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CHEMISTRY

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- 9. Chemical Equilibrium** **575-587**
law of chemical equilibrium, equilibrium constant (K_p and K_c), Gibbs' energy in chemical equilibrium and Le-Chatelier's principle.
- 10. Ionic Equilibrium** **588-600**
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Unit Test 2 **601-602**
- 11. Redox Reactions** **603-613**
redox reactions, oxidation number and balancing of redox reactions.
- 12. Electrochemistry** **614-632**
molar conductivity, equivalent conductivity, variation of conductivity with dilution, electrolysis, electrochemical cells, standard reduction potential of a half-cell and cell reaction, emf and its measurement, Nernst equation, relationship between the potential, free energy and K , fuel cells.
- 13. Chemical Kinetics** **633-647**
factors that affect the rate of reaction, rate law and rate constant, molecularity and order of a reaction, pseudo molecular reactions, half-life of a reaction, activation energy and Arrhenius equation.
- 14. Adsorption** **648-656**
types and characteristics of Adsorption; Freundlich and Langmuir adsorption Isotherm.
- 15. Colloidal State** **657-666**
classification of colloids, their preparation and properties especially coagulation, flocculation and gold number.
Unit Test 3 **667-668**
- 16. Classification of Elements and Periodicity in Properties** **669-682**
modern periodic law, *s*, *p*, *d* and *f*-block elements, periodic trends in properties of elements like atomic and ionic radii, ionisation and electron gain enthalpy, oxidation states and chemical reactivity.
- 17. General Principles and Processes of Isolation of Elements** **683-695**
abundance of elements in earth's crust, metallurgical process and their applications and general extraction of metals like aluminium, copper, zinc and iron from their ores.
- 18. Hydrogen** **696-709**
dihydrogen, hydrides, hydrogen peroxide and hardness of water.
- 19. s-block Elements** **710-723**
general trends in physical and chemical properties of elements of group I and II elements, diagonal relationship of the elements.
- 20. p-block Elements I (Group 13 & 14)** **724-737**
anomalous behaviour of boron and carbon, diborane, alums, allotropes of carbon, silicates and zeolites.
- 21. p-block Elements II (Group 15 & 16)** **738-751**
physical and chemical properties of group 15 and 16, anomalous behaviour of nitrogen and oxygen, allotropic forms of phosphorus and sulphur, nitric acid and sulphuric acid, structure of oxides and sulphur.
- 22. p-block Elements III (Group 17 & 18)** **752-762**
physical and chemical properties of halogens; trend in the acidic nature of HX; structure of interhalogen, oxides and oxoacids of halogens; uses of noble gases; structures of fluorides and oxides of xenon.
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- 23. d- & f- block Elements** **765-778**
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- 24. Coordination Compounds** **779-794**
ligands, Sidwick and Werner's theory, IUPAC nomenclature, isomerism and valence bond theory.
- 25. Environmental Chemistry** **795-802**
environmental pollution, tropospheric and particulate pollutants, stratospheric pollution, water and soil pollution.
Unit Test 5 **803-804**
- 26. Purification & Characterisation of Organic Compounds** **805-816**
methods of purification of organic compounds alongwith their examples, qualitative and quantitative analysis for the detection of elements like N,S,P, halogens, empirical and molecular formula of organic compounds.
- 27. Some Basic Principles of Organic Chemistry** **817-831**
hydrocarbon, haloalkanes, alcohols, phenols and ethers, aldehydes and ketones.
- 28. Hydrocarbons** **832-848**
halogenation of alkanes, ozonolysis, acidic property of alkynes, etc.

Unit Test 6 **849-850**

- 29. Organic Compounds Containing Halogens** **851-863**
preparation and properties of alkyl/aryl halides, nucleophilic substitution reactions and polyhalogen compounds.
- 30. Alcohols, Phenols and Ether** **864-879**
properties of alcohols and phenols, oxidation methods for alcohols and phenols, Reimer Tiemann reaction, Friedel-Crafts reaction etc.
- 31. Aldehydes, Ketones and Carboxylic Acids** **880-897**
Cannizzaro reaction, reduction reactions of aldehydes and ketones, acidic strength of carboxylic acids, esterification.
- 32. Organic Compounds Containing Nitrogen** **898-910**
preparation and properties of 1°, 2° and 3° amine, identification of 1°, 2°, 3° Amines, properties of Diazonium Salts, etc.

Unit Test 7 **911-912**

- 33. Polymers** **913-923**
classification of polymers on the basis of source, structure, molecular forces and mode of polymerisation, rubber and biodegradable polymers.
- 34. Biomolecules** **924-936**
monosaccharides, oligosaccharides, amino acids, essential and non-essential amino acids, structure of proteins, classification of vitamins and nucleic acids.
- 35. Chemistry in Everyday Life** **937-945**
analgesics, tranquilizers, antiseptics, antibiotics, antimicrobials and their common examples especially their chemical structure.
- 36. Principles related to Practical Chemistry** **946-962**
detection of functional groups, titration, qualitative salt analysis etc.

