Amrut Sevabhavi Sanstha's Parbhani

Late Ku. Durga K. Banmeru Science College, Lonar Dist- Buldana

Department of Chemistry Teaching Plan Session-2017-18 B.Sc.-Ist Semester-Ist

Name of Faculty:- Mr. Suryakant B. Borul

No.	Month		Topics Names	Required	
1		A) Electronic displacements:	vi s e s (s s missi and rippiteations)	Lecture 02	Lects
	July	B) Reactive Intermediates:	g-services out of the redections,	02	
		C) Aliphatic Hydrocarbon:	Alkanes- Methods of formation: i) Wurtz reaction and ii) Corey-House reaction, reactions i) Halogenation mechanism ii) Aromatisation.	03	14
			Alkenes Method of formation mechanism- i) dehyhrogenation of alkyl halides (E ₁ & E ₂) ii) Dehydration of alcohols.	02	
and the same of th			Reactions-Electrophilic and free radical addition of HX and X_2 (with mechanism)	01	
			Alkynes- Preparations from vicinal and germinal dihalides, Reaction-Hydrogenation.	02	
			Alkadienes: -Classification 1, 3-Butadiene- Preparation from cyclohexene, reactions-Addition of H ₂ , Br ₂ & HBr	02	
2		Aromatic Hydrocarbons	Introduction, Nomenclature and Isomerism of Aromatic Compounds.	02	
	Aug	A)	Structure of Benzene of Benzene : Kekule structure and Molecular orbital structure.	02	
		ediplica i	Aromaticity and Huckel's rule Aromatic,	02	
	1	3)	antiaromatic and non-aromatic system Mechnism of Electrophilic Aromatic Substitution:-	02	14
	()	Nitration, Friedal Craft Alkylation and Acylation. Nuclear and side chain halogenations, Birch reduction.	01	
	ı))	Orientation:- Effect of substituent group. Activating and deactivating group. Theory of reactivity and orientation on the basis of inductive and resonance effects (-CH ₃ , -OH, -NO ₂ and -Cl group).	02	

Sr.	Mont	h Name of Unit	Topics Names	Requ. Lect.	Total Lects.
No. 3	5.13	A] Periodic Properties:	Atomic and ionic radii. Types of atomic radii. Periodic trends in atomic and ionic radii. Ionization energy, electron affinity and electronegativity.	03	
	Aug		Effect of ionization energy and electronegativity on different properties of elements namely metallic and non-metallic character, relative reactivity, oxidizing and reducing properties., Scales of electronegativity Pauling scale and Mulliken Scales. Electronegativity and partial ionic character of a covalent bond.	03	14
			Screening effect, screening constant and effective nuclear charge. Slater's rules for calcul. screening constant.	02	
		B] Ionic bonding:	Problems. Definition of ionic bond, types of cations. Factors affecting ionic bond formation. Born Lande equation to cal. lattice energy. Born-Haber's cycle to determine lattice energy	03	
			Solvation and salvation energy, factors affecting salvation energy, Det ⁿ of salvation energy. Solubility of ionic solids, lattice energy and salvation energy.	03	
2	- -	Charmodynamics	Adiabatic and Isothermal processes. Work done in Adiabatic and isothermal processes, relationship between pressure, volume and temperature.	03	
Aug			First law of Thermodynamics and its limitations, Need of Second law.	02	14
			Carnot's heat engine, derivation of expression for the work done and efficiency of Carnot's engine. Statements of Second law of thermodynamics.	03	
		I g	Concept of Entropy, Physical significance of Entropy, Derivation of expression for the Entropy change for an ideal as Entropy change for an ideal gas for isothermal, isobaric and isochoric processes,	03	
		E	Entropy of fusion, sublimation, vapourization, transition and s calculations. Entropy change as a criterion for pontaneity. Numericals.	03	

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Sr No	1		Topics Names	Requ. Lect.	
5		A] S-Block element:	reference to electronic configuration, ionisation energy, oxidation states.	03	
	Sept- Oct	B] P-Block	Reactivity and flame colouration. Diagonal relationship between Li and Mg.	02	
		element:	Comparative study of 13th, 14th and 15th group elements with reference to electronic configuration,	03	14
			ionisation energy, oxidation states. Concept of inert pair effect. Diagonal relationship between Be and Al. Structure of diamond and graphite.		
			Abnormal behaviour of nitrogen. Hydrides of boron-preparation (from BCl3 and NaBH4two), properties (action of heat, water, alkali and oxygen), structure and bonding in diborane. Carbides, types of carbides and fullerenes.	03	
6	Oct	A] Gaseous	Postulates of Kinetic theory of gases, Derivation of Kinetic gas		
		State:	equation.	02	
			RMS, Average and Most probable velocities and their relationship. Maxwell-Boltzmann distribution law of molecular velocities (only qualitative treatment), Mean free path, collision number and collision diameter.	03	
			Deviation of real gases from ideal gas behavior. Vander waal's equation of state and its derivation for real gases.	02	
			Critical phenomenon, Andrew's experiment - isotherm of CO2. Critical state, critical constant, Pc, Vc and Tc in terms of Vanderwaal's constants 'a' and 'b'. Law of Corresponding state. Numericals.		14
		BJ Phase Rule:	Statement of phase rule, explanation of phase, number of Components and degree of freedom.	02	
			Application of phase rule to water and sulfur system.	02	



Amrut Sevabhavi Sanstha's Parbhani

Late Ku. Durga K. Banmeru Science College, Lonar Dist- Buldana

Department of Chemistry
Teaching Plan Session-2017-18
B.Sc.-IIIrd Semester-Vth

A				
Name of Fac	ulty:- Mr.	Kamalakar	K.	Wayhal

r. IV 0.	Ionth	Name of Unit	Kamalakar K. Wavhal Topics Names	Requ. Lect.	
1	July	Coordination Compounds-1:	Important terms namely-molecular or addition compounds, double salts, complex ion, ligand, coordination number, central metal ion etc. Werner's theory of coordination and experimental evidences on the basis of conduction data and formation of AgCl precipitate in case of cobaltamines.	03	Lec
			Sidgwick's electronic interpretation & its drawbacks. EAN rule. IUPAC rules for nomenclature of coordination. Structural linkage & coordination isomerism in complexes.	03	
			Geometrical isomerism in octahedral complexes of type Ma4b2, Ma4bc, Ma3b3, M(AA)2b2. Square planar complexes of type Ma2b2 and Ma2bc. Optical isomerism in octahedral complexes of type Ma2b2c2, Mabcdef, M(AA)3, M(AA)2b2	03	14
		B) Chelates:	Tetrahedral complexes of type Mabcd and M(AA)2. Optical isomerism in square planar complexes. VBT as applied to structure and bonding in complexes and Magnetic properties of complexes of 3d series elements. Limitations of VB theory.	03	
		od 10. Borsky	Definition, classification & applications of chelates	02	
Ju Au		A] Crystal Field Theory (CFT):	Postulates of CFT, Crystal field splitting in octahedral, distorted octahedral, square planar tetrahedral complexes,	03	
			concept of CFSE, high spin and low spin complexes on the basis of $\Delta 0$ and pairing energy, distribution of electrons in t2g	03	
		B] Electronic	orbitals in high spin and low spin octahedral complexes. Factor affecting magnitude of CF splitting in octahedral complexes.	02	14
		Spectra of Transition Metal Complexes	Introduction to spectra, selection rules for d-d transitions, spectroscopic terms-determination of ground term symbols for d1 to d10, spectra of d1 and d9 octahedral complexes,	03	
			Orgel diagram for d1 and d9 states, electronic spectrum of $[\mathrm{Ti}(H_2O)_6]^{3+}$ complex ion. Spectrochemical series.	03	

Sr	. Mon	th Name of Unit	Topics Names	Requ. Lect.	Total Leet
3	Aug	A] Heterocyclic compounds	Nomenclature, Pyrrole: Synthesis from acetylene, succinimide and furan, Basicity, acetaldehyde, acetone, ethylene oxide & CO ₂ .	02	
			Electrophilic substitution reactions (orientation) – nitration, sulphonation, acetylation and halogenation, Molecular orbital structure.	02	14
			Pyridine: Synthesis from acetylene and pentamethylene diamine hydrochloride, Basicity, Electrophilic substitution reactions (orientation) – nitration, sulphonation, Nucleophilic	03	
		B]	substitution reactions (orientation)- with NaNH2, C6H5Li and KOH.		t. Lan
		all to	Grignard reagents: Methyl magnesium bromide- Synthesis from methyl bromide (only reaction) Synthetic applications: Electrophilic substitution reactions-formation of alkanes, alkenes, higher alkynes and other organometallic compounds,	02	
		1300 44	Nucleophilic substitution reactions- Reaction with aldehydes & ketones, ethylene oxide, acetyl chloride, methyl cyanide & CO ₂ .	02	
		7	Methyl lithium-Synthesis and reaction with water, formaldehyde, acetaldehyde, acetone, ethylene oxide and CO ₂ .	03	
	Aug- Sept		Classification on the basis of structure and mode of application, Preparation and uses of Methyl orange,	03	
		1	Crystal violet, Phenolphthalein, Alizarin and Indigo. Analgesic and antipyretics: Synthesis and uses of othenylbutazone. Sulpha drugs: Synthesis and uses of sulphanilamide and sulphadiazine.	02	
		I	Antimalarials: Synthesis of chloroquine from 4,7-lichloroquinoline and its uses.	02	
		C] Pesticides:	nsecticides: Synthesis and uses of malathion. Herbicides: Synthesis and uses of 2,4-dichloro phenoxy acetic acid (2,4-D)	03	
		F	Fungicides: Synthesis and uses of thiram (tetramethyl thiuram lisulphide	02	

Sr. No.		Name of Unit		Requ. Lect.	Total Lect.
5	Sept- Oct	Photochemistry	(i) Photochemical and thermal reactions. (ii) Lambert's law - Statement and derivation.	02	Dett.
			Beer's law - Statement and derivation. Reasons for deviation from Beer's law. (iii) Laws of photochemistry.	02	
			(iv) Quantum yield of photochemical reaction. Reasons for high and low quantum yield. Experimental determination of quantum yield. Photosensitized reaction.	02	
			(v) Kinetics of photochemical decomposition of HI. (vi) Fluorescence and Phosphorescence.	02	
			Selection rule for electronic transition. Internal conversion and inter-system crossing. Explanation of fluorescence and phosphorescence on the basis of Joblonski diagram	03	
			(vii) Chemiluminescence and Bioluminescence with examples. (viii) Numericals.	03	
6	Oct	Molecular Spectroscopy	(i) Electromagnetic radiation, characteristics of electromagnetic radiation in terms of wavelength, wave number, frequency and energy of photon. Spectrum of electromagnetic radiation. (ii) Types of spectra - Emission and absorption spectra, atomic and molecular spectra, line and band spectra		
			(iii) Translational, vibrational, rotational and electronic motion. The degree of freedom in each motion. (iv) Energy level diagram of a molecule indicating electronic, vibrational and rotational transitions. (v) Condition for pure rotational spectrum, selection rule for rotational transition.		
			Derivation of expression for moment of inertia of a diatomic rigid rotor. Isotope effect. Applications of microwave spectroscopy for the determination of moment of inertia and	:	
			bonding. (vi) Condition for exhibiting vibrational spectra (i.e. IR active molecule),		
			selection rule for vibrational transition. Vibrational energy levels of a simple harmonic oscillator. Zero point energy position of a spectral line. Determination of force constant of a covalent bond.		
			(v) Raman effect - Raman's spectrum of a molecule. Condition for exhibiting Raman spectrum (i.e. Raman active molecule), selection rule for rotational transitions.	20	
			Pure rotational spectrum of diatomic molecule, vibrational Raman spectrum of a diatomic molecule. (vii) Numericals.	02	
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Incharge Teacher Wavhal Kamalakar K.

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Late Ku. Durga K. Banmeru Science College, Lonar Dist- Buldana

Department of Chemistry Teaching Plan Session-2017-18 B.Sc.-IInd Semester-IIIrd

Name of Faculty:-Mr. Shivshankar P. More

Sr. No.	Month	Name of Unit	Topics Names	Requ. Lecture	
1	June- July	A] Aldehydes and Ketones:	Preparation of acetaldehyde from ethanol, ethylidene chloride and acetylene. Preparation of benzaldehyde from benzene (Gattermann-Koch reaction) and toluene.	02	
			Preparation of acetone from isopropyl alcohol, isopropylidene chloride and propyne. Preparation of acetophenone from benzene and ethyl benzene.	02	
			Structure of carbonyl group, acidity of á-hydrogen in carbonyl compounds. Reactions of aldehydes &/or ketones: Cannizaro's,	02	
			Reformatsky, Perkin with mechanism, Mannich reaction, Benzoin and Aldol condensations. Clemmensen, Wolf- Kishner, MPV and LiAlH4 reductions.	02	
		B] Carboxylic acids:	Structure and reactivity of carboxylic groups. Acidity of carboxylic acids, effects of substituents on acids strength. Oxalic acid: Preparation from ethylene glycol and cyanogen. Reactions: Reaction with ethyl alcohol, ammonia, glycerol and action of heat. Lactic acid: Preparation from acetaldehyde and pyruvic acid.	02	14
			Reactions: Reaction with ethanol,PCl ₅ , action of heat, oxidation and reduction. Benzoic acid: Preparation from toluene, benzyl alcohol, phenyl cyanide and benzamide.	02	
			Reactions: Reaction with ethanol, PCl ₅ and ammonia. Salicylic acid: Preparation by Reimer-Tiemann reaction. Reactions: Reaction with CH ₃ COCl, CH ₃ OH and C ₆ H ₅ OH.	02	
2	July	A] Optical isomerism:	Element of symmetry, chirality, asymetric carbon atom, enantiomers, diastereoisomers,	02	
			relative and absolute configurations, DL and RS nomenclature, racemisation and resolution.	02	
		B] Geometrical	Cis-trans & <i>E-Z</i> nomenclature, Methods of structure determination.	03	
1350		isomerism: C]	Bayer's Strain theory and its limitations. Stability of cycloalkanes, conformational isomers of ethane	03	14
		Conformational isomerism:	conformational isomers of, n-butane & cyclohexane, their energy level diagrams.	02	
		de la compete de	Newman & Sawhorse projection formulae.	02	

Sr. Vo.	Month	Name of Unit	Topics Names	Require
3	Aug	A] Covalent Bonding:	Molecular Orbital Theory. Postulates of MO theory. LCAO approximation. Formation of bonding and antibonding MOs. Rules for LCAO. MO energy level diagram. MO structure of homonuclear diatomic molecules of namely He ₂ , H ₂ , N ₂ and O ₂ . Stability sequence of species of O2	Lect. L
		B] Metallic Bonding:	Paramagnetic nature of O2. MO structure of heteronuclear diatomic molecules viz. NO, HF &CO. properties of CO viz. – triple 15 16 bond, almost nonpolar nature, edonor & acceptor behaviour. Comparison of VB and MO theories.	03
			Free electron theory and properties of metals such as electrical and thermal conduction, malleability, ductility and metallic lusture. VB theory or Resonance theory of metals. Band theory to explain nature of conductors, insulators and semiconductors.	03
		C]	Various rules under VSEPR theory to explain molecular geometry various rules- BeCl ₂ , BF ₃ , CH ₄ , NH ₄ + , PCl ₅ , SF ₆ , IF ₇ , SnCl ₂ , NH ₃ , H ₂ O, SF ₄ ,	03
		VSEPR Theory:	Various rules under VSEPR theory to explain molecular geometry Limitations of VSEPR theory.	02
	Aug-	Theory of Quantitative Inorganic Analysis	(a) Introduction:-Volumetric analysis, titrant, titrate, end point, equivalence point, indicator etc. Requirements of volumetric analysis. Definition of standard solution, primary standard substance.	02
		A] Volumetric Analysis:	Terms to express concentrations namely- molarity, normality, molality, mole fraction and percentage. (b) Acid-Base titrations:- Types of acid base titrations. pH variations during acid base titration. Acid base indicators. Choice of suitable indicators for different acid base titrations.	02
			(c) Redox Titrations:-Pinciples involved in redox titrations. Brief idea about use of KMnO ₄ , K ₂ Cr ₂ O ₇ as oxidants in acidic medium in redox titrations.	02
		B] Gravimetric	Use of I_2 in iodometry & iodimetry. Redox indicators-external & internal indicators. iodometric estimation of Cu (II).	02
		Analysis:	Definition. Theoretical principles underlying various steps involved in gravimetric analysis with reference to estimation of barium as BaSO ₄	04
			Coprecipitation and post precipitation	02

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	Name of Unit	Topics Names	Requ. Lect.	Tota Lects
5	A) Liquid State:-	Surface tension – Determination and its S.I. unit, Effect of	POSITION OF STREET	
C	ant	temperature on surface tension, Derivation of expression		
150	ept	for relative surface tension by Drop number method.	02	
		Application of surface tension.		
		Viscosity- Determination and its S.I. unit, Effect of		
	1 74 5 - 3	temperature on viscosity, derivation of expression for	02	
		relative viscosity by Ostwald's viscometer method.		
	B)	Application of viscosity.		
	Electrochemistry:	Conductance of electrolyte solutions. Specific, equivalent &		14
		molar conductance. Detn of conductance of electrolyte soln.	02	
		Variation of specific and equivalent Conductance with		
		dilution for strong electrolyte Conductometric titrations,	02	
		Application of Conductometric titrations.		
		Migration of ions under the influence of electric field.		
		Transport number of ions. Determ. of Transport number of	02	
		ions by Hottorf's method & Moving boundary method.		
		Kohlrausch's law of independent migration of ions.		
		Determ ⁿ of $\lambda \infty$ & degree of α dissociation of a week elect.	02	
		Determination of constant of a week electrolyte. Numerical.	02	
	A)	Definition and physical significance of Helmholtz work		
	Thermodynamics	function (A) and Gibbs free energy. Change in free energy	02	
	and Equilibrium:	(ΔG) as a criteria of spontaneity and equilibrium.		
	and Equilibrium.	Variation of free energy G with 'P' & 'T'. Gibbs-		1
0-4		Helmholtz equation in terms of G and its applications.	02	
Oct		Partial molal function, chemical potential, derivations of		1
		Gibb's-Duhem equation. Chemical potential of an ideal gas	03	
			05	
		in gaseous mixture.	-	+
		Derivation of Gibbs-Duhem equation. Derivation of Van't	02	14
		Hoff reaction of isotherm & its application to equil. state.		- 1
	B) Phase	Derivation of Van't Hoff equn & its applications.	01	
	Equilibrium:	Numericals.	-	-
		Immiscible liquids, Nerst distribution law and its		
		application to association and dissociation of solute in one		
		of the solvent Process of extraction, derivation of formula	02	
		for the amount of solute left unextracted after nth		
		extraction.		
		Phase transition- Clausius-clyperon. Partially miscible	02	
		liquids- Phase diagram of phenol-water, triethyl amine-	2	
		water & nicotine-water systems. Numerical.	-	+

Teacher Sign

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Late Ku. Durga K. Banmeru Science College, Lonar Dist- Buldan Department of Chemistry

Teaching Plan Session-2017-18 B.Sc.-Ist Semester-IInd

Name of Faculty:- Prof. Suryakant B. Borul

No.	Mont		Topics Names	Requ. Lect.	Tota Lects
1		A] Alkyl Halides:	Introduction, Synthe sis of vinyl chloride from acetylene and	02	
		170	allyl chloride from propylene,	02	
	Dec-		Reactions of both with aqueous and alcoholic KOH,	00	
	Jan		Comparison of reactivity of vinyl an allyl chloride.	02	
			Synthesis chlorobenzene from benzene, phenol and benzene		
		B] Aryl Halides:	diazonium chloride, Synthesis of benzyl chloride from	02	14
	-	•	toluene and benzyl alcohol,		
			Reactions of both with aqueous KOH, NH3 and sodium		
		*	ethoxide, Comparison of reactivity of chlorobenzene and	02	•
			benzyl chloride. Benzyne intermediate mechanism.		
		• •	Dihydric alcohols: Ethylene glycol- Preparation from		
		C] Alcohols:	ethylene, ethylene chloride and ethylene oxide,	02	
			R eactions- with Na, PCl5, CH3COOH, ZnCl2, conc.		
			H2SO4 and dehydration with heat. Trihydric alcohols:	02	
			Glycerol- Preparation from propylene,		
		•	Reactions- with Na, HCl, PCl5, HNO3 and KHSO4.		
		•	Pinacol- pinacolone rearrangement (mechanism).	02	
1		,	Timeor phaeologe rearrangement (meenamsm).		
1		A] Phenols:	Introduction, Methods of formations a) from aniline	02	
		*	b) from Cumene. Acidic character,		
-			Reaction of Phenols- a) Carboxylation (Kolb's reaction), b)	02	
J	an		Fries Rearrangement,	_	
			c) Claisen Rearrengement d) Reimer-Tiemann reaction.	02	
			Introduction, Diethyl ether- Preparation by Williamson's	02	
			synthesis and continuous etherification process,	02	14
			Reactions-with cold and hot HI	02	
			Introduction, Synthesis of ethylene oxide from ethylene and	02	
1		CU TO	styrene oxide from styrene.	02	
			Ring opening reactions of both catalyzed by acid and alkali.		
			opening reactions of both catalyzed by acid and alkali.		
+				02	

Month	Name of Unit	Topics Names	Requ. Lect.	
Jan- Feb	Chemical Kinetics	Explanation of terms like rate of reaction, order of a reaction and molecularity. Definition zero, first and second order reaction. Half life period of a reaction.	02	+
		Derivation of rate equation for first and second order reaction with equal initial concentration and different initial concentration of a reactant. Characteristics of first and second order reaction.	03	
	•	Examples of first and second order reaction viz. the reactions (i) decomposition of H ₂ O ₂ , (ii) reaction between K ₂ S ₂ O ₈ and KI,	03_	
	•	(iii) Hydrolysis of methyl acetate catalyzed by acid, (iv) saponification of ethyl acetate by NaOH and (v) inversion of cane sugar. Determination of order of a reaction by integration, graphical, equifractional change, etc. method. Effect of temperature on reaction rates. Arrhenius equation, activation energy and its determination using Arrhenius equation. Numericals	03	
. Feb	LIMITE	in the state of th	03	•
ren	UNIT-I A] Polarisation- B] Covalent	Directional nature of covalent to applications.	02	
	bonding- C] Intermolecular	IF ₇ . IF ₇ .	02	
	forces- D] Acids and Base-	dipole interactions. Ion - dipole interactions. Theory of solvent sys. & Lux-Flood concept of the system of the s		1
•		& bases. Hard and soft acids and bases. Pearsons HSAB principle with imp 04 applications.	-	

