**NOTE: Sub Topics mentioned in the below schedule are syllabi given in the broucher of IIT JEE Advanced – 2017**

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| **MATHEMATICS** | | **PHYSICS** | | **CHEMISTRY** |
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| **STRAIGHT LINE AND CIRCLES :** **TWO DIMENSIONS**: cartesian coordinates, distance between two points, section formulae, shift of origin. equation of a straight line in various forms, angle between two lines, distance of a point from a line; lines through the point of intersection of two given lines, equation of the bisector of the angle between two lines, concurrency of lines; centroid, orthocentre, incentre and circumcentre of a triangle. locus problems.  equation of a circle in various forms, equations of tangent, normal and chord. parametric equations of a circle, intersection of a circle with a straight line or a circle, equation of a circle through the points of intersection of two circles and those of a circle and a straight line. | | **Heat &Thermodynamics:** Thermal Expansion Of Solids,  Liquids & Gases; Calorimetry, Latent Heat; Heat  Conduction In One Dimension; Elementary Concepts Of Convection & Radiation; Newton's Law Of Cooling; Ideal Gas Laws; Specific Heats (Cv&Cp For Monoatomic & Diatomic Gases);  Isothermal & Adiabatic Processes, Bulk Modulus Of Gases; Equivalence Of Heat & Work; First Law Of Thermodynamics & Its  Applications (Only For Ideal Gases); Blackbody Radiation: Absorptive & Emissive Powers; Kirchhoff's Law; Wien's Displacement Law, Stefan's Law, Second law of thermodynamics, carnot cycle.  **Experiments:**1. Plotting a cooling curve for the relationship between the temperature of a hot body and time  2. Specific heat capacity of a given (i) solid and (ii) liquid by method of mixtures | | Isolation/preparation and properties of the  Following non-metals: nitrogen, phosphorus, oxygen, sulphur and ; properties of allotropes phosphorus and  Sulphur.  Preparation and properties of the following  Compounds:  Nitrogen: oxides, oxyacids and  Ammonia;  phosphorus: oxides, oxyacids (phosphorus acid, phosphoric acid) and phosphine;  oxygen: ozone and hydrogen peroxide;  Sulphur: hydrogen sulphide, oxides, sulphurous acid, sulphuric acid and sodium thiosulphate; |
| **STRAIGHT LINE AND CIRCLES :** **TWO DIMENSIONS**: cartesian coordinates, distance between two points, section formulae, shift of origin. equation of a straight line in various forms, angle between two lines, distance of a point from a line; lines through the point of intersection of two given lines, equation of the bisector of the angle between two lines, concurrency of lines; centroid, orthocentre, incentre and circumcentre of a triangle. locus problems.  equation of a circle in various forms, equations of tangent, normal and chord. parametric equations of a circle, intersection of a circle with a straight line or a circle, equation of a circle through the points of intersection of two circles and those of a circle and a straight line. | | **Heat &Thermodynamics:** Thermal Expansion Of Solids,  Liquids & Gases; Calorimetry, Latent Heat; Heat  Conduction In One Dimension; Elementary Concepts Of Convection & Radiation; Newton's Law Of Cooling; Ideal Gas Laws; Specific Heats (Cv&Cp For Monoatomic & Diatomic Gases);  Isothermal & Adiabatic Processes, Bulk Modulus Of Gases; Equivalence Of Heat & Work; First Law Of Thermodynamics & Its  Applications (Only For Ideal Gases); Blackbody Radiation: Absorptive & Emissive Powers; Kirchhoff's Law; Wien's Displacement Law, Stefan's Law.  **Experiments:** Specific heat capacity of a given solid | | **Group 15th & 16th**  Isolation/preparation and properties of the  Following non-metals: nitrogen, phosphorus, oxygen, sulphur and ; properties of allotropes phosphorus and Sulphur.  Preparation and properties of the following Compounds:  Nitrogen: oxides, oxyacids and  Ammonia;   phosphorus: oxides, oxyacids (phosphorus acid, phosphoric acid) and phosphine;  oxygen: ozone and hydrogen peroxide;  Sulphur: hydrogen sulphide, oxides, sulphurous acid, sulphuric acid and sodium thiosulphate; |
