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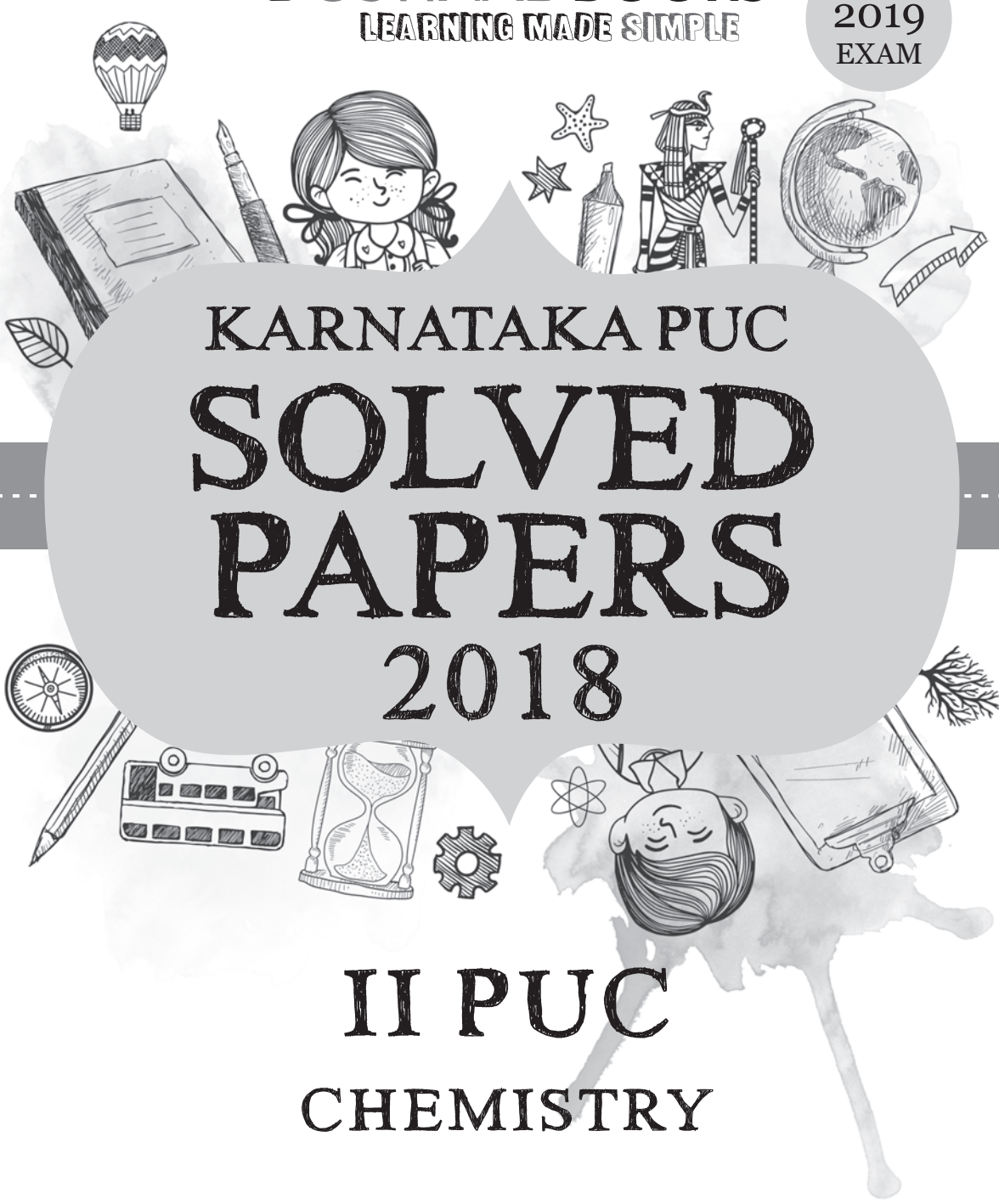

KARNATAKA PUC SOLVED PAPERS 2018

II PUC

CHEMISTRY

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Latest Syllabus
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BLOW UP SYLLABUS
II PUC CHEMISTRY - Code No. 34

Column1	Column2	Column3	Column4	Column5	Column6	Column7
SUBJECT	**CLASS**	**CODE**	**DEPARTMENT OF P U EDUCATION**		**ACADEMIC PROGRAM FOR THE YEAR 2018-19**	
CHEMIS-TRY	**PUC II**	**34**	*PUC (4 THEORY + 2 PRACTICE HOURS A WEEK)*	***PRACTICE SESSIONS***	PRACTICALS (1 CLASS OF 2 HOURS DURATION PER WEEK PER BATCH	
DAY	DATE	DAY				
DAY 1	02-May-18	WEDNESDAY	**Unit - 1 : The Solid State** • to describe general characteristics of solid state • to distinguish between amorphous and crystalline solids.			
DAY 2	3-May-18	THURSDAY	• classify crystalline solids on the basis of the nature of binding forces • define crystal lattice and unit cell			
DAY 3	04-May-18	FRIDAY	• to explain close packing of particles • to describe different types of voids and closed packed structures			
DAY 4	5-May-18	SATURDAY	• to calculate the packing efficiency of different types cubic unit cells • to corelate the density of a substance with it's unit cell properties			
DAY 5	06-May-18	SUNDAY				
DAY 6	7-May-18	MONDAY		PRACTICE SESSIONS		
DAY 7	08-May-18	TUESDAY		PRACTICE SESSIONS		
DAY 8	9-May-18	WEDNESDAY	• to describe imperfections in solids and their effect on properties			
DAY 9	10-May-18	THURSDAY	• to corelate the electrical and magnetic properties of solids		Surface Chemistry : Preparation of one Lyophillic(Starch sol) and Lyophobic sol(Ferric hydroxide sol) , To purify prepared sol by dialysis	

DAY 10	11-May-18	FRIDAY	Election Duty			
DAY 11	12-May-18	SATURDAY	Election Duty			
DAY 12	13-May-18	SUNDAY				
DAY 13	14-May-18	MONDAY	Numericals on formula of a compound and number of voids filled		Chemical Kinetics : Effect of concentration on rate of reaction between Sodium thiosulphate and hydrochloric acid.	
DAY 14	15-May-18	TUESDAY	Numericals on density			
DAY 15	16-May-18	WEDNESDAY		PRACTICE SESSIONS		
DAY 16	17-May-18	THURSDAY		PRACTICE SESSIONS		
DAY 17	18-May-18	FRIDAY	**Unit - 6: General Principles and processes of Isolation of Elements** • to explain the terms minerals, ores, concentration, calcination, roasting, refining, etc. • to understand the principles of oxidation and reduction as applied to the extraction procedures			
DAY 18	19-May-18	SATURDAY	• to apply the thermodynamic concepts like that of Gibbs energy and entropy to the principles of extraction of 1. aluminium 2. copper, 3. zinc.			
DAY 19	20-May-18	SUNDAY				
DAY 20	21-May-18	MONDAY	4. Iron • extraction of copper from low grade ores and scrapes • extraction of chlorine from Brime solution(oxidation) • extraction of gold and silver involving leaching with Cyanide ion (CN^-)		Effect of temperature on rate of reaction between Sodium thiosulphate and hydrochloric acid.	
DAY 21	22-May-18	TUESDAY	• refining techniques : Distillation, Liquation, Electrolysis, Zone Refining			
DAY 22	23-May-18	WEDNESDAY		PRACTICE SESSIONS		
DAY 23	24-May-18	THURSDAY		PRACTICE SESSIONS		

DAY 24	25-May-18	FRIDAY	• Vapour Phase Refining and Chromatographic methods • Uses of alluminium, copper, Zinc and Iron			
DAY 25	26-May-18	SATURDAY	**Unit 10 : Haloalkanes and Haloarenes** • classification of Haloalkanes and Haloarenes on the basis of 1. number of Halogen atoms 2. compounds containing SP3 C-X bond 3. compounds containing SP2 C-X bond • IUPAC nomenclature of Haloalkanes and Haloarenes			
DAY 26	27-May-18	SUNDAY				
DAY 27	28-May-18	MONDAY	• nature of C-X bond • methods of preparation 1. from alcohols 2. from hydrocarbons 3. by electrophilic substitution 4. sandmayer's reaction 5. from alkenes 6. halogen exchange method		To determine the heat of solution of potassium nitrate crystals or copper sulphate. To determine the heat of neutralization of strong acid (HCl) with a strong base (NaOH).	
DAY 28	29-May-18	TUESDAY	• physical properties • chemical reactions 1. Reactions of haloalkanes a. Nucleophilic substitution reaction (with examples) b. Mechanism of substitution nucleophilic bimolecular (S_N2)			
DAY 29	30-May-18	WEDNESDAY		PRACTICE SESSIONS		
DAY 30	31-May-18	THURSDAY		PRACTICE SESSIONS		
DAY 31	01-Jun-18	FRIDAY	• Mechanism of substitution nucleophilic unimolecular (S_N1) • Stereochemical aspects of nucleoplic substitution reactions			
DAY 32	2-Jun-18	SATURDAY	• Stereochemical aspects of nucleoplic substitution reactions (Contd.) 2. Elimination reactions 3. Reactions with metals Preparation of Grignard reagents and its reactivity Wurtz reaction			