Mont	- Tame of Chit	Topics Names		Total Lects.
Feb		(i) Polar and non-polar molecules. Dipole moment.(ii) Induced polarization & orientation polarization. Clausius- Mossotti equation	03	
Mar	ch	(iii) Measurement of dipole moment by temperature and refractivity methods.	01	
		(iv)Applications of dipole moment for the determination of molecular structure. i.e. percentage ionic character of covalent bonding, molecular geometry, cis-trans isomers, ortho, meta and para isomers of a disubstituted benzene.	03	-
•	B]Magnetic Properties:	(i) Paramagnetic and diamagnetic substances, origin of paramagnetism, diamagnetism, ferromagnetism and antiferromagnetism.(ii) Volume, specific, mass and molar susceptibility. Relationship between.	03	
		(iii) Relationship between magnetic moment and number of unpaired electrons. (iv) Gouy's balance method for determination of magnetic susceptibility.	02	
		(v) Application of magnetic moment in the determination of molecular structure.(vi) Numericals.	02	
5	P-Block Elements- Id ha B B] Noble Gases- Ir	Comparative study of 16 th and 17 th group elements with reference to electronic configuration,	02	
Mai		Ionisation energy & oxidation states. Oxidising properties of halogens with reference to oxidation potential.	02	2
•		Basic properties of halogens with special reference to iodin. Interhalogen compounds. Introduction to fluorocarbons.	e. 07	2
		Inertness of noble gases. Compounds of noble gases-only str. & bonding in XeF ₂ , XeF ₄ , XeOF ₄ ,XeO ₂ F ₂ XeO ₃ and XeO ₄	0	2 1
	C] Non-aqueous Solvents-	Requirements of a good solvent. Water as a universal solv		2
		Classification of solvents. Reactions in liquid ammonia aci	d 0)2
		solutions of metals in liquid ammonia.	(02

(mr.s.B.Boom) (Teacher) Late Ku, Durga K, Banneryu Science College, Lonareru Science College, Lonareru

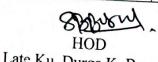
Late Ku. Durga K. Banmeru Science College, Lonar Dist-Buldana Department of Chemistry Teaching Plan Session-2017-18 B.Sc.-IInd Semester-IVth

	Month	aculty:- Mr. Shivs Name of Unit	Topics Names	Requ. Lecture	Total
	Dec-	Colligative	(i) Defination and examples of colligative properties.	02	
- 1	Jan	the modern control of the control of		02	
		Dilute Solutions:	(ii Elevation of boiling point, thermodynamic derivation of		
			the relationship between elevation of boiling point and		
		•	molar mass of a non-volatile solute.	00	
			Cotrell's method for determination of elevation of boiling	02	
		•	point.		1.4
		(iii) Depression of freezing point, thermodynamic	02	14	
		derivation of the relationship between depression			
	deposition of the	of freezing point and molar mass of a non-volatile solute.			
		Rast's method for determination of depression of freezing	02-		
	The second second	point.	02		
		(iv) Abnormal behavior of solution. Van't Hoff's factor 'i'.	02		
			Determination of degree of association and dissociation	02	
			from Van't Hoff's factor.(v) Numerical.		
		•	Symmetry in crystal, plane of symmetry, axis of	02	
Ja	n	•	Symmetry in crystal, plane of symmetry, symmetry and point of symmetry. Law of constancy of		
		Crystalline state	interfacial angles .		-
		,	Elements of symmetry in cubic crystals. Laws of	02	14
			authorized Law of rational indices, Weiss and Miller		14
			indices of a lattice planes, calculation of interplaner		
			distance d(h,k,l) from Miller indices in a cubic system. Seven crystal systems and fourteen Bravais lattices,	-	
		the same	Bravais lattices of cubic system. Simple cubic system	02	
			(S.C.C.), body centered cubic system (B.C.C.) and face		
			centered cubic system (F.C.C.).		
			Calculation of number of constituent units in S.C.C.,	02	
		•	B.C.C. and F.C.C.	02	
			Ratio of interplaner distances for 100, 110 and 111 lattice	02	
			plane in S.C.C., B.C.C. and F.C.C. Derivation of Bragg's equation for X-ray diffraction,		13/2
			Bragg's X-ray spectrometer method for the determination	02	
			of crystal structure of NaCl and KCl.		
			Anomalous behaviour of KCl towards X-ray. Numericals.	02	
					-

	Month	Name of Unit	Topics Names	Requ. Lecture	T
		A] Chemistry of	Definition of transition elements. General characteristics		+
	Jan-Feb	elements of	of transition elements. Comparative study of first	02	
		transition series:	And the second of the second o		
-			transition series elements (3d) with reference to following		
		•,	properties: (i) Electronic configuration		
-			(ii) Atomic and ionic size (iii) Ionization energy (iv)		1
			Metallic nature (v) Oxidation states (vi) Magnetic	03	
-			properties (vii) Color of salts (viii) Catalytic properties		
			(ix) Complex formation behaviour.		
-			Study of 4d and 5d series elements-Electronic	03	
-			configuration.		
-				02	
-		B] Extraction of	Comparison of 3d series elements with 4d and 5dseries	03	
-		elements:	elements with respect to size, oxidation states, magnetic		
-			properties and color.		
-	1		Principles involved in extraction of elements. Major		
-		*	methods of extraction of elements. Factors affecting	03	
-			choice of extraction method. Thermodynamics of		
			1	1	
-			reduction processes-Ellingham diagrams for oxides and		
-			importance of this diagram		
-	Feb	A] Inner	Definition, Lanthanides and Actinides. Comparative study	-	
		transition	of Lanthanides with respect to following properties:(i)	02	
		elements:	Electronic configuration		
-			(ii) Atomic and ionic radii lanthanide contraction	02	
-	- 1		definition, cause and effect of lanthanide contraction		
		•	(iii) Oxidation states	02	
-		• * 1	(iv) Magnetic properties	. 1	14
-			(v) Color of salts .	.02	
-	A - 1-4-15	year architect	vi) Complex formation behavior.		
		B] General	Occurrence of lanthamides. Isolation of lanthanides by ion		_
		Principles of	exchange method. Actinides- Electronic configuration and	03	
1		Metallurgy:	oxidation states.		
			Comparison of lanthanides and actinides.		
	¥		Definition of metallurgy, steps in metallurgy. Ore	-	
			dressing by gravity separation, froath floatation and		
			electromagnetic separation.	03	
			Calcinations, roasting, smelting and refining of metals. Meaning of termshydrometallurgy and pyrometallurgy.		
		THE RESERVE OF THE PARTY OF THE	IVICALITIE OF Termehydrometallurgy and	1	

5	Month Feb-	Name of Unit	1 opics Names	Requ. Lecture	Tota
	March		Nitrobenzene: Synthesis from benzene, Reduction of	03	
		compounds:	nitrobenzene in acidic, neutral and alkaline medium.		-
		B] Amir	Basicity and effect of substituents. Methods of preparation	02	
•		Compounds:	of aniline from nitrobenzene, Reactions: with acetyl and		14
	•	benzoyl chlorides, Br2(aq) and Br2(CS2),	_		
		C] Diazoniui	Carbylamine reaction, alkylation, Hoffmann's exhaustive	02	
		Salts:	methylation and its mechanism.		
			Preparation benzene diazonium chloride, Synthetic	03	
			applications- Preparation of benzene, phenol,		
		D] Amino actor	halobenzene,nitrobenzene,benzonitrile, coupling with		
		•	phenol and aniline.		
			Classification, Strecker and Gabrial phthalimide	02	
			synthesis, Zwitterion structure, Isoelectric point,		•
			peptide synthesis, Structure determination of polypeptides	02	
			by end group analysis.		
1					
		A] Polynuclear		02	
I	March	ch hydrocarbons:	Reactions – electrophilic substitution		The state of the s
			Preparation of naphthols from naphthalene sulphonic	02	
		B] Reactive	acids and naphthylamines from naphthols.	1	4
	1	methylene .	Malonic Ester: Synthesis from acetic acid, Synthetic	03	
0		compounds:	applications- Synthesis of acetic acid, succinic acid,	03	
			glutaric acid, crotonic acid and malonyl urea.		.
		3.	Acetoacetic ester: Synthesis from ethyl acetate, Synthetic	00	
		CI.	applications- Synthesis of acetic acid, propionic acid,	03	
		CJ Carbohydřates:	isobutyric acid, succinic acid, glutaric acid, crotonic acid,		
			acetyl acetone and 4-methyl uracil.		İ
			Constitution of glucose, cyclic structure, Pyranose and	02	
			Constitution of glucose, cyclic structure, Pyranose and Furanose structure, Epimerization, conversion of glucose	02	
				02	
			Furanose structure, Epimerization, conversion of glucose to fractose and vice-versa,	02	





Late Ku. Durga K. Banmeru
Science College, Lonar
Department of Chemistry
Late Ku. Longon, Banmeru
Science College Longon

Late Ku. Durga K. Banmeru Science College, Lonar Dist-Buldana

Department of Chemistry
Teaching Plan Session-2017-18
B.Sc.-IIIrdSemester-VIth

Sr.	Montl	h Name of Un	avhal Kamalakar K. Topics Names		
No.			Topics Names	Requ Lectur	
1	Dec- Jan	A) Kinetic Aspects of Metal Complexes:	Types of reactions of coordination compounds. Brief ideabout substitution reactions. SN1 dissociative and SN associative mechanism of substitution in octahedra complexes. Labile and inert complexes.	12 al	
		B) Analytical Chemistry:	Factors affecting lability of complexes viz. arrangement of d-electrons (VB theory),. Mechanism of substitution reactions in square planar complexes.		-
•		1. Colorimetry Spectrophotom etry	Concept of Dmax. Beer-Lambert's law Verification of Beer's law. Block diagrams of colorimeter and spectrophotometer	1	14
		2. Paper Chromatograph			
			Definition and classification of chromatography. Principle of ifferential migration. Principle and technique of paper chromatography, Rf value and factors affecting Rf value	02	
2 J		n A] Organometallic Chemistry:	Definition, nomenclature and classification of organometallic compounds. Metal carbonyls- definition and classification.	02	-
		•	Preparation, properties, structure and bonding in Ni(CO)4, Fe(CO) ₅ , Cr(CO) ₆ . Nature of M-C bond in metal carbonyls. Definition and classification. Silicones: preparation, properties structure and bonding and applications.	03	4
		3] Inorganic	Phosphonitrile halides polymers- preparation, properties, structure and bonding in cyclic polymers.	02	
	Ci	C] Bio- norganic .	Essential and trace elements in biological processes. Biological role of Na+, K+, Ca2+ and Mg2+ ions. Metalloporphyrins- Haemoglobin and Myoglobin and their role in oxygen transport.	02	

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Sr.	Month	Name of Unit		Requ. Lecture	To Lec
3	Jan- Feb	A) Electronic	Introduction, radiation source, spectral range, types of electronic transitions, chromophore, auxochrome, bathochromic,	02	
-		Spectroscopy:	hypsochromic, Hyperchromic and hypochromic effects. Applications to the structure determination of compounds like dines, aldehydes,	03	-
•		B) Infrared Spectroscopy	ketones & aromatic systems. Types of vibrational modes, stretching and bending, spectrum range, radiation source, presentation of IR spectrum, characteristic frequencies of various groups,	03	1
Section of the least of the lea		C) Purification	Finger print region. Structure of organic compounds (IR spectra of simple compounds: H ₂ O, CO ₂ , CH CH, CH ₃ COCH ₃).	02	
		of Organic	Sublimation, crystallization.	02	
		Compounds:	Paper chromatography: Principle and Rf value.	02	1
4	Feb	Unit ĮV : A) Nuclear	Introduction, spin quantum number, instrumentation, Aspects of NMR- number of signals(equivalent & non-equivalent protons),	03	
and the same of th		Magnetic	Positions of signals(chemical shift), intensities of signals,	02	
-		Resonance Spectroscopy :	Splitting of signals (spin-spin coupling), coupling constant, and applications.	03	
		B)•	Introduction, theory, instrumentation-(ion sources),	02	
		Mass Spectrometr	Mass spectra of neopentane and methanol, molecular ion peak, base peak, metastable peak,	02] 1
1		y:	Rules of fragmentation, applications.	02	7

Sr. No.	Month	Name of Unit	Topics Names	Requ. Lecture	
5	Feb-		(i) Types of electrode, - Standard hydrogen electrode, Calomel	02	
	March	Electrochemi stry:	electrode, Quinhydrone electrode and Glass electrode. Principle of Potentiometric titration. Study of acid-base, redox and precipitation titration.		•
•			(ii) pH of a solution and pH scale. Determination of pH of a solution using hydrogen, quinhydrone and glass electrodes. Advantage and disadvantage of these electrodes. pH-metric titrations. Determination of pka of a weak acid by pH-metric measurement.	02	14
			(iii) Concentration cells - Types of concentration cells, concentration cell without transfer and determination of its emf. (iv) Numericals		
		•	(i) Shell model of a nucleus - Assumptions, evidences for existence of magic numbers, advantages and limitations. (ii) Liquid drop model of a nucleus - Assumptions, similarities between nucleus and liquid drop, advantages and limitations, explanation of nuclear fission reaction on the basis of liquid		-

B] Nuclear Chemistry: (iii) Nuclear force and its explanation on the basis of Meson theory. (iv) Characteristics of nuclear reaction, difference of a nuclear and chemical reactions. Calculation		
of a nuclear reaction. (v) Characteristics of nuclear fission of energy. vi) Nuclear fusion reaction. (v) Nuclear fusion reaction. (v) Nuclear fusion reaction. (v) Nuclear fusion reaction. (v)	02	
and other stars. Fusion reactions as a potential future source of energy.	02	
vii) Applications of radio isotopes in industry, agriculture, medicines and bio-sciences with two examples each. (viii) Numericals.	02	

6	6 March	Elementary Quantum	(i) Limitations of classical mechanics. Plank's quantum theory (postulates only)	02	
		Mechanics	Photoelectric effect - Experiments, observation and Einstein's explanation. Compton effect and its explanation. (ii) de Broglie hypothesis of matter waves	03	
,			De-Broglie's equation. Heisenberg's uncertainty principle. (iii) Classical wave equation, derivation of time independent Schrodinger's wave equation in one-dimension and its extension to a three-dimensional space.	02	14
		W	Well behaved wave function, physical significance of wave function (Born interpretation).	02	
			(iv) Application of Schrodinger wave equation to a particle in one-dimensional box & its extension to a three-dimensional box	03	
		•	Concept of atomic orbital. (v) Numericals	02	

Incharge Teacher-Wavhal Kamalakar k. Late Kir Durga K. Bahmeru Late College, Longrar. Science College, Longrar.

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Amrut Sevabhavi Sanstha's Parbhani

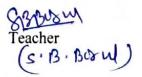
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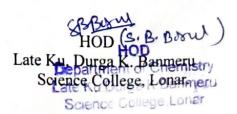
Department of Chemistry Teaching Plan Session-2018-19 B.Sc.-Ist Semester-Ist r. Suryakant B. Borul

Sr. No.	Month	Faculty:- Mr. Surya Name of Unit	Topics Names	Required Lecture	1
1		A) Electronic	Inductive effect, electromeric effect, Resonance &	02	
		displacements:	Hyperconjugation (Definition and Applications)		
	July	B) Reactive	Carbocations, Carbanions and Free radicals, their	02	
		Intermediates:	generation stability & reactions.		
		7 3	Alkanes- Methods of formation: i) Wurtz reaction and	03	
		C) Aliphatic	ii) Corey-House reaction, reactions i) Halogenation		14
		Hydrocarbon:	mechanism ii) Aromatisation.		
			Alkenes Method of formation mechanism- i)	02	
		A COLLEGE	dehyhrogenation of alkyl halides (E ₁ & E ₂) ii)		
			Dehydration of alcohols.	J. 1984	
			Reactions-Electrophilic and free radical addition of HX	01	
			and X ₂ (with mechanism)		
			Alkynes- Preparations from vicinal and germinal	02	
	-84		dihalides, Reaction-Hydrogenation.		
			Alkadienes:-Classification 1, 3-Butadiene- Preparation	02	
			from cyclohexene, reactions-Addition of H ₂ , Br ₂ & HBr		
2		Aromatic	Introduction, Nomenclature and Isomerism of Aromatic	02	
	July-	Hydrocarbons	Compounds.		
	Aug	A)	Structure of Benzene of Benzene : Kekule structure and	02	
			Molecular orbital structure.		
			Aromaticity and Huckel's rule Aromatic,	02	4
		B)	antiaromatic and non-aromatic system	02	
			Mechnism of Electrophilic Aromatic Substitution:-	03	14
			Nitration, Friedal Craft Alkylation and Acylation.	-10	
		C)	Nuclear and side chain halogenations, Birch reduction.	01	
	127		Orientation:- Effect of substituent group. Activating and		
		D)	deactivating group. Theory of reactivity and orientation	02	
			on the basis of inductive and resonance effects (-CH ₃ , -		
			OH, -NO ₂ and -Cl group).		

Sr. No.	Month	Name of Unit	Topics Names	Requ. Lect.	Tota Lects
3	Aug	A] Periodic Properties:	Atomic and ionic radii. Types of atomic radii. Periodic trends in atomic and ionic radii. Ionization energy, electron affinity and electronegativity.	03	
			Effect of ionization energy and electronegativity on different properties of elements namely metallic and non-metallic character, relative reactivity, oxidizing and reducing properties., Scales of electronegativity Pauling scale and Mulliken Scales. Electronegativity and partial ionic character of a covalent bond.	03	14
		B] Ionic bonding:	Screening effect, screening constant and effective nuclear charge. Slater's rules for calcul. screening constant. Problems.	02	
			Definition of ionic bond, types of cations. Factors affecting ionic bond formation. Born Lande equation to cal. lattice energy. Born-Haber's cycle to determine lattice energy	03	
			Solvation and salvation energy, factors affecting salvation energy, Det ⁿ of salvation energy. Solubility of ionic solids, lattice energy and salvation energy.	03	
4	Aug- Sept	Thermodynamics	Adiabatic and Isothermal processes. Work done in Adiabatic and isothermal processes, relationship between pressure, volume and temperature.	03	
			First law of Thermodynamics and its limitations, Need of Second law.	02	14
			Carnot's heat engine, derivation of expression for the work done and efficiency of Carnot's engine. Statements of Second law of thermodynamics.	03	
			Concept of Entropy, Physical significance of Entropy, Derivation of expression for the Entropy change for an ideal gas Entropy change for an ideal gas for isothermal, isobaric and isochoric processes,	03	
			Entropy of fusion, sublimation, vapourization, transition and its calculations. Entropy change as a criterion for spontaneity. Numericals.	03	

Sr.	Month	Name of Unit	Topics Names	Requ. Lect.	Tota Lects
No. 5		A] S-Block element:	Comparative study of 1st and 2nd group elements with reference to electronic configuration, ionisation energy, oxidation states.	03	
	Sept-		Reactivity and flame colouration. Diagonal relationship between Li and Mg.	02	
	Oct	B] P-Block element:	Comparative study of 13th, 14th and 15th group elements with reference to electronic configuration,	03	14
			ionisation energy, oxidation states. Concept of inert pair effect. Diagonal relationship between Be and Al. Structure of diamond and graphite.		
			Abnormal behaviour of nitrogen. Hydrides of boron- preparation (from BCl3 and NaBH4two), properties (action of heat, water, alkali and oxygen), structure and bonding in	03	
			diborane. Carbides, types of carbides and fullerenes.	19	
6	Oct	A] Gaseous State:	Postulates of Kinetic theory of gases, Derivation of Kinetic gas equation.	02	
			RMS, Average and Most probable velocities and their relationship. Maxwell-Boltzmann distribution law of molecular velocities (only qualitative treatment), Mean	03	
			free path, collision number and collision diameter.		
			Deviation of real gases from ideal gas behavior. Vander waal's equation of state and its derivation for real gases.	02	
•			Critical phenomenon, Andrew's experiment - isotherm of CO2. Critical state, critical constant, Pc, Vc and Tc in terms of Vanderwaal's constants 'a' and 'b'. Law of	03	14
			Corresponding state. Numericals.		
		B] Phase Rule:	Statement of phase rule, explanation of phase, number of Components and degree of freedom.	02	
		•	Application of phase rule to water and sulfur system.	02	-





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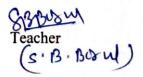
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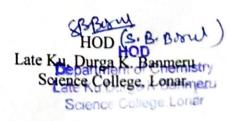
Name of Faculty:-Mr. Shivshankar P. More

Sr. No.	Month	Name of Unit	Topics Names	Requ. Lecture	Tota Lect
1	June- July	A] Aldehydes and Ketones:	Preparation of acetaldehyde from ethanol, ethylidene chloride and acetylene. Preparation of benzaldehyde from benzene (Gattermann-Koch reaction) and toluene.	02	
	July		Preparation of acetone from isopropyl alcohol, isopropylidene chloride and propyne. Preparation of acetophenone from benzene and ethyl benzene.	02	
		ally a de en les Les en grant son	Structure of carbonyl group, acidity of á-hydrogen in carbonyl compounds. Reactions of aldehydes &/or ketones: Cannizaro's,	02	
			Reformatsky, Perkin with mechanism, Mannich reaction, Benzoin and Aldol condensations. Clemmensen, Wolf- Kishner, MPV and LiAlH4 reductions.	02	
		B] Carboxylic	Structure and reactivity of carboxylic groups. Acidity of carboxylic acids, effects of substituents on acids strength. Oxalic acid: Preparation from ethylene glycol and cyanogen. Reactions: Reaction with ethyl alcohol, ammonia, glycerol and	02	14
		acids:	action of heat. Lactic acid: Preparation from acetaldehyde and pyruvic acid.	yar	
			Reactions: Reaction with ethanol, PCl ₅ , action of heat, oxidation and reduction. Benzoic acid: Preparation from toluene, benzyl alcohol, phenyl cyanide and benzamide.	02	
			Reactions: Reaction with ethanol, PCl ₅ and ammonia. Salicylic acid: Preparation by Reimer-Tiemann reaction. Reactions: Reaction with CH ₃ COCl, CH ₃ OH and C ₆ H ₅ OH.	02	
2		A] Optical	Element of symmetry, chirality, asymetric carbon atom,	100	
	July	isomerism:	enantiomers, diastereoisomers, relative and absolute configurations, DL and RS	02	
			nomenclature, racemisation and resolution.	02	
		B] Geometrical	Cis-trans & <i>E-Z</i> nomenclature, Methods of structure determination.	03	
		isomerism: C]	Bayer's Strain theory and its limitations. Stability of cycloalkanes, conformational isomers of ethane	03	14
		Conformational isomerism:	conformational isomers of, n-butane & cyclohexane, their energy level diagrams.	02	
		h Tage again	Newman & Sawhorse projection formulae.	02	

