



OUR PASSION - QUALITY ASSURANCE IN EDUCATION

Content Book

For Higher Secondary Schools
2017-2018 and onward

Punjab Education Foundation



IN THE NAME OF ALLAH THE MOST BENEFICENT, AND MERCIFUL



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❄ CLASS 11 – MATHEMATICS ❄

All definitions, examples, exercises, theorems and corollaries will be included in QAT
which are given in PTB

Chapter No. 1: Number Systems

1.1	Introduction					
1.2	Rational Numbers and Irrational Numbers					
	1.2.1	Decimal Representation of Rational and Irrational Numbers				
		1.2.1.1	Terminating Decimal	1.2.1.2.	Recurring Decimals	
1.3	Properties of Real Numbers					
	1.3.1	Addition Law	1.3.2	Multiplication Law	1.3.3	Multiplication-Addition Law
	1.3.4	Properties of Equality		1.3.5	Properties of Inequality (Order properties)	
1.4	Complex Numbers					
	1.4.1	Operations on Complex Numbers		1.4.2	Complex Numbers as Ordered Pairs of Real Numbers	
	1.4.3	Properties of the Fundamental Operation in Complex Numbers		1.4.4	A Special Subset of C	
1.5	The Real Line					
	1.5.1	The Real Plane or the Coordinate Plane				
1.6	Geometrical Representation of Complex Numbers - The Complex Plane					
1.7	To find real and imaginary parts					

Chapter No. 2: Sets, Functions And Groups

2.1	Introduction to Sets				
	2.1.1	Three different ways to describe a Set	2.1.2	Equal Sets	
	2.1.3	Order of a Set	2.1.4	Singleton Set	
	2.1.5	Empty Set	2.1.6	Finite and Infinite Set	
	2.1.7	Sub sets, Proper and Improper Sub sets	2.1.8	Theorem: The empty set is a subset of every set	
	2.1.9	Power Set	2.1.10	Universal Set or Universe of Discourse	

2.2	Operations on Sets					
	2.2.1	Union of two sets	2.2.2	Intersection of two sets		
	2.2.3	Disjoint Sets	2.2.4	Overlapping Sets		
	2.2.5	Complement of a set	2.2.6	Difference of two sets		
2.3	Venn Diagrams					
	$A \cup B$	$A \cap B$	$A - B$	$B - A$		
2.4	Operations on Three Sets					
2.5	Properties of Union and Intersection					
	2.5.1	Proofs of				
		2.5.1	De Morgan's laws	2.5.2	Distributive laws	
2.6	Inductive and Deductive Logic					
	2.6.1	Aristotelian and Non-Aristotelian Logics	2.6.2	Symbolic Logic		
2.7	Implication or Conditional					
	2.7.1	Biconditional	2.7.2	Conditionals related with a given conditional		
	2.7.3	Tautologies	2.7.4	Quantifiers		
2.8	Truth Sets, A link between Set Theory and Logic					
2.9	Relations					
2.10	Functions					
	Into	Onto	Injective	Bijjective	Set-Builder Notation for a function	
	2.10.1	Linear and Quadratic Functions				
2.11	Inverse of a function					
2.12	Binary Operations					
	2.12.1	Properties of Binary Operations				
	Commutativity		Associativity			
	Existence of an identity element		Existence of inverse of each element			
2.13	Groups					
	2.13.1	Groupoid	2.13.2	Semi-Group	2.13.3	Monoid
	2.13.4	Non-commutative set	2.13.5	Definition of group		

	2.13.6	Finite and Infinite group	2.13.7	Cancellation laws
2.14	Solution of Linear Equations			
2.15	Reversal law of inverses			
	Theorem 1:	If $(G, *)$ is a group with “ e ” its identity, then “ e ” is unique.		
	Theorem 2:	If $(G, *)$ is a group and “ $a \in G$ ” there is a unique inverse of a in G .		