DAY 33	03-Jun-18	SUNDAY				
DAY 34	4-Jun-18	MONDAY	Reactions of Haloarenes 1. Nucleophilic substitution reaction to explain why aryl halides are less reactive towards nucleophilic susbstitution reactions using the following reasons. a. Resonance effect b. Difference in hybridisation of carbon atom C-*X* bond c. Instability of phenyl cation. d. Possibe repulsion between nucleophile and electron rich arenes			
DAY 35	05-Jun-18	TUESDAY	• Electrophilic substitution reactions • Polyhalogen compounds			
DAY 36	6-Jun-18	WEDNESDAY		PRACTICE SESSIONS		
DAY 37	07-Jun-18	THURSDAY		PRACTICE SESSIONS		
DAY 38	8-Jun-18	FRIDAY	**Unit 2 : Solutions** • Types of solutions • expressing concentration of solutions			
DAY 39	09-Jun-18	SATURDAY	• Solubility 1. Solubility of a solid in a liquid, effect of temperature and effect of pressure. 2. Solubility of a gas in a liquid • Henry's Law • Mathematical expression of Henry's law			
DAY 40	10-Jun-18	SUNDAY				
DAY 41	11-Jun-18	MONDAY	• Henry's law constant K_H • Explanation of solubility of the gas in the liquid using K_H • Application of Henry's law in industry • Effect of temperature on the solubility of gases in liquids		THE DANIELL'S CELL :To set up a Daniell cell and To study the variation of cell potential in $Zn\|Zn^{2+}\|\|Cu^{2+}\|$-Cu with change in concentration of electrolytes ($CuSO_4$ or $ZnSO_4$) at room temperature.	
DAY 42	12-Jun-18	TUESDAY	• Vapour pressure of liquid solutions 1. vapour pressure of liquid solutions Raoult's law and mathematical expression • Raoult's law as a special case of Henry's law			

			2. Vapour pressure of solids in liquids Ideal and non-ideal solutions differences between Ideal and non-ideal solutions			
DAY 43	13-Jun-18	WEDNESDAY		PRACTICE SESSIONS		
DAY 44	14-Jun-18	THURSDAY		PRACTICE SESSIONS		
DAY 45	15-Jun-18	FRIDAY	• Azeotropes • Minimum boiling Azeotropes and Maximum boiling Azeotropes • Colligative properties and determination of molar mass 1. Relative lowering of vapour pressure 2. Elivation of boiling point			
DAY 46	16-Jun-18	SATURDAY	RAMZAN			
DAY 47	17-Jun-18	SUNDAY				
DAY 48	18-Jun-18	MONDAY	3. Depression of freezing point. 4. Osmosis and Osmotic pressure • Isotonic Solutions, hypertonic and hypotonic solutions • Reverse Osmosis and water purification • abnormal molar mass			
DAY 49	19-Jun-18	TUESDAY	• Numericals on concentration of solutions • Numericals on Henry's law			
DAY 50	20-Jun-18	WEDNESDAY	• Numericals on relative lowering of vapour pressure • Numericals on elivation of boiling point			
DAY 51	21-Jun-18	THURSDAY		PRACTICE SESSIONS		
DAY 52	22-Jun-18	FRIDAY		PRACTICE SESSIONS		
DAY 53	23-Jun-18	SATURDAY	• Numericals on depression of freezing point • Numericals on osmotic pressure			
DAY 54	24-Jun-18	SUNDAY				
DAY 55	25-Jun-18	MONDAY	**Unit 4 : Chemical Kinetics** Introduction, Rate of a chemical reaction (Average and instantaneous) Units of the rate.		Paper Chromatography : To separate the coloured components present in a mixture of red and blue ink by ascending paper chromatography and find their R_f values.	

DAY 56	26-Jun-18	TUESDAY	Problems on calculation of average rate. Factors influencing the rate of a reaction			
DAY 57	27-Jun-18	WEDNESDAY	Order of a reaction units for rate constants of zero, first and second order reactions			
DAY 58	28-Jun-18	THURSDAY		PRACTICE SESSIONS		
DAY 59	29-Jun-18	FRIDAY		PRACTICE SESSIONS		
DAY 60	30-Jun-18	SATURDAY	Molecularity of a reaction. Derivation of integrated rate equations for zero and first order reactions.			
DAY 61	01-Jul-18	SUNDAY				
DAY 62	2-Jul-18	MONDAY	Expression for K for first order gas phase reaction. Problems on the above expressions.		Preparation of inorganic compounds :To prepare double salt of ferrous ammonium sulphate or Mohr's salt, Potash alum.	
DAY 63	03-Jul-18	TUESDAY	Half life period, derivation of expressions for T1/2 of zero and first order reactions. Problems on half life period.			
DAY 64	4-Jul-18	WEDNESDAY	Pseudo first order reaction examples. Temperature dependence of the rate of the reaction.			
DAY 65	05-Jul-18	THURSDAY		PRACTICE SESSIONS		
DAY 66	6-Jul-18	FRIDAY		PRACTICE SESSIONS		
DAY 67	07-Jul-18	SATURDAY	Arhenius equation, Numericals			
DAY 68	8-Jul-18	SUNDAY				
DAY 69	09-Jul-18	MONDAY	Effect of the temperature on the rate of the reaction. Collision theory		Preparation of Organic compounds : To prepare a pure sample of dibenzal acetone. To prepare a pure sample of p- nitro-acetanilide from acetanilide To prepare a sample of β- naphthol aniline dye (phenyl-azo-β-naphthol)	
DAY 70	10-Jul-18	TUESDAY	**Unit 11 - Alcohols, Phenols and Ethers** Alcohols : Classification, nomenclature, structure of functional group			

DAY 71	11-Jul-18	WEDNESDAY	Methods of preparation from alkenes, aldehydes and ketones ones, carboxylic acid, grignard reagent Physical Properties - Boiling point and solubility			
DAY 72	12-Jul-18	THURSDAY		PRACTICE SESSIONS		
DAY 73	13-Jul-18	FRIDAY		PRACTICE SESSIONS		
DAY 74	14-Jul-18	SATURDAY	Chemical properties - Acidity, Esterification, acylation, oxidation			
DAY 75	15-Jul-18	SUNDAY				
DAY 76	16-Jul-18	MONDAY	Dehydration of alcohols, mechanism of dehydration, De-hydrogenation, Lucas reagent test, Manufacture of methanol and ethanol, Uses of methanol and ethanol		Test for the Functional Groups Present in Organic Compounds	
DAY 77	17-Jul-18	TUESDAY	Phenols - Classification, nomenclature, preparation			
DAY 78	18-Jul-18	WEDNESDAY	Physical properties, Chemical properties - Acidity, Esterification.			
DAY 79	19-Jul-18	THURSDAY				
DAY 80	20-Jul-18	FRIDAY				1 TEST
DAY 81	21-Jul-18	SATURDAY				
DAY 82	22-Jul-18	SUNDAY				
DAY 83	23-Jul-18	MONDAY		PRACTICE SESSIONS	Study of Carbohydrates , Fats and Proteins in Pure Form and Detection of their Presence in Given Food Stuffs.	
DAY 84	24-Jul-18	TUESDAY		PRACTICE SESSIONS		
DAY 85	25-Jul-18	WEDNESDAY	Nitration, Halogenation of Phenol, Kolbe's reaction, Reimer Tiemann reaction, Phenol with Zinc dust and oxidation of Phenol			
DAY 86	26-Jul-18	THURSDAY	Ethers			