Sr. No.	Month	Name of Unit	Topics Names	Requ. Lect.	
3	Aug	A] Covalent Bonding:	Molecular Orbital Theory. Postulates of MO theory. LCAO approximation. Formation of bonding and antibonding MOs. Rules for LCAO. MO energy level diagram. MO structure of homonuclear diatomic molecules of namely He ₂ , H ₂ , N ₂ and O ₂ . Stability sequence of species of O2	03	14
		B] Metallic	Paramagnetic nature of O2. MO structure of heteronuclear diatomic molecules viz. NO, HF &CO. properties of CO viz. – triple 15 16 bond, almost nonpolar nature, edonor & acceptor behaviour. Comparison of VB and MO theories.	03	
		Bonding:	Free electron theory and properties of metals such as electrical and thermal conduction, malleability, ductility and metallic lusture. VB theory or Resonance theory of metals. Band theory to explain nature of conductors, insulators and semiconductors.	03	
	Aug-Sept		Various rules under VSEPR theory to explain molecular geometry various rules- BeCl ₂ , BF ₃ , CH ₄ , NH ₄ + , PCl ₅ , SF ₆ , IF ₇ , SnCl ₂ , NH ₃ , H ₂ O, SF ₄ ,	03	
		C] VSEPR Theory:	Various rules under VSEPR theory to explain molecular geometry Limitations of VSEPR theory.	02	-
4	_	Theory of Quantitative Inorganic Analysis	(a) Introduction:-Volumetric analysis, titrant, titrate, end point, equivalence point, indicator etc. Requirements of volumetric analysis. Definition of standard solution, primary standard substance.	02	
		A] Volumetric Analysis:	Terms to express concentrations namely- molarity, normality, molality, mole fraction and percentage. (b) Acid-Base titrations:- Types of acid base titrations. pH variations during acid base titration. Acid base indicators. Choice of suitable indicators for different acid base titrations.	02	14 (
			(c) Redox Titrations:-Pinciples involved in redox titrations. Brief idea about use of KMnO ₄ , K ₂ Cr ₂ O ₇ as oxidants in acidic medium in redox titrations.	02	
		Di Gariantia	Use of I ₂ in iodometry & iodimetry. Redox indicators- external & internal indicators. iodometric estimation of Cu (II).	02	
		B] Gravimetric Analysis:	Definition. Theoretical principles underlying various steps involved in gravimetric analysis with reference to estimation of barium as BaSO ₄	04	

Sr. Vo.	Month	Name of Unit	Topics Names	Requ. Lect.	Tota Lects
5		A] S-Block element:	Comparative study of 1st and 2nd group elements with reference to electronic configuration, ionisation energy, oxidation states.	03	
	Sept-		Reactivity and flame colouration. Diagonal relationship between Li and Mg.	02	
	Oct.	B] P-Block element:	Comparative study of 13th, 14th and 15th group elements with reference to electronic configuration,	03	14
			ionisation energy, oxidation states. Concept of inert pair effect. Diagonal relationship between Be and Al. Structure of diamond and graphite.		
			Abnormal behaviour of nitrogen. Hydrides of boron- preparation (from BCl3 and NaBH4two), properties (action of heat, water, alkali and oxygen), structure and bonding in diborane. Carbides, types of carbides and fullerenes.	03	
6	Oct	A] Gaseous State:	Postulates of Kinetic theory of gases, Derivation of Kinetic gas equation.	02	
			RMS, Average and Most probable velocities and their relationship. Maxwell-Boltzmann distribution law of molecular velocities (only qualitative treatment), Mean free path, collision number and collision diameter.	03	
			Deviation of real gases from ideal gas behavior. Vander waal's equation of state and its derivation for real gases.	02	
			Critical phenomenon, Andrew's experiment - isotherm of CO2. Critical state, critical constant, Pc, Vc and Tc in terms of Vanderwaal's constants 'a' and 'b'. Law of	03	14
		Dl Dhoso Dulos	Statement of phase rule, explanation of phase, number of		
		B] Phase Rule:	Components and degree of freedom. Application of phase rule to water and sulfur system.	02	





Amrut Sevabhavi Sanstha's Parbhani

Late Ku. Durga K. Banmeru Science College, Lonar Dist- Buldana Department of Chemistry Teaching Plan Session-2018-19 B.Sc.-IIIrd Semester-Vth

ľ	lame of	f	Facul	tv:-	Mr.	Kamalakar	K	W	avhal	

Sr. No.	1	h Name of Unit	Topics Names	Requ. Lect.	1
1	July	Coordination Compounds-I:	Important terms namely-molecular or addition compounds, double salts, complex ion, ligand, coordination number, central metal ion etc. Werner's theory of coordination and experimental evidences on the basis of conduction data and formation of AgCl precipitate in case of cobaltamines.	03	
			Sidgwick's electronic interpretation & its drawbacks. EAN rule. IUPAC rules for nomenclature of coordination. Structural linkage & coordination isomerism in complexes.	03	
,			Geometrical isomerism in octahedral complexes of type Ma4b2, Ma4bc, Ma3b3, M(AA)2b2. Square planar complexes of type Ma2b2 and Ma2bc. Optical isomerism in octahedral complexes of type Ma2b2c2, Mabcdef, M(AA)3, M(AA)2b2	03	14
		B) Chelates:	Tetrahedral complexes of type Mabcd and M(AA)2. Optical isomerism in square planar complexes. VBT as applied to structure and bonding in complexes and Magnetic properties of complexes of 3d series elements. Limitations of VB theory.	03	
1	70		Definition, classification & applications of chelates	02	
-	July- Aug	A] Crystal Field Theory	Postulates of CFT, Crystal field splitting in octahedral, distorted octahedral, square planar tetrahedral complexes,	03	
		(CFT):	concept of CFSE, high spin and low spin complexes on the basis of $\Delta 0$ and pairing energy, distribution of electrons in t2g	03	
		B] Electronic	orbitals in high spin and low spin octahedral complexes. Factor affecting magnitude of CF splitting in octahedral complexes.	02	14
	a	Spectra of Transition Metal Complexes	Introduction to spectra, selection rules for d-d transitions, spectroscopic terms-determination of ground term symbols for d1 to d10, spectra of d1 and d9 octahedral complexes,	03	
		Complexes	Orgel diagram for d1 and d9 states, electronic spectrum of $[\mathrm{Ti}(\mathrm{H_2O})_6]^{3+}$ complex ion. Spectrochemical series.	03	

Sr. No.	Month	Name of Unit	Topics Names	Requ. Lect.	Total Lect.
	A STATE OF LABOUR	B Drugs:	Analgesic and antipyretics: Synthesis and uses of phenylbutazone. Sulpha drugs: Synthesis and uses of sulphanilamide and sulphadiazine.	03	
			Antimalarials: Synthesis of chloroquine from 4,7-dichloroquinoline and its uses.	02	
		C] Pesticides:	Insecticides:Synthesis and uses of malathion. Herbicides: Synthesis and uses of 2,4-dichloro phenoxy acetic acid (2,4-D)	03	
			Fungicides: Synthesis and uses of thiram (tetramethyl thiuram disulphide	02	
5	1	Photochemistry	(i) Photochemical and thermal reactions. (ii) Lambert's law - Statement and derivation.	02	
	Oct		Beer's law - Statement and derivation. Reasons for deviation from Beer's law. (iii) Laws of photochemistry.	02	
			(iv) Quantum yield of photochemical reaction. Reasons for high and low quantum yield. Experimental determination of quantum yield. Photosensitized reaction.	02	
			(v) Kinetics of photochemical decomposition of HI. (vi) Fluorescence and Phosphorescence.	02	
			Selection rule for electronic transition. Internal conversion and inter-system crossing. Explanation of fluorescence and phosphorescence on the basis of Joblonski diagram	1	
			(vii) Chemiluminescence and Bioluminescence with examples. (viii) Numericals.	03	

Teacher Sign

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HOD Late Ku. Durga K. Banmeru Science College, Lonar

,	Sept- Oct	Molecular Spectroscopy	(i) Electromagnetic radiation, characteristics of electromagnetic radiation in terms of wavelength, wave number, frequency and energy of photon. Spectrum of the control of		+
			energy of photon. Spectrum of electromagnetic radiation. (ii) Types of spectra - Emission and absorption spectra, atomic and molecular spectra, line and band spectra		
			(iii) Translational, vibrational, rotational and electronic motion. The degree of freedom in each motion. (iv) Energy level diagram of a molecule indicating electronic, vibrational and rotational transitions. (v) Condition for pure rotational spectrum, selection rule for rotational transition.	02	
			Derivation of expression for moment of inertia of a diatomic rigid rotor. Isotope effect. Applications of microwave spectroscopy for the determination of moment of inertia and bonding. (vi) Condition for exhibiting vibrational spectra (i.e. IR active molecule),	03	
		position of a simple harmonic oscillator. Zero position of a spectral line. Determination of force covalent bond.		02	
			(v) Raman effect - Raman's spectrum of a molecule. Condition for exhibiting Raman spectrum (i.e. Raman active molecule), selection rule for rotational transitions.	02	
			Pure rotational spectrum of diatomic molecule, vibrational Raman spectrum of a diatomic molecule. (vii) Numericals.	02	

Teacher Sign

HOD

Late Ku. Durga K. Banmeru
Science College, Lonar

Amrut Sevabhavi Sanstha's Parbhani

Late Ku. Durga K. Banmeru Science College, Lonar Dist- Buldana

N	tme of l	Faculty:- Prof. Sury	Teaching Plan Session-2018-19 B.ScI** Semester-II** akant B. Borul		
Dirigina	Month	Name of Unit	Topics Names	Requ. Lect.	Tota Lects
1		A] Alkyl Halides:	Introduction, Synthesis of vinyl chloride from acetylene and allyl chloride from propylene,	02	
	Dec- 18 Jan- 19		Reactions of both with aqueous and alcoholic KOH, Comparison of reactivity of vinyl an allyl chloride.	02	
		B} Aryl Halides:	Synthesis chlorobenzene from benzene, phenol and benzene diazonium chloride, Synthesis of benzyl chloride from toluene and benzyl alcohol,	02	14
			Reactions of both with aqueous KOH, NH ₃ and sodium ethoxide, Comparison of reactivity of chlorobenzene and benzyl chloride. Benzyne intermediate mechanism.	02	
		C] Alcohols:	Dihydric alcohols: Ethylene glycol- Preparation from ethylene, ethylene chloride and ethylene oxide,	02	
			R eactions- with Na, PCl5, CH3COOH, ZnCl2, conc. H2SO4 and dehydration with heat. Trihydric alcohols: Glycerol- Preparation from propylene,	02	
			Reactions- with Na, HCl, PCl5, HNO3 and KHSO4. Pinacol- pinacolone rearrangement (mechanism).	02	
2		A] Phenols:	Introduction, Methods of formations a) from aniline b) from Cumene. Acidic character,	02	
	Jan		Reaction of Phenols- a) Carboxylation (Kolb's reaction), b) Fries Rearrangement,	02	
			c) Claisen Rearrengement d) Reimer-Tiemann reaction.	02	1
			Introduction, Diethyl ether- Preparation by Williamson's synthesis and continuous etherification process,	02	14
		B] Ethers:	Reactions-with cold and hot HI	02	1
		C] Epoxides:	Introduction, Synthesis of ethylene oxide from ethylene and styrene oxide from styrene.	02	
			Ring opening reactions of both catalyzed by acid and alkali.	02	

Sr. No.	-		Topics Names	Requ. Lect.	Tota
3	Jan- Feb	Chemical Kinetics	Explanation of terms like rate of reaction, order of a reaction and molecularity. Definition zero, first and second order reaction. Half life period of a reaction.		Leci
			Derivation of rate equation for first and second order reaction with equal initial concentration and different initial concentration of a reactant. Characteristics of first and second order reaction. Examples of first and second order reaction viz the reactions.	03	14
			Examples of first and second order reaction viz. the reactions (i) decomposition of H_2O_2 , (ii) reaction between $K_2S_2O_8$ and KI ,	03	
			(iii) Hydrolysis of methyl acetate catalyzed by acid, (iv) saponification of ethyl acetate by NaOH and (v) inversion of cane sugar. Determination of order of a reaction by integration, graphical, equifractional change, etc. method.	03	
December 100			Effect of temperature on reaction rates. Arrhenius equation, activation energy and its determination using Arrhenius equation. Numericals.	03	
1					\dashv
	Feb	UNIT-I A] Polarisation-	residence its applications.	02	
Contraction of the Contraction		B] Covalent bonding-	IF ₇ .	02	
		Intermolecular forces-	Dipole-dipole, dipole-induced-dipole, induced dipole-induced	1.	4
1		Dl Acids and	i de la companya de l	03	
			Theory of solvent sys. & Lux-Flood concept of acids & bases.	3	
	Tr.	Ī a	Hard and soft acids and bases. Pearsons HSAB principle with imp opplications.	4	

Sr. No.	Month	Name of Unit	Topics Names	Requ. Lect.	
5	Feb-	A]Electrical Properties:	(i) Polar and non-polar molecules. Dipole moment.(ii) Induced polarization & orientation polarization. Clausius- Mossotti equation	03	
	March		(iii) Measurement of dipole moment by temperature and refractivity methods.	01	
			(iv)Applications of dipole moment for the determination of molecular structure. i.e. percentage ionic character of covalent bonding, molecular geometry, cis-trans isomers, ortho, meta and para isomers of a disubstituted benzene.	03	
		B]Magnetic Properties:	(i) Paramagnetic and diamagnetic substances, origin of paramagnetism, diamagnetism, ferromagnetism and antiferromagnetism.(ii) Volume, specific, mass and molar susceptibility. Relationship between.	03	
		. roperms.	(iii) Relationship between magnetic moment and number of unpaired electrons. (iv) Gouy's balance method for determination of magnetic susceptibility.	02	
			(v) Application of magnetic moment in the determination of molecular structure.(vi) Numericals.	02	
6		A] P-Block Elements-	Comparative study of 16 th and 17 th group elements with reference to electronic configuration,	02	
	March	Elements-	Ionisation energy & oxidation states. Oxidising properties of halogens with reference to oxidation potential.	02	
		B] Noble Gases-	Basic properties of halogens with special reference to iodine. Interhalogen compounds. Introduction to fluorocarbons.	02	
			Inertness of noble gases. Compounds of noble gases-only str. & bonding in XeF ₂ , XeF ₄ , XeOF ₄ ,XeO ₂ F ₂ XeO ₃ and XeO ₄	02.	14
		C] Non-aqueous Solvents-	Requirements of a good solvent. Water as a universal solv. Physical prop of solvents namely liq. range, dielectric constant, dipole moment, heat of vaporisation & solubility behaviour.	02	
			Classification of solvents. Reactions in liquid ammonia acid base, precipitation, redox, solvolysis	02	
		100	solutions of metals in liquid ammonia.	02	

(mr. s. B. Browl) Teacher HOD

Late Ku. DurghOD Banmeru

Science College Lonar

Late Ku. Durga K. Banmeru Science College, Lonar Dist-Buldana

Department of Chemistry Teaching Plan Session-2018-19 B.Sc.-IInd Semester-IVth

Sr.	Month	aculty:- Mr. Shivsl Name of Unit	Topics Names	Requ. Lecture	Tota
-	Dec-	Colligative	(i) Definition and examples of colligative properties.	02	
	Jan	Properties of Dilute Solutions:	(ii Elevation of boiling point, thermodynamic derivation of	02	
		Colligative Properties of Dilute Solutions: Crystalline state Crystalline state	the relationship between elevation of boiling point		
			and molar mass of a non-volatile solute.		
			Cotrell's method for determination of elevation of boiling point.	02	
		Lagrandia Allagador	(iii) Depression of freezing point, thermodynamic	02	14
			derivation of the relationship between depression of		
			freezing point and molar mass of a non-volatile solute.		
			Rast's method for determination of depression of freezing	02	
			point.		
			(iv) Abnormal behavior of solution. Van't Hoff's factor 'i'.	. 02	
		and the second second	Determination of degree of association and dissociation	02	
			from Van't Hoff's factor(v) Numerical.		
2	Jan		Symmetry in crystal, plane of symmetry, axis of	02	
2	Jan	Crystalline state	symmetry and point of symmetry. Law of constancy of interfacial angles.		
			Elements of symmetry in cubic crystals. Laws of	02	
			symmetry. Law of rational indices, Weiss and Miller		1
			indices of a lattice planes, calculation of interplaner		
	n la		distance d(h,k,l) from Miller indices in a cubic system. Seven crystal systems and fourteen Bravais lattices,		-
			Bravais lattices of cubic system. Simple cubic system	02	
			(S.C.C.), body centered cubic system (B.C.C.) and face		
		The light of	centered cubic system (F.C.C.).		
			Calculation of number of constituent units in S.C.C.,		
			B.C.C. and F.C.C.	02	-
			Ratio of interplaner distances for 100, 110 and 111 lattice	02	
			plane in S.C.C., B.C.C. and F.C.C. Derivation of Bragg's equation for X-ray diffraction,	02	+
			Bragg's X-ray spectrometer method for the determination	02	
			of crystal structure of NaCl and KCl.		
- 1			Anomalous behaviour of KCl towards X-ray. Numericals.	02	1

Sr. No.		Name of Unit	Topics Names	Lecture	Tota
3	Jan-Fel	A] Chemistry of elements of transition series: B] Extraction of elements:	elements of transition series: of transition elements. Comparative study of first transition series elements (3d) with reference to following properties: (i) Electronic configuration	00	
			(ii) Atomic and ionic size (iii) Ionization energy (iv) Metallic nature (v) Oxidation states (vi) Magnetic properties (vii) Color of salts (viii) Catalytic properties (ix) Complex formation behaviour.	03	14
			Study of 4d and 5d series elements-Electronic configuration.	03	
			Comparison of 3d series elements with 4d and 5dseries elements with respect to size, oxidation states, magnetic properties and color.	03	e de la companya de l
			Principles involved in extraction of elements. Major methods of extraction of elements. Factors affecting choice of extraction method. Thermodynamics of reduction processes-Ellingham diagrams for oxides and importance of this diagram	03	
1	Feb	A] Inner transition elements:	Definition, Lanthanides and Actinides. Comparative study of Lanthanides with respect to following properties:(i) Electronic configuration	02	
			(ii) Atomic and ionic radii lanthanide contraction definition, cause and effect of lanthanide contraction	02	
			(iii) Oxidation states (iv) Magnetic properties	02	4
		a de la compa	(v) Color of salts vi) Complex formation behavior.	02	
		B] General Principles of Metallurgy:	Occurrence of lanthanides. Isolation of lanthanides by ion exchange method. Actinides- Electronic configuration and oxidation states.	03	
			Comparison of lanthanides and actinides. Definition of metallurgy, steps in metallurgy. Ore dressing by gravity separation, froath floatation and electromagnetic separation. Calcinations, roasting, smelting and refining of metals. Meaning of termshydrometallurgy and pyrometallurgy.	03	

Sr. No.	Month	Name of Unit	Topics Names	Requ. Lecture	Total
5	Feb- March	A] Aromatic nitro compounds:	Nitrobenzene: Synthesis from benzene, Reduction of nitrobenzene in acidic, neutral and alkaline medium.	03	
		B] Amino Compounds: C] Diazonium Salts:	Basicity and effect of substituents. Methods of preparation of aniline from nitrobenzene, Reactions: with acetyl and benzoyl chlorides, Br2(aq) and Br2(CS2),	02	14
			Carbylamine reaction, alkylation,Hoffmann's exhaustive methylation and its mechanism.	02	
		D] Amino acids and Proteins:	Preparation benzene diazonium chloride, Synthetic applications- Preparation of benzene, phenol, halobenzene, nitrobenzene, benzonitrile, coupling with phenol and aniline.	03	
			Classification, Strecker and Gabrial phthalimide synthesis, Zwitterion structure, Isoelectric point,	02	
			peptide synthesis, Structure determination of polypeptides by end group analysis.	02	
6	March	A] Polynuclear hydrocarbons:	Naphthalene - Haworth synthesis, orbital picture, Reactions - electrophilic substitution	02	
		B] Reactive	Preparation of naphthols from naphthalene sulphonic acids and naphthylamines from naphthols.	02	14
		methylene compounds:	Malonic Ester: Synthesis from acetic acid, Synthetic applications- Synthesis of acetic acid, succinic acid, glutaric acid, crotonic acid and malonyl urea.	03	
		C] Carbohydrates:	Acetoacetic ester: Synthesis from ethyl acetate, Synthetic applications- Synthesis of acetic acid, propionic acid, isobutyric acid, succinic acid, glutaric acid, crotonic acid, acetyl acetone and 4-methyl uracil.	03	
			Constitution of glucose, cyclic structure, Pyranose and Furanose structure, Epimerization, conversion of glucose to fructose and vice-versa,	02	
			Introduction to fructose, ribose, 2- deoxyribose, maltose, sucrose. (their structures only determination not needed).	92	

Teacher Sign

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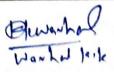
Late Ku. Durga K. Banmeru

Science College Lonar

Late Ku. Durga K. Banmeru Science College, Lonar Dist-Buldana

Department of Chemistry
Teaching Plan Session-2018-19
B.Sc.-IIIrdSemester-VIth

Sr. No.	Month	of Faculty:- Wavb Name of Unit	Topics Names	Requ. Lecture	Total Lects
1	Dec- Jan		Types of reactions of coordination compounds. Brief idea about substitution reactions. SN1 dissociative and SN2 associative mechanism of substitution in octahedral complexes. Labile and inert complexes.	03	
			Factors affecting lability of complexes viz. arrangement of d-electrons (VB theory),. Mechanism of substitution reactions in square planar complexes.	03	
			Concept of max. Beer-Lambert's law Verification of Beer's law. Block diagrams of colorimeter and spectrophotometer	02	14
			Difference between colorimeter and spectrophotometer. Application of colorimetric &spectrophotometric technique for determination of concentration of metal.	02	
THE STREET			Definition and classification of chromatography. Principle of ifferential migration.	02	
	# % L		Principle and technique of paper chromatography, Rf value and factors affecting Rf value	02	
2 J	Jan	A] Organometallic Chemistry: B] Inorganic Polymers: C] Bio-	Definition, nomenclature and classification of organometallic compounds. Metal carbonyls- definition and classification.	02	
			Preparation, properties, structure and bonding in Ni(CO)4, Fe(CO) ₅ , Cr(CO) ₆ . Nature of M-C bond in metal carbonyls.	03	
			Definition and classification. Silicones: preparation, properties structure and bonding and applications.	03	14
			Phosphonitrile halides polymers- preparation, properties, structure and bonding in cyclic polymers.	02	
			Essential and trace elements in biological processes.	02	
		inorganic Chemistry	Biological role of Na+, K+, Ca2+ and Mg2+ ions. Metalloporphyrins- Haemoglobin and Myoglobin and their role in oxygen transport.	02	



Sr. No.	Month	Name of Unit	Topics Names	Requ. Lecture	
3	Jan- Feb	A) Electronic Spectroscopy	Introduction, radiation source, spectral range, types of electronic transitions, chromophore, auxochrome, bathochromic, hypsochromic,	02	
		:	Hyperchromic and hypochromic effects. Applications to the structure determination of compounds like dines, aldehydes, ketones & aromatic systems.	03	
		B) Infrared Spectroscopy	Types of vibrational modes, stretching and bending, spectrum range, radiation source, presentation of IR spectrum, characteristic frequencies of various groups,	03	14
		C) Purification of Organic Compounds:	Finger print region. Structure of organic compounds (IR spectra of simple compounds: H ₂ O, CO ₂ , CH□CH, CH ₃ COCH ₃). Sublimation, crystallization.	02	
			Paper chromatography: Principle and Rf value.	02	
4	Feb	A) Nuclear Magnetic	Introduction, spin quantum number, instrumentation, Aspects of NMR- number of signals(equivalent & non-equivalent protons), Positions of signals(chemical shift), intensities of signals,	03	
		Resonance Spectroscopy :	Splitting of signals (spin-spin coupling), coupling constant, and applications.	03	
		B)	Introduction, theory, instrumentation-(ion sources),	02	No.
		Mass Spectrometr	Mass spectra of neopentane and methanol, molecular ion peak, base peak, metastable peak,	02	14
		y:	Rules of fragmentation, applications.	02	1

Sr.	Month	Name of Unit	Topics Names	Requ.	Total
No.				Lecture	
5	Feb-	A]	(i) Types of electrode - Standard hydrogen electrode, Calomel	02	
	March	Electrochemi	electrode, Quinhydrone electrode and Glass electrode. Principle		
	100	stry:	of Potentiometric titration. Study of acid-base, redox and		
	1		precipitation titration.	T _p	
			(ii) pH of a solution and pH scale. Determination of pH of a	02	1
			solution using hydrogen, quinhydrone and glass electrodes.		
		N-13 (9-6)	Advantage and disadvantage of these electrodes. pH-metric		
	Marin I		titrations. Determination of pka of a weak acid by pH-metric		
			measurement.		14
		4.94	(iii) Concentration cells - Types of concentration cells,	02	
			concentration cell without transfer and determination of its emf.		
	1		(iv) Numericals		
	- 1		(i) Shell model of a nucleus - Assumptions, evidences for	02	1
	1		existence of magic numbers, advantages and limitations. (ii)		
1			Liquid drop model of a nucleus - Assumptions, similarities		
			between nucleus and liquid drop, advantages and limitations,		
	1	N N	explanation of nuclear fission reaction on the basis of liquid		

and the same of th	drop model.	
B] Nucl Chemis		02
	vi) Nuclear fusion reaction - Characteristic of a nuclear fusion reaction. Thermonuclear reactions as a source of energy of sun and other stars. Fusion reactions as a potential future source of energy.	02
	vii) Applications of radio isotopes in industry, agriculture, medicines and bio-sciences with two examples each. (viii) Numericals.	02

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6 Ma	March	Elementary Quantum	(i) Limitations of classical mechanics. Plank's quantum theory (postulates only)	02	
		Mechanics	Photoelectric effect - Experiments, observation and Einstein's explanation. Compton effect and its explanation. (ii) de Broglie hypothesis of matter waves	03	
			De-Broglie's equation. Heisenberg's uncertainty principle. (iii) Classical wave equation, derivation of time independent Schrodinger's wave equation in one-dimension and its extension to a three-dimensional space.	02	14
			Well behaved wave function, physical significance of wave function (Born interpretation).	02	
			(iv) Application of Schrodinger wave equation to a particle in one-dimensional box & its extension to a three-dimensional box.	03	
			Concept of atomic orbital. (v) Numericals	02	1

Incharge Teacher-Wavhal Kamalakar k.

