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

Exam Name – SU-JEE-Engineering

Sr. No	Topic/subject/section/Unit Name	Number of Question
1.	**English & GK** ● Logical Reasoning ● Environment ● Reading Comprehension ● Grammar ● General Knowledge ● Language Code ● Analogies (relationship between words) ● Rearrange the words and phrases to form meaningful sentences ● Odd one out ● Give the meaning of ● Give one word for ● Synonym ● Antonym ● English Literature ● Relationship	10
2.	**Chemistry** **Solid State :** Classification of solids based on different binding forces :molecular, ionic covalent and metallic solids,amorphous and crystalline solids(elementary idea),unit cell in two dimensional and three dimensional lattices,calculation of density of unit cell, packing in solids, packing efficiency, voids ,number of atoms per unit cellin a cubic unit cell, point defects, electrical and magnetic properties, Band	30

theory of metals ,conductors,semiconductors and insulators and n and p type semiconductors

Electrochemistry

Redox reactions; conductance in electrolytic solutions, specific and molar conductivity variations of conductivity with concentration, Kohlrausch's Law, electrolysis and laws of electrolysis (elementary idea), dry cell – electrolytic cells and Galvanic cells; lead accumulator, EMF of a cell, standard electrode potential,

Nernst equation and its application to chemical cells. Relation between Gibbs energy change and EMF of a cell, fuel cells; corrosion

Surface Chemistry

Adsorption– physisorption and chemisorption; factors affecting adsorption of gases on solids;catalysis:homogenous and heterogeneous, activity and selectivity: enzyme catalysis; colloidal state: distinction between true solutions, colloids and suspensions; lyophillic, lyophobic multimolecular and macromolecular colloids;

properties of colloids; Tyndall effect, Brownian movement, electrophoresis, coagulation; emulsions – types of emulsions.

Polymers

Classification– Natural and synthetic, methods of polymerization (addition and

	condensation),copolymerization. Some important polymers: natural and synthetic like polythene, nylon, polyesters, bakelite,rubber. Biodegradable and nonbiodegradable polymers. **General Principles and Processes of Isolation of Elements** Principles and methods of extraction – concentration, oxidation, reduction electrolytic method and refining; occurrence and principles of extraction of aluminium, copper, zinc and iron	
3.	**Mathematics** **1. Algebra** 1.1 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. 1.2 Quadratic equations with real coefficients, relations between roots and coefficients, formation of quadratic equations with given roots, symmetric functions of roots. 1.3 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, Mathematical induction.	30

1.4 Logarithms and their properties, Exponential series

1.5 Permutations and combinations, Simple applications of Permutations as an arrangement and

combination as selection, binomial theorem for a positive integral index,

properties of binomial coefficients.

1.6 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,applications of determinants in finding the area of

triangles,

1.7 Sets, Relations and Functions, algebra of sets applications, equivalence relations, mappings,

oneone,into and onto mappings, composition of mappings, binary operation, inverse of function,

functions of real variables like polynomial, modulus, signum and greatest integer.

2.Trigonometry

2.1Trigonometric functions, their periodicity and graphs, addition and subtraction formulae,

multiple and sub-multiple angles formulae, general solution of trigonometric equations.

2.2 Relations between sides and angles of a triangle, sine rule, cosine rule, half-angle formula and

the area of a triangle,

2.3 Inverse trigonometric functions

3. Two-dimensional & Three- dimensional Coordinate Geometry

3.1 Two dimensions: Cartesian coordinates, distance between two points, section formulae, shift of

origin.

3.2 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;

3.3 Centroid, orthocentre, incentre and circumcentre of a triangle.

3.4 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.

3.5 Equations of a parabola, ellipse and hyperbola in standard form, their foci, directrices and

eccentricity, parametric equations, equations of tangent and normal, Locus problems.

3.6Three dimensions: Direction cosines and direction ratios, equation of a straight

line in space, equation of a plane, distance of a point from a plane,condition for coplanarity of three

lines, angles between two planes, angle between a line and a plane.

4. Differential calculus

4.1 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.

4.2 Limit and continuity of a function, limit and continuity of the sum, difference, product and

quotient of two functions, L'Hospital rule of evaluation of limits of functions.

4.3 Even and odd functions, inverse of a function, continuity of composite functions, intermediate

value property of continuous functions.

4.4 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.

4.5 Derivatives of implicit functions, derivatives up to order two, 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.

