

## Syllabus for Sandip University Joint Entrance Exam(SU-JEE)

Exam Name – SU-JEE M.Sc. Chemistry

Sr. No	Topic/subject/section/Unit Name	Number of Question
1.	<b>Atomic Structure, Chemical Bonding, &amp; Periodic Properties</b> <ul style="list-style-type: none"><li>● Wave Mechanical Concept of Atomic Structure</li><li>● Heisenberg's Uncertainty principle</li><li>● Schrödinger wave equation</li><li>● Quantum numbers</li><li>● Chemical Bonding</li><li>● Ionic Solids</li><li>● Metallic bond</li><li>● Valence bond theory</li><li>● Weak interactions</li><li>● Periodic properties</li></ul>	10
2.	<b>S, P ,Transition &amp; Inner Transition Elements</b> <ul style="list-style-type: none"><li>● Boron Hydrides</li><li>● Carbides</li><li>● Clathrates</li><li>● Fluorides and Oxides of Xenon</li><li>● Halogens</li><li>● Hydrides</li><li>● Lithium and Beryllium</li><li>● Nitrogen Compounds</li><li>● Noble gases</li><li>● P – Block Elements</li><li>● S – Block Elements</li> <li>● Transition Elements</li><li>● Physico-chemical properties</li><li>● Variable oxidation states</li><li>● Spectral and Magnetic properties</li><li>● Inner Transition Elements</li></ul>	10

	<ul style="list-style-type: none"> <li>● Lanthanoids</li> <li>● Ionic radii and Lanthanide contraction</li> <li>● Separation of lanthanoids</li> <li>● Actinoids</li> </ul>	
3.	<b>Coordination &amp; Bioinorganic Chemistry</b> <ul style="list-style-type: none"> <li>●</li> <li>● Effective atomic number</li> <li>● Coordination Compounds</li> <li>● Bioinorganic Chemistry</li> </ul>	10
4.	<b>Nuclear &amp; Radiochemistry</b> <b>The Atomic Nucleus and Its Properties:</b> Atomic nucleus and its composition, nuclear radius and nuclear density, nuclear force, mass defect, packing fraction, binding energy, nuclear spin and moments, nuclear potential, concepts of nuclear structure – shell model, nuclear statistics, nuclear stability, nuclidic mass and atomic mass, nuclear mass and energy correlation, classification of nuclides. <b>2. Radioactivity and Radioactive Decay Laws:</b> Radioactivity, units of radioactivity, natural and artificial radioactivity, radioactive decay, radioactive decay constant, kinetics of radioactive decay, half-life and average life, radioactive decay series, radioactive equilibria, comparison between radioactive equilibrium and chemical equilibrium.	10
5.	<b>Fundamentals of Organic Chemistry &amp; Isomerism</b> <ul style="list-style-type: none"> <li>● Carbocations</li> <li>● Concept of stereo isomerism</li> <li>● Electrometric Effects</li> </ul>	10

	<ul style="list-style-type: none"> <li>● Huckel's rule and its significance</li> <li>● Hybridization</li> <li>● Inductive Effects</li> <li>● Requirements of aromaticity</li> <li>● Resonance</li> </ul>	
6.	<p><b>Hydrocarbons and their Derivatives</b></p> <ul style="list-style-type: none"> <li>● Acidity of alkynes</li> <li>● Aromatic Electrophilic substitutions</li> <li>● Hoffman rule</li> <li>● Mechanism of electrophilic and nucleophilic addition</li> <li>● Methods of formation of Alkenes</li> <li>● Saytzeff rule</li> </ul> <p><b>Nitrogen and Oxygen bearing Functional Groups</b></p> <ul style="list-style-type: none"> <li>● Condensation with Ammonia and amines</li> <li>● Mechanism of Electrophilic aromatic substitution in arylamines</li> <li>● Methods of formation of ethers and epoxides</li> <li>● Nucleophilic substitution in nitroarenes</li> <li>● Preparation, properties and factors affecting basicity of amines</li> <li>● Reactions of arenediazonium salts</li> <li>● Reaction of aryl amines with nitrous acid</li> <li>● Reduction of nitro compounds</li> <li>●</li> </ul>	10
7.	<p><b>Solid State &amp; Metallurgy</b></p> <ul style="list-style-type: none"> <li>● General Characteristics of Solid State</li> <li>● Amorphous and Crystalline Solids</li> <li>● <b>Classification of Crystalline Solids</b></li> </ul>	10

	<ul style="list-style-type: none"> <li>● <b>Crystal Lattices and Unit Cells</b></li> <li>● Number of Atoms in a Unit Cell</li> <li>● Close-Packed Structures</li> <li>● Packing Efficiency</li> <li>● Calculations Involving Unit Cell Dimensions\</li> <li>● Imperfections in Solids</li> <li>● Electrical Properties</li> <li>● Magnetic Properties</li> <li>● Occurrence of metals</li> <li>● Concentration of Ores</li> <li>● Extraction of Crude Metal from Concentrated Ore</li> <li>● Thermodynamic Principles of Metallurgy</li> <li>● Electrochemical Principles o f Metallurgy</li> <li>● Oxidation Reduction</li> <li>● Refining</li> <li>● Uses of Aluminium, Copper, Zinc and Iron</li> </ul>	
<b>8.</b>	<b>States of Matter</b> <ul style="list-style-type: none"> <li>● Gaseous State</li> <li>● Liquid State</li> <li>● Solid State</li> <li>● Liquid crystals</li> </ul>	10
<b>9.</b>	<b>Chemical Kinetics and Photochemistry</b> <ul style="list-style-type: none"> <li>● Isolation methods</li> </ul>	10

	<ul style="list-style-type: none"> <li>● Techniques for kinetic investigation</li> <li>● Conductometry</li> <li>● Potentiometry</li> <li>● Polarimetry</li> <li>● Spectrophotometry</li> <li>● Effect of temperature on rate of reaction</li> <li>● Arrhenius equation</li> <li>● Theories of chemical kinetics</li> <li>● Photochemical decomposition of hydrogen iodide</li> <li>● Photochemistry</li> </ul>	
<b>10</b>	<b>Laws of Thermodynamics &amp; Electrochemistry</b> <ul style="list-style-type: none"> <li>● First Law of thermodynamics</li> <li>● Second law of thermodynamics</li> <li>● Third law of thermodynamics</li> <li>● Migration of ions and Kohlrausch law</li> <li>● Debye-Huckel-Onsager's equation</li> <li>● Hittorf's method and moving boundary method</li> <li>● Application of conductivity measurements</li> <li>● Types of reversible electrodes</li> <li>● Electrode reactions</li> <li>● Nernst equation</li> <li>● Electrolytic and Galvanic cells</li> <li>● Measurement of EMF of a cell</li> </ul>	<b>10</b>
<b>Total</b>		<b>100</b>