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Late Ku. Durga K. Banmeru Science College, Lonar Dist-Buldana Department of Chemistry

Department of Chemistry Teaching Plan Session-2019-20 B.Sc.-Ist Semester-Ist

Name of Faculty:- Mr. Suryakant B. Borul

Sr. No.	Month	Name of Unit	Topics Names	Required Lecture	Total Lects.
1		A) Electronic	Inductive effect, electromeric effect, Resonance &	02	
		displacements:	Hyperconjugation (Definition and Applications)		
	July	B) Reactive	Carbocations, Carbanions and Free radicals, their	02	
		Intermediates:	generation stability & reactions.		
			Alkanes- Methods of formation: i) Wurtz reaction and	03	
	1	C) Aliphatic	ii) Corey-House reaction, reactions i) Halogenation		14
		Hydrocarbon:	mechanism ii) Aromatisation.		
			Alkenes Method of formation mechanism- i)	02	
			dehyhrogenation of alkyl halides (E ₁ & E ₂) ii)		
			Dehydration of alcohols.		
			Reactions-Electrophilic and free radical addition of HX	01	
			and X ₂ (with mechanism)		
			Alkynes- Preparations from vicinal and germinal	02	
			dihalides, Reaction-Hydrogenation.	1	
			Alkadienes:-Classification 1, 3-Butadiene- Preparation	02	
		•	from cyclohexene, reactions-Addition of H ₂ , Br ₂ & HBr		4
2		Aromatic	Introduction, Nomenclature and Isomerism of Aromatic	02	
	July-	Hydrocarbons	Compounds.		1.
	Aug	A)	Structure of Benzene of Benzene: Kekule structure and	02	1
			Molecular orbital structure.		
			Aromaticity and Huckel's rule Aromatic,	02	
		B)	antiaromatic and non-aromatic system	02	
			Mechnism of Electrophilic Aromatic Substitution:-	03	14
			Nitration, Friedal Craft Alkylation and Acylation.		
		C)	Nuclear and side chain halogenations, Birch reduction.	01	-
		-	Orientation:- Effect of substituent group. Activating and		
		D)	deactivating group. Theory of reactivity and orientation	02	
		a algania e a	on the basis of inductive and resonance effects (-CH ₃ , -		
			OH, -NO ₂ and -Cl group).		
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Sr. No.	Month	Name of Unit	Topics Names	Requ. Lect.	
3		A] Periodic	Atomic and ionic radii. Types of atomic radii. Periodic		
		Properties:	trends in atomic and ionic radii. Ionization energy, electron	03	
	Aug		affinity and electronegativity.		
			Effect of ionization energy and electronegativity on		
			different properties of elements namely metallic and non-	03	
			metallic character, relative reactivity, oxidizing and		14
			reducing properties., Scales of electronegativity Pauling		
			scale and Mulliken Scales. Electronegativity and partial		
			ionic character of a covalent bond.		
			Screening effect, screening constant and effective nuclear	02	
			charge. Slater's rules for calcul. screening constant.		
		B] Ionic bonding:	Problems.		
			Definition of ionic bond, types of cations. Factors affecting	1	
			ionic bond formation. Born Lande equation to cal. lattice	03	
		100	energy. Born-Haber's cycle to determine lattice energy		
			Solvation and salvation energy, factors affecting salvation		
			energy, Det ⁿ of salvation energy. Solubility of ionic solids,	03	
			lattice energy and salvation energy.		
4	,		Adiabatic and Isothermal processes. Work done in	1-8	
	Aug- Sept	Thermodynamics	Adiabatic and isothermal processes, relationship between	03	
	Sept	1 net mody namics	pressure, volume and temperature.		
			First law of Thermodynamics and its limitations,	02	
			Need of Second law.	-	14
1			Carnot's heat engine, derivation of expression for the work		
			done and efficiency of Carnot's engine. Statements	03	
			of Second law of thermodynamics.		
			Concept of Entropy, Physical significance of Entropy,		
			Derivation of expression for the Entropy change for an ideal		
			gas Entropy change for an ideal gas for isothermal, isobaric	03	
			and isochoric processes,		
			Entropy of fusion, sublimation, vapourization, transition and		
			its calculations. Entropy change as a criterion for	1	
			spontaneity. Numericals.	03	
-			,		

No.	Month	Name of Unit	Topics Names	Requ.	Total Lects
5		A] S-Block	Comparative study of 1st and 2nd group elements with	03	Lects
		element:	reference to electronic configuration, ionisation energy,		
			oxidation states.		
	Sept-	- ş.*	Reactivity and flame colouration. Diagonal relationship	02	
	Oct	DID Disal.	between Li and Mg.		
		B] P-Block element:	Comparative study of 13th, 14th and 15th group elements with	03	
			reference to electronic configuration,		14
	4		ionisation energy, oxidation states. Concept of inert pair effect.	03	
	1		Diagonal relationship between Be and Al. Structure of diamond		
			and graphite.		
			Abnormal behaviour of nitrogen. Hydrides of boron-		
			preparation (from BCl3 and NaBH4two), properties (action of	03	
			heat, water, alkali and oxygen), structure and bonding in		
			diborane. Carbides, types of carbides and fullerenes.		
6	Oct	A] Gaseous	Postulates of Kinetic theory of gases, Derivation of Kinetic gas		
		State:	equation.	02	
			RMS, Average and Most probable velocities and their		
	37		relationship. Maxwell-Boltzmann distribution law of molecular	03	
			velocities (only qualitative treatment), Mean	Ł.	
			free path, collision number and collision diameter.	49	
	-		Deviation of real gases from ideal gas behavior. Vander waal's		
			equation of state and its derivation for real gases.	02	
			Critical phenomenon, Andrew's experiment - isotherm of CO2.		14
			Critical state, critical constant, Pc, Vc and Tc in terms of	03	
			Vanderwaal's constants 'a' and 'b'. Law of		-
			Corresponding state. Numericals.		
9			Statement of phase rule, explanation of phase, number of		
		B] Phase Rule:	Components and degree of freedom.	02	
			Application of phase rule to water and sulfur system.	02	

Teacher (mr 5 · B · Boom)

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Late Ku. Durga K. Banmeru

Svience College II onar.
के.कु.दुर्श क.बनमेरु बिझान महाधियाल
लोणार जि.बुटाडाणा

Department of Chemistry Teaching Plan Session-2019-20 B.Sc.-IInd Semester-IIIrd

Name of Faculty:-Mr. Shivshankar P. More

No.	Month	Name of Unit	Topics Names	Requ. Lecture	
1	June- July	A] Aldehydes and Ketones:	Preparation of acetaldehyde from ethanol, ethylidene chloride and acetylene. Preparation of benzaldehyde from benzene (Gattermann-Koch reaction) and toluene.	02	
			Preparation of acetone from isopropyl alcohol, isopropylidene chloride and propyne. Preparation of acetophenone from benzene and ethyl benzene.	02,	
			Structure of carbonyl group, acidity of á-hydrogen in carbonyl compounds. Reactions of aldehydes &/or ketones: Cannizaro's,	02'	
			Reformatsky, Perkin with mechanism, Mannich reaction, Benzoin and Aldol condensations. Clemmensen, Wolf- Kishner, MPV and LiAlH4 reductions.	.02	
			Structure and reactivity of carboxylic groups. Acidity of carboxylic acids, effects of substituents on acids strength. Oxalic acid: Preparation from ethylene glycol and cyanogen. Reactions:	02	14
		B] Carboxylic acids:	Reaction with ethyl alcohol, ammonia, glycerol and action of heat. Lactic acid: Preparation from acetaldehyde and pyruvic acid.	æ	
			Reactions: Reaction with ethanol, PCl ₅ , action of heat, oxidation and reduction. Benzoic acid: Preparation from toluene, benzyl alcohol, phenyl cyanide and benzamide.	02	
			Reactions: Reaction with ethanol, PCl ₅ and ammonia. Salicylic acid: Preparation by Reimer-Tiemann reaction. Reactions: Reaction with CH ₃ COCl, CH ₃ OH and C ₆ H ₅ OH.	02	
2		A] Optical	Element of symmetry, chirality, asymetric carbon atom,		
	July	isomerism:	enantiomers, diastereoisomers,	02	
			relative and absolute configurations, DL and RS nomenclature, racemisation and resolution. Cis-trans & E-Z nomenclature, Methods of structure	02	
		B] Geometrical	determination.	03	
		isomerism: C]	Bayer's Strain theory and its limitations. Stability of cycloalkanes, conformational isomers of ethane	03	14
		Conformational isomerism:	conformational isomers of, n-butane & cyclohexane, their energy level diagrams.	02	
		isumer ism.	Newman & Sawhorse projection formulae.	02	
		7			

No 3	. Iviont	Name of Unit	Topics Names		u.Tota
3	Aug	A] Covalent Bonding:	Molecular Orbital Theory. Postulates of MO theory. LCAO approximation. Formation of bonding and antibonding MOs. Rules for LCAO. MO energy level diagram. MO structure of homonuclear diatomic molecules of namely He ₂ , H ₂ , N ₂ and O ₂ . Stability sequence of species of O2	03	14
		B] Metallic Bonding:	Paramagnetic nature of O2. MO structure of heteronuclear diatomic molecules viz. NO, HF &CO. properties of CO viz. – triple 15 16 bond, almost nonpolar nature, edonor & acceptor behaviour. Comparison of VB and MO theories.	03	
			Free electron theory and properties of metals such as electrical and thermal conduction, malleability, ductility and metallic lusture. VB theory or Resonance theory of metals. Band theory to explain nature of conductors, insulators and semiconductors.	03	
		C] COFAL) POLS VSEPR Theory	Various rules under VSEPR theory to explain molecular geometry various rules- BeCl ₂ , BF ₃ , CH ₄ , NH ₄ + , PCl ₅ , SF ₆ , IF ₇ , SnCl ₂ , NH ₃ , H ₂ O, SF ₄ , CIF ₂ , BγF ₅ XeF ₆ 50F ₄ Various rules under VSEPR theory to explain molecular geometry Limitations of VSEPR theory.	03	
4	Aug- Sept	Theory of Quantitative Inorganic Analysis	(a) Introduction:-Volumetric analysis, titrant, titrate, end point, equivalence point, indicator etc. Requirements of volumetric analysis. Definition of standard solution, primary standard substance.	02	
		A] Volumetric Analysis:	Terms to express concentrations namely- molarity, normality, molality, mole fraction and percentage. (b) Acid-Base titrations:- Types of acid base titrations. pH variations during acid base titration. Acid base indicators. Choice of suitable indicators for different acid base	02	14
			titrations. (c) Redox Titrations:-Pinciples involved in redox titrations. Brief idea about use of KMnO ₄ , K ₂ Cr ₂ O ₇ as oxidants in acidic medium in redox titrations.	02	
		DI Cuavimatuis	Use of I ₂ in iodometry & iodimetry. Redox indicators- external & internal indicators. iodometric estimation of Cu (II).	02	5
		B] Gravimetric Analysis:	Definition. Theoretical principles underlying various steps involved in gravimetric analysis with reference to estimation of barium as BaSO ₄	04	^ 3
			Coprecipitation and post precipitation	02	

0,	Month	Name of Unit	Topics Names	Requ. Lect.	Tota Lect
5		A) Liquid State:-	Surface tension - Determination and its S.I. unit, Effect of	<u> </u>	2000
		11) Ziquiu Stato	temperature on surface tension, Derivation of expression		
	Sept		for relative surface tension by Drop number method.	02	
	14.	10.	Application of surface tension.	02	
		(· 9 /	Viscosity- Determination and its S.I. unit, Effect of		-
			,	02	
	16.15		temperature on viscosity, derivation of expression for	02	
		D)	relative viscosity by Ostwald's viscometer method.		
		B)	Application of viscosity.		
	-	Electrochemistry:	Conductance of electrolyte solutions. Specific, equivalent &	0.0	14
	1 - 1		molar conductance. Detn of conductance of electrolyte soln.	02	
			Variation of specific and equivalent Conductance with		
			dilution for strong electrolyte Conductometric titrations,	02	-
	4		Application of Conductometric titrations.		
			Migration of ions under the influence of electric field.		
			Transport number of ions. Determ. of Transport number of	02	
	-		ions by Hottorf's method & Moving boundary method.		
			Kohlrausch's law of independent migration of ions.		
			Determ ⁿ of λ∞ & degree of α dissociation of a week elect.	02	
			Determination of constant of a week electrolyte. Numerical.	02	
		A)	Definition and physical significance of Helmholtz work		
	-	Thermodynamics	function (A) and Gibbs free energy. Change in free energy	02	
		and Equilibrium:	(ΔG) as a criteria of spontaneity and equilibrium.	32	
		4	Variation of free energy G with 'P' & 'T'. Gibbs-		
	Oct		Helmholtz equation in terms of G and its applications.	02	
	Alaka C	/	Partial molal function, chemical potential, derivations of		
			•	02	
		1	Gibb's-Duhem equation. Chemical potential of an ideal gas	03	
	1000		in gaseous mixture.		
			Derivation of Gibbs-Duhem equation. Derivation of Van't		
3			Hoff reaction of isotherm & its application to equil. state.	02	14
	3.4.1	B) Phase	Derivation of Van't Hoff equn & its applications.	01	
	734	Equilibrium:	Numericals.		
	1.0		Immiscible liquids, Nerst distribution law and its		
			application to association and dissociation of solute in one		l .
				02	
			of the solvent Process of extraction, derivation of formula	02	
			of the solvent Process of extraction, derivation of formula for the amount of solute left unextracted after nth	02	1
			of the solvent Process of extraction, derivation of formula for the amount of solute left unextracted after nth extraction.	02	
			of the solvent Process of extraction, derivation of formula for the amount of solute left unextracted after nth extraction. Phase transition- Clausius-clyperon. Partially miscible	_	
			of the solvent Process of extraction, derivation of formula for the amount of solute left unextracted after nth extraction.	02	

Teacher Sign

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Late Ku. Durga K. Banmeru
Science College, Lonar

Department of Chemistry

Teaching Plan Session-2019-20

	Nome	a a C Para Maria	B.ScIII rd Semester-VI th		
Sr.	Month		Mr. Suryakant B. Borul	Requ.	Tota
No.			Topics Names	Lecture	1
4	Feb	Unit IV:	Introduction, spin quantum number, instrumentation, Aspects of		
		A) Nuclear	NMR- number of signals(equivalent & non-equivalent protons),	03	
		Magnetic	Positions of signals(chemical shift), intensities of signals,	02	
		Resonance Spectroscopy:	Splitting of signals (spin-spin coupling), coupling constant, and applications.	03	
N		B)	Introduction, theory, instrumentation-(ion sources),	02	
	J.	Mass	Mass spectra of neopentane and methanol, molecular ion peak,	02	
		Spectrometry:	base peak, metastable peak,		
			Rules of fragmentation, applications.	02	14
5	Feb-	A]	(i) Types of electrode - Standard hydrogen electrode, Calomel	02	
	March	Electrochemi	electrode, Quinhydrone electrode and Glass electrode. Principle		
		. stry:	of Potentiometric titration. Study of acid-base, redox and precipitation titration.		
	S.		(ii) pH of a solution and pH scale. Determination of pH of a solution using hydrogen, quinhydrone and glass electrodes. Advantage and disadvantage of these electrodes. pH-metric titrations. Determination of pka of a weak acid by pH-metric measurement.	02	14
		Berne .	(iii) Concentration cells - Types of concentration cells, concentration cell without transfer and determination of its emf. (iv) Numericals	02	14
			(i) Shell model of a nucleus-Assumptions, evidences for existence of magic numbers, advantages and limitations. (ii) Liquid drop model of a nucleus-Assumptions, similarities between nucleus & liquid drop, advantages & limitations, explanation of nuclear fission reaction on the basis of liquid drop model.	02	
			(iii) Nuclear force and its explanation on the basis of Meson theory. (iv) Characteristics of nuclear reaction, difference between nuclear and chemical reactions. Calculation of Q value of a nuclear reaction. (v) Characteristics of nuclear fission reaction, fission yield. Fission reaction as an alternative source of energy.	02	
		, (81) F	vi) Nuclear fusion reaction - Characteristic of a nuclear fusion reaction. Thermonuclear reactions as a source of energy of sun and other stars. Fusion reactions as a potential future source of energy.	02	
1	1	7 (1) (1) (1) (1) (1) (1) (1) (1) (1) (1)	vii) Applications of radio isotopes in industry, agriculture,	02	

medicines & bio-sciences with two ex. each. (viii) Numericals.

Sr.					Total
No.	Month	Name of Unit	Topics Names	Lecture	Lects.
6	March	Elementary	(i) Limitations of classical mechanics. Plank's quantum theory	02	
		Quantum	(postulates only)		
		Mechanics	Photoelectric effect - Experiments, observation and Einstein's	03	
			explanation. Compton effect and its explanation. (ii) de Broglie		
			hypothesis of matter waves		14
			De-Broglie's equation. Heisenberg's uncertainty principle. (iii)	02	
			Classical wave equation, derivation of time independent		
			Schrodinger's wave equation in one-dimension and its extension		
			to a three-dimensional space.	1	
			Well behaved wave function, physical significance of wave	02	
			function (Born interpretation).		
			(iv) Application of Schrodinger wave equation to a particle in	03	
			one-dimensional box & its extension to a three-dimensional box.		
			Concept of atomic orbital. (v) Numericals	02	-
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Incharge Teacher-Wavhal Kamalakar k.

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Department of Chemistry

Teaching Plan Session-2019-20

B.Sc.-IIIrdSemester-VIth

N	ame	of	Faculty:-	Wavha	ıl Kamı	alakar K.

Sr. No.		Name of Unit	Topics Names		Tota
1	Dec-	A) Kinetic	Types of recetions of a live	Lecture	Lects
-	Jan	Aspects of Metal Complexes:	Types of reactions of coordination compounds. Brief idea about substitution reactions. SN1 dissociative and SN2 associative mechanism of substitution in octahedral complexes. Labile and inert complexes.	03	
		B) Analytical Chemistry: 1. Colorimetry	Factors affecting lability of complexes viz. arrangement of d-electrons (VB theory),. Mechanism of substitution reactions in square planar complexes.	03	
		Spectrophotom etry	Concept of Dmax. Beer-Lambert's law Verification of Beer's law. Block diagrams of colorimeter and spectrophotometer	02	14
		2. Paper Chromatography		02	
			Definition and classification of chromatography. Principle of ifferential migration.	02	
			Principle and technique of paper chromatography, Rf value and factors affecting Rf value	02	
2 .	Jan	A] Organometallic Chemistry :	Definition, nomenclature and classification of organometallic compounds. Metal carbonyls- definition and classification.	02	
			Preparation, properties, structure and bonding in Ni(CO)4, Fe(CO) ₅ , Cr(CO) ₆ . Nature of M-C bond in metal carbonyls.	03	
			Definition and classification. Silicones: preparation, properties structure and bonding and applications.	03	14
		B] Inorganic Polymers:	Phosphonitrile halides polymers- preparation, properties, structure and bonding in cyclic polymers.	02	
		C] Bio-	Essential and trace elements in biological processes.	02	
		Chemistry	Biological role of Na+, K+, Ca2+ and Mg2+ ions. Metalloporphyrins- Haemoglobin and Myoglobin and their role in oxygen transport.	02	
	A.,				-

Sr. No.	Month	Name of Unit	Topics Names	Requ. Lecture	
3	Jan- Feb	A) Electronic Spectroscopy :	Introduction, radiation source, spectral range, types of electronic transitions, chromophore, auxochrome, bathochromic, hypsochromic,	02	
		B) Infrared Spectroscopy	Hyperchromic and hypochromic effects. Applications to the structure determination of compounds like dines, aldehydes, ketones & aromatic systems.	03	14
		C) Purification of Organic	Types of vibrational modes, stretching and bending, spectrum range, radiation source, presentation of IR spectrum, characteristic frequencies of various groups,	03	
		Compounds:	Finger print region. Structure of organic compounds (IR spectra of simple compounds: H ₂ O, CO ₂ , CH□CH, CH ₃ COCH ₃).	02	
			Sublimation, crystallization.	02	
			Paper chromatography: Principle and Rf value.	02	

Incharge Teacher-Wavhal Kamalakar k.