Chapter No. 3: Matrices And Determinants

3.1	Introduction and types of matrix			
	Row Matrix	Column Matrix	Rectangular Matrix	
	Square Matrix	Diagonal Matrix	Scalar Matrix	
	Unit Matrix	Null Matrix	Equal Matrices	Transpose of Matrix
	3.1.1	Addition of Matrices	3.1.2	Scalar Multiplication
	3.1.3	Subtraction of Matrices	3.1.4	Multiplication of two Matrices
3.2	Determinant of a 2×2 matrix			
	3.2.1	Singular and Non-Singular matrices	3.2.2	Adjoint of a 2×2 Matrix
	3.2.3	Inverse of a 2×2 Matrix		
3.3	Solution of simultaneous linear equations by using matrices			
3.4	Field			
3.5	Properties of matrix addition, scalar multiplication and matrix multiplication			
3.6	Determinants			
	3.6.1	Minor and Cofactor of an element of a matrix or its determinant		
	3.6.2	Determinant of a square matrix of order $n \geq 3$		
3.7	Properties of determinants which help in their evaluation (Properties 1 to 7)			
3.8	Adjoint and Inverse of a square matrix of order $n \geq 3$			
3.9	Elementary Row and Column Operations on a Matrix			
	Upper Triangular matrix		Lower Triangular matrix	
	Triangular Matrix		Symmetric Matrix	
	Skew Symmetric Matrix	Hermitian Matrix	Skew Hermitian Matrix	

3.10	Echelon and Reduced Echelon Forms of Matrices		
	3.10.1	Rank of a Matrix	
3.11	System of Linear Equations		
	3.11.1	Homogeneous Linear Equations	3.11.2 Non-Homogeneous Linear Equations
3.12	Cramer's Rule		

Chapter No. 4: Quadratic Equations

4.1	Introduction		
	4.1.1	Solution of Quadratic Equations	
		4.1.1.1	By Factorization
		4.1.1.2	By Completing square
		4.1.1.3	By quadratic formula
		4.1.1.4	Derivation of quadratic formula
4.2	Solution of Equations Reducible to the Quadratic Equation (Type I to type V)		
4.3	Three Cube Roots of Unity		
	4.3.1	Properties of Cube Roots of Unity	
4.4	Four Fourth Roots of Unity		
	4.4.1	Properties of four fourth roots of unity	
4.5	Polynomial Function		
4.6	Theorems		
	4.6.1	Remainder Theorem	4.6.2 Factor Theorem
4.7	Synthetic Division		
4.8	Relations between the roots and the coefficients of a quadratic equation		
4.9	Formation of an equation whose roots are given		
4.10	Nature of the roots of a quadratic equation		
4.11	System of two equations involving two variables		
	Case 1	One linear equation and one quadratic equation	
	Case 2	Both the equations are quadratic in two variables	
4.12	Problems on quadratic equations		

Chapter No. 5: Partial Fractions

5.1	Introduction		
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	Partial Fraction	Partial Fraction Resolution	Conditional equation
5.2	Rational Fraction		
	5.2.1	Proper rational fraction	5.2.2 Improper rational fraction
5.3	Resolution of a rational fraction $\frac{P(x)}{Q(x)}$ into partial fractions		
	Case I	Resolution of $\frac{P(x)}{Q(x)}$ into partial fractions when Q(x) has only non-repeated linear factors.	
	Case II	When Q(x) has repeated linear factors	
	Case III	When Q(x) contains non-repeated irreducible quadratic factor.	
	Case IV	When Q(x) has repeated irreducible quadratic factors	

Chapter No. 6: Sequence and Series

6.1	Introduction		
	Sequence	Real Sequence	
6.2	Types of Sequences		
6.3	Arithmetic Progression (A.P)		
6.4	Arithmetic Mean (A.M)		
	6.4.1	“n” Arithmetic means between two given numbers	
6.5	Series		
	6.5.1	Sum of first “n” terms of an arithmetic series	
6.6	Word problems on A.P		
6.7	Geometric progression(G.P)		
6.8	Geometric Means		
	6.8.1	n Geometric Means between two given numbers	
6.9	Sum of n terms of a Geometric Series		

6.10	The Infinite Geometric Series	
6.11	Word problems on G.P	
6.12	Harmonic Progression(H.P)	
	6.12.1	n Harmonic Means between two numbers
6.13	Relations between Arithmetic ,Geometric and Harmonic means	
6.14	Sigma Notation (or Summation Notation)	
6.15	To find the formulae for sums	

