SYLLABUS 2020-2021

CLASS: 12 SUBJECT: ENGLISH

UNIT	CONTENTS
1	**Prose** Two Gentlemen of Verona **Supplementary** God Sees the Truth but Waits **Grammar** Tenses Modal Auxiliaries Reported Speech
2	**Poem** Our Casuarina Tree **Grammar** Prepositions Prepositional phrases Conjunctions Connectives or Linkers
3	**Prose** In Celebration of Being Alive **Poem** All the World's a Stage **Grammar** Active and Passive Voice Interrogatives
4	**Poem** Ulysses **Supplementary** The Midnight Visitor **Grammar** Kinds of Sentences Conditionals

5	**Prose** The Chair **Poem** A Father to his Son **Supplementary** All Summer in a Day **Grammar** Non-finite verbs Articles and Determiners Degrees of Comparison
6	**Prose** On the Rule of the Road **Grammar** Agreement of the Subject with the verb

SYLLABUS 2020-2021

STANDARD: 12

SUBJECT: MATHEMATICS

UNIT	CONTENT
1. Applications of Matrices and Determinants	1.1 Introduction 1.2 Inverse of a Non-Singular Square Matrix 1.2.1 Adjoint of a square Matrix 1.2.2 Definition of inverse matrix of a square matrix 1.2.3 Properties of inverses of matrices 1.2.4 Application of matrices to Geometry 1.3 Elementary Transformations of a Matrix 1.3.1 Elementary row and column operations 1.3.2 Row-Echelon form 1.3.3 Rank of a Matrix 1.4 Applications of Matrices: Solving System of Linear Equations 1.4.1 Formation of a System of Linear Equations 1.4.2 System of Linear Equations in Matrix Form 1.4.3 Solution to a System of Linear equations (i) Matrix Inversion Method (ii) Cramer's Rule (iii) Gaussian Elimination Method (*All properties without proof)
2. Complex Numbers	2.1 Introduction to Complex Numbers 2.1.1 Powers of imaginary unit 2.2 Complex Numbers 2.2.1 Rectangular form 2.2.2 Argand plane 2.2.3 Algebraic operations on complex number 2.3 Basic Algebraic Properties of Complex Numbers 2.3.1 Properties of complex numbers 2.4 Conjugate of a Complex Number 2.4.1 Geometrical representation of conjugate of a complex number 2.4.2 Properties of Complex Conjugates

	2.5 Modulus of a Complex Number 2.5.1 Properties of Modulus of a complex number 2.5.2 Square roots of a complex number 2.6 Geometry and Locus of Complex Numbers (*All properties without proof)
3. Theory of Equations	3.1 Introduction 3.2 Basics of Polynomial Equations 3.2.1 Different types of Polynomial Equations 3.2.2 Quadratic Equations 3.3 Vieta's Formulae and Formation of Polynomial Equations 3.3.1 Vieta's formula for Quadratic Equations 3.3.2 Vieta's formula for Polynomial Equations (a) The Fundamental Theorem of Algebra (b) Vieta's Formula (i) Vieta's Formula for Polynomial equation of degree 3 (c) Formation of Polynomial Equations with given Roots 3.4 Nature of Roots and Nature of Coefficients of Polynomial Equations 3.4.1 Imaginary Roots 3.4.2 Irrational Roots 3.4.3 Rational Roots 3.6 Roots of Higher Degree Polynomial Equations 3.7 Polynomials with Additional Information 3.7.1 Imaginary or Surds Roots 3.7.2 Polynomial equations with Even Powers Only 3.7.3 Zero Sum of all Coefficients 3.7.4 Equal Sums of Coefficients of Odd and Even Powers 3.8 Polynomial Equations with no additional information 3.8.2 Reciprocal Equations 3.9 Descartes Rule 3.9.1 Statement of Descartes Rule 3.9.2 Attainment of bounds (*All properties without proof)

4. Inverse Trigonometric Functions	4.1 Introduction 4.2 Some Fundamental Concepts 4.2.1 Domain and Range of trigonometric functions 4.2.2 Graphs of functions 4.2.3 Amplitude and Period of a graph 4.2.4 Inverse functions 4.2.5 Graphs of inverse functions 4.3 Sine Function and Inverse Sine Function 4.3.2 Properties of the sine function 4.3.3 The inverse sine function and its properties 4.4 The Cosine Function and Inverse Cosine Function 4.4.2 Properties of the cosine function 4.4.3 The inverse cosine function and its properties 4.5 The Tangent Function and the Inverse Tangent Function 4.5.2 Properties of the tangent function 4.5.3 The inverse tangent function and its properties 4.6 The Cosecant Function and the Inverse Cosecant Function 4.6.2 The inverse cosecant function 4.7 The Secant Function and Inverse Secant Function 4.7.2 Inverse secant function 4.8 The Cotangent Function and the Inverse Cotangent Function 4.8.2 Inverse cotangent function 4.9 Principal Value of Inverse Trigonometric Functions (*All properties without proof)