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| **PARABOLA AND CIRCLES** | | **Electrostatics, gauss law & gravitation:**  Coulomb's law; electric field and potential; electrical potential energy of a system of point charges and of electrical dipoles in a uniform electrostatic field; electric field lines; flux of electric field; gauss's law and its application in simple cases, such as, to find field due to infinitely long straight wire, uniformly charged infinite plane sheet and uniformly charged thin spherical shell and gravitation. | | **Group 14th**  Isolation/preparation and properties of the Silicon  Properties of allotropes of carbon (only diamond and graphite)  Preparation and properties of the following compounds Carbon: Oxides And Oxyacid  (Carbonic Acid);  Silicon: Silicones, Silicates and Silicon Carbide;  Preparation and properties of oxides and chlorides of tin and lead  **2. 17th  group & 18 group**  Isolation/preparation and properties of the Following  non-metals: halogens  Preparation and properties of the following compounds:  Halogens: hydrohalic acids,  oxides and oxyacids of chlorine, bleaching powder;  Xenon fluorides |
| **PARABOLA AND CIRCLES** | | **Electrostatics, Gauss law &Gravitation:**  Coulomb's law; electric field and potential; electrical potential energy of a system of point charges and of electrical dipoles in a uniform electrostatic field; electric field lines; flux of electric field; gauss's law and its application in simple cases, such as, to find field due to infinitely long straight wire, uniformly charged infinite plane sheet and uniformly charged thin spherical shell and gravitation. | | **Group 14th**  Isolation/preparation and properties of the Silicon  Properties of allotropes of carbon (only diamond and graphite)  Preparation and properties of the following compounds Carbon: Oxides And Oxyacid  (Carbonic Acid);  Silicon: Silicones, Silicates and Silicon Carbide;  Preparation and properties of oxides and chlorides of tin and lead  **2. 17th  group & 18 group**  Isolation/preparation and properties of the halogens  Preparation and properties of the following  compounds:  Halogens: hydrohalic acids,  oxides and oxyacids of chlorine, bleaching powder;  Xenon fluorides |
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| Ellipse And Hyperbola In Standard Form, Their Foci, Directrices And Eccentricity, Parametric Equations, Equations Of Tangent And Normal, Locus Problems | | **Capacitance(With R-C Circuits):**Parallel Plate Capacitor With And Without Dielectrics; Capacitors In Series And Parallel; Energy Stored In A Capacitor  **Current Electricity:** Electric Current; Ohm's Law; Series And Parallel Arrangements Of Resistances And Cells; Kirchhoff's Laws and Simple Applications; Heating Effect Of Current. Verification of Ohm's Law Using Voltmeter and Ammeter, And Specific Resistance Of The Material Of A Wire Using Meter Bridge & P.O. Box,R-C Circuits, color coding of resistors.  **Experiments:** 1. Resistivity of the material of a given wire using metre bridge.  2. Resistance of a given wire using Ohm’s law  3. Potentiometer-(i) Comparison of emf of two primary cells.  (ii) determination of internal resistance of a cell  4. Post office box | | **Organic Chemistry**  Concepts: Hybridisation of carbon; Sigma and pi-bonds; Shapes of simple organic molecules;Structural and geometrical isomerism; Optical  isomerism of compounds containing up to two asymmetric centres, (*R,S* and *E,Z*nomenclature excluded); IUPAC nomenclature of simple organic compounds (only hydrocarbons, mono-functional and bifunctional  compounds); Conformations of  ethane and butane (Newman projections); Resonance and hyperconjugation; Keto-enol  tautomerism;  Determination of empirical and molecular formulae of simple compounds (only combustion method); |
| Ellipse And Hyperbola In Standard Form, Their Foci, Directrices And Eccentricity, Parametric Equations, Equations Of Tangent And Normal, Locus Problems | | **Capacitance(With R-C Circuits):**Parallel Plate Capacitor With And Without Dielectrics; Capacitors In Series And Parallel; Energy Stored In A Capacitor  **Current Electricity:** Electric Current; Ohm's Law; Series And Parallel Arrangements Of Resistances And Cells; Kirchhoff's Laws and Simple Applications; Heating Effect Of Current. Verification of Ohm's Law Using Voltmeter and Ammeter, And Specific Resistance Of The Material Of A Wire Using Meter Bridge & P.O. Box,R-C Circuits.  **Experiments:** 1. Resistivity of the material of a given wire using metre bridge.  2. Resistance of a given wire using Ohm’s law  3. Potentiometer-(i) Comparison of emf of two primary cells.(ii) determination of internal resistance of a cell  4. Post office box | | **Organic Chemistry**  Concepts: Hybridisation of carbon; Sigma and pi-bonds; Shapes of simple organic molecules;Structural and geometrical isomerism; Optical  isomerism of compounds containing up to two  asymmetric centres, (*R,S* and *E,Z* nomenclature excluded); IUPAC nomenclature  of simple organic compounds (only hydrocarbons, mono-functional and bifunctional  compounds); Conformations of  ethane and butane (Newman projections); Resonance and hyperconjugation; Keto-enol  tautomerism; Determination of empirical and molecular formulae of simple compounds (only combustion method); |