DAY 87	27-Jul-18	FRIDAY	Unit 12: Aldehdyes, Ketones and Carboxylic acids. Introduction, Nomenclature of aldehydes and ketonesNature of carbonyl group			
DAY 88	28-Jul-18	SATURDAY	Preparation of aldehydes and ketones			
DAY 89	29-Jul-18	SUNDAY				
DAY 90	30-Jul-18	MONDAY		PRACTICE SESSIONS	• Determination of Concetration / Molarity of $KMnO_4$ solution by Titrating it against a standard solution of Oxalic Acid	
DAY 91	31-Jul-18	TUESDAY		PRACTICE SESSIONS		
DAY 92	1-Aug-18	WEDNESDAY	Properties - Physical Properties, Chemical Properties, addition reactions Mechanism of addition of HCN			
DAY 93	02-Aug-18	THURSDAY	Condensation reactions, Clemmensen reduction, Wolff-Kishner reduction			
DAY 94	3-Aug-18	FRIDAY	Tests to distinguish aldehydes and ketones - Haloform reaction, Aldol condensation			
DAY 95	04-Aug-18	SATURDAY	Cannizaro's reaction, Uses of aldehydes and ketones, Carboxylic acids - Nomenclature			
DAY 96	5-Aug-18	SUNDAY				
DAY 97	06-Aug-18	MONDAY		PRACTICE SESSIONS	• Determination of Concetration / Molarity of $KMnO_4$ solution by Titrating it against a standard solution of Ferruous Ammonium Sulphate.	
DAY 98	7-Aug-18	TUESDAY		PRACTICE SESSIONS		
DAY 99	08-Aug-18	WEDNESDAY	Structure of carboxylic group, methods of preparation of carboxylic acids			
DAY 100	9-Aug-18	THURSDAY	Physical properties and reactions of carboxylic acids			
DAY 101	10-Aug-18	FRIDAY	HVZ reaction and electrophilic reactions and uses of carboxylic acids			
DAY 102	11-Aug-18	SATURDAY	**Unit 7 :** P-Block elements. Nitrogen family - occurance, electronic configuration, oxidation state, atomic and ionic radii, ionisation energy, electro negativity			

DAY 103	12-Aug-18	SUNDAY				
DAY 104	13-Aug-18	MONDAY		PRACTICE SESSIONS	Qualitative Analysis : Determination of one cation and one anion in a given salt.	
DAY 105	14-Aug-18	TUESDAY		PRACTICE SESSIONS		
DAY 106	15-Aug-18	WEDNESDAY	INDEPENDENCE DAY			
DAY 107	16-Aug-18	THURSDAY	Chemical properties of P block elements, preparation of di-nitrogen, properties and uses of di-nitrogen			
DAY 108	17-Aug-18	FRIDAY	Ammonia - Preparation, manufacture by Haber's process, properties and uses			
DAY 109	18-Aug-18	SATURDAY	Oxides of nitrogen - Methods of preparation, structure, appearance and chemical nature. Nitric acid - Manufacture by Ostwald's process			
DAY 110	19-Aug-18	SUNDAY				
DAY 111	20-Aug-18	MONDAY	Properties and uses of Nitric acid Phosphorus - Allotropic forms, Preparation, properties and uses of Phosphine		Qualitative Analysis : Determination of one cation and one anion in a given salt.	
DAY 112	21-Aug-18	TUESDAY		PRACTICE SESSIONS		
DAY 113	22-Aug-18	WEDNESDAY	BAKRID			
DAY 114	23-Aug-18	THURSDAY		PRACTICE SESSIONS		
DAY 115	24-Aug-18	FRIDAY	Phosphorus Halides - Preparation, properties and structure Oxoacids of phosphorus Group 16 elements - Occurrence, electronic configuration, electron gain enthalpy and other physical properties			
DAY 116	25-Aug-18	SATURDAY	Chemical properties of Group 16 elements Di-oxygen - preparation, properties and uses Ozone - preparation, properties and uses			
DAY 117	26-Aug-18	SUNDAY				
DAY 118	27-Aug-18	MONDAY	Sulphur - Allotropic forms Sulphur-di-oxide - preparation, properties and uses Oxoacids of sulphur			

DAY 119	28-Aug-18	TUESDAY	Sulphuric acid - manufacture by contact process, properties, uses. Group 17 elements physical and chemical properties			
DAY 120	29-Aug-18	WEDNESDAY		PRACTICE SESSIONS		
DAY 121	30-Aug-18	THURSDAY		PRACTICE SESSIONS		
DAY 122	31-Aug-18	FRIDAY	Chlorine preparation, properties and uses.Hydrogen chloride preparation, properties and uses			
DAY 123	01-Sep-18	SATURDAY	Oxo Acids of Halogens, inter halogen compounds.Group 18 elements			
DAY 124	2-Sep-18	SUNDAY				
DAY 125	03-Sep-18	MONDAY	**UNIT 5 : SURFACE CHEMISTRY :** Adsorption : adsorbate, adsorbent, examples, distinction between adsorption and absorption. H, S and G for adsorption of gas on a solid. Physisorption and chemisorption-characteristics and differences. Factors affecting adsorption of a gas on a solid		Qualitative Analysis : Determination of one cation and one anion in a given salt.	
DAY 126	4-Sep-18	TUESDAY	Applications of adsorption . Catalysis: homogeneous and heterogeneous catalysis, examples, activity and selectivity of a catalyst ,examples, shape selective catalysis, examples. Enzyme catalysis: examples, characteristics (to be mentioned), mechanism.			
DAY 127	05-Sep-18	WEDNESDAY		PRACTICE SESSIONS		
DAY 128	6-Sep-18	THURSDAY		PRACTICE SESSIONS		
DAY 129	07-Sep-18	FRIDAY	Colloids: colloidal state-distinction of true solution, colloids, and suspension based on particle size. Classification of colloids-types of colloidal systems- examples, lyophilic and lyophobic— differences and examples, macromolecular, multimolecular and associated colloids, examples			

DAY 130	8-Sep-18	SATURDAY	formation of micelle, cleansing action of soaps. Preparation of colloids-chemical methods sulphur and ferric hydroxide sols, Bredig's arc method for metal sols, peptisation			
DAY 131	09-Sep-18	SUNDAY				
DAY 132	10-Sep-18	MONDAY				
DAY 133	11-Sep-18	TUESDAY				
DAY 134	12-Sep-18	WEDNESDAY				
DAY 135	13-Sep-18	THURSDAY	GANESH CHATURTHI			
DAY 136	14-Sep-18	FRIDAY				
DAY 137	15-Sep-18	SATURDAY				MID TERM
DAY 138	16-Sep-18	SUNDAY				
DAY 139	17-Sep-18	MONDAY				
DAY 140	18-Sep-18	TUESDAY				
DAY 141	19-Sep-18	WEDNESDAY				
DAY 142	20-Sep-18	THURSDAY				
DAY 143	21-Sep-18	FRIDAY	LAST DAY OF MOHARRUM			
DAY 144	22-Sep-18	SATURDAY	Purification– dialysis, electro-dialysis, ultrafiltration (in brief). Properties of colloids: Tyndall effect, Brownian movement, charge on colloidal particles, examples, electrophoresis,			
DAY 145	23-Sep-18	SUNDAY				
DAY 146	24-Sep-18	MONDAY	Coagulation – methods of coagulation of Iyophobic sols, Hardy- Schulze rule-examples, coagulating value. Protective colloid - example. Applications: In industries, medicines, purification of drinking water. Emulsions : types, examples		Qualitative Analysis : Determination of one cation and one anion in a given salt.	
DAY 147	25-Sep-18	TUESDAY		PRACTICE SESSIONS		
DAY 148	26-Sep-18	WEDNESDAY		PRACTICE SESSIONS		
DAY 149	27-Sep-18	THURSDAY	**UNIT-III Electrochemistry :** Redox reaction – As fundamental reaction in electrochemical cells, electronic and electrolytic conductors – differences, strong and weak electrolytes, examples-			

DAY 150	28-Sep-18	FRIDAY	Ionic conductance- factors affecting ionic conductance, conductivity and molar conductivity of electrolytic solutions- definitions, mathematical expressions, relationship between them, SI units, numerical problems.			
DAY 151	29-Sep-18	SATURDAY	Variation of conductivity and molar conductivity with concentration, graph for variation of Δ_m vs $C^{1/2}$ for strong and weak electrolytes using equation $\Delta_m = E^0_m - A\,c^{1/2}$ (measurement of conductivity from Wheatstone network not included), limiting molar conductivities, Kohlrausch law and applications,			
DAY 152	30-Sep-18	SUNDAY				
DAY 153	01-Oct-18	MONDAY	Numerical problems on calculation of $\Delta_m 0$ for weak electrolytes. Electrolysis – Faraday's laws of electrolysis (elementary idea) , concept of nF required to discharge one mole of M^{n+} ions, numerical problems on I law. Galvanic cells : Electrode potential		Qualitative Analysis : Determination of one cation and one anion in a given salt.	
DAY 154	2-Oct-18	TUESDAY	MAHATMA GANDHI JAYANTHI			
DAY 155	03-Oct-18	WEDNESDAY		PRACTICE SESSIONS		
DAY 156	4-Oct-18	THURSDAY		PRACTICE SESSIONS		
DAY 157	05-Oct-18	FRIDAY	Half cell concept, standard electrode potential, galvanic cell, Daniell cell, cell potential, EMF (emf), $E^0_{cell} = E^0_{right} - E^0_{left}$ Measurement of electrode potential – SHE - diagram, half cell representation, half cell reaction, E^0 taken as 0.0 V (at all temperatures).			
DAY 158	6-Oct-18	SATURDAY	Measurement of E^0 of Zn and Cu using SHE (experimental details not expected) numerical problems on E^0 Importance of standard electrode potentials- to decide and compare the strengths of oxidising and reducing agents . Nernst equation (derivation not required) : Nernst equation at 298 K for single electrode potential and cell potential,			