5. Two Dimensional Analytical Geometry-II	5.1 Introduction (Theorem 5.1-5.5 without proof) 5.2 Circle 5.2.1 Equation of a circle in standard form 5.2.2 Equations of tangent and normal at a point P on a given circle (without proof) 5.2.3 Condition for the line $y = mx + c$ to be a tangent to the circle $x^2 + y^2 = a^2$ and finding the point of contact (without proof) 5.3 Conics 5.3.1 The general equation of a Conic 5.3.2 Parabola 5.3.3 Ellipse (Theorem 5.3.3-without proof) 5.3.4 Hyperbola (Theorem 5.3.4-without proof) 5.4 Conic Sections 5.4.1 Geometric description of conic section 5.4.2 Degenerate Forms 5.5 Parametric form of Conics 5.5.1 Parametric equations 5.6 Tangents and Normals to Conics 5.6.1 Equation of tangent and normal to the parabola $y^2 = 4ax$ (without proof) 5.6.2 Equations of tangent and normal to Ellipse and Hyperbola (without proof) 5.6.3 Condition for the line $y = mx + c$ to be a tangent to the conic sections (without proof) 5.7 Real life Applications of Conics 5.7.1 Parabola 5.7.2 Ellipse 5.7.3 Hyperbola 5.7.4 Reflective property of parabola 5.7.5 Reflective property of Ellipse (*All properties without proof)

6. Applications of Vector Algebra	6.1 Introduction (Theorems 6.1-6.23-without proof) 6.2 Geometric Introduction to Vectors 6.3 Scalar Product and Vector Product 6.3.1 Geometrical interpretation 6.3.2 Application of dot and cross products in plane Trigonometry 6.3.3 Application of dot and cross products in Geometry 6.3.4 Application of dot and cross product in Physics 6.4 Scalar triple product 6.4.1 Properties of the scalar triple product 6.5 Vector triple product 6.6 Jacobi's Identity and Lagrange's Identity 6.7 Application of Vectors to 3D Geometry 6.7.1 Different forms of equation of a straight line 6.7.2 A point on the straight line and the direction of the straight line are given 6.7.3 Straight Line passing through two given points 6.7.4 Angle between two straight lines 6.7.5 Point of intersection of two straight lines 6.7.6 Shortest distance between two straight lines 6.8 Different forms of Equation of a plane 6.8.1 Equation of a plane when a normal to the plane and the distance of the plane from the origin are given 6.8.2 Equation of a plane perpendicular to a vector and passing through a given point 6.8.3 Intercept form of the equation of a plane 6.8.4 Equation of a plane passing through three given non-collinear points 6.8.5 Equation of a plane passing through a given point and parallel to two given non-parallel vectors 6.8.6 Equation of a plane passing through two given distinct points and is parallel to a non-zero vector

	6.8.7 Condition for a line to lie in a plane 6.8.8 Condition for coplanarity of two lines 6.8.10 Angle between two planes 6.8.11 Angle between a line and a plane 6.8.12 Distance of a point from a plane 6.8.13 Distance between two parallel planes (*All properties without proof)
7. Applications of Differential Calculus	7.1 Introduction 7.1.1 Early Developments 7.2 Meaning of Derivatives 7.2.1 Derivative as slope 7.2.2 Derivative as rate of change 7.2.3 Related rates 7.2.4 Equations of Tangent and Normal 7.2.5 Angle between two curves 7.5 Indeterminate Forms 7.5.1 A Limit Process 7.5.2 The l'Hôpital's Rule 7.5.3 Indeterminate forms $\left(\frac{0}{0}, \frac{\infty}{\infty}, 0 \times \infty, \infty - \infty\right)$ 7.6 Applications of First Derivative 7.6.1 Monotonicity of functions 7.6.2 Absolute maxima and minima 7.6.3 Relative Extrema on an Interval 7.6.4 Extrema using First Derivative Test 7.7 Applications of Second Derivative 7.7.1 Concavity, Convexity, and Points of Inflection 7.7.2 Extrema using Second Derivative Test 7.8 Applications in Optimization (*All properties without proof)
8. Differentials and Partial Derivatives	8.1 Introduction 8.2 Linear Approximation and Differentials 8.2.2 Errors: Absolute Error, Relative Error, and Percentage Error 8.2.3 Differentials (*All properties without proof)