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| **COMPLEX NUMBERS :** algebra of complex numbers, addition, multiplication, conjugation, polar representation, properties of modulus and principal argument, triangle inequality, cube roots of unity, geometric interpretations. | | **Magnetism :**Magnetic force on a moving point charges and current elements, Magnetic force between two current carrying wires, Motion of a charged particle in magnetic and electric field, Magnetic dipoles moment, magnetic torque, magnetic dipoles, Torque, P.E and interaction regarding magnetic dipole, Cyclotron, BiotSavart’sLaw, Ampere’s Law & their applications, Bar magnet as equivalent solenoid, magnetic field lence,earth's magnetic field and magnetic elements.Para,dia and ferro magnetic substances.Moving coil alvanometer, its current sensitivity. Experiment Resistance and figure of merit of a galvanometer by half deflection method | | **Organic Chemistry**  Hydrogen bonds:definition and their effects on physical  properties of alcohols and carboxylic acids;Inductive and resonance effects on acidity and  basicity of organic acids and bases; Polarity and inductive effects in alkyl halides; Reactive  intermediates produced during homolytic and heterolytic bond cleavage; Formation,  structure and stability of carbocations, carbanions and free radicals.  Preparation, properties and reactions of alkanes: Homologous series, physical properties of alkanes (melting points, boiling  points and density); Combustion and halogenation of alkanes; Preparation of alkanes by Wurtz reaction and decarboxylation  reactions. Preparation, properties and reactions of alkenes and alkynes: Physical properties of  alkenes and alkynes (boiling points, density and dipole moments); Acidity of alkynes; Acid catalysed hydration of alkenes and alkynes  (excluding the stereochemistry of addition and elimination); Reactions of alkenes with KMnO4 and ozone; Reduction of alkenes and alkynes;  Preparation of alkenes and alkynes by elimination reactions; Electrophilic addition  reactions of alkenes with X2, HX, HOX and H2O (X=halogen); Addition reactions of alkynes; Metal acetylides. |
| **COMPLEX NUMBERS :** algebra of complex numbers, addition, multiplication, conjugation, polar representation, properties of modulus and principal argument, triangle inequality, cube roots of unity, geometric interpretations. | | **Magnetism :**Magnetic force on a moving point charges and current elements, Magnetic force between two current carrying wires, Motion of a charged particle in magnetic and electric field, Magnetic dipoles moment, magnetic torque, magnetic dipoles, Torque, P.E and interaction regarding magnetic dipole, Cyclotron, BiotSavart’s Law, Ampere’s Law & their applications,Moving coil galvanometer, its current sensitivity. Experiment Resistance and figure of merit of a galvanometer by half deflection method | | **Organic Chemistry**  Hydrogen bonds:definition and their effects on physical  properties of alcohols and carboxylic acids;Inductive and resonance effects on acidity and  basicity of organic acids and bases; Polarity and inductive effects in alkyl halides; Reactive  intermediates produced during homolytic and heterolytic bond cleavage; Formation, structure and stability of carbocations, carbanions and free radicals.  Preparation, properties and reactions of alkanes: Homologous series, physical properties of alkanes (melting points, boiling points and density); Combustion and halogenation of alkanes; Preparation of alkanes by Wurtz reaction and decarboxylation  reactions. Preparation, properties and reactions of alkenes and alkynes: Physical properties of  alkenes and alkynes (boiling points, density and dipole moments); Acidity of alkynes; Acid catalysed hydration of alkenes and alkynes (excluding the stereochemistry of addition and elimination); Reactions of alkenes with KMnO4 and ozone; Reduction of alkenes and alkynes; Preparation of alkenes and alkynes by elimination reactions; Electrophilic addition reactions of alkenes with X2, HX, HOX and H2O (X=halogen); Addition reactions of alkynes; Metal acetylides. |