Unit Test 8 **963-964**

MATHEMATICS

- 1. Sets and Relations** **967-980**
equivalence relation, subset, power set and algebraic properties of sets.
- 2. Functions** **981-996**
domain and range of function, injective, surjective and bijective function. They should also concentrate on composition of functions.
- Unit Test 1** **997-998**
- 3. Complex Numbers** **999-1016**
on modulus, conjugate, triangle inequality, argument, square root and cube root numbers.
- 4. Quadratic Equations** **1017-1029**
relation between roots and coefficients, nature of roots and location of roots.
- 5. Matrices** **1030-1044**
on all types of matrices, multiplication of matrices, symmetric and skew-symmetric matrices and invertible matrices.

- 6. Determinants** **1045-1064**
on properties of determinant, properties of adjoint, conditions of consistency of system of equations and Cramer's rule for solving system of equations.

Unit Test 2 **1065-1066**

- 7. Permutation and Combination** **1067-1078**
on fundamental principle of counting, permutation, combination and dearrangement. Students should also concentrate on mixed problems of permutation and combination.
- 8. Principle of Mathematical Induction** **1079-1088**
mathematical statements (such as Sx, Sx^2, Sx^3, \dots). These statements help to solve the questions based on series, easily and quickly.
- 9. Binomial Theorem** **1089-1106**
binomial theorem, properties of binomial expansion and binomial coefficients, general term, middle term and greatest term and multinomial theorem.

- 10. Sequence and Series** **1107-1122**
arithmetic progression, geometric progression and sum of special series.
Unit Test 3 **1123-1124**
- 11. Limits** **1125-1136**
series expansions, standard limits and also concentrate on L'Hospital's rule along with indeterminate form.
- 12. Continuity** **1137-1149**
types of continuity, properties of continuous function and intermediate value theorem.
- 13. Differentiability and Differentiation** **1150-1165**
all the topics of differentiation.
- 14. Application of Derivatives** **1166-1184**
maximum and minimum values, tangent and normal, rate of change and increasing and decreasing functions.
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- 15. Indefinite Integration** **1187-1201**
method of substitution, algebraic integrals, integration of the form $\int e^x [f(x) + f'(x)] dx$, integration by partial fraction and integration by parts.
- 16. Definite Integrals and its Applications** **1202-1221**
properties of definite integrals, integral as a limit of sum, and area of the region bounded by curves and tracing of curves.
- 17. Differential Equations** **1222-1238**
order and degree of differential equation, solution of differential equation by variable separable form, homogeneous equation and linear differential equation.
Unit Test 5 **1239-1240**
- 18. Cartesian Coordinate System** **1241-1261**
straight line, triangle and its centres, locus.
- 19. Circle** **1262-1276**
special cases of circles, equation of tangent, condition for a line to be a tangent to a circle, intersection of a line and a circle and family of circles.
- 20. Conic Sections** **1277-1303**
parabola, ellipse, hyperbola and their tangents and normals.
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- 21. Trigonometric Functions, Identities and Equations** **1306-1321**
trigonometric ratios, trigonometric functions, related angles and all formulae regarding angles, trigonometric identities and solutions of trigonometric equations.
- 22. Inverse Trigonometric Functions** **1322-1334**
sequence, differentiation, trigonometry
- 23. Properties of Triangles, Height and Distances** **1335-1353**
relation between the sides and angles, circles connected with triangles, regular polygon and height and distances.
Unit Test 7 **1354-1355**
- 24. Vector Algebra** **1356-1373**
addition and subtraction of vectors, vector multiplication by scalar, collinearity and coplanarity, dot product and vector product of two vectors, scalar triple product, vector triple product, area of parallelogram and triangle.
- 25. Three Dimensional Geometry** **1374-1396**
changing unsymmetrical form to symmetrical form, perpendicular distance of a point from a line, skew-lines, shortest distance between two skew-lines, angle between two planes, equation of a plane through the intersection of two planes, angle between a line and a plane, distance of a point from a plane.
- 26. Probability** **1397-1411**
addition, multiplication theorem, independent events, conditional probability, Baye's theorem and binomial distribution are important topics.
- 27. Statistics** **1412-1424**
variance, standard deviation, mean deviation about mean or median and arithmetic mean.
- 28. Mathematical Reasoning** **1425-1434**
logical operations, truth value and truth table and algebra of statements.
Unit Test 8 **1435-1436**
- 10 Mock Tests** **1439-1562**
5 Solved Papers **1563-1720**
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