Late Ku. Durga K. Banmeru Sciennachteger from क क.कु.दुर्गा क.वनमेरु विज्ञान नहारि

Department of Chemistry

Teaching Plan Session-2019-20

B.Sc.-IIIrd Semester-Vth

Name of Faculty:- Mr. Suryakant B. Borul

		Month	Name of Unit	Topics Names	Requ.	Total
	No.				Lect.	Lect.
	3	July		Nomenclature, Pyrrole: Synthesis from acetylene, succinimide		
			compounds	and furan, Basicity, acetaldehyde, acetone, ethylene oxide &	02	
				CO ₂ .		
		1		Electrophilic substitution reactions (orientation) - nitration,		
				sulphonation, acetylation and halogenation, Molecular orbital	02	14
				structure.		
				Pyridine: Synthesis from acetylene and pentamethylene		
				diamine hydrochloride, Basicity, Electrophilic substitution	03	
	2		ř.	reactions (orientation) - nitration, sulphonation, Nucleophilic		
				substitution reactions (orientation)- with NaNH2, C6H5Li and		
		100 1. 4.	B]	кон.	1	
Ď,			Organometallic	Grignard reagents: Methyl magnesium bromide- Synthesis	02	
			compounds::	from methyl bromide (only reaction) Synthetic applications:		
	ī		,	Electrophilic substitution reactions-formation of alkanes,		
				alkenes, higher alkynes and other organometallic compounds,		
				Nucleophilic substitution reactions- Reaction with aldehydes &	02	
6		1		ketones, ethylene oxide, acetyl chloride, methyl cyanide &		
				CO ₂ .		
		r.		Methyl lithium-Synthesis and reaction with water,		İ
The state of				formaldehyde, acetaldehyde, acetone, ethylene oxide and CO ₂ .	03	

110.	wionth	Name of Unit	Topics Names	Requ. Lect.	Total Lect.
4	Aug	A] Dyes:	Classification on the basis of structure and mode of application,	03	Dect.
			Preparation and uses of Methyl orange,		
	Á		Crystal violet, Phenolphthalein, Alizarin and Indigo.	02	
		B] Drugs:	Analgesic and antipyretics: Synthesis and uses of	03	
			phenylbutazone. Sulpha drugs: Synthesis and uses of		
			sulphanilamide and sulphadiazine.		
			Antimalarials: Synthesis of chloroquine from 4,7-	02	
			dichloroquinoline and its uses.		
			Insecticides:Synthesis and uses of malathion. Herbicides:	03	
		C] Pesticides:	Synthesis and uses of 2,4-dichloro phenoxy acetic		
		C) I esticides:	acid (2,4-D)		
			Fungicides: Synthesis and uses of thiram (tetramethyl thiuram	02	
			disulphide		
1	Aug- I	Photochemistry	(i) Photochemical and thermal reactions. (ii) Lambert's law -	02	
	Sept		Statement and derivation.	02	į.
	1		Beer's law - Statement and derivation. Reasons for deviation from Beer's law. (iii) Laws of photochemistry.	02	
			(iv) Quantum yield of photochemical reaction. Reasons for	02	
			high and low quantum yield. Experimental determination of	-	
		-	quantum yield. Photosensitized reaction.		
			(v) Kinetics of photochemical decomposition of HI. (vi)	02	
		-	Fluorescence and Phosphorescence. Selection rule for electronic transition. Internal conversion and		
			inter system procesing Familians, c. c.	03	
			phosphorescence on the basis of Joblonski diagram		
			(vii) Chemiluminescence and Bioluminescence with examples.	03	\dashv
			(viii) Numericals.		

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Late Ku. Durga K. Banmeru Science College, Lonar Dist-Buldana Department of Chemistry

Department of Chemistry Teaching Plan Session-2019-20 B.Sc.-IIIrd Semester-Vth

N	ame of	Facult	v:- Mr.	Kamalakar	K.	Wavhal

	-	racuity wir. r	Kamalakar K. Wavhal		
Sr. No.	Month	Name of Unit	Topics Names	Requ. Lect.	
1	July	Coordination Compounds-I:	Important terms namely-molecular or addition compounds, double salts, complex ion, ligand, coordination number, central metal ion etc. Werner's theory of coordination and experimental evidences on the basis of conduction data and formation of AgCl	03	
			precipitate in case of cobaltamines. Sidgwick's electronic interpretation & its drawbacks. EAN rule. IUPAC rules for nomenclature of coordination. Structural linkage & coordination isomerism in complexes.	03	
			Geometrical isomerism in octahedral complexes of type Ma4b2, Ma4bc, Ma3b3, M(AA)2b2. Square planar complexes of type Ma2b2 and Ma2bc. Optical isomerism in octahedral complexes of type Ma2b2c2, Mabcdef, M(AA)3, M(AA)2b2	03	14
		B) Chelates:	Tetrahedral complexes of type Mabcd and M(AA)2. Optical isomerism in square planar complexes. VBT as applied to structure and bonding in complexes and Magnetic properties of complexes of 3d series elements. Limitations of VB theory. Definition, classification & applications of chelates	03	
	July- Aug	A] Crystal Field Theory	Postulates of CFT, Crystal field splitting in octahedral, distorted octahedral, square planar tetrahedral complexes,	03	
	-	(CFT):	concept of CFSE, high spin and low spin complexes on the basis of $\Delta 0$ and pairing energy, distribution of electrons in t2g	03	
		B] Electronic	orbitals in high spin and low spin octahedral complexes. Factor affecting magnitude of CF splitting in octahedral complexes.	02	14
	, ,	Spectra of Transition Metal Complexes	Introduction to spectra, selection rules for d-d transitions, spectroscopic terms-determination of ground term symbols for d1 to d10, spectra of d1 and d9 octahedral complexes,		
			Orgel diagram for d1 and d9 states, electronic spectrum of [Ti(H ₂ O) ₆] ³⁺ complex ion. Spectrochemical series.	03	

6	6				
0	Sept- Oct	Molecular Spectroscopy	(i) Electromagnetic radiation, characteristics of electromagnetic radiation in terms of wavelength, wave number, frequency and energy of photon. Spectrum of electromagnetic radiation. (ii) Types of spectra - Emission and absorption spectra, atomic and molecular spectra, line and band spectra	03	
			(iii) Translational, vibrational, rotational and electronic motion. The degree of freedom in each motion. (iv) Energy level diagram of a molecule indicating electronic, vibrational and rotational transitions. (v) Condition for pure rotational spectrum, selection rule for rotational transition.	02	
			Derivation of expression for moment of inertia of a diatomic rigid rotor. Isotope effect. Applications of microwave spectroscopy for the determination of moment of inertia and bonding. (vi) Condition for exhibiting vibrational spectra (i.e. IR active molecule),	03	
			selection rule for vibrational transition. Vibrational energy levels of a simple harmonic oscillator. Zero point energy, position of a spectral line. Determination of force constant of a covalent bond.	02	
			(v) Raman effect - Raman's spectrum of a molecule. Condition for exhibiting Raman spectrum (i.e. Raman active molecule), selection rule for rotational transitions.	02	1
			Pure rotational spectrum of diatomic molecule, vibrational Raman spectrum of a diatomic molecule. (vii) Numericals.	02	

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Department of Chemistry Teaching Plan Session-2019-20

Name of Faculty:- Prof. Suryakant B. Borul

No	Month.		Topics Names	1 -	Total Lects
1		A] Alkyl Halides:	Introduction, Synthesis of vinyl chloride from acetylene and	02	
			allyl chloride from propylene,	02	
	Dec-		Reactions of both with aqueous and alcoholic KOH,	02	The state of the s
	19		Comparison of reactivity of vinyl an allyl chloride.	02	
	Jan-		Synthesis chlorobenzene from benzene, phenol and benzene		
	20	B] Aryl Halides:	diazonium chloride, Synthesis of benzyl chloride from	02	14
			toluene and benzyl alcohol,		
			Reactions of both with aqueous KOH, NH3 and sodium		
			ethoxide, Comparison of reactivity of chlorobenzene and	02	
			benzyl chloride. Benzyne intermediate mechanism.		
			Dihydric alcohols: Ethylene glycol- Preparation from	02	100
		C] Alcohols:	ethylene, ethylene chloride and ethylene oxide,	02	
			R eactions- with Na, PCI5, CH3COOH, ZnCl2, conc.		
	1		H2SO4 and dehydration with heat. Trihydric alcohols:	02	
			Glycerol- Preparation from propylene,		
			Reactions- with Na, HCl, PCl5, HNO3 and KHSO4.	22	
			Pinacol- pinacolone rearrangement (mechanism).	02	
2		A] Phenols:	Introduction, Methods of formations a) from aniline	02	
			b) from Cumene. Acidic character,		
			Reaction of Phenols- a) Carboxylation (Kolb's reaction), b)	02	
	Jan		Fries Rearrangement,		To be a second
			c) Claisen Rearrengement d) Reimer-Tiemann reaction.	02	
,			Introduction, Diethyl ether- Preparation by Williamson's	02	
			synthesis and continuous etherification process,		14
		B] Ethers:	Reactions-with cold and hot HI	02	
			Introduction, Synthesis of ethylene oxide from ethylene and	02	
		C] Epoxides:	styrene oxide from styrene.	02	No. of the last of
	8.		Ring opening reactions of both catalyzed by acid and alkali.		The spirit Library
				02	
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Sr. No.	Month	Name of Unit	Topics Names	Requ. Lect.	
	Jan- Feb	Chemical Kinetics	Explanation of terms like rate of reaction, order of a reaction and molecularity. Definition zero, first and second order reaction. Half life period of a reaction.	02	
			Derivation of rate equation for first and second order reaction with equal initial concentration and different initial concentration of a reactant. Characteristics of first and second order reaction.	03	14
			Examples of first and second order reaction viz. the reactions (i) decomposition of H_2O_2 , (ii) reaction between $K_2S_2O_8$ and KI ,	03	
			(iii) Hydrolysis of methyl acetate catalyzed by acid, (iv) saponification of ethyl acetate by NaOH and (v) inversion of cane sugar. Determination of order of a reaction by integration, graphical, equifractional change, etc. method.	03	
			Effect of temperature on reaction rates. Arrhenius equation, activation energy and its determination using Arrhenius equation. Numericals.	03	
4	Feb	UNIT-I	Defn, polarising power, polarizability. Effect of polarization on		
		A] Polarisation-	nature of bond. Fajan's rules of polarisation & its applications.	02	
		B] Covalent bonding-	Directional nature of covalent bond. Hybridization, types of hybridization to explain geometries of NH ⁴⁺ ion, PCl ₅ , SF ₆ & IF ₇ .	02	1.4
		C] Intermolecular forces-	Dipole-dipole, dipole-induced-dipole, induced dipole-induced dipole interactions. Ion - dipole interactions.	03	14
	1	Base-	Theory of solvent sys. & Lux-Flood concept of acids & bases.	03	
			Hard and soft acids and bases. Pearsons HSAB principle with impapplications.	04	

5r. <u>No</u> 5	Montl		Topics Names		Total Lects
5	Feb- Marcl	A]Electrical Properties:	 (i) Polar and non-polar molecules. Dipole moment. (ii) Induced polarization & orientation polarization. Clausius-Mossotti equation (iii) Measurement of dipole moment by temperature and 	03	Lects
			refractivity methods. (iv)Applications of dipole moment for the determination of molecular structure. i.e. percentage ionic character of covalent bonding, molecular geometry, cis-trans isomers, ortho, meta and para isomers of a disubstituted benzene.	03	
	1	B]Magnetic Properties:	(i) Paramagnetic and diamagnetic substances, origin of paramagnetism, diamagnetism, ferromagnetism and antiferromagnetism.(ii) Volume, specific, mass and molar susceptibility. Relationship between.	03	
			(iii) Relationship between magnetic moment and number of unpaired electrons. (iv) Gouy's balance method for determination of magnetic susceptibility.	02	
			(v) Application of magnetic moment in the determination of molecular structure.(vi) Numericals.	02	
6		A] P-Block Elements-	Comparative study of 16 th and 17 th group elements with reference to electronic configuration,	02	
	March	rch	Ionisation energy & oxidation states. Oxidising properties of halogens with reference to oxidation potential.	02	
		B] Noble Gases-	Basic properties of halogens with special reference to iodine. Interhalogen compounds. Introduction to fluorocarbons.	02	
			Inertness of noble gases. Compounds of noble gases-only str. & bonding in XeF ₂ , XeF ₄ , XeOF ₄ , XeO ₂ F ₂ XeO ₃ and XeO ₄	02	14
		C] Non-aqueous Solvents-	Requirements of a good solvent. Water as a universal solv. Physical prop of solvents namely liq. range, dielectric constant, dipole moment, heat of vaporisation & solubility behaviour.	02	
			Classification of solvents. Reactions in liquid ammonia acid base, precipitation, redox, solvolysis	02	
			solutions of metals in liquid ammonia.	02	
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Late Ku. Durga K. Banmeru Science College, Lonar Dist-Buldana Department of Chemistry

Department of Chemistry Teaching Plan Session-2019-20 B.Sc.-IInd Semester-IVth

Name of Faculty:- Mr. Shivshankar P. More

Sr. No.		Name of Unit	Topics Names	Requ. Lecture	Tota
1	Dec- Jan	Colligative	(i) Definition and examples of colligative properties.	02	
	oan .	Properties of Dilute Solutions:	(ii Elevation of boiling point, thermodynamic derivation of	02	
		Share Solutions.	the relationship between elevation of boiling point		
			and molar mass of a non-volatile solute.		
			Cotrell's method for determination of elevation of boiling	02	
				02	
			point.		14
			(iii) Depression of freezing point, thermodynamic	02	14
			derivation of the relationship between depression of		-
			freezing point and molar mass of a non-volatile solute.		
			Rast's method for determination of depression of freezing	02	
			point.		
	-		(iv) Abnormal behavior of solution. Van't Hoff's factor 'i'.	02	
			Determination of degree of association and dissociation	02	
			from Van't Hoff's factor(v) Numerical.	02	
\dashv	200		nom van trion stactor(v) rumencar.		
2	Jan		Symmetry in crystal, plane of symmetry, axis of	02	
		Crystalline state	symmetry and point of symmetry. Law of constancy of		
			interfacial angles.		
	7		Elements of symmetry in cubic crystals. Laws of	02	
- Ja			symmetry. Law of rational indices, Weiss and Miller		14
Til.		-	indices of a lattice planes, calculation of interplaner distance d(h,k,l) from Miller indices in a cubic system.	ı	
			Seven crystal systems and fourteen Bravais lattices,		
		4.,	Bravais lattices of cubic system. Simple cubic system	02	
STATE OF			(S.C.C.), body centered cubic system (B.C.C.) and face		
1			centered cubic system (F.C.C.).		
		4	Calculation of number of constituent units in S.C.C.,		
		L	B.C.C. and F.C.C.	02	
			Ratio of interplaner distances for 100, 110 and 111 lattice plane in S.C.C., B.C.C. and F.C.C.	00	
			Derivation of Bragg's equation for X-ray diffraction,	02	
			Bragg's X-ray spectrometer method for the determination	02	
	dia.		of crystal structure of NaCl and KCl.	02	
			Anomalous behaviour of KCl towards X-ray. Numericals.	02	

Sr. No.	Month	Name of Unit	Topics Names		Total
J	Jan-Feb	A] Chemistry of elements of transition series:	of transition elements. Comparative study of first transition series elements (3d) with reference to following properties: (i) Electronic configuration	02	
			(ii) Atomic and ionic size (iii) Ionization energy (iv) Metallic nature (v) Oxidation states (vi) Magnetic properties (vii) Color of salts (viii) Catalytic properties (ix) Complex formation behaviour.	03	14
		DI E. d.	Study of 4d and 5d series elements-Electronic configuration. Comparison of 3d series elements with 4d and 5dseries	03	
	_	B] Extraction of elements:	elements with respect to size, oxidation states, magnetic properties and color.		
			Principles involved in extraction of elements. Major methods of extraction of elements. Factors affecting choice of extraction method. Thermodynamics of reduction processes-Ellingham diagrams for oxides and importance of this diagram	03	X
4	Feb	A] Inner transition elements:	Definition, Lanthanides and Actinides. Comparative study of Lanthanides with respect to following properties:(i) Electronic configuration	02	
			(ii) Atomic and ionic radii lanthanide contraction definition, cause and effect of lanthanide contraction	02	
			(iii) Oxidation states (iv) Magnetic properties (v) Color of salts		14
			vi) Complex formation behavior. Occurrence of lanthanides. Isolation of lanthanides by ion	02	
		Principles of Metallurgy:	exchange method. Actinides- Electronic configuration and exchange method. Actinides- Electronic configuration and exchange method. Actinides- Electronic configuration and exchange method. Actinides- Electronic configuration and exchange method. Actinides- Electronic configuration and exchange method. Actinides- Electronic configuration and exchange method. Actinides- Electronic configuration and exchange method. Actinides- Electronic configuration and exchange method. Actinides- Electronic configuration and exchange method. Actinides- Electronic configuration and exchange method.	03	
AL CALLED		e	Definition of metallurgy, steps in metallurgy. Ore dressing by gravity separation, froath floatation and electromagnetic separation. Calcinations, roasting, smelting and refining of metals. Meaning of termshydrometallurgy and pyrometallurgy.	03	

r. lo.	Month	Name of Unit	Topics Names	Regu. Lecture	Tota
5	Feb-	A] Aromatic	Nitrobenzene: Synthesis from benzene, Reduction of	03	
	March	nitro compounds:	nitrobenzene in acidic, neutral and alkaline medium.		and the second
		B] Amino	Basicity and effect of substituents. Methods of preparation	02	40 maren
		. 1 .	of aniline from nitrobenzene, Reactions: with acetyl and		14
	- 1		benzoyl chlorides, Br2(aq) and Br2(CS2),		700000000000000000000000000000000000000
		C] Diazonium	Carbylamine reaction, alkylation, Hoffmann's exhaustive	02	
		Salts:	methylation and its mechanism.		
			Preparation benzene diazonium chloride, Synthetic	03	
			applications- Preparation of benzene, phenol,		
		D] Amino acids and Proteins:	halobenzene,nitrobenzene,benzonitrile, coupling with		
			phenol and aniline.		
			Classification, Strecker and Gabrial phthalimide	02	
			synthesis, Zwitterion structure, Isoelectric point,		100
			peptide synthesis, Structure determination of polypeptides	02	
			by end group analysis.		
6		A] Polynuclear	Naphthalene - Haworth synthesis, orbital picture,	02	
	March	hydrocarbons:	Reactions – electrophilic substitution		
	e.		Preparation of naphthols from naphthalene sulphonic	02	
	217	B] Reactive	acids and naphthylamines from naphthols.		14
di.		methylene	Malonic Ester: Synthesis from acetic acid, Synthetic		
	V.	compounds:	applications- Synthesis of acetic acid, succinic acid,	03	
			glutaric acid, crotonic acid and malonyl urea.		
			Acetoacetic ester: Synthesis from ethyl acetate, Synthetic		
1			applications- Synthesis of acetic acid, propionic acid,	03	
1000		C]	isobutyric acid, succinic acid, glutaric acid, crotonic acid,		
		Carbohydrates:	acetyl acetone and 4-methyl uracil.		
			Constitution of glucose, cyclic structure, Pyranose and	02	
			Furanose structure, Epimerization, conversion of glucose		- A
			to fructose and vice-versa,		
					ē.
			Introduction to fructose, ribose, 2- deoxyribose, maltose,	02	

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Late Ku. Durga K. Banmeru
Science Collegenta विभाग

Department of Chemistry Teaching Plan Session-2020-21 B.Sc.-Ist Semester-Ist

Name of Faculty:- Mr. Suryakant B. Borul

No.	Month		Topics Names	Required Lecture	
1	- 7.	A) Electronic	Inductive effect, electromeric effect, Resonance &	02	
		displacements:	Hyperconjugation (Definition and Applications)		
	July	B) Reactive	Carbocations, Carbanions and Free radicals, their	02	
		Intermediates:	generation stability & reactions.		
			Alkanes- Methods of formation: i) Wurtz reaction and	03	
		C) Aliphatic	ii) Corey-House reaction, reactions i) Halogenation		14
		Hydrocarbon:	mechanism ii) Aromatisation.		
			Alkenes Method of formation mechanism- i)	02	
			dehyhrogenation of alkyl halides (E ₁ & E ₂) ii)		
			Dehydration of alcohols.		
			Reactions-Electrophilic and free radical addition of HX	01	
			and X ₂ (with mechanism)		
			Alkynes- Preparations from vicinal and germinal	02	
			dihalides, Reaction-Hydrogenation.	02	
			Alkadienes:-Classification 1, 3-Butadiene- Preparation	02	_
			from cyclohexene, reactions-Addition of H ₂ , Br ₂ & HBr	02	1
2		Aromatic	Introduction, Nomenclature and Isomerism of Aromatic	02	
	July-	Hydrocarbons	Compounds.	02	-
	Aug	A)	Structure of Benzene of Benzene: Kekule structure and	02	
,			Molecular orbital structure.	02	
			Aromaticity and Huckel's rule Aromatic,		
		B)	antiaromatic and non-aromatic system	02	- '-
		1.14	Mechnism of Electrophilic Aromatic Substitution:-	02	
		many y	Nitration Friedal Care All Land	- 03	14
		C)	Nitration, Friedal Craft Alkylation and Acylation.	-	
			Nuclear and side chain halogenations, Birch reduction.	01	
-		D)	Orientation:- Effect of substituent group. Activating and		
			deactivating group. Theory of reactivity and orientation	02	114
		9 - 1	on the basis of inductive and resonance effects (-CH ₃ , -		* : -
1		17 T	OH, -NO ₂ and -Cl group).	1	

No.	Month	Name of Unit	Topics Names	Requ. Lect,	2.75
3	Aug	Al Periodic Properties:	Atomic and ionic radii. Types of atomic radii. Periodic trends in atomic and ionic radii. Ionization energy, electron affinity and electronegativity.	03	,
			Effect of ionization energy and electronegativity on different properties of elements namely metallic and non- metallic character, relative reactivity, oxidizing and reducing properties., Scales of electronegativity Pauling	03	14
			scale and Mulliken Scales. Electronegativity and partial ionic character of a covalent bond.		
		B] Ionic bonding:	Screening effect, screening constant and effective nuclear charge. Slater's rules for calcul. screening constant. Problems.	02)
			Definition of ionic bond, types of cations. Factors affecting ionic bond formation. Born Lande equation to cal. lattice energy. Born-Haber's cycle to determine lattice energy	03	
	ē		Solvation and salvation energy, factors affecting salvation energy, Det ⁿ of salvation energy. Solubility of ionic solids, lattice energy and salvation energy.	03	
4	Aug- Sept	Thermodynamics	Adiabatic and Isothermal processes. Work done in Adiabatic and isothermal processes, relationship between pressure, volume and temperature.	03	
			First law of Thermodynamics and its limitations, Need of Second law.	02	14)
			Carnot's heat engine, derivation of expression for the work done and efficiency of Carnot's engine. Statements of Second law of thermodynamics.	03	
			Concept of Entropy, Physical significance of Entropy, Derivation of expression for the Entropy change for an ideal gas Entropy change for an ideal gas for isothermal, isobaric and isochoric processes,	03	
			Entropy of fusion, sublimation, vapourization, transition and its calculations. Entropy change as a criterion for spontaneity. Numericals.	03	

No.		rame of Unit			
5	nit i	A] S-Block	Topics Names	00	
		element:	Comparative study of 1st and 2nd	Requ.	Total
			Comparative study of 1st and 2nd group elements with	03	Lects.
	Sept-		oxidation states.		
	Oct	¥	Reactivity and flame colouration. Diagonal relationship between Li and Mg		
		B] P-Block	Line.	02	
		element:	Comparative study of 13th, 14th and 15th group elements with reference to electronic configuration,	03	
	-1		ionisation energy, oxidation states. Concept of inert pair effect.		14
.	1 7		Diagonal relationship between Be and Al. Structure of diamond	03	
			Brapinic.	,	
			Abnormal behaviour of nitrogen. Hydrides of boron-		-
			proparation (from BCl3 and NaBH4two), properties (action of	03	
			meat, water, alkali and oxygen), structure and honding in		
			diborane. Carbides, types of carbides and fullerenes.		
6	Oct	A] Gaseous	Postulates of Kinetic theory of gases, Derivation of Kinetic gas		
	-	State:	equation.		
			RMS, Average and Most probable velocities and their	02	_
			relationship. Maxwell-Boltzmann distribution law of molecular	03	
			velocities (only qualitative treatment), Mean	0.3	
			free path, collision number and collision diameter.		
			Deviation of real gases from ideal gas behavior. Vander waal's	-	
P			equation of state and its derivation for real gases.	02	
			Critical phenomenon, Andrew's experiment - isotherm of CO2.	-	14
			Critical state, critical constant, Pc, Vc and Tc in terms of	03	
- m*			Vanderwaal's constants 'a' and 'b'. Law of		
fa s			Corresponding state. Numericals.		
The Land		DI DI DI	Statement of phase rule, explanation of phase, number of	-	-
		B] Phase Rule:	Components and degree of freedom.	02	
	(Fr		Application of phase rule to water and sulfur system.	02	
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Late Ku. Durga K. Banmeru
Science College, Lonar.