9. Applications of integration	9.1 Introduction 9.3 Fundamental Theorems of Integral Calculus and their Applications 9.5 Improper Integrals 9.6 Reduction Formulae 9.7 Gamma Integral 9.8 Evaluation of Bounded Plane Area by Integration 9.8.1 Area of the region bounded by a curve, x - axis and the lines $x = a$ and $x = b$. 9.8.2 Area of the region bounded by a curve, y- axis and the lines $y = c$ and $y = d$. 9.8.3 Area of the region bounded between two curves (*All properties without proof)
10. Ordinary Differential Equations	10.1 Introduction 10.2 Differential Equation, Order, and Degree 10.4 Formation of Differential Equations 10.4.1 Formation of Differential equations from Physical Situations 10.4.2 Formation of Differential Equations from Geometrical Problems 10.5 Solution of Ordinary Differential Equations 10.6 Solution of First Order and First Degree Differential Equations 10.6.1 Variables Separable Method 10.6.3 Homogeneous Form or Homogeneous Differential Equation 10.7 First Order Linear Differential Equations 10.8 Applications of First Order Ordinary Differential Equations 10.8.1 Population growth 10.8.2. Radioactive decay 10.8.3. Newton's Law of cooling/warming 10.8.4 Mixture problems

11. Probability Distributions	11.1 Introduction 11.2 Random Variable 11.3 Types of Random Variable 11.3.1 Discrete random variables 11.3.2 Probability Mass Function 11.3.3 Cumulative Distribution Function or Distribution Function 11.3.4 Cumulative Distribution Function from Probability Mass function 11.3.5 Probability Mass Function from Cumulative Distribution Function 11.4 Continuous Distributions 11.4.1 The definition of continuous random variable 11.4.2 Probability density function 11.4.3 Distribution function (Cumulative distribution function) 11.4.4 Distribution function from Probability density function 11.4.5 Probability density function from Probability distribution function (*All properties without proof)
12. Discrete Mathematics	12.1 Introduction 12.2 Binary Operations 12.2.1 Definitions 12.2.2 Some more properties of a binary operation 12.2.3 Some binary operations on Boolean Matrices 12.2.4 Modular Arithmetic 12.3 Mathematical Logic 12.3.1 Statement and its truth value 12.3.2 Compound Statements, Logical Connectives, and Truth Tables 12.3.3 Tautology, Contradiction, and Contingency 12.3.4 Duality 12.3.5 Logical Equivalence (*All properties without proof)
(*All examples and exercise problems for the content mentioned above)	

SYLLABUS 2020-2021

SUBJECT: PHYSICS

CLASS: 12

UNIT	CONTENT
1. Electrostatics	1.1 Introduction 1.1.1 Historical background of electric charges 1.1.2 Basic Properties of charges 1.2 Coulomb's law 1.2.1 Super position principle 1.3.1 Electric Field 1.3.2 Electric field due to the system of point charges 1.4.1 Electric dipole 1.4.2 Electric Field due to a dipole 1.4.3 Torque experienced by an electric dipole in the uniform electric field 1.5 Electrostatic potential and potential energy 1.5.1 Electrostatic Potential energy & Electro static Potential 1.5.2 Electric Potential due to a point charge 1.5.3 Electro static Potential at a point due to an electric dipole 1.5.6 Electro static potential energy for collection of point charges 1.5.7 Electro static potential energy of a dipole in a uniform electric field 1.6.1 Electric Flux 1.6.2 Electric flux for closed surfaces 1.6.3 Gauss Law 1.6.4 Applications of Gauss Law 1.8.1 Capacitors 1.8.2 Energy stored in the capacitor 1.8.3 Application of capacitors 1.8.4 Effect of dielectrics in capacitors 1.8.5 Capacitors in series and parallel 1.9.1 Distribution of charges in a conductor 1.9.2 Action of points or corona discharge 1.9.4 Vande graff Generator