| **FUNCTIONS :** Real Valued Functions Of A Real Variable, Into, Onto And One-To-One Functions, Sum, Difference, Product And Quotient Of Two Functions, Composite Functions, Absolute Value, Polynomial, Rational, Trigonometric, Exponential And Logarithmic Functions, Even And Odd Functions, Inverse Of A Function, Continuity Of Composite Functions, Intermediate Value Property Of Continuous Functions, Limits. | **E M I  & AC :** Magnetic flux  calculation, Faraday’s laws Lenz’s law, Motional EMF, Induced electric filed ,Self and mutual induction, L-R,C-R,L-C-R circuits, L-C Oscillations with D-C source, LCR series circuit with AC , resonance: Quality factor, Power in AC circuits,Wattless current.AC generator and transformer | | | **Organic Chemistry**  Reactions of benzene: Structure and aromaticity; Electrophilic substitution reactions: halogenation, nitration, sulphonation, Friedel-  Crafts alkylation and acylation; Effect of *o-, m* and *p*-directing groups in monosubstituted  benzenes.  Characteristic reactions of the following : Alkyl halides: rearrangement reactions of alkyl carbocation, Grignard reactions, nucleophilic  substitution reactions,elimination reactions.  Haloarenes: nucleophilic aromatic substitution in haloarenes and substituted  haloarenes (excluding Benzyne mechanism and Cine substitution). |
| **FUNCTIONS :** Real Valued Functions Of A Real Variable, Into, Onto And One-To-One Functions, Sum, Difference, Product And Quotient Of Two Functions, Composite Functions, Absolute Value, Polynomial, Rational, Trigonometric, Exponential And Logarithmic Functions, Even And Odd Functions, Inverse Of A Function, Continuity Of Composite Functions, Intermediate Value Property Of Continuous Functions, Limits. | **E M I  & AC :** Magnetic flux  calculation, Faraday’s laws Lenz’s law, Motional EMF, Induced electric filed ,Self and mutual induction, L-R,C-R,L-C-R circuits, L-C Oscillations with D-C source, LCR series circuit with AC , resonance: Quality factor, Power in AC circuits,Wattless current. | | | **Organic Chemistry**  Reactions of benzene: Structure and aromaticity; Electrophilic substitution reactions: halogenation, nitration, sulphonation, Friedel-  Crafts alkylation and acylation; Effect of *o-, m* and *p*-directing groups in monosubstituted  benzenes.  Characteristic reactions of the following : Alkyl halides: rearrangement reactions of alkyl carbocation, Grignard reactions, nucleophilic substitution reactions,elimination reactions.  Haloarenes: nucleophilic aromatic substitution in aloarenes and substituted haloarenes (excluding Benzyne mechanism and Cine substitution). |
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| **CONTINUITY, DIFFERENTIABILITY, DERIVATIVES :**  Derivative of a function,  derivative of the sum, difference, product and quotient of two functions, chain rule, derivatives of polynomial, rational, trigonometric, inverse trigonometric, exponential and logarithmic functions. derivatives of implicit functions, derivatives up to order two | | **Geometrical  &  Wave Optics**  **Experiments:** 1. Focal length of (i) Convex mirror  (ii) Concave mirror, and (iii) convex lens using parallax method.  2. Plot of angle of deviation vs angle of incidence for a triangular prism.  3. Refractive index of a glass slab using a travelling microscope | | **ORGANIC CHEMISTRY**  Characteristic reactions of the following : Alcohols: esterification, dehydration and oxidation, reaction with sodium, phosphorus halides, ZnCl2/concentrated HCl, conversion of alcohols into aldehydes and ketones; Ethers:  Preparation by Williamson’s Synthesis Phenols:   Acidity, electrophilic substitution reactions (halogenation, nitration and  sulphonation); Reimer-Tiemann reaction, Kolbe reaction.  Amines: basicity of substituted anilines and aliphatic amines, preparation from  nitro compounds, reaction with nitrous acid, azo coupling reaction of diazonium salts of aromatic amines, Sandmeyer and related reactions of diazonium salts; carbylamines reaction; |
| **CONTINUITY, DIFFERENTIABILITY, DERIVATIVES :**  Derivative Of A Function,  Derivative Of The Sum, Difference, Product And Quotient Of Two Functions, Chain Rule, Derivatives Of Polynomial, Rational, Trigonometric, Inverse Trigonometric, Exponential And Logarithmic Functions. Derivatives Of Implicit Functions, Derivatives Up To Order Two | | Geometrical  &  Wave Optics(Excluding Optical instruments diffraction, polarization)  Experiments: Focal length of (i) Concave mirror, and (ii) convex lens using parallax method. | | **Organic Chemistry**  Characteristic reactions of the following : Alcohols: esterification, dehydration and oxidation, reaction with  sodium, phosphorus halides,  ZnCl2/concentrated HCl, conversion of alcohols into aldehydes and ketones; Ethers:  Preparation by Williamson’s Synthesis  **Phenols:**  Acidity, electrophilic substitution reactions (halogenation, nitration and  sulphonation); Reimer-Tiemann reaction, Kolbe reaction.  **Amines:** basicity of substituted anilines and aliphatic amines, preparation from itrocompounds, reaction with nitrous acid, azo coupling reaction of diazonium salts of aromatic amines, Sandmeyer and related  reactions of diazonium salts; carbylamines reaction; |