Department of Chemistry
Teaching Plan Session-2020-21
B.Sc.-IInd Semester-IIIrd

Name of Faculty:-Mr. Shivshankar P. More

Sr. No.	Month	Name of Unit	Topics Names	Requ. Lecture	Tot:
- 1	June- July	A] Aldehydes and Ketones:	Preparation of acetaldehyde from ethanol, ethylidene chloride and acetylene. Preparation of benzaldehyde from benzene (Gattermann-Koch reaction) and toluene. Preparation of acetone from isopropyl alcohol,	02	
			isopropylidene chloride and propyne. Preparation of acetophenone from benzene and ethyl benzene.	02	
,			Structure of carbonyl group, acidity of á-hydrogen in carbonyl compounds. Reactions of aldehydes &/or ketones: Cannizaro's,	02	
1			Reformatsky, Perkin with mechanism, Mannich reaction, Benzoin and Aldol condensations. Clemmensen, Wolf- Kishner, MPV and LiAlH4 reductions.	02	
		B] Carboxylic acids:	Structure and reactivity of carboxylic groups. Acidity of carboxylic acids, effects of substituents on acids strength. Oxalic acid: Preparation from ethylene glycol and cyanogen. Reactions: Reaction with ethyl alcohol, ammonia, glycerol and action of heat. Lactic acid: Preparation from acetaldehyde and pyruvic acid.	02	14
			Reactions: Reaction with ethanol,PCl ₅ , action of heat, oxidation and reduction. Benzoic acid: Preparation from toluene, benzyl alcohol, phenyl cyanide and benzamide.	02	
			Reactions: Reaction with ethanol, PCl ₅ and ammonia. Salicylic acid: Preparation by Reimer-Tiemann reaction. Reactions: Reaction with CH ₃ COCl, CH ₃ OH and C ₆ H ₅ OH.	02	
Jı	_	A] Optical isomerism:	Element of symmetry, chirality, asymetric carbon atom, enantiomers, diastereoisomers,	02	
		PT	relative and absolute configurations, DL and RS nomenclature, racemisation and resolution. Cis-trans & E-Z nomenclature, Methods of structure	02	
	- 1	-	determination.	03	
	(somerism: C] Conformational	Bayer's Strain theory and its limitations. Stability of cycloalkanes, conformational isomers of ethane	03	14
	1	somerism:	conformational isomers of, n-butane & cyclohexane, their energy level diagrams.	02	
- 8			Newman & Sawhorse projection formulae.	02	

. 1	Month	Name of Unit	Topics Names	Requ Lect.	
	Aug	A] Covalent Bonding:	Molecular Orbital Theory. Postulates of MO theory. LCAO approximation. Formation of bonding and antibonding MOs. Rules for LCAO. MO energy level diagram. MO structure of homonuclear diatomic molecules of namely He ₂ , H ₂ , N ₂ and O ₂ . Stability sequence of species of O2	03	14
		B] Metallic Bonding:	Paramagnetic nature of O2. MO structure of heteronuclear diatomic molecules viz. NO, HF &CO. properties of CO viz. — triple 15 16 bond, almost nonpolar nature, edonor & acceptor behaviour. Comparison of VB and MO theories.	03	
		bonuing:	Free electron theory and properties of metals such as electrical and thermal conduction, malleability, ductility and metallic lusture. VB theory or Resonance theory of metals. Band theory to explain nature of conductors, insulators and semiconductors.	03	
		C	Various rules under VSEPR theory to explain molecular geometry various rules- BeCl ₂ , BF ₃ , CH ₄ , NH ₄ + , PCl ₅ , SF ₆ , IF ₇ , SnCl ₂ , NH ₃ , H ₂ O, SF ₄ ,	03	
		C] VSEPR Theory:	Various rules under VSEPR theory to explain molecular geometry Limitations of VSEPR theory.	02	
4	Aug- Sept	Theory of Quantitative Inorganic Analysis	(a) Introduction:-Volumetric analysis, titrant, titrate, end point, equivalence point, indicator etc. Requirements of volumetric analysis. Definition of standard solution, primary standard substance.	02	
	A-	A] Volumetric Analysis:	Terms to express concentrations namely- molarity, normality, molality, mole fraction and percentage. (b) Acid-Base titrations:- Types of acid base titrations. pH variations during acid base titration. Acid base indicators. Choice of suitable indicators for different acid base titrations.	02	14
			(c) Redox Titrations:-Pinciples involved in redox titrations. Brief idea about use of KMnO ₄ , K ₂ Cr ₂ O ₇ as oxidants in acidic medium in redox titrations.	02	
		B] Gravimetric	Use of I_2 in iodometry & iodimetry. Redox indicators-external & internal indicators. iodometric estimation of Cu (II).	02	
		Analysis:	Definition. Theoretical principles underlying various steps involved in gravimetric analysis with reference to estimation of barium as BaSO ₄	04	
			Coprecipitation and post precipitation	02	

	Mon	nt Name of Unit	Topics Names	Requ.	Total
No	_		Topics Names	Lect.	Lects.
5	5 2	A) Liquid State:-	Surface tension – Determination and its S.I. unit, Effect of		
	Sep	ot	temperature on surface tension, Derivation of expression		9 ×
			for relative surface tension by Drop number method.	02	
			Application of surface tension.	1	
			Viscosity- Determination and its S.I. unit, Effect of		
		1	temperature on viscosity, derivation of expression for	02	
	-		relative viscosity by Ostwald's viscometer method.		
		B)	Application of viscosity.		
		Electrochemistry:	Conductance of electrolyte solutions. Specific, equivalent &		14
			molar conductance. Detn of conductance of electrolyte soln.	02	-
			Variation of specific and equivalent Conductance with		
1	1		dilution for strong electrolyte Conductometric titrations,	02	
			Application of Conductometric titrations.		
			Migration of ions under the influence of electric field.		
			Transport number of ions. Determ. of Transport number of	02	
-			ions by Hottorf's method & Moving boundary method.		1 1
			Kohlrausch's law of independent migration of ions.		
- 1			Determ ⁿ of $\lambda \infty$ & degree of α dissociation of a week elect.	02	1
		-	Determination of constant of a week electrolyte. Numerical.	02	
	6	(A)	Definition and physical significance of Helmholtz work		
		Thermodynamics	function (A) and Gibbs free energy. Change in free energy	02	
		and Equilibrium:	(ΔG) as a criteria of spontaneity and equilibrium.		
			Variation of free energy G with 'P' & 'T'. Gibbs-		1
		Oct	Helmholtz equation in terms of G and its applications.	02	
	_		Partial molal function, chemical potential, derivations of] [
			Gibb's-Duhem equation. Chemical potential of an ideal gas	03	
		P = =	in gaseous mixture.		
. 1			Derivation of Gibbs-Duhem equation. Derivation of Van't		
L	1 1		Hoff reaction of isotherm & its application to equil. state.	02	14
		B) Phas	T TP	01	
		Equilibrium:	Numericals.		
	-		Immiscible liquids, Nerst distribution law and its	1	
			application to association and dissociation of solute in one		
			of the solvent Process of extraction, derivation of formula		-
	-	2	for the amount of solute left unextracted after nth		
			extraction.		
	3.4		Phase transition- Clausius-clyperon. Partially miscible		
	-		liquids- Phase diagram of phenol-water, triethyl amine-	02	1 12
			water & nicotine–water systems. Numerical.		
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Late Ku. Durga K. Banmeru Science College, Lonar

Late Ku. Durga K. Banmeru Science College, Lonar Dist-Buldana Department of Chemistry Teaching Plan Session-2020-21 B.Sc.-IIIrd Semester-Vth Name of Faculty:- Mr. Kamalakar K. Wavhal

No.		Name of Unit	Topics Names	Requ. Lect.	
1	July	Coordination Compounds-I:	Important terms namely-molecular or addition compounds, double salts, complex ion, ligand, coordination number, central metal ion etc. Werner's theory of coordination and experimental evidences on the basis of conduction data and formation of AgCl precipitate in case of cobaltamines. Sidgwick's electronic interpretation & its drawbacks. EAN rule.	03	
)			IUPAC rules for nomenclature of coordination. Structural linkage & coordination isomerism in complexes.		
		B) Chelates:	Geometrical isomerism in octahedral complexes of type Ma4b2, Ma4bc, Ma3b3, M(AA)2b2. Square planar complexes of type Ma2b2 and Ma2bc. Optical isomerism in octahedral complexes of type Ma2b2c2, Mabcdef, M(AA)3, M(AA)2b2 Tetrahedral complexes of type Mabcd and M(AA)2. Optical isomerism in square planar complexes. VBT as applied to structure and bonding in complexes and Magnetic properties of complexes of 3d series elements. Limitations of VB theory.		14
			Definition, classification & applications of chelates	02	
2	July- Aug	A] Crystal Field Theory (CFT):	Postulates of CFT, Crystal field splitting in octahedral, distorted octahedral, square planar tetrahedral complexes,		
			concept of CFSE, high spin and low spin complexes on the basis of $\Delta 0$ and pairing energy, distribution of electrons in t2g		
		B] Electronic	orbitals in high spin and low spin octahedral complexes. Factor affecting magnitude of CF splitting in octahedral complexes.		14
		Spectra of Transition Metal Complexes	Introduction to spectra, selection rules for d-d transitions, spectroscopic terms-determination of ground term symbols for d1 to d10, spectra of d1 and d9 octahedral complexes,		
			Orgel diagram for d1 and d9 states, electronic spectrum of $[\mathrm{Ti}(\mathrm{H_2O})_6]^{3+}$ complex ion. Spectrochemical series.	03	

15		Name of Unit	Topics Names	Requ. Lect.	Tota Lect
	Month	Name of Unit	i form contylene succinimide		
+	Aug	Al Heterocyclic	Nomenclature, Pyrrole: Synthesis from acetylene, succinimide	02	
	Aug	compounds	and furan, Basicity, acetaldehyde, acetone, ethylene oxide &	02	
		Compounds	COs		
	L		Electrophilic substitution reactions (orientation) – nitration,		
			sulphonation, acetylation and halogenation, Molecular orbital	02	14
		3	structure.		
			Pyridine: Synthesis from acetylene and pentamethylene	03	
			diamine hydrochloride, Basicity, Electrophilic substitution	03	ŕ
			reactions (orientation) - nitration, sulphonation, Nucleophilic		
			substitution reactions (orientation)- with NaNH2, C6H5Li and		
		B	кон.		
		Organometallic		02	
		compounds::	from methyl bromide (only reaction) Synthetic applications:		
		compounds			
			Electrophilic substitution reactions-formation of alkanes,		-
			alkenes, higher alkynes and other organometallic compounds,		
			Nucleophilic substitution reactions- Reaction with aldehydes &	02	
			ketones, ethylene oxide, acetyl chloride, methyl cyanide &		
			CO ₂ .		
			Methyl lithium-Synthesis and reaction with water,	1:	1
			formaldehyde, acetaldehyde, acetone, ethylene oxide and CO ₂ .	03	
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4	Aug-	A] Dyes:	Classification on the basis of structure and mode of application,	03	
	Sept		Preparation and uses of Methyl orange,	-	
			Crystal violet, Phenolphthalein, Alizarin and Indigo.	02	
			Analgesic and antipyretics: Synthesis and uses of	03	-
			phenylbutazone. Sulpha drugs: Synthesis and uses of		
		Di Denga			1
		B] Drugs:	sulphanilamide and sulphadiazine.		1
			Antimalarials: Synthesis of chloroquine from 4,7-	02	
			dichloroquinoline and its uses.		-
	j	* *	Insecticides:Synthesis and uses of malathion. Herbicides:	03	-
		C] Pesticides:	Synthesis and uses of 2,4-dichloro phenoxy acetic		_
			acid (2,4-D)		
			Fungicides: Synthesis and uses of thiram (tetramethyl thiuram	02	-
			disulphide	02	
		The William	distribute		

Sr.	Month	Name of Unit			
No.	Olien	ivame of Onit	Topics Names	Requ.	Total
5	Sent-	Photochemistry		Lect.	Lect.
	Oct	notoenemistry	Statement and derivation.	02	
			Beer's law - Statement and derivation. Reasons for deviation from Beer's law. (iii) Laws of photochemistry.	02	
	-8	*	(iv) Quantum yield of photochemical reaction. Reasons for high and low quantum yield. Experimental determination of quantum yield. Photosensitized reaction.	02	
			(v) Kinetics of photochemical decomposition of HI. (vi) Fluorescence and Phosphorescence.	02	
			Selection rule for electronic transition. Internal conversion and inter-system crossing. Explanation of fluorescence and phosphorescence on the basis of Joblonski diagram	03	
0			(vii) Chemiluminescence and Bioluminescence with examples. (viii) Numericals.	03	
	6 O	ct Molecular Spectroscopy	(i) Electromagnetic radiation, characteristics of electromagnetic radiation in terms of wavelength, wave number, frequency and energy of photon. Spectrum of electromagnetic radiation. (ii) Types of spectra - Emission and absorption spectra, atomic and molecular spectra, line and band spectra	03	
			(iii) Translational, vibrational, rotational and electronic motion. The degree of freedom in each motion. (iv) Energy level diagram of a molecule indicating electronic, vibrational and rotational transitions. (v) Condition for pure rotational spectrum, selection rule for rotational transition.	02	
٥			Derivation of expression for moment of inertia of a diatomic rigid rotor. Isotope effect. Applications of microwave spectroscopy for the determination of moment of inertia and bonding. (vi) Condition for exhibiting vibrational spectra (i.e. IR active molecule),	03	
			selection rule for vibrational transition. Vibrational energy levels of a simple harmonic oscillator. Zero point energy, position of a spectral line. Determination of force constant of a covalent bond.	02	
			(v) Raman effect - Raman's spectrum of a molecule. Condition for exhibiting Raman spectrum (i.e. Raman active molecule), selection rule for rotational transitions.	02	
			Pure rotational spectrum of diatomic molecule, vibrational Raman spectrum of a diatomic molecule. (vii) Numericals.	02	
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Incharge Teacher Wavhal Kamalakar K. SAPORENOW

Late Ku. Durga K. Banmeru

Department of Chemistry Teaching Plan Session-2020-21 B.Sc.-Ist Semester-IInd

Name of Faculty:- Prof. Suryakant B. Borul

ir. M	Ionth	Name of Unit		2	5
1		A] Alkyl Halides:	Introduction, Synthe'sis of vinyl chloride from acetylene and	02	
STATE SHOWS			allyl chloride from propylene,		
SHIP TO SHIP SHIP	Dec-		Introduction, Synthe'sis of vinyl chloride from acetylene and allyl chloride from propylene, Reactions of both with aqueous and alcoholic KOH, Comparison of reactivity of vinyl an allyl chloride. Synthesis chlorobenzene from benzene, phenol and benzene diazontum chloride, Synthesis of benzyl chloride from toluene and benzyl alcohol, Reactions of both with aqueous KOH, NH3 and sodium ethoxide, Comparison of reactivity of chlorobenzene and benzyl chloride. Benzyne intermediate mechanism. Dihydric alcohols: Ethylene glycol- Preparation from ethylene, ethylene chloride and ethylene oxide, Reactions- with Na, PCI5, CH3COOH, ZnCI2, conc. H2SO4 and dehydration with heat. Trihydric alcohols: Glycerol- Preparation from propylene, Reactions- with Na, HCl, PCI5, HNO3 and KHSO4. Pinacol- pinacolone rearrangement (mechanism). Introduction, Methods of formations a) from aniline b) from Cumene. Acidic character, Reaction of Phenols- a) Carboxylation (Kolb's reaction), b) Fries Rearrangement, c) Claisen Rearrengement d) Reimer-Tiemann reaction. Introduction, Diethyl ether- Preparation by Williamson's synthesis and continuous etherification process, Reactions-with cold and hot HI Introduction, Synthesis of ethylene oxide from ethylene and 02 Introduction, Synthesis of ethylene oxide from ethylene and		
the strategies and	1		Comparison of reactivity of vinyl an allyl chloride.		
go garanti en Sil	20 Jan-				
and the second	24	B Aryl Halides:		02	14
CHIEF WATER					
and and an				02	
A CONTROLLEGE					
- Committee				02	
		C] Alcohols:		02	
and anomalie				02	
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+					-
2		Al Phenols:	Introduction, Methods of formations a) from aniline	02	
			b) from Cumene. Acidic character,		
			Reaction of Phenols- a) Carboxylation (Kolb's reaction), b)	02	
J	an		Fries Rearrangement,		
			c) Claisen Rearrengement d) Reimer-Tiemann reaction.	02	1
			Introduction, Diethyl ether- Preparation by Williamson's	02	-
-					14
		B] Ethers:	_	02	
	n } .		Introduction, Synthesis of ethylene oxide from ethylene and		
		CJ Epoxides:		02	-
	3'-		5 . 5	02	- 7
	-			02	_

Sr. No.		Name of Unit	Topics Names	Requ. Lect.	1
3	Jan- Feb	Chemical Kinetics	Explanation of terms like rate of reaction, order of a reaction and molecularity. Definition zero, first and second order reaction. Half life period of a reaction.	02	
			Derivation of rate equation for first and second order reaction with equal initial concentration and different initial concentration of a reactant. Characteristics of first and second	03	14
			order reaction.		
			Examples of first and second order reaction viz. the reactions (i) decomposition of H ₂ O ₂ , (ii) reaction between K ₂ S ₂ O ₈ and KI,	03	
	14		(iii) Hydrolysis of methyl acetate catalyzed by acid, (iv) saponification of ethyl acetate by NaOH and (v) inversion of cane sugar. Determination of order of a reaction by integration, graphical, equifractional change, etc. method.	03	
			Effect of temperature on reaction rates. Arrhenius equation, activation energy and its determination using Arrhenius equation. Numericals.	03	
4	Feb	b UNIT-I A] Polarisation-	Defn, polarising power, polarizability. Effect of polarization on nature of bond. Fajan's rules of polarisation & its applications.	02	
		B] Covalent bonding-	Directional nature of covalent bond. Hybridization, types of hybridization to explain geometries of NH ⁴⁺ ion, PCl ₅ , SF ₆ & IF ₇ .	02	į,
		C] Intermolecular forces-	Dipole-dipole, dipole-induced-dipole, induced dipole-induced dipole interactions. Ion - dipole interactions.	03	14
		D] Acids and Base-	Theory of solvent sys. & Lux-Flood concept of acids & bases.	03	
			Hard and soft acids and bases. Pearsons HSAB principle with impapplications.	04	

Month	Name of Unit	Topics Names	Requ. Lect.	Total Lects.
Feb-	A Electrical Properties:	(i) Polar and non-polar molecules. Dipole moment. (ii) Induced polarization & orientation polarization. Clausius-	03	- 1, 4
March		Mossotti equation (iii) Measurement of dipole moment by temperature and refractivity methods.	01	
		(iv)Applications of dipole moment for the determination of molecular structure, i.e. percentage ionic character of covalent bonding, molecular geometry, cis-trans isomers, ortho, meta and para isomers of a disubstituted benzene.	03	. ".
	B]Magnetic	(i) Paramagnetic and diamagnetic substances, origin of paramagnetism, diamagnetism, ferromagnetism and antiferromagnetism.(ii) Volume, specific, mass and molar	03	
	unpaired electrons. (iv) Gouy's	(iii) Relationship between magnetic moment and number of unpaired electrons. (iv) Gouy's balance method for determination of magnetic susceptibility.		
		(v) Application of magnetic moment in the determination of molecular structure.(vi) Numericals.	02	
	A] P-Block	Comparative study of 16 th and 17 th group elements with reference to electronic configuration,	02	
March	Elements-	Ionisation energy & oxidation states. Oxidising properties of	02	
	Bl Noble Gases-	halogens with reference to oxidation potential. Basic properties of halogens with special reference to iodinal Interhalogen compounds, Introduction to fluorocarbons.	e. 02	
,	Pl Monte Guses-	Inertness of noble gases. Compounds of noble gases-only str. & bonding in XeF ₂ , XeF ₄ , XeOF ₄ , XeO ₂ F ₂ XeO ₃ and XeO ₄	0.	1
	C] Non-aqueous Solvents-	Requirements of a good solvent. Water as a universal solvent Physical prop of solvents namely liq. range, dielectric constant dipole moment, heat of vaporisation & solubility behaviour.	1 0	2
		Classification of solvents. Reactions in liquid ammonia aci- base, precipitation, redox, solvolysis	d 0	2
		solutions of metals in liquid ammonia.	0	2