DAY 159	07-Oct-18	SUNDAY				
DAY 160	8-Oct-18	MONDAY	MAHALAYA AMMAVASYA			
DAY 161	09-Oct-18	TUESDAY	Numerical problems to calculate half cell and cell potentials (only for metal electrodes). Relationship between equilibrium constant. Relationship between equilibrium constant and E^0_{cell} (derivation not required), numerical problems. Relationship between standard Gibbs energy and E^0_{cell}, numerical problems.		Qualitative Analysis : Determination of one cation and one anion in a given salt.	
DAY 162	10-Oct-18	WEDNESDAY	Factors affecting the products of electrolysis, examples – molten and aqueous solution of NaCl only. Batteries: types-difference, examples, Leclanche cell (dry cell)			
DAY 163	11-Oct-18	THURSDAY		PRACTICE SESSIONS		
DAY 164	12-Oct-18	FRIDAY		PRACTICE SESSIONS		
DAY 165	13-Oct-18	SATURDAY	Lead acid battery–anode, cathode, electrolyte, reactions at anode and cathode (diagram not required), Fuel cell – definition – examples, H_2-O_2 fuel cell – schematic diagram, anode, cathode, electrolyte, reactions at anode and cathode. Corrosion – rusting of iron-anodic, cathodic reactions, composition of rust, methods of prevention			
DAY 166	14-Oct-18	SUNDAY				
DAY 167	15-Oct-18	MONDAY				
DAY 168	16-Oct-18	TUESDAY				
DAY 169	17-Oct-18	WEDNESDAY				
DAY 170	18-Oct-18	THURSDAY	MAHANAVAMI			
DAY 171	19-Oct-18	FRIDAY	VIJAYADASHMI			
DAY 172	20-Oct-18	SATURDAY				
DAY 173	21-Oct-18	SUNDAY				MID TERM
DAY 174	22-Oct-18	MONDAY				
DAY 175	23-Oct-18	TUESDAY				VACATION
DAY 176	24-Oct-18	WEDNESDAY	VALMIKI JAYANTHI			

DAY 177	25-Oct-18	THURSDAY				
DAY 178	26-Oct-18	FRIDAY				
DAY 179	27-Oct-18	SATURDAY				
DAY 180	28-Oct-18	SUNDAY				
DAY 181	29-Oct-18	MONDAY	UNIT VIII **d and f Block Elements** General introduction, electronic configuration, characteristics of transition metals (d-block) - variation in atomic and ionic size.			
DAY 182	30-Oct-18	TUESDAY	Electronic configuration of 3d series elements, general trends in properties of the first row transition metals (3d series) – metallic character, ionization enthalpies, oxidation states		Qualitative Analysis : Determination of one cation and one anion in a given salt.	
DAY 183	31-Oct-18	WEDNESDAY	Magnetic properties, colour, catalytic properties, formation of interstitial compounds, alloy formation.			
DAY 184	1-Nov-18	THURSDAY	KANNADA RAJYOTHSAVA			
DAY 185	02-Nov-18	FRIDAY		PRACTICE SESSIONS		
DAY 186	3-Nov-18	SATURDAY		PRACTICE SESSIONS		
DAY 187	04-Nov-18	SUNDAY				
DAY 188	5-Nov-18	MONDAY	Potassium dichromate: preparation from chromite ore ($FeCr_2O_4$). Properties – oxidizing property – with I^- , H_2S, Sn^{2+}, Fe^{2+} etc.		Qualitative Analysis : Determination of one cation and one anion in a given salt.	
DAY 189	06-Nov-18	TUESDAY	NARAKA CHATURDASHI			
DAY 190	7-Nov-18	WEDNESDAY	Interconversion of chromates and dichromates in aqueous solution depending on pH. Potassium permanganate : Preparation from MnO_2 by fusion with KOH and acidification.			
DAY 191	08-Nov-18	THURSDAY	BALIPADYAMI DEEPAWALI			
DAY 192	9-Nov-18	FRIDAY	Properties of potassium permanganate – Action of heat, oxidising property-oxidation of I^- , Fe^{2+}, $C_2O_4^{2-}$, H_2S etc. In acidic medium, $S_2O_3^{2-}$, I^- etc in neutral / alkaline medium			

DAY 193	10-Nov-18	SATURDAY	f-block elements: Lanthanoids-electronic configuration, atomic size- lanthanoid contraction and its consequences			
DAY 194	11-Nov-18	SUNDAY				
DAY 195	12-Nov-18	MONDAY		PRACTICE SESSIONS	Qualitative Analysis : Determination of one cation and one anion in a given salt.	
DAY 196	13-Nov-18	TUESDAY		PRACTICE SESSIONS		
DAY 197	14-Nov-18	WEDNESDAY	Oxidation states of f–block elements, chemical reactivity–general characteristics. Actinoids : electronic configuration			
DAY 198	15-Nov-18	THURSDAY	ionic size – actinoid contraction – compared to lanthanoid contraction, oxidation states– general characteristics compared with lanthanoids.			
DAY 199	16-Nov-18	FRIDAY	**Unit 13 : Amines.** Structure of amines. Classification. Nomenclature of amines.			
DAY 200	17-Nov-18	SATURDAY	Preparation of amines. Physical properties.			
DAY 201	18-Nov-18	SUNDAY				
DAY 202	19-Nov-18	MONDAY		PRACTICE SESSIONS	Qualitative Analysis : Determination of one cation and one anion in a given salt.	
DAY 203	20-Nov-18	TUESDAY		PRACTICE SESSIONS		
DAY 204	21-Nov-18	WEDNESDAY	EID MILAD			
DAY 205	22-Nov-18	THURSDAY	Basic character of amines. Structure-basicity relationship of amines.			
DAY 206	23-Nov-18	FRIDAY	Chemical reactions of amines			
DAY 207	24-Nov-18	SATURDAY	Diazonium salts. Methods of preparation. Physical properties.			
DAY 208	25-Nov-18	SUNDAY				
DAY 209	26-Nov-18	MONDAY	KANAKLDAS JAYANTHI			
DAY 210	27-Nov-18	TUESDAY	Chemical reactions of diazonium salts. Importance of diazonium salts in synthesis of aromatic compounds.		Qualitative Analysis : Determination of one cation and one anion in a given salt.	
DAY 211	28-Nov-18	WEDNESDAY		PRACTICE SESSIONS		

DAY 212	29-Nov-18	THURSDAY		PRACTICE SESSIONS		
DAY 213	30-Nov-18	FRIDAY	**Unit 9 : Coordination compounds.** Werner's theory of coordination compounds. Difference between a double salt and a complex			
DAY 214	1-Dec-18	SATURDAY	Definitions of some important terms pertaining to coordination compounds.			
DAY 215	02-Dec-18	SUNDAY				
DAY 216	3-Dec-18	MONDAY	Nomenclature of Coordination compounds.			
DAY 217	04-Dec-18	TUESDAY	Isomerism in coordination compounds. Stereoisomerism and structural isomerism			
DAY 218	5-Dec-18	WEDNESDAY		PRACTICE SESSIONS		
DAY 219	06-Dec-18	THURSDAY				
DAY 220	7-Dec-18	FRIDAY				2 TEST
DAY 221	08-Dec-18	SATURDAY				
DAY 222	9-Dec-18	SUNDAY				
DAY 223	10-Dec-18	MONDAY		PRACTICE SESSIONS	Qualitative Analysis : Determination of one cation and one anion in a given salt.	
DAY 224	11-Dec-18	TUESDAY	Bonding in coordination compounds. Valence bond theory and its limitations.			
DAY 225	12-Dec-18	WEDNESDAY	Crystal field theory. Colour in coordination compounds. Limitations of crystal field theory.			
DAY 226	13-Dec-18	THURSDAY	Bonding in metal carbonyls. Stability of coordination compounds. Importance and applications of coordination compounds.			
DAY 227	14-Dec-18	FRIDAY	**Unit 14 : Biomolecules. Carbohydrates.** Classification of carbohydrates. Monosaccharides. Preparation of glucose.			
DAY 228	15-Dec-18	SATURDAY		PRACTICE SESSIONS		
DAY 229	16-Dec-18	SUNDAY				
DAY 230	17-Dec-18	MONDAY		PRACTICE SESSIONS	Qualitative Analysis : Determination of one cation and one anion in a given salt.	

