

SEVADAL MAHILA MAHAVIDYALAYA

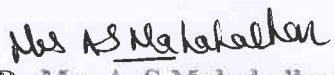
NAME OF LECTURER - **Dr. Mrs. A. S. MAHAKALKAR**

Proposed Teaching Plan of B.Sc. Sem-I Paper-I (Inorganic Chemistry) for the academic year 2021-22

Month	No. of Periods	Unit No.	Topic to be Taught	Other activities
October	12	I	A) Atomic Structure:- Idea of De Broglie matter wave, Heisenberg's Uncertainty Principle, Schrodinger wave Eq, Ψ & Ψ^2 significance, Quantum numbers, Shapes of s, p & d orbital, Aufbau Principle, Pauli's exclusion principles and Hunds rule of maximum multiplicity, Electronic configuration of Elements and ions.(4) B) Periodic Properties:- Atomic and ionic radii, ionization energy, electron affinity and electro negativity- Definition, trends in periodic table. (3) Factors affecting ionization potential, Pauling's & Mulliken's scale of electro negativity. Effective nuclear charge, Slater's rule Problems (2)	Assignment
November December	04 04	II	A) Ionic Bonds - Introduction to ionic bonding. w.r.to formation, Kossel Theory, Lattice energy and Born-Haber cycle. Solvation energy and solubility of ionic solids, polarizing power and polarizability of ions, Fajans rule.(4) B) Covalent bond:- V.B.T. Formation of H_2 molecule, P.E. diagram, Limitations of VBT. and Directional characteristic of covalent bond, Overlap criterion and bond strength. Bond parameters (3), Types of Hybridization and shape of inorganic molecules. Shapes of inorganic molecules (5)	Unit Test Assignment Unit Test
January	12	III	A) S-block elements:- Comparative study: Electronic configuration, atomic	Assignment

			and ionic radii, Ionization potential, Applications of s- block elements (Na,K and Ca) in biosystem. Diagonal Relationship (Li-Mg) (3). Hydrogen bonding. Classification and effect of Hydrogen bonding on viscosity, Solubility, M. pt. and B.pt. (3) B) Chemistry of Nobel gases:- Chemical properties of Nobel gases, Preparation ,Chemical Properties, Structure and bonding and applications of Xenon fluorides Structure and bonding in oxyfluorides (XeOF_2 and XeOF_4) (3)	Unit Test
			A) P-block elements- Introduction of P-block elements w.r.to following elements Hydrides:- comparative study with respect to structure of Hydrides - NH_3, PH_3, AsH_3, SbH_3. Oxides:- Structure of P_2O_3, P_2O_5 and Oxyacids of Phosphorous (H_3PO_3 and H_3PO_4) (2) Peroxyacids of Sulphur:- Preparation and structure of Caro's and Marshall's acids. Hydrides of Boron: Structure and bonding of diborane, structure of borazine. (2)	Assignment
February	02	IV	B) Food Adulteration and Detection Detection, definition, conditions of adulteration, types of adulteration Intentional, Unintentional, natural, chemical contamination, Simple tests for the detection of food adulteration in tea leaves and Coffee, spices(turmeric and chili powder, milk)	Unit Test


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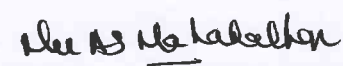
SEVADAL MAHILA MAHAVIDYALAYA

NAME OF LECTURER- Dr. Mrs A. S. Mahakalkar

Proposed Teaching Plan of B.Sc-II (Sem III) Paper-I (Inorganic Chemistry) for the academic year 2021-22

Month	No. of Periods	Unit No.	Topic to be Taught	Other activities
Sept	12	I	A) A) V.S.E. P.R. theory; structure w.r.to $H_2O, NH_3, NH_4, ClF_3, IClO_4$. Preparation, Properties and structure of S_4N_4, Inter halogen compounds, Polyhalides, Structures of I_3^-, I_5^- and $ICl_4^-(3)$ B)MO Theory: LCAO, wave equation for MO's. Difference between BMO and ABMO in terms of energy and electron density distribution curves, order of energy levels in MO, MO diagram for Homonuclear diatomic molecules of elements ($Z=1$ to 9), Concepts of NBMO in HF molecule, Coulsons MO diagram of CO and NO molecule. (6)	Assignment
Octo.	12	II	A) First transition series: Characteristic properties of elements of first transition series with respect to electronic configuration, Atomic and ionic radii, Ionization potential, Variable oxidation states(3) Magnetic properties, Colour, Complex formation tendency and catalytic activity(2) B)Second and Third transition series: electronic configuration of 4d and 5d transition series, Comparative treatment with their 3d analogous (Group Cr-Mo-W, Co-Rh-Ir) in respect of oxidation state and magnetic behaviour (4)	Unit Test Assignment Unit Test Assignment
November	12	III	A) Chemistry of Lanthanides:- Position in periodic table, electronic configuration, oxidation state, atomic and ionic radii. lanthanide contraction	

			and its consequences, complex forming tendency, occurrence and separation of lanthanides (ion exchange and solvent extraction (7) B) Chemistry of Actinides: Position in periodic table, electronic configuration, oxidation state, atomic and ionic radii, actinide contraction.	Unit Test
November December	04 12	IV	A) Errors:- Random and systematic errors, explanation of terms, accuracy and precision, uncertainty, absolute and relative error, mean, median, average and Std deviation, significant figures, problems.(3) B) Soil chemistry – Components of soil, analysis of moisture, pH, salinity, nutrients(N,P,K, micronutrients)	Assignment