2. Current Electricity	2.1 Electric Current 2.1.1 Conventional Current 2.1.2 Drift Velocity 2.1.3 Microscopic model of current 2.2 Ohm's Law 2.2.1 Resistivity 2.2.2 Resistors in Series and Parallel 2.2.3 Colour code for carbon resistors 2.2.4 Temperature dependence of resistivity 2.3 Energy and power in electrical circuits 2.4.1 Electromotive force and internal resistance 2.4.2 Determination of internal resistance 2.4.3 Cells in series 2.4.4 Cells in Parallel 2.5.1 Kirchhoff's First rule 2.5.2 Kirchhoff's Second rule 2.5.3 Wheatstone's bridge 2.5.4 Metre bridge 2.5.7 Measurement of internal resistance of cell by Potentiometer 2.7 Thermo electric current 2.7.1 Seebeck effect 2.7.2 Peltier Effect 2.7.3 Thomson effect
3. Magnetism and magnetic effects of electric current	3.1 Introduction 3.1.2 Basic properties of magnets 3.2 Coulomb's inverse square law of magnetism 3.8 Biot - Savart law 3.8.1 Definition and explanation of Biot - Savart law 3.8.2 Magnetic field due to long straight conductor carrying current 3.8.3 Magnetic field produced along the axis of the current carrying circular coil 3.8.5 Current loop as a magnetic dipole 3.9 Ampere Circuital law 3.9.1 Ampere's circuital law 3.9.2 Magnetic field due to the current carrying wire of infinite length using Ampere's law

	3.9.3 Magnetic field due to a long current carrying solenoid 3.10 Lorentz force 3.10.1 Force on a moving charge in a magnetic field 3.10.2 Motion of a charged particle in a uniform magnetic field 3.10.3 Motion of a charged particle under crossed electric and magnetic field (velocity selector) 3.10.5 Force on a current carrying conductor placed in a magnetic field 3.10.6 Force between two long parallel current carrying conductors 3.11.2 Moving coil galvanometer
4. Electromagnetic Induction and Alternating current	4.1 Electromagnetic Induction 4.1.1 Introduction 4.1.2 Magnetic Flux (Φ_B) 4.1.5 Fleming's right hand rule 4.1.6 Motional emf from Lorentz force 4.3 Self-Induction 4.3.1 Introduction 4.3.2 Self-inductance of a long solenoid 4.3.3 Mutual Induction 4.3.4 Mutual Inductance between two long co-axial solenoids 4.4 Methods of producing induced emf 4.4.1 Introduction 4.4.2 Production of induced emf by changing the magnetic field 4.4.3 Production of induced emf by changing the area of the coil 4.4.4 Production of induced emf by changing relative orientation of the coil with the magnetic field 4.6 Transformer 4.6.1 Construction and working of transformer 4.6.2 Energy losses in Transformer 4.6.3 Advantages of AC in long distance power transmission. 4.7 Alternating Current 4.7.1 Introduction

	4.7.1 Mean or Average value of AC 4.7.2 RMS value of AC 4.7.3 AC circuit containing pure resistor 4.7.4 A Circuit containing pure inductor 4.7.5 AC circuit containing only a capacitor 4.7.6 AC circuit containing a resistor, an inductor and a capacitor in series - Series RLC circuit 4.7.7 Resonance in series RLC circuit 4.7.8 Q- factor 4.8 Power in AC circuits 4.8.1 Introduction of power in AC circuits 4.8.2 Wattless current 4.8.3 Power factor 4.8.4 Advantages and disadvantages of AC over DC 4.9 Oscillation in LC circuits 4.9.1 Energy conversion during LC oscillations 4.9.2 Conservation of energy in LC oscillations
5. Electromagnetic waves	5.1 Introduction 5.1.1 Displacement current and Maxwell's correction to Ampere's circuital law 5.1.3 Maxwell's equations in integral form 5.2 Electromagnetic waves 5.2.1 Production and properties of electromagnetic waves-Hertz experiments 5.2.3 Electromagnetic spectrum 5.3 Types of spectrum emission and absorption spectrum fraunhofer lines
6. Ray optics	6.1 Introduction 6.1.1 Ray optics 6.1.2 Reflection 6.1.3 Angle of deviation due to reflection 6.1.4 Image formed in plane mirror 6.1.5 Characteristics of the image formed by plane mirror 6.2 Spherical mirrors 6.2.1 Paraxial rays and marginal rays 6.2.2 Relation between f and r

	6.2.5 The mirror equation 6.2.6 Lateral magnification in spherical mirror 6.3 Speed of light 6.3.1 Fizeau's method to determine speed of light 6.3.3 Refractive index 6.3.4 Optical path 6.4 Refraction 6.4.1 Angle of deviation due to refraction 6.4.3 Principle of reversibility 6.4.4 Relative refractive index 6.4.5 Apparent depth 6.4.6 Critical angle and total internal reflection 6.4.8 Refraction in glass slab 6.5 Refraction at single spherical surface 6.5.1 Equation for refraction at single spherical surface 6.6 Thin lens 6.6.3 Lens makers formula and lens formula 6.6.4 Lateral magnification in thin lens 6.6.6 Focal length of lenses in contact 6.6.7 Silvered lenses 6.7 Prism 6.7.1 Angle of deviation produced by a prism 6.7.2 Angle of minimum deviation 6.7.3 Refractive index of the material of the prism 6.7.4 Dispersion of white light through a prism 6.7.5 Dispersive power 6.7.6 Scattering of sunlight
7. Wave optics	7.1 Theories on light 7.1.1 Corpuscular theory 7.1.2 Wave theory 7.1.3 Electromagnetic wave theory 7.1.4 Quantum theory 7.2 Wave nature of light 7.2.1 wave optics 7.2.2 Huygens' principle