5. Integral calculus

	5.1 ntegration as the inverse process of differentiation, indefinite integrals of standard functions,

definite integrals and their properties, fundamental theorem of integral calculus.

5.2 Integration by parts, integration by the methods of substitution and partial fractions, application

of definite integrals to the determination of areas involving simple curves.

5.3 Formation of ordinary differential equations, solution of homogeneous differential equations,

separation of variables method, linear first order differential equations.

6.Vectors

6.1 Direction ratio/cosines of vectors, addition of vectors, scalar multiplication, position vector of a

point dividing a line segment in a given ratio.

6.2 Dot and cross products of two vectors, projection of a vector on a line.

6.3 Scalar triple products and their geometrical interpretations.

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7. Statistics & Probability

7.1 Types of data, Frequency Table ,Mean, Median, Mode ,Variance/Standard Deviation,Graphs ,

7.2 Addition and multiplication rules of probability, conditional probability, Bayes Theorem,

independence of events, computation of probability of events using permutations and combinations | |
| **4.** | **Physics:-** | 30 |

Chapter-1 : Circular Motion & Rotational motion

Angular Velocity,Angular Acceleration,Relation between Linear and angular velocity,Uniform circular motion(period,frequency ,acceleration),Relation between Linear & Angular Acceleration, Centripetal & Centrifugal Forces,Equations of motion,Torque,Moment of inertia

Chapter-2 : Elasticity & Surface Tension

Definition of stress and strain (Tensile,Volume and Shearing),Hook's Law,Young's Modulus,Bulk Modulus,Modulus of rigidity, Poisson's Ratio,cohesive force,Adhesive Force, Surface energy,Surface Tension,Angle of contact,Effect of impurities and temperature on surface tension,Rise of liquid in capillary tube.

Chapter-3 : Ray optics and Optical Instruments

Reflection & Refraction of light by spherical surfaces & by lenses,Mirror equation,Power of a lens, Total internal reflection,Refraction & Dispersion through a Prism, Study of Optical Instruments like Eye, Microscope, Telescope,

Chapter-4 : Wave theory of light.

Basic Definitions(Amplitude,Period,Wavelength,Frequency,Velocity),Transverse and longitudinal wave nature,Huygens Principle,the Doppler effect, Interference of light and Young's Experiment, Diffraction of light,Single slit diffraction, Resolving power of optical instruments,Polarization of light.

Chapter-5 : Electric Charges & Fields

Basic properties of electric charge, Coulomb's Law, Forces between multiple charges , Electric Field, Electric field lines, Electric Flux, Electric Dipole, Gauss Law and its application.

Chapter-6 : Current electricity

Electric current in conductors, Ohm's Law & It's Limitations, Drift of electrons and origin of resistivity, Temperature dependence of resistivity, Electrical Energy ,Power,Combination of resistors- Series and Parallel,Cells, emf ,Internal Resistance, Kirchhoff's Law,Wheatstone Bridge, Meter Bridge,Potentiometer.

Chapter-7 : Magnetism & Electromagnetic induction

Magnetization and Magnetic Intensity,Earth's Magnetism, Magnetic property of materials,Ferromagnetic, Dia- Magnetic & Para magnetic materials,Permanent and electromagnets, Magnetic Force, Motion in a Magnetic field and combined electric and magnetic field, Magnetic field due to current element, Biot-Savart Law, Magnetic Flux, Faraday's Law, Lenz's law,Eddy currents.

Chapter-8: A.C Currents

Transformer Study, Basics of AC voltage & AC current,AC voltage applied to an inductor and capacitor,AC voltage applied to Series LCR circuit, Power of AC circuits, RMS values, Resonance, LC oscillations.

Chapter-9: Semiconductor physics

Valance Band, Conduction Band,Intrinsic Semiconductors,P-Type and N-Type semiconductors,Doping, P-N Diode under forward and reverse biasing, Zener Diode,PNP & NPN Transistors, Logic gates (AND gate, OR gate, NOT gate, NAND Gate, NOR Gate.)

Chapter-10 : Atoms, Molecules and nuclei

Rutherford Model of atom, Bohr Model of atom, Radius of Bohr's Orbit, Hydrozen Spectrum, composition and size of nucleus, Isotopes, Isotones and Isobars, Mass energy relation, Mass Defect, Nuclear Binding energy,

	Radioactivity, Properties of alpha & Beta Particles and Gama Rays ,Nuclear Force and Nuclear Energy.	
	Total	**100**