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Proposed Teaching Plan of B. Sc (Sem IV) Paper-I (Inorganic Chemistry) for the academic year 2021-22

Month	No. of Periods	Unit No.	Topic to be Taught	Other activities
February	09	I	Coordination compounds: Distinction among simple salts, double salts and coordination compounds, Werners coordination theory and its experimental verification. Sidgwick's electronic interpretation, EAN rule with examples (6) Nomenclature of coordination compounds. Chelates: classification and their application, VBT of transition metal complexes (3).	Assignment
March	09	II	A) Isomerism in coordination compounds: structural isomerism and stereo isomerism in coordination compounds (2) B) Oxidation and reduction: Use of redox potential data: analysis of Redox cycle (1) Redox stability in water, Latimer diagram of Chlorine and Oxygen, Frost diagram of nitrogen and oxygen and pourbaix diagram of iron (6)	Assignment
April	08	III	A) Colorimeter and Spectrophotometer: Principles of Photometry, Beer-Lambert's law and its deviation, Types of colorimeter, Spectrophotometer with simple schematic diagrams. Applications of colorimeter, Spectrophotometer in quantitative analysis with reference to estimation of Cu (II) as Cu-ammonia complex. (4) B) Separation techniques: Chromatography: Classification, Principle, Technique and application of paper and column chromatography (2) Ion exchange: Types of ion exchange resins, Equilibrium and ion exchange capacity, Applications in separation of binary mixture.	Assignment Unit Test Assignment



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May	10	II & IV	Solvent extraction: Classification, Principle, factors affecting extraction and application in chemistry (4) A) Inorganic Polymers: Silicones: introduction, nomenclature, preparation, properties and uses, " Phosphonitrilic halide polymers: Introduction, preparation, properties and uses. Structure and bonding in $(\text{NPCl}_2)_3$ B) Water Analysis: water and its quality parameters, Physical and chemical quality parameters of drinking water. Analysis of water quality parameters (Ph, conductance, TDS, Turbidity, temporary and permanent hardness, BOD, COD, DO, Alkalinity, Chloride, Flourides, Sulphate)	Preliminary Test
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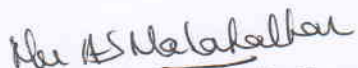
NAME OF LECTURER -- **Dr. Mrs. A. S. Mahakalkar and Mrs. A. M. Durugkar**

Proposed Teaching Plan of B.Sc. Sem-VI Paper-I (Inorganic Chemistry) for the academic year 2021-22

Month	No. of Periods	Unit No.	Topic to be Taught	Other activities
February	04+5	I	A) CFT: Limitations of VBT, CFT splitting of d-orbital in Octahedral, Tetrahedral and Square planer complexes, Factors affecting magnitude of $10Dq$, Crystal field stabilization energy of Octahedral, Tetrahedral and Square planer complexes (5) B) John teller effect , Selection rules (Laporte & Spin selection rule), hole formalism principal. Electronic spectru, of $Ti(H_2O)_6^{3+}$ and $Cu(H_2O)_6^{2+}$ complex ions: (4)	Assignment
March	12+6	II	A)Magnetic properties of Transition metal Complexes: Methods of determining of magnetic susceptibility by Gouy's method (3) Spin only formula and orbital contribution to magnetic moment Magnetic properties of Octahedral and Tetrahedral complexes with respect to CFT. Numerical on magnetic moment (3) B) Thermodynamic and kinetic aspects of metal complexes: A brief outline of thermodynamic stability of metal complexes, factors affecting the stability, determination of composition of Fe III-SSA complex by Job's and Mole ratio method (3).	Assignment Unit test
April	03+7	III	A) Colorimeter and Spectrophotometer: Principles of Photometry, Beer-Lambert's law and its deviation, Types of colorimeter, Spectrophotometer with simple schematic diagrams. Applications of colorimeter, Spectrophotometer in quantitative analysis with reference to estimation of Cu (II) as Cu-ammonia complex. (4) B)Separation techniques: Chromatography: Classification, Principle, Technique and application of paper and column chromatography (2) Ion exchange: Types of ion exchange resins,	Assignment

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May	01	IV	Equilibrium and ion exchange capacity, Applications in separation of binary mixture. Solvent extraction: Classification, Principle, factors affecting extraction and application in chemistry (4) Inorganic Polymers: Silicones: introduction, nomenclature, preparation, properties and uses, General introduction to silicon oils, silicon elastomers and silicon resins (6). Phosphonitrilic halide polymers: Introduction, preparation, properties and uses. Structure and bonding in $(\text{NPCl}_2)_3$ and $(\text{NPCl}_2)_4$ (4)	Revision Assignment Preliminary Exam
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