	7.2.3 Proof for laws of reflection using Huygens principle 7.2.4 Proof for laws of refraction using Huygens principle 7.3 Interference 7.3.1 Phase difference and path difference 7.3.2 Coherant Sources 7.3.3 Double slit as coherent source 7.3.4 Young's double slit experiment 7.3.5 Interference in white light (polychromatic light) 7.3.6 Interference in thin films 7.4 Diffraction 7.4.2 Diffraction in single slit 7.4.4 Fresnel's distance 7.4.5 Difference between interference and diffraction 7.4.9 Resloution 7.5.3.1 Polariser and analyser 7.5.3.2 Plane and partially polrised light 7.5.3.3 Malus law 7.5.3.4 Uses of polroids 7.5.4 Polrisation by reflection 7.5.4.1 Brewster's law 7.5.4.2 Pile of plates 7.6 Optical instruments 7.6.1 Simple microscope 7.6.1.1 Near Point focusing 7.6.1.2 Normal focusing 7.6.1.3 Resolving Power of Microscope 7.6.1.4 Resolving Power of telescope 7.6.2 Compound microscope 7.6.3 Astronomocal telescope 7.6.3.1 Magnification in astronomical telescope 7.6.5 Reflecting telescope 7.6.7.3 Astigmatism

8. Dual nature of radiation and mater	8.1 Introduction 8.1.1 Electron Emission 8.2 Photo Electric Effect 8.2.1 HERTZ, Hallwach and Lenards's Observation 8.2.2 Effect of intensity of incident Light on Photo Electric current 8.2.3 Effect of Potential Difference on Photo Electric current 8.2.4 Effect of Frequency on Incident Light on stopping potential 8.2.5 Laws of Photo Electric current 8.2.6 Concept of Quantization of Energy 8.2.7 Particle Nature of light - Einstein Explanation 8.2.8 Photo Electric cells and their Applications 8.3 Matter waves 8.3.1 Introduction wave Nature of Particles 8.3.2 De - Broglie wavelength 8.3.3 De Broglie wavelength of electron 8.3.4 Davisson - Germer Experiment 8.3.5 Electron Microscope 8.4 X - ray Spectra Continuous X Ray Spectra, Characteristic X Ray Spectra
9. Atomic and nuclear physics	9.1 Introduction 9.2 Electric Discharge Through gases Properties of Cathode Rays 9.2.1 Determination of Specific Charge (e/m) of electron - Thomsons experiment 9.2.2 Determination of charge of electron -Millikan's Oil Drop Experiment 9.3.2 Ruther ford Model 9.3.3 Bohr atom model 9.3.4 Atomic Structure 9.4.3 Atomic and Nuclear masses 9.4.4 Size and density of Nucleus 9.4.5 Mass Defects and Binding energy 9.4.6 Binding Energy 9.5 Nuclear Force 9.6.1 Alpha decay

	9.6.2 Beta Decay 9.6.3 Gamma Emission 9.6.4 Laws of Radioactivity 9.6.5 Half Life, Mean life 9.6.6 Carbon dating 9.7 Nuclear fission 9.8 Nuclear fusion
10. Electronics and communication systems	10.1 Introduction 10.1.1 Energy Band Diagram 10.1.2 Classification of materials 10.2 Types of Semi conductors 10.2.1 Intrinsic Semiconductor 10.2.2 Extrinsic Semi conductor 10.3.1 PN Junction Formation 10.3.2 PN Junction Diode 10.3.4 Rectification 10.3.5 Breakdown Mechanism 10.3.6 Zener Diode 10.4 The Bipolar Junction transistor 10.4.1 Transistor circuit Configuration 10.4.2 Transistor action in CB mode 10.4.3 Relation between α and β 10.4.4 Operating point 10.4.5 Transistor as a switch 10.5 Digital Electronics 10.5.1 Analog and digital signal 10.6 Boolean Algebra 10.7 De Morgans Theorem 10.7.1 De Morgans 1st Theorem 10.7.2 De Morgans 2nd Theorem 10.7.3 Integrated chips 10.8 Communication System 10.9 Modulation 10.9.1 Amplitude modulation 10.9.2 Frequency modulation 10.9.3 Phase modulation

11. Recent developments in physics	11.1 Introduction 11.2 Nano science and Nano technology 11.2.1 Nano Science 11.2.2 Interdisciplinary nature of nanotechnology 11.2.3 Nano in nature 11.3 Robotics 11.3.1 What is Robotics ? 11.3.2 Components of robotics 11.3.3 Types of Robotics
	1. 2. 3. 4. 5. 6.