Chapter No. 7: Permutation , Combination and Probability

7.1	Introduction	
7.2	Permutation	
	7.2.1	Permutation of things not all Different
	7.2.2	Circular Permutations
7.3	Combinations	
	7.3.1	Complementary Combination
7.4	Probability	
	7.4.1	Probability that an event does not occur
	7.4.2	Estimating Probability and Tally mark
	7.4.3	Addition of Probabilities
	7.4.4	Multiplication of Probabilities

Chapter No. 8: Mathematical Induction and Binomial theorem

8.1	Introduction
8.2	Principle of Mathematical Induction
8.3	Binomial Theorem
	8.3.1 Middle Term in the Expansion of $(a + x)^n$
	8.3.2 Some Deductions from the binomial expansion of C
8.4	The Binomial Theorem when the index n is a negative integer or a fraction
8.5	Application of Binomial Theorem

Chapter No. 9: Applications of Trigonometry

9.1	Introduction
9.2	Units of Measures of Angles
	9.2.1 Sexagesimal System : (Degrees , Minute and Second)
	9.2.2 Conversion from $D^{\circ} M' S''$ to a decimal form and vice versa
	9.2.3 Circular System(radians)
9.3	Relation between the length of an arc of a circle and the circular measure of its central angle
	9.3.1 Conversion of Radian into Degree and Vice Versa
9.4	General Angle (Conterminal Angles)
9.5	Angle in the Standard Position
9.6	Trigonometric Functions
9.7	Trigonometric Functions of Any angle
9.8	Fundamental Identities
9.9	Signs of the Trigonometric Function

9.10	The values of the Trigonometric Functions of Acute Angles 45° , 30° and 60°
9.11	The values of the Trigonometric Functions of 0° , 90° , 180° , 270° and 360°
9.12	Domains of Trigonometric Functions and Fundamental identity

Chapter No. 10 Trigonometric Identities of Sum and Difference of Angles

10.1	Introduction
	10.1.1 Distance formula
	10.1.2 Fundamental law of Trigonometry
10.2	Deductions from Fundamental law
10.3	Trigonometric ratios of Allied Angles
10.4	Further applications of Basic Identities
10.5	Double Angle Identities
10.6	Half Angle Identities
10.7	Triple Angle Identities
10.8	Sums , Difference and Product of Sines and Cosines

Chapter No. 11 Trigonometric Functions and their Graphs

11.1	Introduction
	11.1.1 Domains and Ranges of Sines and Cosines Functions
	11.1.2 Domains and Ranges of Tangent and Cotangent Functions
	11.1.3 Domains and Ranges of Secant Function
	11.1.4 Domains and Ranges of Cosecant Function
11.2	Period of Trigonometric Functions

11.3	Values of Trigonometric Functions
11.4	Graphs of Trigonometric functions
11.5	Graph of $y = \text{Sin}x$ from -2π to 2π
11.6	Graph of $y = \text{Cos}x$ from -2π to 2π
11.7	Graph of $y = \text{Tan}x$ from -2π to 2π
11.8	Graph of $y = \text{Cot}x$ from -2π to 2π
11.9	Graph of $y = \text{sec}x$ from -2π to 2π
11.10	Graph of $y = \text{cosec}x$ from -2π to 2π

Chapter No. 12 Application of Trigonometry

12.1	Introduction
12.2	Tables of Trigonometric Ratios
12.3	Solution of Right Triangles
12.4	(a) Height and Distances (b) Angles of Elevation and depression
12.5	Engineering and heights and Distances
12.6	Oblique Triangles
	12.6.1 The Law of Cosines
	12.6.2 The Law of Sines
	12.6.3 The Law of Tangents
	12.6.4 Half Angle formulae
12.7	Solution of Oblique Triangles
	12.7.1 Case I : When measures of one side and two angles are given

	12.7.2	Case II : When measures of two sides and their included angles are given
	12.7.3	Case III: When measures of three sides are given
12.8	Area of Triangle	
12.9	Circles Connected with Triangle	
	12.9.1	Circum Circle
	12.9.2	In-Circle
	12.9.3	Escribed Circles
12.10	Engineering and Circles Connected with Triangles	