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Late Ku. Durga K. Banmeru
Science College, Lonar

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Department of Chemistry Teaching Plan Session-2020-21 B.Sc.-IInd Semester-IVth

Name of Faculty: - Mr. Shivshankar P. More

Sr. No.	Month	Name of Unit	Topics Names	Requ. Lecture	Tota
	Dec- Jan	Colligative Properties of	(i) Defination and examples of colligative properties.	02	
		Dilute Solutions:	(ii Elevation of boiling point, thermodynamic derivation or	02	
			the relationship between elevation of boiling point and		
			molar mass of a non-volatile solute.		
			Cotrell's method for determination of elevation of boiling	02	
			point.		
	1		(iii) Depression of freezing point, thermodynamic	02	14
			derivation of the relationship between depression		
			of freezing point and molar mass of a non-volatile solute.		
			Rast's method for determination of depression of freezing	02	
			point.		
			(iv) Abnormal behavior of solution. Van't Hoff's factor 'i'.	02	1
			Determination of degree of association and dissociation	02	-
			from Van't Hoff's factor.(v) Numerical.		
2	Jan		Symmetry in crystal, plane of symmetry, axis of		
		Crystalline state	symmetry and point of symmetry. Law of constancy of	02	
			interfacial angles.		
	, residen		Elements of symmetry in cubic crystals. Laws of	02	-
			symmetry. Law of rational indices, Weiss and Miller	٥ <u>ـ</u>	14
	yr. 1.7		indices of a lattice planes, calculation of interplaner		
	W	2 1	distance d(h,k,l) from Miller indices in a cubic system.	1	
		The second second	Seven crystal systems and fourteen Bravais lattices,		
			Bravais lattices of cubic system. Simple cubic system	02	
		rahan Err	(S.C.C.), body centered cubic system (B.C.C.) and face centered cubic system (F.C.C.).	,	
i	4.1	g factor	Calculation of number of constituent units in S.C.C.,		1
+			B.C.C. and F.C.C.	02	
	1		Ratio of interplaner distances for 100, 110 and 111 lattice	02	-
			plane in S.C.C., B.C.C. and F.C.C.	02	
٠.			Derivation of Bragg's equation for X-ray diffraction,		
			Bragg's X-ray spectrometer method for the determination of crystal structure of NaCl and KCl.	02	
		A PROPERTY OF	Anomalous behaviour of KCl towards X-ray. Numericals.	02	· · ·
		the state of the s	or iter towards A-ray, Numericals.	02	

or.	Month	Name of Unit	Topics Names	Requ. Lecture	Tota
3	Jan-Feb	A] Chemistry of elements of transition series:	Definition of transition elements. General characteristics of transition elements. Comparative study of first	02	E .
	= -		transition series elements (3d) with reference to following properties: (i) Electronic configuration		
			(ii) Atomic and ionic size (iii) Ionization energy (iv) Metallic nature (v) Oxidation states (vi) Magnetic properties (vii) Color of salts (viii) Catalytic properties (ix) Complex formation behaviour.	03	14
			Study of 4d and 5d series elements-Electronic configuration.	03	
		B] Extraction of elements:	Comparison of 3d series elements with 4d and 5dseries elements with respect to size, oxidation states, magnetic properties and color.	03	
			Principles involved in extraction of elements. Major methods of extraction of elements. Factors affecting choice of extraction method. Thermodynamics of	03	
			reduction processes-Ellingham diagrams for oxides and importance of this diagram		
4	Feb	A] Inner transition elements:	Definition, Lanthanides and Actinides. Comparative study of Lanthanides with respect to following properties:(i) Electronic configuration	02	
	1		(ii) Atomic and ionic radii lanthanide contraction definition, cause and effect of lanthanide contraction	02	
	† i		(iii) Oxidation states (iv) Magnetic properties	02	14
			(v) Color of salts vi) Complex formation behavior.	02	
		B] General Principles of Metallurgy:	exchange method. Actinides- Electronic configuration and oxidation states.		
			Comparison of lanthanides and actinides. Definition of metallurgy, steps in metallurgy. Ore dressing by gravity separation, froath floatation and electromagnetic separation.	1	
			Calcinations, roasting, smelting and refining of metals. Meaning of termshydrometallurgy and pyrometallurgy.	. I j . r	

Sr. No.	Month	Name of Unit	Topics Names	Requ. Lecture	Total
5	Feb- March	A] Aromatic nitro compounds: B] Amino Compounds:	Nitrobenzene: Synthesis from benzene, Reduction of nitrobenzene in acidic, neutral and alkaline medium.	03	
			Basicity and effect of substituents. Methods of preparation of aniline from nitrobenzene, Reactions: with acetyl and	02	14
		C] Diazonium Salts:	benzoyl chlorides, Br2(aq) and Br2(CS2), Carbylamine reaction, alkylation, Hoffmann's exhaustive methylation and its mechanism.	02	
		D] Amino acids and Proteins:	Preparation benzene diazonium chloride, Synthetic applications- Preparation of benzene, phenol, halobenzene, nitrobenzene, benzonitrile, coupling with phenol and aniline.	03	
)			Classification, Strecker and Gabrial phthalimide synthesis, Zwitterion structure, Isoelectric point,	02	
			peptide synthesis, Structure determination of polypeptides by end group analysis.	02	
6	March	A] Polynuclear hydrocarbons:	Naphthalene - Haworth synthesis, orbital picture, Reactions - electrophilic substitution	02	
		B] Reactive methylene compounds: C] Carbohydrates:	Preparation of naphthols from naphthalene sulphonic acids and naphthylamines from naphthols.	02	14
			Malonic Ester: Synthesis from acetic acid, Synthetic applications- Synthesis of acetic acid, succinic acid, glutaric acid, crotonic acid and malonyl urea.	03	
			Acetoacetic ester: Synthesis from ethyl acetate, Synthetic applications- Synthesis of acetic acid, propionic acid, isobutyric acid, succinic acid, glutaric acid, crotonic acid, acetyl acetone and 4-methyl uracil.	03	
			Constitution of glucose, cyclic structure, Pyranose and Furanose structure, Epimerization, conversion of glucose to fructose and vice-versa,	02	
			Introduction to fructose, ribose, 2- deoxyribose, maltose, sucrose. (their structures only determination not needed).	02	

Teacher Sign

HOD

Late Ku. Durga K. Banmeru
Science College, Lonar

Department of Chemistry
Teaching Plan Session-2020-21
B.Sc.-IIIrdSemester-VIth

Name of Faculty:- Wavhal Kamalakar K.

Sr. No.	Month	Name of Unit	Topics Names	Requ. Lecture	Tota Lects
1	Dec-	A) Kinetic	Types of reactions of coordination compounds. Brief idea		
•	Aspects of Metal Complexes: B) Analytical Chemistry: 1. Colorimetry Spectrophotom etry	Aspects of Metal	about substitution reactions. SN1 dissociative and SN2 associative mechanism of substitution in octahedral complexes. Labile and inert complexes.	03	
		Factors affecting lability of complexes viz. arrangement of d-electrons (VB theory),. Mechanism of substitution reactions in square planar complexes.	03		
		Spectrophotom	Concept of Dmax. Beer-Lambert's law Verification of Beer's law. Block diagrams of colorimeter and spectrophotometer	02	14
				02	
			Definition and classification of chromatography. Principle of ifferential migration.	02	
			Principle and technique of paper chromatography, Rf value and factors affecting Rf value	02	
2	Jan	Polymers:	Definition, nomenclature and classification of organometallic compounds. Metal carbonyls- definition and classification.	02	
			Preparation, properties, structure and bonding in Ni(CO)4, Fe(CO) ₅ , Cr(CO) ₆ . Nature of M-C bond in metal carbonyls.	03	
			Definition and classification. Silicones: preparation, properties structure and bonding and applications.	03	14
			Phosphonitrile halides polymers- preparation, properties, structure and bonding in cyclic polymers.	02	
		C] Bio-	Essential and trace elements in biological processes.	02	
		Chemistry	Biological role of Na+, K+, Ca2+ and Mg2+ ions. Metalloporphyrins- Haemoglobin and Myoglobin and their role in oxygen transport.	02	

r.	Month	Name of Unit	Topics Names	Requ. Lecture	Total Lecte
3	Jan- Feb	A) Electronic Spectroscopy	Introduction, radiation source, spectral range, types of electronic transitions, chromophore, auxochrome, bathochromic, hypsochromic,	02	
		:	Hyperchromic and hypochromic effects. Applications to the structure determination of compounds like dines, aldehydes, ketones & aromatic systems.	03	
		B) Infrared Spectroscopy	Types of vibrational modes, stretching and bending, spectrum range, radiation source, presentation of IR spectrum, characteristic frequencies of various groups,	03	14
		C) Purification of Organic Compounds:	Finger print region. Structure of organic compounds (IR spectra of simple compounds: H ₂ O, CO ₂ , CH \(\subseteqCH, CH ₃ COCH ₃). Sublimation, crystallization.	02	
-		Compounds:	Paper chromatography: Principle and Rf value.	02	-
	4 Feb	A) Nuclear Magnetic Resonance Spectroscopy	Introduction, spin quantum number, instrumentation, Aspects of NMR- number of signals(equivalent & non-equivalent protons), Positions of signals(chemical shift), intensities of signals, Splitting of signals (spin-spin coupling), coupling constant, and applications.	03 02 03	
		B) Mass Spectrometr y:	Introduction, theory, instrumentation-(ion sources), Mass spectra of neopentane and methanol, molecular ion peak, base peak, metastable peak, Rules of fragmentation, applications.	02 02 02	14

Sr.	Month	Name of Unit	Topics Names	Requ.	Total
No.		,		Lecture	
5	Feb-	A]	(i) Types of electrode - Standard hydrogen electrode, Calomel	02	
	March	Electrochemi	electrode, Quinhydrone electrode and Glass electrode. Principle		
		stry:	of Potentiometric titration. Study of acid-base, redox and precipitation titration.		
			(ii) pH of a solution and pH scale. Determination of pH of a solution using hydrogen, quinhydrone and glass electrodes.	02	
			Advantage and disadvantage of these electrodes. pH-metric titrations. Determination of pka of a weak acid by pH-metric measurement.		14
			(iii) Concentration cells - Types of concentration cells, concentration cell without transfer and determination of its emf. (iv) Numericals	02	
			(i) Shell model of a nucleus - Assumptions, evidences for existence of magic numbers, advantages and limitations. (ii)	02	
Y :			Liquid drop model of a nucleus - Assumptions, similarities between nucleus and liquid drop, advantages and limitations, explanation of nuclear fission reaction on the basis of liquid		

Amrut Sevabhavi Sanstha's Parbhani

Late Ku. Durga K. Banmeru Science College, Lonar Dist- Buldana Department of Chemistry

Teaching Plan Session-2021-22 B.Sc.-Ist Semester-Ist

Name of Faculty:- Mr. Suryakant B. Borul

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or.	Month	Name of Unit	Topics Names	Required Lecture	
1		A) Electronic	Inductive effect, electromeric effect, Resonance &	02	
	DC+	displacements:	Hyperconjugation (Definition and Applications)		
		B) Reactive	Carbocations, Carbanions and Free radicals, their	02	
		Intermediates:	generation stability & reactions.		
			Alkanes- Methods of formation: i) Wurtz reaction and	03	
		C) Aliphatic	ii) Corey-House reaction, reactions i) Halogenation		14
		Hydrocarbon:	mechanism ii) Aromatisation.		
			Alkenes Method of formation mechanism- i)	02	
			dehyhrogenation of alkyl halides (E ₁ & E ₂) ii)		
			Dehydration of alcohols.		
			Reactions-Electrophilic and free radical addition of HX	01	
			and X ₂ (with mechanism)		
			Alkynes- Preparations from vicinal and germinal	02	
	- Laurence		dihalides, Reaction-Hydrogenation.		
			Alkadienes:-Classification 1, 3-Butadiene- Preparation	02	
			from cyclohexene, reactions-Addition of H ₂ , Br ₂ & HBr		
2		Aromatic	Introduction, Nomenclature and Isomerism of Aromatic	02	
	oct	Hydrocarbons	Compounds.		
	DUT	A)	Structure of Benzene of Benzene : Kekule structure and	02	
			Molecular orbital structure.		
			Aromaticity and Huckel's rule Aromatic,	02	
		B)	antiaromatic and non-aromatic system	02	
			Mechnism of Electrophilic Aromatic Substitution:-	03	14
			Nitration, Friedal Craft Alkylation and Acylation.		
		C)	Nuclear and side chain halogenations, Birch reduction.	01	
			Orientation:- Effect of substituent group. Activating and		
		D)	deactivating group. Theory of reactivity and orientation	02	
			on the basis of inductive and resonance effects (-CH ₃ , -	-	
1			OH, -NO ₂ and -Cl group).		

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Sr. No.	Mont	h Name of Unit	Topics Names	Requ. Lect.	To
3	Nov	A] Periodi Properties:	Atomic and ionic radii. Types of atomic radii. Periodic trends in atomic and ionic radii. Ionization energy, electron affinity and electronegativity.	03	L
			Effect of ionization energy and electronegativity on different properties of elements namely metallic and non-metallic character, relative reactivity, oxidizing and reducing properties., Scales of electronegativity Pauling scale and Mulliken Scales. Electronegativity and partial ionic character of a covalent bond.	03	
		B] Ionic bonding:	Screening effect, screening constant and effective nuclear charge. Slater's rules for calcul. screening constant. Problems.	02	
			Definition of ionic bond, types of cations. Factors affecting ionic bond formation. Born Lande equation to cal. lattice energy. Born-Haber's cycle to determine lattice energy	03	
			Solvation and salvation energy, factors affecting salvation energy, Det ⁿ of salvation energy. Solubility of ionic solids, lattice energy and salvation energy.	03	
C	ec	Thermodynamics	Adiabatic and Isothermal processes. Work done in Adiabatic and isothermal processes, relationship between pressure, volume and temperature.	03	
			First law of Thermodynamics and its limitations, Need of Second law.	02	1
			Carnot's heat engine, derivation of expression for the work done and efficiency of Carnot's engine. Statements of Second law of thermodynamics.	03	
			Concept of Entropy, Physical significance of Entropy, Derivation of expression for the Entropy change for an ideal gas Entropy change for an ideal gas for isothermal, isobaric and isochoric processes,	03	
			Entropy of fusion, sublimation, vapourization, transition and its calculations. Entropy change as a criterion for spontaneity. Numericals.	03	

Sŕ No			Topics Names	Requ. Lect.	Total
.5		A] S-Block element:	Comparative study of 1st and 2nd group elements with reference to electronic configuration, ionisation energy, oxidation states.	03	Decis
	Dec	n. n. n.	Reactivity and flame colouration. Diagonal relationship between Li and Mg.	02	
	2021	B] P-Block element:	Comparative study of 13th, 14th and 15th group elements with reference to electronic configuration,	03	14
			ionisation energy, oxidation states. Concept of inert pair effect. Diagonal relationship between Be and Al. Structure of diamond and graphite.		
			Abnormal behaviour of nitrogen. Hydrides of boron- preparation (from BCl3 and NaBH4two), properties (action of heat, water, alkali and oxygen), structure and bonding in diborane. Carbides, types of carbides and fullerenes.	03	
6	Jans	A] Gaseous State:	Postulates of Kinetic theory of gases, Derivation of Kinetic gas equation.	02	
	22		RMS, Average and Most probable velocities and their relationship. Maxwell-Boltzmann distribution law of molecular velocities (only qualitative treatment), Mean free path, collision number and collision diameter.	03	
			Deviation of real gases from ideal gas behavior. Vander waal's equation of state and its derivation for real gases.	02	
			Critical phenomenon, Andrew's experiment - isotherm of CO2. Critical state, critical constant, Pc, Vc and Tc in terms of Vanderwaal's constants 'a' and 'b'. Law of	03	14
			Corresponding state. Numericals.		
	В		Components and degree of freedom.	02	
			application of phase rule to water and sulfur system.	02	

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HOD Late Ku. Durga K. Banmeru Science College, Lonar.

Department of Chemistry Teaching Plan Session-2021-22 B.Sc.-IInd Semester-IIIrd

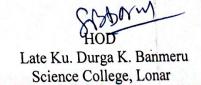
Name of Faculty:-Mr. Shivshankar P. More

Sr. No.	Month	Name of Unit	Topics Names	Requ. Lecture	Tota Lect
1	204	A] Aldehydes and Ketones:	Preparation of acetaldehyde from ethanol, ethylidene chloride and acetylene. Preparation of benzaldehyde from benzene (Gattermann-Koch reaction) and toluene.	02	
	21		Preparation of acetone from isopropyl alcohol, isopropylidene chloride and propyne. Preparation of acetophenone from benzene and ethyl benzene.	02	
			Structure of carbonyl group, acidity of á-hydrogen in carbonyl compounds. Reactions of aldehydes &/or ketones: Cannizaro's,	02	
			Reformatsky, Perkin with mechanism, Mannich reaction, Benzoin and Aldol condensations. Clemmensen, Wolf- Kishner, MPV and LiAlH4 reductions.	02	
		B] Carboxylic	Structure and reactivity of carboxylic groups. Acidity of carboxylic acids, effects of substituents on acids strength. Oxalic acid: Preparation from ethylene glycol and cyanogen. Reactions: Reaction with ethyl alcohol, ammonia, glycerol and	02	14
	- 1	acids:	action of heat. Lactic acid: Preparation from acetaldehyde and pyruvic acid.	. 147	
			Reactions: Reaction with ethanol,PCl ₅ , action of heat, oxidation and reduction. Benzoic acid: Preparation from toluene, benzyl alcohol, phenyl cyanide and benzamide.	02	
			Reactions: Reaction with ethanol, PCl ₅ and ammonia. Salicylic acid: Preparation by Reimer-Tiemann reaction. Reactions: Reaction with CH ₃ COCl, CH ₃ OH and C ₆ H ₅ OH.	02	
	A] Optical omerism:	Element of symmetry, chirality, asymetric carbon atom, enantiomers, diastereoisomers,	02	
0	4		relative and absolute configurations, DL and RS nomenclature, racemisation and resolution.	02	
	B	Geometrical	Cis-trans & E-Z nomenclature, Methods of structure determination.	03	
	C	A LONG TO A STATE OF THE STATE	Bayer's Strain theory and its limitations. Stability of cycloalkanes, conformational isomers of ethane	03	14
		onformational omerism:	conformational isomers of, n-butane & cyclohexane, their energy level diagrams.	02	
			Newman & Sawhorse projection formulae.	02	

No.		Name of Unit	Topics Names	Requ.	Tota
3	404	A] Covalent Bonding:	Molecular Orbital Theory. Postulates of MO theory. LCAO approximation. Formation of bonding and antibonding MOs. Rules for LCAO. MO energy level diagram. MO structure of homonuclear diatomic molecules of namely He ₂ , H ₂ , N ₂ and O ₂ . Stability sequence of species of O2	Lect.	Lect
		B] Metallic Bonding:	Paramagnetic nature of O2. MO structure of heteronuclear diatomic molecules viz. NO, HF &CO. properties of CO viz. — triple 15 16 bond, almost nonpolar nature, edonor & acceptor behaviour. Comparison of VB and MO theories.	03	
			Free electron theory and properties of metals such as electrical and thermal conduction, malleability, ductility and metallic lusture. VB theory or Resonance theory of metals. Band theory to explain nature of conductors, insulators and semiconductors.	03	
	- 1	C]	Various rules under VSEPR theory to explain molecular geometry various rules- BeCl ₂ , BF ₃ , CH ₄ , NH ₄ +, PCl ₅ , SF ₆ , IF ₇ , SnCl ₂ , NH ₃ , H ₂ O, SF ₄ ,	03	
-		VSEPR Theory:	Various rules under VSEPR theory to explain molecular geometry Limitations of VSEPR theory.	02	
		Theory of	(a) Introduction:-Volumetric analysis, titrant, titrate, end		
	Dec	Quantitative Inorganic Analysis	point, equivalence point, indicator etc. Requirements of volumetric analysis. Definition of standard solution, primary standard substance.	02	
		A] Volumetric Analysis:	Terms to express concentrations namely- molarity, normality, molality, mole fraction and percentage. (b) Acid-Base titrations:- Types of acid base titrations. pH variations during acid base titration. Acid base indicators. Choice of suitable indicators for different acid base titrations.	02	14
			(c) Redox Titrations:-Pinciples involved in redox titrations. Brief idea about use of KMnO ₄ , K ₂ Cr ₂ O ₇ as oxidants in acidic medium in redox titrations.	02	
			Use of I_2 in iodometry & iodimetry. Redox indicators-external & internal indicators. iodometric estimation of Cu .	02	
		B] Gravimetric Analysis:	Definition. Theoretical principles underlying various steps involved in gravimetric analysis with reference to estimation of barium as BaSO ₄	04	
1			Coprecipitation and post precipitation	02	

h	-	Name of Unit	Topics Names	Requ.	Total
	A	A) Liquid State:-	Surface tension Data	Lect.	Lects.
	21		temperature on surface tension, Derivation of expression for relative surface tension by Drop number method. Application of surface tension	02	zees.
	21	B) Electrochemistry:	Viscosity- Determination and its S.I. unit, Effect of temperature on viscosity, derivation of expression for relative viscosity by Ostwald's viscometer method. Application of viscosity. Conductance of electrology	02	
			Conductance of electrolyte solutions. Specific, equivalent & molar conductance. Detn of conductance of electrolyte soln. Variation of specific and service to the solution .	02	14
			Variation of specific and equivalent Conductance with dilution for strong electrolyte Conductometric titrations, Application of Conductometric titrations. Migration of ions and explanation of the conductometric titrations.	02	
			Migration of ions under the influence of electric field. Transport number of ions. Determ. of Transport number of ions by Hottorf's method & Moving boundary method. Kohlrausch's law of intermediate the influence of electric field.	02	
			Kohlrausch's law of independent migration of ions. Determ ⁿ of λ∞ & degree of α dissociation of a week elect. Determination of constant of a week electrolyte. Numerical.	02	
6	+	A)	Numerical.	02	
	1	Thermodynami	(ΔG) as a criteria of spontaneity and equilibrium	02	
			Variation of free energy G with 'P' & 'T'. Gibbs- Helmholtz equation in terms of G and its applications	00	
			Partial molal function, chemical potential, derivations of Gibb's-Duhem equation. Chemical potential of an ideal gain gaseous mixture.	s 03	
-	,	B)	Derivation of Gibbs-Duhem equation. Derivation of Van Hoff reaction of isotherm & its application to equil. state.	02	
		Equilibrium:	Phase Derivation of Van't Hoff equn & its application Numericals.	s. 01	
			Immiscible liquids, Nerst distribution law and is application to association and dissociation of solute in or of the solvent Process of extraction, derivation of formula for the amount of solute left unextracted after reextraction.	ne ıla 02	2
			Phase transition- Clausius-clyperon. Partially miscil liquids- Phase diagram of phenol-water, triethyl amir water & nicotine-water systems. Numerical.		2