PRACTICALS

CLASS: 12 **SUBJECT: PHYSICS**

Sl.No	Topic
1	Determine the value of the Horizontal component of the earth magnetic field using tangent galvanometer. Take atleast four readings.
2	Compare the emf of two cells using potentiometer.
3	Adjust the grating for normal incidence using the spectrometer. Determine the wavelength of green, blue, yellow and red lines of mercury spectrum(the number of lines per metre length of the grating can be noted from the grating).
4	Voltage - current characteristics of a PN junction diode.
5	Verification of truth tables of logic gates using integrated circuits.
6	Verification of De morgan's Theorems.

SYLLABUS 2020-2021

STANDARD: 12 **SUBJECT : CHEMISTRY**

UNIT	CONTENT
1.Metallurgy	Introduction 1.1 Occurrence of metals 1.1.1 Mineral and ore 1.2 Concentration of ores 1.2.1 Gravity separation or Hydraulic wash 1.2.2 Froth flotation 1.2.3 Leaching Cyanide leaching Recovery of metal of interest from the complex by reduction Ammonia leaching Alkali leaching Acid leaching 1.2.4 Magnetic separation 1.3 Extraction of crude metal 1.3.1 Conversion of ores into oxides Roasting Calcination 1.3.2 Reduction of metal oxides Smelting 1.3.2 Reduction by carbon: Reduction by hydrogen Reduction by metal: Auto-reduction: 1.6 Refining process 1.6.1 Distillation 1.6.2 Liquation 1.6.3 Electrolytic refining 1.6.4 Zone Refining 1.6.5 Vapour phase method Mond process for refining nickel Van-Arkel method for refining zirconium/ titanium
2. P-block elements -I	Introduction 2.1 General trends in properties of p-block elements 2.1.1 Electronic configuration and oxidation state 2.1.2 Metallic nature: 2.1.3 Ionisation Enthalpy

	2.1.4 Electronegativity 2.1.5 Anomalous properties of the first elements 2.1.6 Inert pair effect 2.1.7 Allotropism in p-block elements 2.2 Group 13 (Boron group) elements 2.2.1 Occurrence 2.2.2 Physical properties 2.2.3 Chemical properties of boron Uses of boron 2.2.4 Borax [Na2B4O7.10H2O] Preparation Properties Uses of Borax 2.2.5 Boric acid [H3BO3 or B(OH)3] Preparation, Properties Structure of Boric acid Uses of boric acid 2.2.9 Alums Preparation Properties of Alum Uses of Alum 2.3 Group 14 (Carbon group) elements: 2.3.1 Occurrence 2.3.2 Physical properties 2.3.3 Tendency for catenation 2.3.4 Allotropes of carbon Graphite Diamond Fullerenes Graphene 2.3.8 Silicones Preparation Types of silicones Properties, Uses
3. P-block elements -II	Introduction 3.1 Group 15 (Nitrogen group) elements 3.1.1 Occurrence 3.1.2 Physical properties 3.1.3 Nitrogen Preparation Properties of Nitrogen Uses of nitrogen

	3.1.4 Ammonia (NH3) Preparation Properties of Ammonia Chemical Properties Structure of ammonia 3.1.7 Allotropic forms of phosphorus 3.1.8 Properties of phosphorus Uses of phosphorus Oxoacids of Phosphorus-Structure Group 16 (Oxygen group) elements Occurrence Physical properties 3.2 Oxygen Preparation: Properties Chemical properties Uses of Oxygen 3.2.1 Allotropic forms of sulphur 3.2.2 Sulphur dioxide Preparation Properties Uses of sulphur dioxide Structure of sulphur dioxide Structure of oxoacids of sulphur 3.3 Group 17 (Halogen group) elements: 3.3.1 Chlorine Occurrence: Physical properties of Chlorine 3.3.1 Manufacture of chlorine Physical properties Chemical properties Uses of chlorine 3.3.4 Inter halogen compounds: Properties of inter halogen compounds Structure of inter halogen compounds 3.4 Group 18 (Inert gases) elements: 3.4.1 Occurrence: Physical properties-Inert Gases Physical properties Properties of inert, gases Chemical Properties Uses of noble gases