Chapter No. 13 Inverse Trigonometric Functions

13.1	Introduction	
13.2	Inverse Trigonometric Functions	
13.3	The Inverse Cosine function	
13.4	Inverse Tangent Function	
13.5	Inverse Cotangent , Secant and Cosecant Functions	
13.6	Domains and Ranges of Principal Trigonometric Function and Inverse Trigonometric Function	
13.7	Addition and Subtraction Formulas	

Chapter No. 14 Solution of Trigonometric Equations

14.1	Introduction	14.2	Solution of General Trigonometric Equations
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❄ CLASS 11 – ENGLISH ❄

1: Reading & Writing Book I (Essays)

1.1	Lesson No.1	Button Button	
1.2	Lesson No.2	Clearing in the Sky	
1.3	Lesson No.3	Dark they were, and Golden - Eyed	
1.4	Lesson No.4	Thank you, M'am	
1.5	Lesson No.5	The Piece of String	
1.6	Lesson No.6	The Reward	
1.7	Lesson No.7	The use of Force	
1.8	Lesson No.8	The Gulistan of Sadi	
1.9	Lesson No.9	The foolish Quack	
1.10	Lesson No.10	A mild attack of Locusts	
1.11	Lesson No.11	I have a dream	
1.12	Lesson No.12	The gift of Mag!	
1.13	Lesson No.13	God be praised	
1.14	Lesson No.14	Overcoat	
1.15	Lesson No.15	The Angel and the Author and others	
1.16	Comprehension	1.17	Translation
1.18	Synonyms	1.19	MCQs
1.20	Write the answer of the questions (100-150 words)		
1.21	Read the statement and mark the true & false statement		
1.22	Answer the following questions (in one or two sentences)		
1.23	Read the passage and answer the questions given at the end		
1.24	Connect part of column I with the relevant part of column II		
1.25	Use of words/ phrasal verbs in sentences		

2: Reading & Writing Book III (Plays)

2.1	Play No. 1	Heat Lightning
2.2	Play No. 2	Visit to a small planet
2.3	Play No. 3	The Oyster and the Pearl
2.4	Character Sketches	
2.5	Write the short answers of the questions	
2.6	Choose the correct answer	
2.7	Write the answer of the questions (100-150 words)	
2.8	Mark the statement true or false	

3: Grammar

3.1	Use the correct form of verbs		
3.2	Use of prepositions		
3.3	Punctuate the following sentences		
3.4	Direct Indirect narrations	3.5	Pairs of words
3.6	Translate the passage into Urdu	3.7	Letter writing / Application writing
3.8	Story writing		

❄ CLASS 11 – PHYSICS ❄

Note: All exercises (MCQs, Short Questions, and Problems) and examples will be included in QAT which are given in PTB.

Chapter No. 1: Measurements

1.1	Introduction to Physics					
1.2	Physical Quantities					
1.3	International System of Units					
	1.3.1	Base Units	1.3.2	Supplementary Units	1.3.3	Derived Units
	1.3.4	Scientific Notation		1.3.5	Conventions for Indicating units	
1.4	Errors and Uncertainty					
1.5	Significant Figures			1.6	Precision and Accuracy	
1.7	Assessment of Total Uncertainty in the final Result					
1.8	Dimensions of Physical Quantities					
	1.8.1	Checking the Homogeneity of Physical Equation				
	1.8.2	Deriving a Possible Formula				

Chapter No. 2: Vector And Equilibrium

2.1	Basic Concepts of Vectors					
	2.1.1	Vectors	2.1.2	Rectangular Coordinate System		
	2.1.3	Addition of Vectors	2.1.4	Resultant Vector	2.1.5	Vector Subtraction
	2.1.6	Multiplication of a vector by Scalar				
	2.1.7	Unit Vector	2.1.8	Null Vector	2.1.9	Equal Vectors
	2.1.10	Rectangular Components of a Vector				
	2.1.11	Determination of a Vector from its Rectangular Components				
	2.1.12	Position Vectors				
2.2	Vector Addition by Rectangular Components					
2.3	Product of Two Vectors					
	2.3.1	Scalar or Dot Product		2.3.2	Vector or Cross Product	