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| **APPLICATIONS OF DERIVATIVES :** geometrical interpretation of the derivative, tangents and normals, increasing and decreasing functions, maximum and minimum values of a function, rolle’s theorem and lagrange’s mean value theorem. | | **Sound Waves, Waves in a string**  **Experiment:** Speed of sound in air at room temperature using a resonance tube | | **Organic Chemistry**  Characteristic reactions of the following :   conversion of alcohols into aldehydes and ketones;  Aldehydes and Ketones: oxidation, reduction, oxime and hydrazone formation; Aldol condensation, Perkin reaction; Cannizzaro reaction; Haloform reaction and nucleophilic addition reactions (Grignard addition); |
| **APPLICATIONS OF DERIVATIVES :** geometrical interpretation of the derivative, tangents and normals, increasing and decreasing functions, maximum and minimum values of a function, rolle’s theorem and lagrange’s mean value theorem. | | **Sound Waves, Waves in a string**  **Experiment:** Speed of sound in air at room temperature using a resonance tube | | **Organic Chemistry**  Characteristic reactions of the following :   conversion of alcohols into aldehydes and ketones;  Aldehydes and Ketones: oxidation, reduction,  oxime and hydrazone formation; Aldol condensation, Perkin reaction; Cannizzaro reaction; Haloform reaction and nucleophilic addition reactions (Grignard addition); |
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| **QUADRATIC EQUATIONS AND LOGARITHMS:** Quadratic Equations In Real And Complex Number System And Their Solutions, Relation Between Roots And Coefficients, Nature Of Roots, Formation Of Quadratic Equation With Given Roots,Logarithm And Their Properties  **SEQUENCES AND SERIES,:**Arithmetic, Geometric And Harmonic Progressions, Arithmetic, Geometric? And Harmonic Means, Sums Of Finite Arithmetic And Geometric Progressions, Infinite Geometric Series, Sums Of Squares And Cubes Of The First N Natural Numbers | | **Modern Physics :** Atomic nucleus; alpha, beta and gamma radiations; law of radioactive decay; decay constant; half-life and mean life; binding energy and its calculation; fission and fusion processes; energy calculation in these processes.  Photoelectric effect; bohr's theory of hydrogen-like atoms;  characteristic and continuous x-rays, moseley's law; de broglie wavelength of matter waves | | **Organic Chemistry**  Characteristic reactions of the following : Carboxylic acids: formation of esters, acid chlorides and amides, ester hydrolysis; Carbohydrates:  Classification; mono- and disaccharides (glucose and sucrose); Oxidation,reduction, glycoside formation and hydrolysis of sucrose.  Amino acids and peptides: General structure (only primary structure for peptides) and  physical properties.  Properties and uses of some important polymers: Polythene, nylon,polyester and Bakelite.  Practical organic chemistry: Detection of elements (N, S, halogens); Detection and  identification of the following functional groups: hydroxyl (alcoholic and phenolic), carbonyl (aldehyde and ketone), carboxyl, amino and  nitro; Chemical methods of separation of mono-functional organic compounds from  binary mixtures. |
| **QUADRATIC EQUATIONS AND LOGARITHMS:** Quadratic Equations In Real And Complex Number System And Their Solutions, Relation Between Roots And Coefficients, Nature Of Roots, Formation Of Quadratic Equation With Given Roots,Logarithm And Their Properties  **SEQUENCES AND SERIES,:**Arithmetic, Geometric And Harmonic Progressions, Arithmetic, Geometric? And Harmonic Means, Sums Of Finite Arithmetic And Geometric Progressions, Infinite Geometric Series, Sums Of Squares And Cubes Of The First N Natural Numbers | | **Modern Physics :** Atomic nucleus; alpha, beta and gamma radiations; law of radioactive decay; decay constant; half-life and mean life; binding energy and its calculation; fission and fusion processes; energy calculation in these processes.  Photoelectric effect; bohr’s theory of hydrogen-like atoms;  characteristic and continuous x-rays, moseley’s law; de roglie wavelength of matter waves. | | **Organic Chemistry**  Characteristic reactions of the following : Carboxylic acids: formation of esters, acid chlorides and amides, ester hydrolysis; Carbohydrates: Classification; mono- and disaccharides (glucose and sucrose); Oxidation,reduction, glycoside formation and hydrolysis of sucrose. Amino acids and peptides: General structure (only primary structure for peptides) and  physical properties. Properties and uses of some  important polymers: Polythene, nylon, polyester and Bakelite. Practical organic chemistry: Detection of elements (N, S, halogens); Detection and identification of the following functional groups: hydroxyl (alcoholic and phenolic), carbonyl (aldehyde and ketone), carboxyl, amino and nitro; Chemical methods of separation of mono-functional organic compounds from  binary mixtures. |