4. Transition and inner transition elements	Introduction 4.1 Position of d- block elements in the periodic table 4.2 Electronic configuration 4.3 General trend in properties 4.3.1 Metallic behavior 4.3.2 Variation of atomic and ionic size 4.3.3 Ionization enthalpy 4.3.4 Oxidation state 4.3.5 Standard electrode potentials of transition metals 4.3.6 Magnetic properties 4.3.7 Catalytic properties 4.3.8 Alloy formation 4.3.9 Formation of interstitial compounds 4.3.10 Formation of complexes f-block elements - Inner transition elements The position of Lanthanoids in the periodic table Electronic configuration of Lanthanoids Oxidation state of lanthanoids Atomic and ionic radii Causes of lanthanoid contraction Consequences of lanthanoid contraction Actinoids: Th Pa U Np Pu Am Cm Bk Cf Es Fm Md No Lr Electronic configuration of actinoids Oxidation state of actinoids Differences between lanthanoids and actinoids
5. Coordination chemistry	Introduction 5.1 Coordination compounds and double salts 5.2 Werner's theory of coordination compounds Postulates Werner's theory 5.2.1 Limitations of Werner's theory 5.3 Definition of important terms pertaining to co-ordination compounds 5.3.1 Coordination entity 5.3.2 Central atom/ion 5.3.3 Ligands Coordination sphere, Coordination polyhedron, Coordination number, Oxidation state (number)

	Types of complexes Classification based on the net charge on the complex Classification based on kind of ligands 5.4 Nomenclature of coordination compounds a. Naming the ligands b.Naming the central metal More examples with names - IUPAC Nomenclature 5.6 Theories of coordination compound 5.6.1 Valence Bond Theory Main assumptions of VBT Illustration(1-4) Limitations of VBT
6. Solid state	6.1. Introduction General Characteristics of Solids 6.2. Classification of Solids 6.3. Classification of Crystalline Solids 6.3.1. Ionic solids 6.3.2. Covalent Solids 6.3.3. Molecular Solids 6.3.4. Metallic Solids 6.4. Crystal lattice and unit cell 6.5 Primitive and Non Primitive unit 6.5.1 Primitive (or) Simple Cube unit cell 6.5.2 Body Centered cubic unit cell 6.5.3 Face centered cubic unit cell 6.5.4 Calculations involving unit cell Dimensions 6.5.5 Calculation of density 6.6 Packing in Crystals 6.6.1 Linear arrangement of spheres in one direction 6.6.2 Two dimensional Close Packing 6.6.3 Simple Cubic arrangement 6.6.4. Body Centered Cubic arrangement 6.7. Imperfections in solids 6.7.1 Schottky defect 6.7.2. Frenkel defect 6.7.3. Metal Excess defect 6.7.4. Metal Deficiency defect 6.7.5. Impurity defect

7. Chemical kinetics	7. Introduction & Rate of Chemical reaction 7.1.1 Stoichiometry and rate of reaction 7.1.2 Average and instantaneous rate 7.3 Rate law and Rate Constant 7.4 Molecularity 7.5 Integrated Rate Equation 7.5.1 Integrated rate law for First order 7.5.2 Integrated rate law for a Zero order reaction 7.6 Half life period of a reaction 7.8 Arrhenius Equation
8.Ionic Equillibrium	Introduction 8.1. Acids and bases 8.1.1 Arrhenius concept 8.1.2 Lowry - Bronsted Theory 8.1.3 Lewis Concept 8.2 Strength Of Acids and Bases 8.3 Ionisation of water 8.4 The pH Scale 8.4.1 Relation between pH and pOH 8.5 Ionistion of Weak Acids 8.5.1 Ostwalds Dilution Law 8.6 . Common ion effect 8.7 Buffer Solution 8.7.1 Buffer Action 8.7.3 Henderson Hasselbalch Equation 8.9 Solubility Product 8.9.1 Determination of solubility Product from Molar Solubility
9. Electro chemistry	Introduction 9.1 Conductivity of electrolytic solution 9.1.1 Molar conductivity 9.1.2 Equivalent conductance 9.1.3 Factors affecting Electrolytic conductance 9.1.4 Measurement of conductivity of ionic solutions 9.2 Variation of molar conductivity with concentration 9.2.2 Kohlrausch's law and Applications 9.3.2 Galvanic cell notation 9.3.4 Measurement of electrode potential 9.4 Thermodynamics of cell reactions

