assignment sheet for chap 11 is discussed Extra questions are discussed based on the concept taught	Understand the meaning of environmental chemistry. Define the terms atmospheric pollution, global warming, green house effect, acid rain, ozone layer depletion. Identify causes of the above, suggest strategies for controlling environmental pollution. Appreciate the importance of green chemistry in day to day life.
Feb	5th week 24-29	3	Revision					

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ANNUAL EXAMINATION MARCH 02/03/20 to 19/03/20								

Note: The topics which require more periods than those allotted will be covered by taking extra classes.

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Smt. Annapoorni Shastri
Director
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BHAVANS B. P. VIDYA MANDIR
NAGPUR
CHEMISTRY STD: XI (2019-2020)

PRACTICAL SYLLABUS

1. Determination of melting point of an organic compound.
 2. Determination of boiling point of an organic compound.
 3. Crystallization of impure sample of Alum
 4. Determination of pH of some solutions of known and varied concentrations of acids, bases pH paper or universal indicator.
 5. Study the pH change by common-ion in case of weak acids and weak bases.
 6. Study the shift in equilibrium between ferric ions and thiocyanate ions by increasing/decreasing the concentration of either of the ions.
 7. Using a chemical balance preparation of standard solution of Oxalic acid.
 8. Determination of strength of a given solution of Sodium Hydroxide by titrating it against standard solution of Oxalic acid.
 9. Determination of strength of a given solution of Hydrochloric acid by titrating it against standard Sodium Carbonate solution.
 10. Qualitative Analysis
 - (a) Determination of one anion and one cation in a given salt
- Cations- Pb^{2+} , Cu^{2+} , Al^{3+} , Fe^{3+} , Mn^{2+} , Ni^{2+} , Zn^{2+} , Ca^{2+} , Ba^{2+} , Mg^{2+} , NH_4^+
- Anions – CO_3^{2-} , Cl^- , NO_3^- , SO_4^{2-}

(Note: Insoluble salts excluded)

(b) Detection of -Nitrogen, Sulphur, Chlorine in organic compounds.

PROJECT

Scientific investigations involving laboratory testing and collecting information from other sources as given in the lab manual or any other investigatory project, which involves about 10 periods of work, can be chosen with the approval of the teacher.

XI Chemistry **Portion for Examinations 2019-20**

Periodic test 1 (13-08-2019)

Chapter 1 Some Basic concepts of Chemistry -10M
Chapter 2 Structure of Atom –15M

Periodic test 2 (18-11-2019)

Chapter 13 Hydrocarbons-15M
Chapter 5 States of matter (Including 5.7-Postulates of kinetic theory) -10 M

Periodic test 3 (20-01-2020)

Chapter 6 Thermodynamics -15 M
Chapter 7 Equilibrium (including 7.8.5-Effect of a catalyst) – 10 M

Half Yearly Examination (23-09-19 to 20-10-19)

Chapter-1(9M), Chapter-2(18M), Chapter-3(12M)
Chapter -4(18M), Chapter-12(13M)

PRACTICAL

1. Determination of Melting Point of the given organic sample.
2. Determination of Boiling Point of the given organic sample.
3. Preparation of crystals of Alum.
4. Volumetric Analysis- a) Determination of the strength of NaOH by titrating against standard oxalic acid.
b) Determination of the strength of HCl by titrating against standard Sodium carbonate solution.
5. Salt Analysis –Groups 0,1,2 and all acid radicals.

ANNUAL PROMOTION EXAMINATION (02-03-20 to 19-03-20)

(Theory & Practicals) Course & Marks Distribution as per Board Pattern