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| **VECTORS:** Addition Of Vectors, Scalar Multiplication, Dot And Cross Products, Scalar Triple Products And Their Geometrical Interpretations.  **THREE DIMENSIONS:** Direction Cosines And Direction Ratios, Equation Of A Straight Line In Space, Equation Of A Plane, Distance Of A Point From A Plane. | | Fluid statics ,Fluid Dynamics ,Surface tension | | **Physical Chemistry**  Chemical kinetics: Rates of chemical  reactions; Order of reactions; Rate constant;  First order reactions; Temperature dependence  of rate constant (Arrhenius equation).  Nuclear chemistry: Radioactivity: isotopes and isobars; Properties of α ,β *and*γ rays;  Kinetics of radioactive decay (decay series  excluded), carbon dating; Stability of nuclei  with respect to proton-neutron ratio; Brief discussion on fission and fusion reactions.  Solid state: Classification of solids, crystalline  state, seven crystal systems (cell parameters  a, b, c,α ,β ,γ ), close packed structure of solids  (cubic), packing in fcc, bcc and hcp lattices; Nearest neighbours, ionic radii, simple ionic compounds, point defects. |
| **VECTORS:** Addition Of Vectors, Scalar Multiplication, Dot And Cross Products, Scalar Triple Products And Their Geometrical Interpretations.  **THREE DIMENSIONS:** Direction Cosines And Direction Ratios, Equation Of A Straight Line In Space, Equation Of A Plane, Distance Of A Point From A Plane. | | Fluid statics ,Fluid Dynamics ,Surface tension | | **Physical Chemistry**  Chemical kinetics: Rates of chemical reactions; Order of reactions; Rate constant;  First order reactions; Temperature dependence  of rate constant (Arrhenius equation).  Nuclear chemistry: Radioactivity: isotopes and isobars; Properties of α ,β *and*γ rays;  Kinetics of radioactive decay (decay series excluded), carbon dating; Stability of nuclei  with respect to proton-neutron ratio; Brief discussion on fission and fusion reactions.  Solid state: Classification of solids, crystalline state, seven crystal systems (cell parameters  a, b, c,α ,β ,γ ), close packed structure of solids  (cubic), packing in fcc, bcc and hcp lattices; Nearest neighbours, ionic radii, simple ionic  compounds, point defects. |
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| **MATRICES&DETERMINANTS:**  matrices as a rectangular array of real numbers, equality of matrices, addition, multiplication by a scalar and product of matrices, transpose of a matrix, determinant of a square matrix of order up to three, inverse of a square matrix of order up to three, properties of these matrix operations, diagonal, symmetric and skew-symmetric matrices and their properties, solutions of simultaneous linear equations in two or three variables. | | **1. SHM**  Kinematics and Energy of a general Simple Harmonic oscillator, Time period of spring-block system and related problems Simple pendulum, Physical pendulum, Cumulative problems in SHM (upto syllabus covered)  **2. All Experiments of JEE ADV SYLLABUS** | | **Physical Chemistry**  Gaseous and liquid states: Absolute scale of  temperature, ideal gas equation; Deviation  from ideality, van der Waals equation; Kinetic  theory of gases; Average, root mean square and most probable velocities and their relation  with temperature; Law of partial pressures; Vapour pressure; Diffusion of gases.  Energetics: First law of thermodynamics; Internal energy, work and heat, pressurevolume  work; Enthalpy, Hess’s law; Heat of reaction, fusion and vapourization; Second law  of thermodynamics; Entropy; Free energy; Criterion of spontaneity. |
| **MATRICES&DETERMINANTS:**  matrices as a rectangular array of real numbers, equality of matrices, addition, multiplication by a scalar and product of matrices, transpose of a matrix, determinant of a square matrix of order up to three, inverse of a square matrix of order up to three, properties of these matrix operations, diagonal, symmetric and skew-symmetric matrices and their properties, solutions of simultaneous linear equations in two or three variables. | | **1. SHM**  Kinematics and Energy of a general Simple Harmonic oscillator, Time period of spring-block system and related problems  Simple pendulum, Physical pendulum, Cumulative problems in SHM (upto syllabus covered)  **2. All Experiments of JEE ADV SYLLABUS** | | **Physical Chemistry**  Gaseous and liquid states: Absolute scale of  temperature, ideal gas equation; Deviation  from ideality, van der Waals equation; Kinetic  theory of gases; Average, root mean square and most probable velocities and their relation with temperature; Law of partial pressures; Vapour pressure; Diffusion of gases.  Energetics: First law of thermodynamics; Internal energy, work and heat, pressure volume  work; Enthalpy, Hess’s law; Heat of reaction, fusion and vapourization; Second law of thermodynamics; Entropy; Free energy; Criterion of spontaneity. |