DAY 231	18-Dec-18	TUESDAY	Structure of glucose. Cyclic structure of glucose. Structure of fructose.			
DAY 232	19-Dec-18	WEDNESDAY	Disaccharides, polysaccharides, importance of carbohydrates.			
DAY 233	20-Dec-18	THURSDAY	Proteins. Amino acids.Classification of amino acids.			
DAY 234	21-Dec-18	FRIDAY	Peptides, structure of proteins. Denaturation of proteins.			
DAY 235	22-Dec-18	SATURDAY		PRACTICE SESSIONS		
DAY 236	23-Dec-18	SUNDAY				
DAY 237	24-Dec-18	MONDAY		PRACTICE SESSIONS	Qualitative Analysis : Determination of one cation and one anion in a given salt.	
DAY 238	25-Dec-18	TUESDAY	CHRISTMAS			
DAY 239	26-Dec-18	WEDNESDAY	Enzymes. Vitamins. Classification of vitamins. Nucleic acids.			
DAY 240	27-Dec-18	THURSDAY	Structure of Nucleic acids. Biological functions of Nucleic acids.			
DAY 241	28-Dec-18	FRIDAY	**Unit 15 : Polymers.** Polymer. Polymerisation. Classification of Polymers based on source and structure.			
DAY 242	29-Dec-18	SATURDAY	Classification of polymers based on mode of polymerisation and molecular force			
DAY 243	30-Dec-18	SUNDAY				
DAY 244	31-Dec-18	MONDAY		PRACTICE SESSIONS	Qualitative Analysis : Determination of one cation and one anion in a given salt.	
DAY 245	01-Jan-19	TUESDAY		PRACTICE SESSIONS		
DAY 246	2-Jan-19	WEDNESDAY	Types of polymerisation reactions. Addition polymerisation. Preparation of some important addition polymers.			
DAY 247	03-Jan-19	THURSDAY	Condensation polymerisation and copolymers. (including examples)			
DAY 248	4-Jan-19	FRIDAY	Rubber. Molecular mass of polymers. Biodegradable polymers.			

DAY 249	05-Jan-19	SATURDAY	**Unit 16 : Chemistry in Everyday life.** Drugs and their classification. Drug -target interation			
DAY 250	6-Jan-19	SUNDAY				
DAY 251	07-Jan-19	MONDAY				
DAY 252	8-Jan-19	TUESDAY				
DAY 253	09-Jan-19	WEDNESDAY				
DAY 254	10-Jan-19	THURSDAY				2NDPUC PREPARA-TORY
DAY 255	11-Jan-19	FRIDAY				EXAM
DAY 256	12-Jan-19	SATURDAY				
DAY 257	13-Jan-19	SUNDAY				
DAY 258	14-Jan-19	MONDAY				
DAY 259	15-Jan-19	TUESDAY				
DAY 260	16-Jan-19	WEDNESDAY				
DAY 261	17-Jan-19	THURSDAY				
DAY 262	18-Jan-19	FRIDAY			PRACTICE SESSIONS	
DAY 263	19-Jan-19	SATURDAY		PRACTICE SESSIONS		
DAY 264	20-Jan-19	SUNDAY				
DAY 265	21-Jan-19	MONDAY	Therapeutic action of different classes of drugs. Antacids. Antihistamines.			
DAY 266	22-Jan-19	TUESDAY	Neurologically active drugs. Antimicrobi-als. Antifertility drugs.			
DAY 267	23-Jan-19	WEDNESDAY	Chemicals in food. Artificial sweetening agents. Food preservatives.			
DAY 268	24-Jan-19	THURSDAY	Cleansing agents. Soaps. Types of soaps. Synthetic detergents. Types and uses.			
DAY 269	25-Jan-19	FRIDAY		PRACTICE SESSIONS		
DAY 270	26-Jan-19	SATURDAY		PRACTICE SESSIONS		

LATEST BLUEPRINT

Time : 3 Hrs. 15 Min. **Max. Marks : 70**

Group	Unit	Title	Hours	Marks	Total Number of Questions in each part				Total
					Part-A I 10 × 1 Marks	Part-B II 8 × 2 Marks	Part-C III 8 × 3 Marks	Part-D IV & V 11 × 5 Marks	
Group-I Physical	1	The Solid State	8	7		1		1	2
	2	Solution	9	7	2			1	3
	3	Electrochemistry	9	6	1			1	2
	4	Chemical Kinetics	9	8	1	1		1	3
	5	Surface Chemistry	6	6	1			1	2
		Total of Group-I	**41**	**34**					
Group-II Inorganic	6	General Principles and Processes of isolation of elements	5	4	1		1		2
	7	The P-block Elements	11	10	1		3		4
	8	The D and F-block elements	9	10		2	2		4
	9	Coordination Compounds	7	6			2		2
		Total of Group-II	**32**	**30**					
Group-III Organic	10	Haloalkanes and Haloarenes	7	6	1			1	2
	11	alcohols, Phenols and Ethers	8	7		1		1	2
	12	aldehydes, Ketones and Carboxylic Acids	9	8	1	1		1	3
	13	Amines	6	5				1	1
	14	Biomolecules	7	6	1			1	2
	15	Polymers	5	5				1	1
	16	Chemistry in Everyday Life	5	4		2			2
		Total of Group-III	**47**	**41**					
		TOTAL	**120**	**105**	**10**	**8**	**8**	**11**	**37**

SOLVED PAPER	II PUC March-2018	Chemistry Subject Code 36(N/S)

Time : 3 hrs 15 min **Max. Marks : 70**

Instructions :

(1) *The question paper has four parts. All parts are ompulsory.*
(2) *Part – A carries 10 marks. Each question carries one mark.*
Part – B carries 10 marks. Each question carries two marks.
Part – C carries 15 marks. Each question carries three marks.
Part – D carries 35 marks. Each question carries five marks.
(3) *Write balanced chemical equations and draw diagrams wherever necessary.*
(4) *Use log tables and simple calculator if necessary . (Use of scientific calculator is not allowed.)*

PART - A

I. Answer all the questions. Each question carries one mark. **10 × 1 = 10**
(Answer each question in **one words** or in **one sentence**):

1. State Henry's law.
2. Van't Hoff's factor for a solution is less than one, what is the conclusion drawn from it.
3. How many Faraday of electricity is required to reduce 1 mole of MnO^-_4 ions to Mn^{2+} ions?
4. If the unit of rate constant of a reaction is $mol^{-1} LS^{-1}$ the mention its order.
5. Name a metal refined by Van Arkel method.
6. Complete the following equation.
$XeF_6 + H_2O \rightarrow .....+ 2HF.$
7. What is an ambidentate ligand?
8. Name the following reaction.
$H_3C – Br + AgF \rightarrow H_3C – F + AgBr.$
9. Ethanal (CH_3CHO) undergoes aldol condensation reaction. Give reason.
10. Deficiency of which vitamin causes the disease "Rickets".

PART - B

II. Answer any five of the following . Each question carries 2 marks: **5 × 2 = 10**

11. What is Frenkel defect? How does it affect density of the solid?
12. Draw a neat labeled diagram of $H_2 – O_2$ fuel cell. Write the reaction occurs at cathode of the cell.
13. A first order reaction is found to have a rate constant, $K = 5.5 \times 10^{-14} S^{-1}$.
Find the half-life of the reaction.
14. Give reason:
(a) Cerium (Ce) exhibits +4 oxidation state.
(b) Actinoid contraction is greater from element to element than lanthanoid contraction
15. How anisole reacts with bromine in ethanoic acid? Write the chemical equation for the reaction.
16. Explain the preparation of carboxylic acids from Grignard reagent. Give equation.
17. Give an example each for
(a) Artifical sweetening agents
(b) Narcotic analgesics.
18. What are cationic detergents? Give an example.

PART - C

III. Answer any five of the following. Each question carries 3 marks : **5 × 3 = 15**

19. Explain the process of obtaining "blister copper" from "copper matte" with equations.

20. Write the equations involved in the manufacture of nitric acid by Ostwalds process by maintaining reaction conditions.