2.4	Torque			
2.5	Equilibrium of Forces			
	2.5.1	First condition of Equilibrium	2.5.2	Second condition of Equilibrium

CHAPTER No. 3: Motion And Force

3.1	Displacement			
3.2	Velocity			
3.3	Acceleration			
3.4	Velocity Time Graph			
3.5	Review of Equation of Uniformly Accelerated Motion			
3.6	Newton's Law of Motion			
	3.6.1	Newton's First Law of Motion		
	3.6.2	Newton's Second Law of Motion		
	3.6.3	Newton's Third Law of Motion		
3.7	Momentum			
	3.7.1	Momentum and Newton's Second Law of Motion		
	3.7.2	Impulse		
	3.7.3	Law of Conservation of Momentum		
3.8	Elastic and Inelastic Collisions			
	3.8.1	Elastic Collision in One Dimension		
3.9	Force Due to Water Flow			
3.10	Momentum and Exclusive Forces			
3.11	Rocket Propulsion			
3.12	Projectile Motion			
	3.12.1	Height of Projectile	3.12.2	Time of Flight
	3.12.3	Range of Projectile	3.12.4	Applications to Ballistic Missiles

Chapter No. 4: Work And Energy

4.1	Work Done by a Constant Force		
4.2	Work Done by a Variable Force		
4.3	Work Done by Gravitational Field		
4.4	Power		
	4.4.1	Power and Velocity	
4.5	Energy		
	4.5.1	Work Energy Principle	4.5.2 Absolute Potential Energy
	4.5.3	Escape Velocity	
4.6	Interconversion of Potential Energy and Kinetic Energy		
4.7	Conservation of Energy		
4.8	Non Conventional Energy Sources		
	4.8.1	Energy from Tides	4.8.2 Energy from Waves
	4.8.3	Solar Energy	4.8.4 Energy from Biomass
	4.8.5	Energy from Waste Products	4.8.6 Geothermal Energy

Chapter No. 5: Circular Motion

5.1	Angular Displacement	5.2	Angular Velocity	5.3	Angular Acceleration
5.4	Relation between Angular and Linear Velocities				
	5.4.1	Equations of Angular Motion			
5.5	Centripetal Force	5.6	Moment of Inertia	5.7	Angular Momentum
5.8	Law of Conservation of Angular Momentum				
5.9	Rotational Kinetic Energy				
	5.9.1	Rotational Kinetic Energy of a Disc and a Hoop			
5.10	Artificial Satellites	5.11	Real and Apparent Weight		
5.12	Weightlessness in Satellites and Gravity Free system				
5.13	Orbital Velocity	5.14	Artificial Gravity	5.15	Geostationary Orbits
5.16	Communication Satellites	5.17	Newton's and Einstein view of Gravitation		

Chapter No. 6: Fluid Dynamics

6.1	Viscous drag and Stokes Law	6.2	Terminal Velocity	
6.3	Fluid Flow	6.4	Equation of Continuity	
6.5	Bernoulli's Equation	6.6	Applications of Bernoulli's Equation	
	6.6.1	Torricelli's Theorem		
	6.6.2	Relation between speed and pressure of the fluid		
	6.6.3	Venturi Relation	6.6.4	Blood Flow

Chapter No. 7: Oscillations

7.1	Simple Harmonic Motion	7.2	SHM And Uniform Circular Motion
7.3	Phase	7.4	A Horizontal Mass Spring System
7.5	Simple Pendulum	7.6	Energy Conservation in SHM
7.7	Free And Forced Oscillation	7.8	Resonance
7.9	Damped Oscillation	7.10	Sharpness of Resonance

Chapter No. 8: Waves

8.1	Progressive Waves	8.1.1	Transverse and Longitudinal Waves
8.2	Periodic Waves	8.3	Speed of Sound in Air
	8.3.1	Effect of Variation of Pressure, Density and Temperature on the speed of sound in gas	
8.4	Principle of Superposition	8.5	Interference
8.6	Beats	8.7	Reflection of waves
8.8	Stationary Waves	8.9	Stationary Waves in a stretched String
8.10	Stationary waves in air column	8.11	Doppler Effect
	8.11.1	Application of Doppler Effect	