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| **INDEFINITE AND DEFINITE INTEGRATION:** integration as the inverse process of differentiation, indefinite integrals of standard functions, definite integrals and their properties, fundamental theorem of integral calculus. integration by parts, integration by the methods of substitution and partial fractions. | | **1. Work, Energy, Power**  Work ,Power, Energy : Work, Kinetic energy, work – energy  theorem, conservative and non conservative forces, potential energy, conservation of energy,  Spring problems in WPE, Equilibrium- Stable, unstable & neutral, Power, Motion of a body in verticle circular motion  **2. C M, COM and Collisions :**  Conservation of linear  Momentum, Systems of particles; Centre of mass and its motion; impulse; Elastic and inelastic collisions | | **Physical Chemistry**  **Electrochemistry:** Electrochemical cells and  cell reactions; Standard electrode potentials;  Nernst equation and its relation to ΔG;  Electrochemical series, emf of galvanic cells;  Faraday’s laws of electrolysis; Electrolytic conductance, specific, equivalent and molar conductivity, Kohlrausch’s law; Concentration cells.  **Solutions:** Raoult’s law; Molecular weight determination from lowering of vapour pressure, elevation of boiling point and depression of freezing point. |
| **AREAS AND DIFFERENTIAL EQUATIONS :** application of definite integrals to the determination of areas involving simple curves. formation of ordinary differential equations, solution of homogeneous differential equations, separation of variables method, linear first order differential equations. | | **Rigid body mechanics : ( complete rotation)**  Rigid body, moment of inertia, parallel and  Perpendicular axes theorems, moment of inertia of uniform bodies with simple geometrical shapes; torque; dynamics of rigid bodies with fixed axis of rotation; rolling without slipping of rings, cylinders and spheres; equilibrium of rigid bodies. Situations involving work energy theorem in rotation.  Concept of angular momentum, principle of conservation of angular momentum, collision of a point mass with a rigid body, Toppling situations, Impulse and Collisions involving rigid body | | **Physical Chemistry**  **Chemical equilibrium:** Law of mass action; Equilibrium constant, Le Chatelier’s principle  (effect of concentration, temperature and  pressure); Significance of ΔG and ΔGo in chemical equilibrium; Solubility product,common ion effect, pH and buffer solutions;  Acids and bases (Bronsted and Lewis concepts); Hydrolysis of salts. |
| **AREAS AND DIFFERENTIAL EQUATIONS :** application of definite integrals to the determination of areas involving simple curves. formation of ordinary differential equations, solution of homogeneous differential equations, separation of variables method, linear first order differential equations. | | **Rigid body mechanics : ( complete rotation)**  Rigid body, moment of inertia, parallel and  Perpendicular axes theorems, moment of inertia of uniform bodies with simple geometrical shapes; torque; dynamics of rigid bodies with fixed axis of rotation; rolling without slipping of rings, cylinders and spheres; equilibrium of rigid bodies. Situations involving work energy theorem in rotation.  Concept of angular momentum, principle of conservation of angular momentum, collision of a point mass with a rigid body, Toppling situations, Impulse and Collisions involving rigid body | | **Physical Chemistry**  **Chemical equilibrium:** Law of mass action;  Equilibrium constant, Le Chatelier’s principle  (effect of concentration, temperature and  pressure); Significance of ΔG and ΔGo in chemical equilibrium; Solubility product,common ion effect, pH and buffer solutions;  Acids and bases (Bronsted and Lewis concepts); Hydrolysis of salts. |