21. **(a)** How is Ozonised oxygen prepared in the laboratory? Give equation. **(2)**

(b) Give the composition of "Oleum". **(1)**

22. Complete the following equations:

(a) $2NaOH + Cl_2 \rightarrow NaCl + ... + H_2O$ **(1)**

(b) $Na_2SO_3 + 2HCl \rightarrow 2NaCl + H_2O$ **(1)**

(c) $Cl_2 + 3F_2 \xrightarrow{573\ K} .....$ **(1)**

23. How is potassium permanganate ($KMnO_4$) prepared from MnO_2? Write the equations. **(3)**

24. **(a)** Why 3d-series of elements acts as good catalyst? **(2)**

(b) Give reason : Ti^{4+} salts are colourless where as Cr^{3+} salts are coloured. **(1)**

25. With the help of Valence Bond Theory (VBT), explain hybridisation, geometry and magnetic property of $[NiCl_4]^{2-}$. **(3)**

26. **(a)** Write the IUPAC name of : $[Co(NH_3)_4(H_2O)Cl]Cl_2$. **(1)**

(b) Explain linkage isomerism with example. **(2)**

PART - D

IV. Answer any three of the following. Each question carries 5 marks: **3 × 5 = 15**

27. **(a)** Calculate packing efficiency in simple cubic lattice. **(3)**

(b) An element having atomic mass 107.9 u has FCC lattice. The edge length of its unit cell is 408.6 pm. Calculate density of the unit cell.

[Given, $N_A = 6.022 \times 10^{23}\ mol^{-1}$]. **(2)**

28. **(a)** The boiling point of benzene is 353.23 K. When 1.80g of a non-volatile, non-ionisable solute was dissolved in 90g of benzene, the boiling point raised to 354.11 K. Calculate molar mass of the solute. [K_b for benzene $= 2.53\ K\ Kg\ mol^{-1}$]. **(3)**

(b) Define:

i) Molality of a solution. **(1)**

ii) Isotonic solutions. **(1)**

29. **(a)** Calculate e.m.f. of the cell for the reaction:

$Mg_{(s)} + Cu^{2+}\ (0.0001\ M) \rightarrow Mg^{2+}\ (0.001\ M) + Cu_{(s)}$

Given that : $E^o_{Mg^{2+}/Mg} = -2.37\ V$

$E^o_{Cu^{2+}/Cu} = +0.34\ V$ **(3)**

(b) i) State Kohlrausch law. **(1)**

ii) What is meant by limiting molar conductance. **(1)**

30. **(a)** Derive an integrated rate equation for rate constant of a first order reaction. **(3)**

(b) Draw a graph of potential energy V/S reaction co-ordinates showing the effect of catalyst on activation energy (E_a) of a reaction. **(2)**

31. **(a)** Write any two differences between Iyophilic and Iyophobic colloids. **(2)**

(b) What is heterogeneous catalysis? Give an example. **(2)**

(c) Give an expression for Freundlich adsorption isotherm. **(1)**

V. Answer any four of the following. Each question carries 5 marks: **4 × 5 = 20**

32. **(a)** Write the equations for the steps in S_N1 mechanism of the conversion of tert-Butyl bromide into tert-Butyl alcohol . **(2)**

(b) Explain Fittig reaction. **(2)**

(c) Name the reagent used in the dehydrohalogenation of haloalkanes. **(1)**

33. **(a)** Write the mechanism of acid catalysed dehydration of ethanol to ethane. **(3)**

(b) Between phenol and alcohol which is more acidic? Why? **(2)**

34. **(a)** Explain Rosenmund reduction with equation. **(2)**

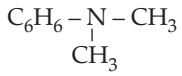
(b) How does propanone (CH_3COCH_3) reacts with hydrazine? Give equation. **(2)**

(c) Name an oxidising agent used in Etard's reaction. **(1)**

35. **(a)** Explain carbyl amine reaction with equation. **(2)**

(b) How does nitrobenzene is reduced to aniline? Give equation. **(2)**

(c) Write the IUPAC name of



(1)

36. **(a)** Write Haworth structure of "Lactose". **(2)**

(b) i) What are non-essential amino acids? **(1)**

ii) Write Zwitter ionic structure of "glycine". **(1)**

(c) Name the nitrogenous base present in RNA but not in DNA. **(1)**

37. **(a)** Explain the preparation of Nylon –6, 6 with equation. **(2)**

(b) What are thermoplastic polymers? Give an example **(2)**

(c) Write the structure of isoprene (2 – methyl–1, 3 –butadiene). **(1)**

●●

SOLUTIONS
As Per Scheme of Valuation
(Issued by Department of PUE, Karnataka)

PART - A

I. 1. The solubility of a gas in a liquid is directly proportional to the partial pressure of the gas present above the surface of the liquid or solution. **[1]**

OR

Mole of fraction of gas in the solution is proportional to the partial pressure of the gas over the solution.

OR

The partial pressure of the gas in vapour phase (P) is proportional to the mole fraction of the gas in the solution.

OR

$p \alpha X$ *(or)* $p = K_H X$

2. Solute undergoes association. **[1]**

3. 5 **(or)** (Five) or 5F **(or)** 5 Faraday (any one) **[1]**

4. Second order **(or)** 2 **(or)** Order = 2 **(or)** Two (any one) **[1]**

5. Zirconium **(or)** Titanium **(or)** Zr (or) Ti **[1]**

6. $XeFO_4$ **[1]**

7. Ligand which can ligate through two different atoms. **[1]**

8. Swartz **(or)** Swarts **[1]**

9. Due to the presence of α - hydrogen atom. **[1]**

OR

α - Hydrogen present **(or)** Alpha – hydrogen present.

OR

CH_3CHO Contains α - hydrogen atom

10. D, **(or)** Vit – D **(or)** Vitamin – D **[1]**

PART - B

II. 11. Dislocation of smaller ion (cation) from its normal site to interstitial site. **[1]**

Density is not affected

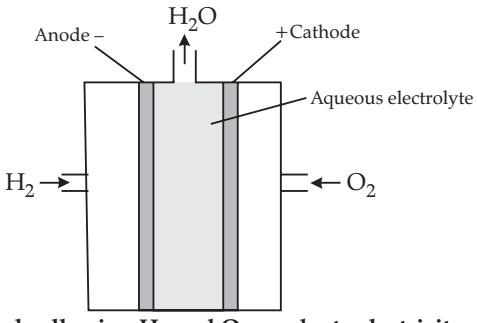
OR

Density remains same

OR

Does not change in the density

12. **[1]**



Fuel cell using H_2 and O_2 products electricity

Cathode : $O_2(g) + 2H_2O(l) + 4\,e^- \rightarrow 4\,OH^-(aq)$. **[1]**

13. $t_{1/2} = \dfrac{0.693}{K}$ **[1]**

$t_{1/2} = \dfrac{0.693}{55\times10^{-14}S^{-1}}$ **[1]**

$= 1.26 \times 10^{13}$ S

Unit is compulsory

14. **(a)** Attaining extra stability of empty *f* orbital **[1]**

OR

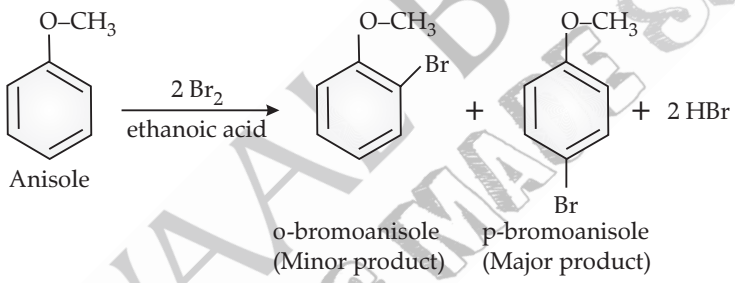
Ce^{+4} is favoured by its noble configuration

OR

Stable noble gas configuration of Xenon.