Chapter No. 9: Physical Optics

9.1	Wave Fronts	9.2	Huygens's Principle
9.3	Interference of light Waves	9.4	Young's Double Slit Experiment
9.5	Interference in thin Films	9.6	Newton's Rings

9.7	Michelson's Interferometer	9.8	Diffraction of Light
9.9	Diffraction due to a Narrow Slit	9.10	Diffraction Grating
9.11	Diffraction of X-Rays by Crystals	9.12	Polarization

Chapter No. 10: Optical Instruments

10.1	Least Distance of Distinct Vision		
10.2	Magnifying power and Resolving power of optical Instruments		
10.3	Simple Microscope	10.4	Compound Microscope
10.5	Astronomical Telescope	10.6	Spectrometer
10.7	Speed of light	10.8	Introduction to Fibre Optics
10.9	Fibre Optic Principles		
10.9.1	Total Internal Reflection	10.9.2	Continuous Refraction
10.10	Types of Optical Fibres	10.11	Signal Transmission and conversion to sound
10.12	Losses of Power		

Chapter No. 11: Heat And Thermodynamics

11.1	Kinetic Theory of Gases	11.2	Internal Energy
11.3	Work And Energy	11.4	First Law of Thermodynamics
11.4.1	Isothermal Process	11.4.2	Adiabatic Process
11.5	Molar Specific Heat of a gas	11.5.1	Derivation of $C_p - C_v = R$
11.6	Reversible and irreversible Process		
11.7	Heat Engine	11.8	Second Law of thermodynamics
11.9	Carnot Engine and Carnot's Theorem		
11.10	Thermodynamics scale of temperature		
11.11	Petrol Engine and Diesel Engine	11.12	Entropy

❄ CLASS 11 – CHEMISTRY ❄

Chapter No. 1: Basic Concepts

1.1	Atom		
	1.1.1	Evidence of Atom	
	1.1.2	Molecule	
	1.1.3	Ion	
	1.1.4	Molecular Ion	
1.2	Relative Atomic Mass		
1.3	Isotopes		
	1.3.1	Relative Abundance Of Isotopes	
	1.3.2	Determination Of Relative Atomic Masses Of Isotopes By Mass Spectrometry	
	1.3.3	Average Atomic Masses	
1.4	Analysis Of A Compound -Empirical Formula And Molecular Formulas		
	1.4.1	Empirical Formula	
	1.4.2	Empirical Formula From Combustion Analysis	
	1.4.3	Molecular formula	
1.5	Concept Of Mole		
	1.5.1	Avogadro's Number	1.5.2 Molar Volume
1.6	Stoichiometry		
1.7	Limiting Reactant		
1.8	Yield		
1.9	Exercise		

Chapter No. 2: Experimental Techniques In Chemistry

2.1	Introduction		
2.2	Filtration		
	2.2.1	Filtration Through Filter Paper	2.2.2 Filtration Through Filter Crucibles

2.3	Crystallization				
	2.3.1	Choice Of A Solvent	2.3.2	Preparation of the Saturated Solution	
	2.3.3	Filtration	2.3.4	Cooling	2.3.5 Collecting Of Crystals
	2.3.6	Drying Of The Crystallized Substance			
	2.3.7	Decolourization Of Undesirable Colours			
2.4	Sublimation				
2.5	Solvent Extraction				
2.6	Chromatography				
	2.6.1	Paper Chromatography			
2.7	Exercise				

Chapter No. 3: Gases

3.1	States Of Matter				
	3.1.1	Properties of Gases	3.1.2	Properties of Liquids	
	3.1.3	Properties of solids	3.1.4	Units of pressure	
3.2	Gas Laws				
	3.2.1	Boyle' s Law			
	3.2.2	Experimental Verification Of Boyle' s Law			
	3.2.3	Graphical Explanation Of Boyle' s Law			
	3.2.4	Charles' s Law			
	3.2.5	Experimental Verification Of Charles' s Law			
	3.2.6	Derivation Of Absolute	3.2.	Scales Of Thermometry	
3.3	General Gas Equation				
	3.3.1	Ideal Gas Constant R	3.3.2	Density Of An Ideal Gas	
3.4	Avogadro's Law				
3.5	Dalton's Law Of Partial Pressures				
	3.5.1	Calculation Of Partial Pressure Of A Gas			
	3.5.2	Applications Of Dalton's Law Of Partial Pressures			