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| **TRIGONOMETRY**: Trigonometry Upto Transformations, General Solutions | | **1.Elasticity :** Young’s modulus, Experiment to find Young’s modulus of elasticity of the material of a metallic wire  **2.Viscosity:** Viscous force between two layers, stoke's law terminal velocity, Reynolds number, Experiment: Co-efficient of viscosity of a given viscous liquid by measuring terminal velocity of a given spherical body.  **3.Units and dimensions, Significant figures, Error analysis, measurement,** | | **Inorganic Chemistry**  **Periodic Properties chemical bonding:**  Orbital overlap and covalent bond; Hybridisation  (involving s, p and d orbitals only); Orbital  energy diagrams for homonuclear diatomic  species; Hydrogen bond; Polarity in molecules, dipole moment (qualitative aspects only); VSEPR model and shapes of molecules  (linear, angular, triangular, square planar, pyramidal, square pyramidal, trigonal  bipyramidal, tetrahedral and octahedral).  Preparation and properties of the following compounds: Oxides, peroxides, hydroxides, carbonates, bicarbonates, chlorides and sulphates of sodium, potassium, magnesium and calcium |
| **PROPERTIES AND SOLUTIONS OF TRIANGLE :** Relations Between Sides And Angles Of A Triangle, Sine Rule, Cosine Rule, Half-Angle Formula And The Area Of A Triangle, **Inverse Trigonometric Functions (Principal Value Only)** | | **Kinematics of a particle in 1D, 2D, 3D**  **N L M + Friction + Circular motion (Excluding energy based calculations)** | | **1.Coordination compounds**::  nomenclature of mononuclear coordination compounds, *cis-trans* and ionisation isomerisms, hybridization and geometries of mononuclear coordination  compounds (linear, tetrahedral, square planar and octahedral).  **2.13TH  Group elements:**  Isolation/preparation and properties of the Boron. Preparation and properties of following compounds.  Boron: diborane, boric acid and borax; Aluminium: alumina, aluminium chloride and alums; |
| **PROPERTIES AND SOLUTIONS OF TRIANGLE :** Relations Between Sides And Angles Of A Triangle, Sine Rule, Cosine Rule, Half-Angle Formula And The Area Of A Triangle, **Inverse Trigonometric Functions (Principal Value Only)** | | . **Kinematics of a particle in 1D, 2D, 3D**  **N L M + Friction + Circular motion (Excluding energy based calculations)** | | **1.Coordination compounds**::  nomenclature of mononuclear coordination compounds, *cis-trans* and ionisation isomerisms, hybridization and geometries of mononuclear coordination  compounds (linear, tetrahedral, square planar and octahedral).  **2.13TH  Group elements:**  Isolation/preparation and properties of the  Following non-metals  Boron: diborane, boric acid and borax;  Aluminium: alumina, aluminium chloride and alums; |
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| **PERMUTATIONS & COMBINATIONS & BINOMIAL THEOREM**  Binomial Theorem For A Positive Integral Index, Properties Of Binomial Coefficients | | **REVISON OF TOTAL MECHANICS(KINEMATICS TO SHM)** | | **Physical Chemistry**  General topics: Concept of atoms and molecules; Dalton’s atomic theory; Mole  concept; Chemical formulae; Balanced chemical equations; Calculations (based on  mole concept) involving common oxidationreduction, neutralisation, and displacement  reactions; Concentration in terms of mole fraction, molarity, molality and normality, titrations  Surface chemistry: Elementary concepts of  adsorption (excluding adsorption isotherms);  Colloids: types, methods of preparation and  general properties; Elementary ideas of  emulsions, surfactants and micelles (only  definitions and examples).  Atomic structure:  Bohr model, spectrum of hydrogen atom,  quantum numbers; Wave-particle duality, de Broglie hypothesis; Uncertainty principle;  Qualitative quantum mechanical picture of  hydrogen atom, shapes of s, p and d orbitals; Electronic configurations of elements (up to atomic number 36); Aufbau principle; Pauli’sexclusion principle and Hund’s rule; |
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| **PROBABILITY :**addition and multiplication rules of probability, conditional probability, bayes theorem, independence of events, computation of probability of events using permutations and combinations. | | **1.Difraction And Polarization**  **2.Extra Topics of Magnetism** | | **Qualitative Analysis**  Principles of qualitative analysis: Groups I to V (only Ag+, Hg2+, Cu2+, Pb2+, Bi3+, Fe3+,  Cr3+, Al3+, Ca2+, Ba2+, Zn2+, Mn2+ and Mg2+); Nitrate, halides (excluding fluoride),  sulphate and sulphide. |
| **PROBABILITY :**addition and multiplication rules of probability, conditional probability, bayes theorem, independence of events, computation of probability of events using permutations and combinations. | | **Electro Statics, Current Electricity, Magnetism, EMI, AC** | | **Inorganic Chemistry**  Principles of qualitative analysis: Groups I to V (only Ag+, Hg2+, Cu2+, Pb2+, Bi3+, Fe3+, Cr3+, Al3+, Ca2+, Ba2+, Zn2+, Mn2+ and Mg2+); Nitrate, halides (excluding fluoride), sulphate and sulphide. |