(b) Poor shielding by 5*f* electrons **[1]**

15. Anisole undergoes bromination with bromine in ethanoic acid to form a mixture of ortho and para bromo anisole. **[1]**

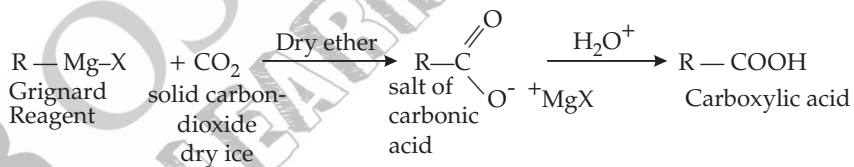


[1]

OR

Self explanatory with equation

16. Grignard reagent reacts with solid CO_2 (dry ice) to form salts of carboxylic acids which on acidification with mineral acid forms carboxylic acids. **[1]**



[1]

OR

Self explanatory equation

17. **(a)** Ortho – sulphobenzimide (Saccharin) **[1]**

OR

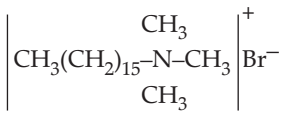
Aspartame **(or)** Alitame **(or)** Sucralose (Trichloro derivative of sucrose)

(b) Morphine **(or)** Heroin **(or)** Codein **[1]**

18. Quarternary ammonium salts of amines with acetate, chlorides or bromides as anions. **[1]**

Example: Cetyltrimethyl ammonium bromide. **[1]**

OR



PART - C

III. 19. Copper matte is charged into silica lined convertor. Some silica is also added and hot air blast is blown to convert the remaining FeS, FeO and Cu_2S/Cu_2O to the metallic copper. **[1]**

Following reaction takes place: **[2]**

$2FeS + 3O_2 \rightarrow 2FeO + 2SO_2$

$FeO + SiO_2 \rightarrow FeSiO_3$

$2Cu_2S + 3O_2 \rightarrow 2Cu_2O + 2SO_2$

$2Cu_2O + Cu_2S \rightarrow 6Cu + SO_2$

The solidified copper obtained has blistered appearance due to the evolution of SO_2 and so it is called blister copper.

OR

Explanation with equations

20. $4NH_3 + 5O_2 \xrightarrow[500\,K,\,9\,bar]{Pt/Rh\ gauze} 4\,NO + 6\,H_2O$ **[1]**

$2\,NO + O_22 \quad NO_2$ **[1]**

$3NO_2 + H_2O \rightarrow 2\,HNO_3 + NO$ **[1]**

21. (a) When a slow dry stream of oxygen is passed through a silent electrical discharge, conversation of oxygen to ozone the product is known as ozonised oxygen

$3O_2 \rightarrow 2O_3$ **[1]**

(b) $H_2S_2O_7$ **[1]**

22. (a) NaOCl **[1]**

(b) SO_2 **[1]**

(c) $2ClF_3$ **[1]**

23. By fusion of MnO_2 with an alkali metal hydroxide and an oxidising agent KNO_3 gives K_2MnO_4 which on acidification gives permanganate. **[1]**

$2MnO_2 + 4KOH + O_2 \longrightarrow 2K_2\,MnO_4 + 2H_2O$**[1]**

$3MnO_4^{2-} + 4\,H^+ \longrightarrow 2MnO_4^- + MnO_2 + 2H_2O$**[1]**

OR

$MnO_2 \xrightarrow[Oxidised\ with\ air]{Fused\ with\ KOH} MnO_4^{2-}$ **[2]**

$MnO_4^{2-} \xrightarrow[In\ alkaline\ solution]{Electrolytic\ oxidation} MnO_4^-$ **[1]**

24. (a) Transition metals and their compounds exhibit catalytic activity due to **[2]**

(i) Ability to adopt to multiple oxidation states

(ii) Transition metals can form complexes with reactant molecules using vacant d-orbitals.

This lowers the energy of activation of the reaction and increases rate of the reaction.

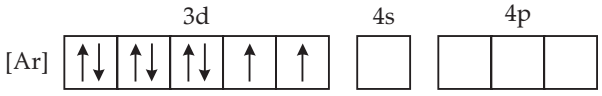
(iii) Due to the presence of large surface area in finely divided state.

(Any 2 points)

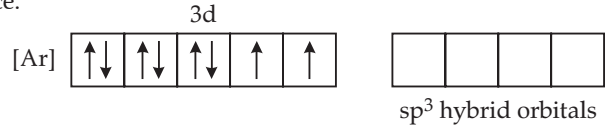
(b) Due to d^0 configuration of Ti^{4+}, it is colourless where Cr^{3+} has d^3 configuration facilitating d-d transition. **[1]**

25. The central metal is present in this complex is Ni (II) or Ni^{+2}. Atomic number of Nickel is 28.

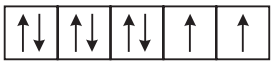
Electronic configuration of Ni^{+2} is [Ar] $3d^8 4s^o$. **[1]**



One vacant 4s-orbital and three vacant 4p-orbitals hybridize to give four equivalent sp3 hybrid orbitals, oriented tetrahedrally in space.



Each Cl^- ligand donates a pair of electron to form a tetrahedral complex. **[1]**

[Ar]  

4 electron pairs from from 4 Cl^- ligands

Sp^3 - hydridisation **[1]**

Orbials containing unpaired electrons hence it is paramagnetic. **[1]**

26. (a) Tetraammineaquachloridocobalt (III) chloride **[1]**

(b) Coordination compounds having same molecular formula but differing in the mode of attachment of ligand to the central metal ion or atom is called Linkage isomerism.

Example : $[Co(NH_3)_5(NO_2)]C_{12}$ and $[Co(NH_3)_5(ONO)]Cl_2$ **[1]**

OR

Any suitable example

IV. 27. (a) In simple cubic unit cell, atoms are located only at the corners of the cube. The particles touch one another along the edge. **[1]**

If the edge length of the cube = a, and radius of each particle is *r*; the a is related to *r* as, $a = 2r$

The volume of the cubic unit cell = $a^3 = (2r)^3 = 8r^3$

Since a simple cubic unit cell contains only 1 atom

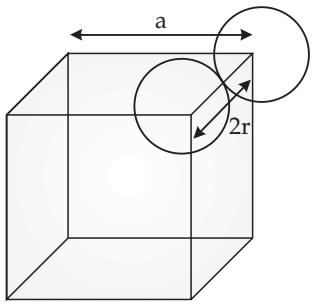
The volume of the occupied space = $\frac{4}{3}\pi r^3$

Packing Efficiency = $\frac{\text{Volume of space occupied by atom}}{\text{Volume of cubic unit cell}} \times 100$ **[1]**

$$= \frac{\frac{4}{3}\pi r^2}{8r^2} \times 100$$

$$= \frac{4\pi r^3}{3 \times 8r^3} \times 100$$

$$= \frac{\pi}{6} \times 100 = 52.36\%$$ **[1]**



(b) $d = \frac{z.M}{a^3.N_A}$

$$= \frac{4 \times 107.9 \times 10^3}{(408.6 \times 10^{-12})^3 \times 6.022 \times \times 10^{23}} = 10.5 \times 10^3 \text{ kg m}^{-3}$$ **[1]**

28. (a) $M_2 = \frac{K_b \times W_2 \times 1000}{\Delta T_b \times W_1}$ $\Delta T_b = 354.11 - 353.23 = 0.88$ **[1]**

$$M_2 = \frac{253 \times 1.8 \times 100}{0.88 \times 90} = 58 \text{ g mol}^{-1}$$ **[1]**

(b) (i) It is defined as number of moles of the solute dissolved in one kilogram (1000g) of the solvent. **[1]**

(ii) Two solutions having same osmotic pressure at a given temperature are called isotonic solutions. **[1]**

29. (a) $E_{cell} = E^0_{Cu^{2+}/cu^-} - E^0_{Mg^{3+}/mg} \frac{RT}{2F} \log_{10} \frac{[Mg^{2+}]}{[Cu^{2+}]}$ **[1]**

$$E_{cell} = (0.34 - (-2.37) - \frac{0.059}{2} \log_{10} \frac{10^{-3}}{10^{-4}}$$ **[1]**

$$E_{cell} = 2.71 - \frac{0.059}{2}\log_{10} 10$$ **[1]**

$E_{cell} = 2.68$ V **[1]**

(b) (i) Limiting molar conductivity of an electrolyte can be represented as the sum of the individual contributions of the anion and cation of the electrolyte. **[1]**

(ii) When concentration approaches zero, the molar conductance is known as limiting molar conductance. **[1]**

30. (a) Consider a general first order reaction, R → P

The differential rate equation for the above reaction can be written as,

$$\text{Rate} = \frac{-d[R]}{R} = k[R]^1$$

$$= \frac{d[R]}{R} = -k \times dt$$

Integrating on both sides of the above equation, we get

$$\int \frac{d[R]}{R} = -k \times \int dt$$

$\ln [R] = -kt + I$ ... (1) **[1]**

Where I → constant of integration.

At time $t = 0$, the concentration of the reactant R = $[R]_0$, where $[R]_0$ is the initial concentration of the reactant.