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Late Ku. Durga K. Banmeru Science College, Lonar Dist-Buldana Department of Chemistry Teaching Plan Session-2021-22

Name of Facult	B.ScIII rd Semester-V th
r. Month Name of the	B.ScIII rd Semester-V th

No.	MOUT	Name of Unit	Kamalakar K. Wavhal		
1		Coordination	Topics Names	Requ.	Tota
	oct 21	Compounds-1:	metal ion etc. Werner's theory of coordination and experimental evidences on the basis of conduction data and formation of AgCl precipitate in case of cobaltamines.		Lec
			Sidgwick's electronic interpretation & its drawbacks. EAN rule. IUPAC rules for nomenclature of coordination. Structural linkage & coordination isomerism in complexes.	03	
			Geometrical isomerism in octahedral complexes of type Ma4b2, Ma4bc, Ma3b3, M(AA)2b2. Square planar complexes of type Ma2b2 and Ma2bc. Optical isomerism in octahedral complexes of type Ma2b2c2, Mabcdef, M(AA)3, M(AA)2b2 Tetrahedral complexes	03	14
		B) Chelates:	structure and bonding in complexes and Magnetic properties of complexes of 3d series elements. Limitations of VB theory.	03	
-			Definition, classification & applications of chelates	02	
	oct 1	A] Crystal Field Theory (CFT):	Postulates of CFT, Crystal field splitting in octahedral, distorted octahedral, square planar tetrahedral complexes,	03	
			concept of CFSE, high spin and low spin complexes on the basis of $\Delta 0$ and pairing energy, distribution of electrons in t2g	03	
	F	B] Electronic	orbitals in high spin and low spin octahedral complexes. Factor affecting magnitude of CF splitting in octahedral complexes.	02	14
	n n	Spectra of Transition Metal Complexes	Introduction to spectra, selection rules for d-d transitions, spectroscopic terms-determination of ground term symbols for d1 to d10, spectra of d1 and d9 octahedral complexes,	03	
			Orgel diagram for d1 and d9 states, electronic spectrum of $[\mathrm{Ti}(\mathrm{H_2O})_6]^{3+}$ complex ion. Spectrochemical series.	03	

Sr. No.		Name of Unit	Topics Names	Requ.	-
3	AND AND RESTAURANCE CONTRA			Lect.	Lect
,	Y0 V	A] Heterocyclic compounds	Nomenclature, Pyrrole: Synthesis from acetylene, succinimide and furan, Basicity, acetaldehyde, acetone, ethylene oxide & CO ₂ .	02	-de
	representation in contraction in con		Electrophilic substitution reactions (orientation) – nitration, sulphonation, acetylation and halogenation, Molecular orbital structure.	02	14
		B] Organometallic	Pyridine: Synthesis from acetylene and pentamethylene diamine hydrochloride, Basicity, Electrophilic substitution reactions (orientation) – nitration, sulphonation, Nucleophilic substitution reactions (orientation)- with NaNH2, C6H5Li and KOH.	03	
		compounds::	from methyl bromide (only reaction) Synthetic applications: Electrophilic substitution reactions-formation of alkanes, alkenes, higher alkynes and other organometallic compounds,	02	
			Nucleophilic substitution reactions- Reaction with aldehydes & ketones, ethylene oxide, acetyl chloride, methyl cyanide & CO ₂ .	02	
			Methyl lithium-Synthesis and reaction with water, formaldehyde, acetaldehyde, acetone, ethylene oxide and CO ₂ .	03	
4	Dec 51	A] Dyes:	Classification on the basis of structure and mode of application, Preparation and uses of Methyl orange,	03	
			Crystal violet, Phenolphthalein, Alizarin and Indigo.	02	
		B] Drugs: C] Pesticides:	Analgesic and antipyretics: Synthesis and uses of phenylbutazone. Sulpha drugs: Synthesis and uses of sulphanilamide and sulphadiazine.	03	
			Antimalarials: Synthesis of chloroquine from 4,7-dichloroquinoline and its uses.	02	
			Insecticides: Synthesis and uses of malathion. Herbicides: Synthesis and uses of 2,4-dichloro phenoxy acetic acid (2,4-D)		
			Fungicides: Synthesis and uses of thiram (tetramethyl thiuram disulphide	02	

Sr.	1	Name of Unit	Topics Names	Requ. Lect.	Tota Lect.
5	DK	Photochemistry	(i) Photochemical and thermal reactions. (ii) Lambert's law - Statement and derivation.	02	
	21		Beer's law - Statement and derivation. Reasons for deviation from Beer's law. (iii) Laws of photochemistry.	02	
			(iv) Quantum yield of photochemical reaction. Reasons for high and low quantum yield. Experimental determination of quantum yield. Photosensitized reaction.		
			(v) Kinetics of photochemical decomposition of HI. (vi)	02	
			Selection rule for electronic transition. Internal conversion and inter-system crossing. Explanation of fluorescence and phosphorescence on the basis of Joblonski diagram	03	
			(vii) Chemiluminescence and Bioluminescence with examples. (viii) Numericals.	03	
6	-	Molecular Spectroscopy	(i) Electromagnetic radiation, characteristics of electromagnetic radiation in terms of wavelength, wave number, frequency and	03	
	Jan 22		energy of photon. Spectrum of electromagnetic radiation. (ii) Types of spectra - Emission and absorption spectra, atomic and molecular spectra, line and band spectra		
			(iii) Translational, vibrational, rotational and electronic motion. The degree of freedom in each motion. (iv) Energy level diagram of a molecule indicating electronic, vibrational and rotational transitions. (v) Condition for pure rotational spectrum, selection rule for rotational transition.	02	
			Derivation of expression for moment of inertia of a diatomic rigid rotor. Isotope effect. Applications of microwave spectroscopy for the determination of moment of inertia and bonding. (vi) Condition for exhibiting vibrational spectra (i.e. IR active molecule),	03	
			selection rule for vibrational transition. Vibrational energy levels of a simple harmonic oscillator. Zero point energy, position of a spectral line. Determination of force constant of a covalent bond.	02	
			(v) Raman effect - Raman's spectrum of a molecule. Condition for exhibiting Raman spectrum (i.e. Raman active molecule), selection rule for rotational transitions.	02	
		1	Pure rotational spectrum of diatomic molecule, vibrational Raman spectrum of a diatomic molecule. (vii) Numericals.	02	

Incharge Teacher Wavhal Kamalakar K.

HOD Late Ku. Durga K. Banmeru

Department of Chemistry

Teaching Plan Session-2021-22 <u>B.Sc.-Ist Semester-IInd</u> Name of Faculty:- Prof. Suryakant B. Borul

Sr No	Month	Name of Unit	Topics Names	Requ. Lect.	
1	Feb	A] Alkyl Halides:	Introduction, Synthe'sis of vinyl chloride from acetylene and allyl chloride from propylene,	02	
	22		Reactions of both with aqueous and alcoholic KOH, Comparison of reactivity of vinyl an allyl chloride.	02	
		B] Aryl Halides:	Synthesis chlorobenzene from benzene, phenol and benzene diazonium chloride, Synthesis of benzyl chloride from toluene and benzyl alcohol,	02	14
			Reactions of both with aqueous KOH, NH ₃ and sodium ethoxide, Comparison of reactivity of chlorobenzene and benzyl chloride. Benzyne intermediate mechanism.	02	
		C] Alcohols:	Dihydric alcohols: Ethylene glycol- Preparation from ethylene, ethylene chloride and ethylene oxide,	02	
			R eactions- with Na, PCl5, CH3COOH, ZnCl2, conc. H2SO4 and dehydration with heat. Trihydric alcohols: Glycerol- Preparation from propylene,	02	
			Reactions- with Na, HCl, PCl5, HNO3 and KHSO4. Pinacol- pinacolone rearrangement (mechanism).	02	
2	Merle	A] Phenols:	Introduction, Methods of formations a) from aniline b) from Cumene. Acidic character,	02	
			Reaction of Phenols- a) Carboxylation (Kolb's reaction), b) Fries Rearrangement,	02	
			c) Claisen Rearrengement d) Reimer-Tiemann reaction.	02	
			Introduction, Diethyl ether- Preparation by Williamson's synthesis and continuous etherification process,	02	14
		B] Ethers:	Reactions-with cold and hot HI	02	
		Cl E	Introduction, Synthesis of ethylene oxide from ethylene and styrene oxide from styrene.	02	
			Ring opening reactions of both catalyzed by acid and alkali.	02	
					107

Sr. No.	Month	Name of Unit	Topics Names	Requ.	Total
3	march	Chemical Kinetics	Explanation of terms like rate of reaction, order of a reaction and molecularity. Definition zero, first and second order reaction. Half life period of a reaction.	02	Lects
			Derivation of rate equation for first and second order reaction with equal initial concentration and different initial concentration of a reactant. Characteristics of first and second order reaction.	03	14
			Examples of first and second order reaction viz. the reactions (i) decomposition of H_2O_2 , (ii) reaction between $K_2S_2O_8$ and KI ,	03	
			(iii) Hydrolysis of methyl acetate catalyzed by acid, (iv) saponification of ethyl acetate by NaOH and (v) inversion of cane sugar. Determination of order of a reaction by integration, graphical, equifractional change, etc. method.	03	
			Effect of temperature on reaction rates. Arrhenius equation, activation energy and its determination using Arrhenius equation. Numericals.	0.0	
4	April	UNIT-I A] Polarisation-	Defn, polarising power, polarizability. Effect of polarization on nature of bond. Fajan's rules of polarisation & its applications.	02	
		B] Covalent bonding-	Directional nature of covalent bond. Hybridization, types of hybridization to explain geometries of NH ⁴⁺ ion, PCl ₅ , SF ₆ & IF ₇ .	00	
		Intermolecular forces-	Dipole-dipole, dipole-induced-dipole, induced dipole-induced dipole interactions. Ion - dipole interactions.	03	1
		Base- Theory of solvent sys. 6 & bases.	Theory of solvent sys. & Lux-Flood concept of acids & bases.	03	
			Hard and soft acids and bases. Pearsons HSAB principle with imapplications.	np 04	

SI	r. Month	Name of Unit	·	Requ. Lect.	
1	_	A]Electrical Properties:	(i) Polar and non-polar molecules. Dipole moment.(ii) Induced polarization & orientation polarization. Clausius- Mossotti equation	03	
	P-br		(iii) Measurement of dipole moment by temperature and refractivity methods.	01	
			(iv)Applications of dipole moment for the determination of molecular structure. i.e. percentage ionic character of covalent bonding, molecular geometry, cis-trans isomers, ortho, meta and para isomers of a disubstituted benzene.	03	
		B]Magnetic Properties:	(i) Paramagnetic and diamagnetic substances, origin of paramagnetism, diamagnetism, ferromagnetism and antiferromagnetism.(ii) Volume, specific, mass and molar susceptibility. Relationship between.	03	
			(iii) Relationship between magnetic moment and number of unpaired electrons. (iv) Gouy's balance method for determination of magnetic susceptibility.	02	
			(v) Application of magnetic moment in the determination of molecular structure.(vi) Numericals.	02	
6	MAY	2 Elements-	Comparative study of 16 th and 17 th group elements with reference to electronic configuration,	02	
	22		Ionisation energy & oxidation states. Oxidising properties of nalogens with reference to oxidation potential.	02	
			Basic properties of halogens with special reference to iodine Interhalogen compounds. Introduction to fluorocarbons.	02	-
		DJ Noble Gases	Inertness of noble gases. Compounds of noble gases-only str. & bonding in XeF ₂ , XeF ₄ , XeOF ₄ ,XeO ₂ F ₂ XeO ₃ and XeO ₄	02	
		C] Non-aqueous Solvents- Physical prop of solvents namely liq. range	Requirements of a good solvent. Water as a universal solv. Physical prop of solvents namely liq. range, dielectric constant, dipole moment, heat of vaporisation & solubility behaviour.	02	
			Classification of solvents. Reactions in liquid ammonia acid base, precipitation, redox, solvolysis	02	
			solutions of metals in liquid ammonia.	02	

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Late Ku. Durga K. Banmeru Science College, Lonar

Department of Chemistry Teaching Plan Session-2021-22 B.Sc.-IInd Semester-IVth

Name of	Faculty:-	Mr. Shivshan	kar P. More
	raculty;-	WIF. Shivshan	Kar P. More

Sr. No.	Month	Name of Unit	hankar P. More Topics Names	Requ. Lecture	Tota
1		Colligative Properties of	(i) Defination and examples of colligative properties.	02	
	Peb				
			Cotrell's method for determination of elevation of boiling point.	02	
			(iii) Depression of freezing point, thermodynamic derivation of the relationship between depression of freezing point and molar mass of a non-volatile solute.	02	14
			Rast's method for determination of depression of freezing point.	02	
			(iv) Abnormal behavior of solution. Van't Hoff's factor 'i'.	02	
			Determination of degree of association and dissociation from Van't Hoff's factor.(v) Numerical.	02	
2	march	Crystalline state	Symmetry in crystal, plane of symmetry, axis of symmetry and point of symmetry. Law of constancy of interfacial angles.	02	
			Elements of symmetry in cubic crystals. Laws of symmetry. Law of rational indices, Weiss and Miller indices of a lattice planes, calculation of interplaner distance d(h,k,l) from Miller indices in a cubic system.	02	14
			Seven crystal systems and fourteen Bravais lattices, Bravais lattices of cubic system. Simple cubic system (S.C.C.), body centered cubic system (B.C.C.) and face centered cubic system (F.C.C.).	02	
			Calculation of number of constituent units in S.C.C., B.C.C. and F.C.C.	02	
			Ratio of interplaner distances for 100, 110 and 111 lattice plane in S.C.C., B.C.C. and F.C.C.	02	
The second second			of crystal structure of NaCl and KCl	02	
S. E.			Anomalous behaviour of KCl towards X-ray. Numericals.	02	

Sr. No.	Month	Name of Unit	Topics Names	Requ. Lecture	Total
3	manh	A] Chemistry of elements of transition series:	Definition of transition elements. General characteristics of transition elements. Comparative study of first transition series elements (3d) with reference to following properties: (i) Electronic configuration	02	
			(ii) Atomic and ionic size (iii) Ionization energy (iv) Metallic nature (v) Oxidation states (vi) Magnetic properties (vii) Color of salts (viii) Catalytic properties (ix) Complex formation behaviour.	03	14
			Study of 4d and 5d series elements-Electronic configuration.	03	
		B] Extraction of elements:	Comparison of 3d series elements with 4d and 5dseries elements with respect to size, oxidation states, magnetic properties and color.	03	(
			Principles involved in extraction of elements. Major methods of extraction of elements. Factors affecting choice of extraction method. Thermodynamics of reduction processes-Ellingham diagrams for oxides and importance of this diagram	03	
4	April	A] Inner transition elements:	Definition, Lanthanides and Actinides. Comparative study of Lanthanides with respect to following properties:(i) Electronic configuration	02	
			(ii) Atomic and ionic radii lanthanide contraction definition, cause and effect of lanthanide contraction	02	
			(iii) Oxidation states (iv) Magnetic properties (v) Color of salts	02	14
		B] General Principles of	vi) Complex formation behavior. Occurrence of lanthanides. Isolation of lanthanides by ion exchange method. Actinides- Electronic configuration and	03	
		Metallurgy:	oxidation states. Comparison of lanthanides and actinides.		
			Definition of metallurgy, steps in metallurgy. Ore dressing by gravity separation, froath floatation and electromagnetic separation. Calcinations, roasting, smelting and refining of metals. Meaning of termshydrometallurgy and pyrometallurgy.	03	

1.	Month	Name of Unit	Topics Names	Requ. Lecture	Tota
5		Name of Unit A] Aromatic nitro compounds: B] Amino Compounds: C] Diazonium Salts: D] Amino acids and Proteins:	Nitrobenzene: Synthesis from benzene, Reduction of nitrobenzene in acidic, neutral and alkaline medium.	03	
		B] Amino	Basicity and effect of substituents. Methods of preparation of aniline from nitrobenzene, Reactions: with acetyl and benzoyl chlorides, Br2(aq) and Br2(CS2),	02	14
			Carbylamine reaction, alkylation,Hoffmann's exhaustive methylation and its mechanism.	02	
			Preparation benzene diazonium chloride, Synthetic applications- Preparation of benzene, phenol, halobenzene, nitrobenzene, benzonitrile, coupling with phenol and aniline.	03	
			Classification, Strecker and Gabrial phthalimide synthesis, Zwitterion structure, Isoelectric point,	02	
			peptide synthesis, Structure determination of polypeptides by end group analysis.	02	
6	way	A] Polynuclear hydrocarbons:	Naphthalene - Haworth synthesis, orbital picture, Reactions - electrophilic substitution	02	
			Preparation of naphthols from naphthalene sulphonic acids and naphthylamines from naphthols.	02	14
		methylene compounds:	Malonic Ester: Synthesis from acetic acid, Synthetic applications- Synthesis of acetic acid, succinic acid, glutaric acid, crotonic acid and malonyl urea.	03	
		C] Carbohydrates:	Acetoacetic ester: Synthesis from ethyl acetate, Synthetic applications- Synthesis of acetic acid, propionic acid, isobutyric acid, succinic acid, glutaric acid, crotonic acid, acetyl acetone and 4-methyl uracil.	03	
			Constitution of glucose, cyclic structure, Pyranose and Furanose structure, Epimerization, conversion of glucose to fructose and vice-versa,	02	
2			Introduction to fructose, ribose, 2- deoxyribose, maltose, sucrose. (their structures only determination not needed).	02	

Teacher Sign

Late Ku. Durga K. Banmeru Science College, Lonar

Department of Chemistry
Teaching Plan Session-2021-22
B.Sc.-IIIrdSemester-VIth

Name of	Faculty:-	Wayhal	Kamala	kar K.
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Sr. No.			Topics Names	Requ. Lecture	
1	Feb	A) Kinetic Aspects of Metal Complexes:	Types of reactions of coordination compounds. Brief idea about substitution reactions. SN1 dissociative and SN2 associative mechanism of substitution in octahedral complexes. Labile and inert complexes.	03	
		B) Analytical Chemistry:	Factors affecting lability of complexes viz. arrangement of d-electrons (VB theory),. Mechanism of substitution reactions in square planar complexes.	03	
		1. Colorimetry Spectrophotom etry	Concept of □max. Beer-Lambert's law Verification of Beer's law. Block diagrams of colorimeter and spectrophotometer	02	14
	1 1	2. Paper Chromatography		02	
			Definition and classification of chromatography. Principle of ifferential migration.	02	
			Principle and technique of paper chromatography, Rf value and factors affecting Rf value	02	
2	mara	A] Organometallic Chemistry:	Definition, nomenclature and classification of organometallic compounds. Metal carbonyls- definition and classification.	02	
			Preparation, properties, structure and bonding in Ni(CO)4, Fe(CO) ₅ , Cr(CO) ₆ . Nature of M-C bond in metal carbonyls.	03	
	in the second		Definition and classification. Silicones: preparation, properties structure and bonding and applications.	03	14
		B] Inorganic Polymers:	Phosphonitrile halides polymers- preparation, properties, structure and bonding in cyclic polymers.	02	
		C] Bio-	Essential and trace elements in biological processes.	02	
	1	inorganic Chemistry	Biological role of Na+, K+, Ca2+ and Mg2+ ions. Metalloporphyrins- Haemoglobin and Myoglobin and their role in oxygen transport.	02	

Sr. No.	Month	Name of Unit	Topics Names	Requ. Lecture	Total
	maxin	A) Electronic Spectroscopy	Introduction, radiation source, spectral range, types of electronic transitions, chromophore, auxochrome, bathochromic, hypsochromic,	02	Lects
		:	Hyperchromic and hypochromic effects. Applications to the structure determination of compounds like dines, aldehydes, ketones & aromatic systems.	03	14
		B) Infrared Spectroscopy	Types of vibrational modes, stretching and bending, spectrum range, radiation source, presentation of IR spectrum, characteristic frequencies of various groups,	03	
		C) Purification	Finger print region. Structure of organic compounds (IR spectra of simple compounds: H ₂ O, CO ₂ , CH□CH, CH ₃ COCH ₃).	02	
		of Organic Compounds:	Sublimation, crystallization. Paper chromatography: Principle and Rf value.	02 02	
4	Apro)	Unit IV: A) Nuclear Magnetic Resonance Spectroscopy : B) Mass	Introduction, spin quantum number, instrumentation, Aspects of NMR- number of signals(equivalent & non-equivalent protons),	03	
			Positions of signals(chemical shift), intensities of signals, Splitting of signals (spin-spin coupling), coupling constant, and applications.	02	
			Introduction, theory, instrumentation-(ion sources), Mass spectra of neopentane and methanol, molecular ion peak,	02	14
		Spectrometr y:	base peak, metastable peak, Rules of fragmentation, applications.	02	
5	April	A] Electrochemi stry:	(i) Types of electrode - Standard hydrogen electrode, Calomel electrode, Quinhydrone electrode and Glass electrode. Principle of Potentiometric titration. Study of acid-base, redox and precipitation titration.	02	14
			(iii) Concentration cells - Types of concentration cells,concentration cell without transfer and determination of its emf.(iv) Numericals	02	

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Sr. No.		Name of Unit	Topics Names	Requ. Lecture	Total Lects
5	1	B] Nuclear	(i) Shell model of a nucleus - Assumptions, evidences for	02	
		Chemistry:	existence of magic numbers, advantages and limitations. (ii) Liquid drop model of a nucleus - Assumptions, similarities between nucleus and liquid drop, advantages and limitations, explanation of nuclear fission reaction on the basis of liquid drop model.	02	
			(iii) Nuclear force and its explanation on the basis of Meson theory. (iv) Characteristics of nuclear reaction, difference between nuclear and chemical reactions. Calculation of Q value of a nuclear reaction. (v) Characteristics of nuclear fission reaction, fission yield. Fission reaction as an alternative source of energy.	02	
			vi) Nuclear fusion reaction - Characteristic of a nuclear fusion reaction. Thermonuclear reactions as a source of energy of sun and other stars. Fusion reactions as a potential future source of energy.	02	
			vii) Applications of radio isotopes in industry, agriculture, medicines and bio-sciences with two examples each. (viii) Numericals.	02	
6	may	Elementary Quantum	(i) Limitations of classical mechanics. Plank's quantum theory (postulates only)	02	
		Mechanics	Photoelectric effect - Experiments, observation and Einstein's explanation. Compton effect and its explanation. (ii) de Broglie hypothesis of matter waves	03	
			De-Broglie's equation. Heisenberg's uncertainty principle. (iii) Classical wave equation, derivation of time independent Schrodinger's wave equation in one-dimension and its extension to a three-dimensional space.	02	14
			Well behaved wave function, physical significance of wave function (Born interpretation).	02	
			(iv) Application of Schrodinger wave equation to a particle in one-dimensional box & its extension to a three-dimensional box.	03	
			Concept of atomic orbital. (v) Numericals	02	

Incharge Teacher-Wavhal Kamalakar k.

Late Ku. Durga K. Banmeru Science College, Lonar.