	9.4.1 Nernst equation Electrolytic cell and Electrolysis Faraday's law of electrolysis First law, Second law Electrochemical series
10. Surface chemistry	Introduction 10.1 Adsorption and Absorption Characteristics of adsorption 10.1.1 Types of Adsorption Physical and Chemical Adsorption 10.1.2 Factors affecting Adsorption 10.1.3 Adsorption isotherms and isobars 10.1.3.1 Freundlich adsorption isotherm and limitations 10.2 Catalysis Positive and Negative Catalysis 10.2.1 Characteristics of Catalysis Promoters and Catalytic poison Auto Catalysis, Negative Catalysis 10.2.2 Theories of Catalysis The Intermediate compound formation theory, Adsorption Theory & Active Centers 10.5 Colloid, dispersion Phase and dispersion medium 10.5.1 Classification of colloidal solution 10.5.2 Preparation of Colloids (1)Dispersion methods [mechanical dispersion, electro dispersion, ultrasonic dispersion, peptisation] (2)Condensation method [oxidation, reduction, hydrolysis, double decomposition, Decomposition] (3)By exchange of solvent 10.5.3 Purification of colloids (i) Dialysis (ii)Electrodialysis (iii)Ultrafiltration 10.5.4 Properties of colloids 14 points [colour, size, Heterogeneous nature, Filtrability, Non- Setting nature, Concentration & density, Diffusability, Colligative Properties, Shape of Colloidal Particles, Optical, Kinetic and Electrical properties, Coagulation,Protective action]

11. Hydroxy compounds and ethers	11.1 Introduction Classification of Alcohols 11.2 IUPAC Nomenclature Physical Properties of Alcohols Preparation of Alcohols Methods to differentiate primary,secondary,Tertiary Chemical Properties of Alchols (without mechanism) Uses of Alcohols Acidity of alcohols Acidity of phenols Preparation of phenol Physical Properties of Phenol Chemical properties of phenols Test to differentiate Alcohols & Phenols Uses of phenol ETHERS Ethers Classification IUPAC System Structure of funtional group Preparation of Ethers except mechanism Physical properties uses Chemical Properties of Ethers (except mechanism)
12. Carbonyl compounds and carboxylic acids	CARBONYL COMPOUNDS 12.1 Nomenclature of Aldehyde and Ketones 12.2 Structure of carbonyl group 12.3 General methods of preparation of Aldehydes and Ketones 12.4 Physical properties of Aldehydes and Ketones 12.5 chemical properties of Aldehydes and Ketones (Mechanism only for aldol and cannizaro reaction) 12.6 Test for Aldehydes (First two test only) CARBOXYLIC ACIDS 12.8 Nomenclature of carboxylic acids 12.9 structure of carboxyl group 12.10 Methods of preparation of carboxylic acids except Sno 5 12.11 Physical properties of carboxylic acids 12.12 Chemical properties of carboxylic acids Test for carboxylic acid (except mechanism of esterification) 12.13 Acidity of carboxylic acids

13. Organic nitrogen compounds	Introduction to Nitro Compounds 13.1 Classification of Nitro compounds 13.1.2 Nomenclature 13.1.3 Isomerism 13.1.4 Acidic Nature of Nitro Alkanes 13.1.5 Preparation of Nitro Alkane first 3 methods only 13.1.6 Preparation of Nitro Arenes first method only 13.1.7 Physical Properties of Nitro Alkanes 13.1.8 Electrophilic Substitution Reaction Chemical properties of Nitro Alkanes 13.2 Amines - Classification 13.2.1 Nomenclature IUPAC system of Amines 13.2.2 Structure of Amines 13.2.3 General Methods of Preparation of Amines 13.2.4 Physical properties of amines 13.2.5 Expression for basic strength of Amines 13.2.6 chemical properties of Amines
14. Bio molecules	14.1 Carbohydrate Introduction 14.1.2 classification of carbohydrate 14.1.3 Glucose,preparation structure 14.1.4 Fructose preparation and structure 14.1.5 Disaccharides 14.1.7 Importance of carbohydrates 14.2 Proteins 14.2.1 Amino acids 14.2.3 properties of Amino acids 14.2.4 peptide bond formation 14.5 Nucleic acids 14.5.1 Composition and structure of nucleic acid 14.5.3 Types of RNA molecules

PRACTICALS

SUBJECT: CHEMISTRY

CLASS: 12

Sl.No	Topic
	Organic compounds
1	Benzophenone
2	Cinnamic Acid
3	Urea
4	Glucose
5	Aniline
	Volumetric analysis
1	Estimation of Ferrous Sulphate (Permanganometry)
2	Estimation of FAS (Permanganometry)
3	Estimation of Oxalic acid (Acid Base Titration)