Substituting in equation 1, we get

$\ln [R]_0 = -(k \times 0) + I$

$\ln [R]_0 = I$ ...(2) **[1]**

Substituting the value of I from equation 2 in equation 1, we get

$\ln [R] = -kt + \ln [R]_0$ ...(3) **[3]**

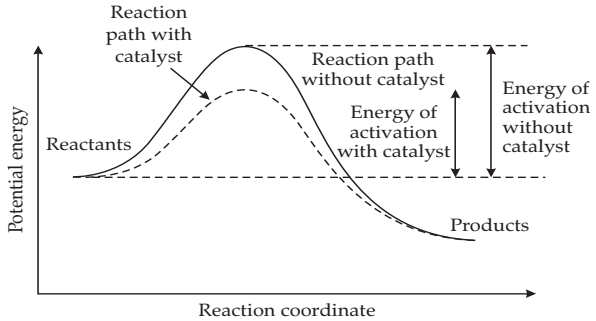
$kt = \ln[R]_0 - \ln [R]$

$$kt = \frac{\ln[R_0]}{[R]}$$

$$\text{Or, } k = \frac{2.303}{t} \times \log \frac{[R]_0}{[R]}$$ ...(4)

Equation 4 is called as the integrated form of rate constant for a first order reaction.

(b)



Effect of catalyst on activation energy

[2]

31. (a)

Iyophilic Sols	Iyophobic Sols
Dispersed phase has high affinity to the dispersion medium.	Dispersed phase has low affinity for the dispersion medium.
Easily formed by direct mixing or on heating.	Cannot be prepared directly. Prepared by special methods only.
Reversible in nature.	Irreversible in nature.
Quite stable and are not easily coagulated.	Unstable. Easily coagulated by adding a small amount of a suitable electrolyte.

(Any two) [2]

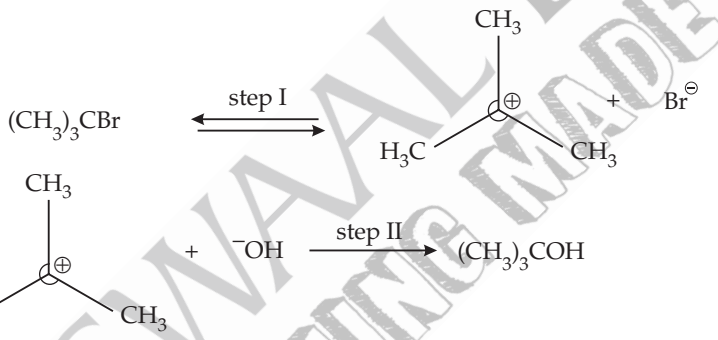
(b) Heterogeneous catalysis is a process where the reacting substance and the catalyst are in different phases. **[1]**

Example: $2\,SO_2(g) + O_2(g) \xrightarrow{Pt(s)\,catalyst} 2\,SO_3(g)$ Any suitable **[1]**

Example .

(c) $\frac{x}{m} = kp^{\frac{1}{x}}$, where $(n > 1)$ **[1]**

V. 32. (a)

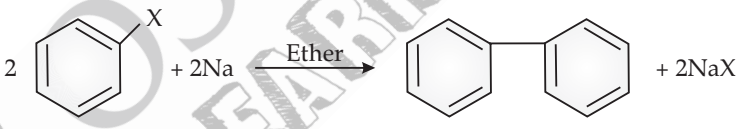


[1]

[1]

(b) When aryl halides reacts with sodium metal in dry ether, it forms diphenyl. **[1]**

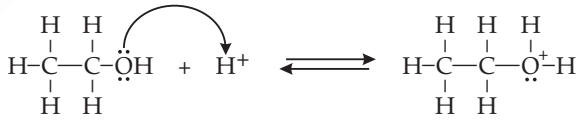
[1]



(c) Alcoholic potassium hydroxide. **[1]**

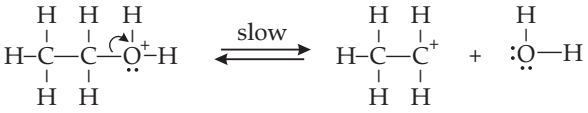
33. (a) The mechanism of dehydration of ethanol involves the following steps:

Step 1: Formation of protonated alcohol. **[1]**



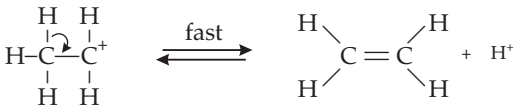
Step 2: Formation of carbocation: It is the slowest step and hence, the rate determining step of the reaction.

[1]



[1]

Step 3: Formation of ethane elimination of a proton. **[1]**



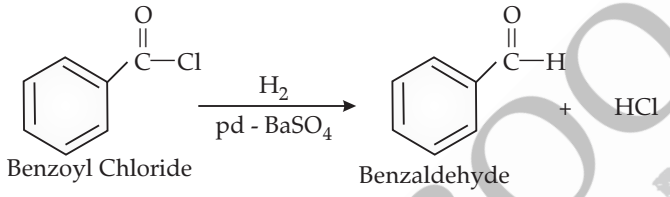
ethyl carbocation ethene

(b) Phenol is more acidic than alcohol. **[1]**

Reason : Phenoxide ion is resonance stabilized whereas alkoxide is not resonance stabilized. **[1]**

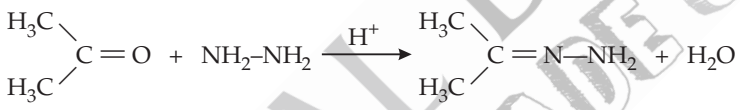
34. **(a)** Benzoyl chloride is hydrogenated over catalyst, palladium on barium sulphate.

This reaction is called Rosenmund reduction. **[1]**



Benzoyl Chloride Benzaldehyde **[1]**

(b) When hydrazine is treated with acetone in the presence of acid as catalyst, propanone (acetone), acetone hydrazone formed. **[1]**



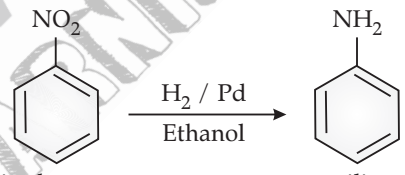
[1]

(c) Chromyl chloride. **[1]**

35. **(a)** Aliphatic and aromatic primary amines on heating with chloroform and ethanolic potassium hydroxide form isocyanides or carbylamines. This reaction is known as carbylamines reaction. **[1]**

1st amine Chloroform Carbylamine **[1]**

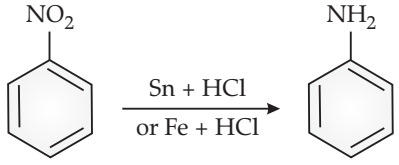
(b) Nitrobenzene is reduced to aniline by passing hydrogen gas in the presence of finely divided nickel, palladium or platinum. **[1]**



nitrobenzene aniline **[1]**

OR

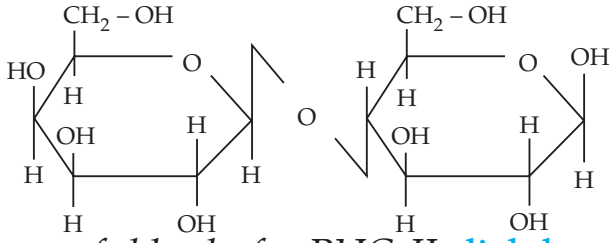
Nitrobenzene is reduced to aniline with metals in acidic medium.



nitrobenzene aniline

(c) N, N – dimethylaniline **[1]**

36. **(a)** **[2]**



(b) (i) These are the amino acids where are synthesized in our body and need not be supplied through diet. **[1]**

(ii) $NH_3 - CH_2 - COO^-$ Nylon 6, 6 **[1]**

(c) Uracil **[1]**

37. (a) It is obtained by the condensation polymerization of hexamethylenediamine with adipic acid under high pressure and at high temperature. **[1]**

$$nHOOC-(CH_2)_4-COOH + nH_2N-(CH_2)_6-NH_2 \xrightarrow[\text{High Pressure}]{533K} \left[\begin{matrix} H & & H & O & & O \\ | & & | & \| & & \| \\ N-(CH_2)_6-N- & & C- & & (CH_2)_4- & C \end{matrix}\right]_n$$

Adipic acid — Hexamethylenediamine

(b) These are the linear or slightly branched long chain molecules capable of repeatedly softening on heating and hardening on cooling. **[1]**

Example : Polythene or Polystyrene or Polyvinyl chloride **[1]**

(c) $CH_2 = \underset{\displaystyle CH_3}{\overset{\displaystyle |}{C}} - CH = CH_2$ **[1]**

Cis - 2-methylbute-1,3-diene
(Isoprene)

●●