3.6	Diffusion And Effusion			
	3.6.1	Graham's Law Of Diffusion	3.6.2	Demonstration Of Graham's Law
3.7	Kinetic Molecular Theory Of Gases			
	3.7.1	Explanation Of Gas Laws From Kinetic Theory Of Gases		
3.8	Kinetic Interpretation Of Temperature			
3.9	Liquefaction Of Gases			
	3.9.1	General Principle Of	3.9.2	Methods Of Liquefaction Of Gases
3.10	Non Ideal Behaviour Of Gases			
	3.10.	Causes For Deviations From Ideality		
	3.10.	Van Der Waals Equation For Real Gases		
3.11	Plasma State			
3.12	Exercise			

Chapter No. 4: Liquids And Solids

4.1	Introduction			
4.2	Intermolecular Forces			
	4.2.1	Dipole- Dipole Forces		
	4.2.2	Dipole – Induced Dipole Forces		
	4.2.3	Instantaneous Dipole Induced Dipole Forces Or London Dispersion Forces		
	4.2.4	Factor Affecting The London Forces		
	4.2.	Hydrogen Bonding		
	4.2.	Properties And Application Of Compounds Containing Hydrogen Bonding		
4.3	Evaporation			
	4.3.1	Vapour Pressure	4.3.2	Measurement Of Vapour Pressure
	4.3.3	Boiling Point	4.3.4	Boiling Point And External Pressure
	4.3.5	Energetics Of Phase Changes		
	4.3.6	Energy Changes And Intermolecular Attractions		
	4.3.7	Change Of State And Dynamic Equilibrium		

4.4	Liquid Crystals			
4.5	Solids (Introduction)			
	4.5.1	Types Of Solids	4.5.2	Properties Of Crystalline Solids
4.6	Crystal Lattice			
	4.6.1	Unit Cell		
4.7	Crystals And Their Classification			
4.8	Classification Of Solids			
	4.8.1	Ionic Solids	4.8.2	Covalent Solid
	4.8.3	Molecular Solids	4.8.4	Metallic Solids
4.9	Determination Of Avogadro's Number (N_A)			
4.10	Exercise			

Chapter No. 5: Atomic Structure

5.1	Sub Atomic Particles Of Atom			
	5.1.1	Discovery Of Electron (Cathode Rays)	5.1.2	Properties Of Cathode Rays
	5.1.3	Discovery Of Proton (Positive Rays)	5.1.4	Properties Of Positive Rays
	5.1.5	Discovery Of Neutron	5.1.6	Properties Of Neutron
	5.1.7	Measurement Of e/m Value Of Electron		
	5.1.8	Measurement Of Charge On Electron –Millikan's Oil Drop Method		
5.2	Rutherford's Model Of Atom (Discovery Of Nucleus)			
5.3	Planck's Quantum Theory			
5.4	Bohr 'S Model of Atom			
5.5	Spectrum			
	5.5.1	Continuous Spectrum	5.5.2	Atomic Or Line Spectrum
	5.5.3	Atomic Emission Spectrum	5.5.4	Atomic Absorption Spectrum
	5.5.5	Hydrogen Spectrum		
	5.5.6	Origin Of Hydrogen Spectrum On The Basis Of Bohr's Model		
	5.5.7	Defects Of Bohr's Atomic Model		

5.6	X- Rays And Atomic Number	
5.7	Wave - Particle Nature Of Matter (Dual Nature Of Matter)	
	5.7.1	Experimental Verification Of Dual Nature Of Matter
5.8	Heisen Berg's Uncertainty Principle	
	5.8.1	Quantum Numbers
	5.8.2	Shapes Of Orbitals
5.9	Electronic Distribution	
	5.9.1	Electronic Configuration Of Elements
5.10	Exercise	

Chapter No.6: Chemical Bonding

6.1	Introduction	
6.2	Cause of Chemical Bonding	
6.3	Energetic of Bond Formation	
6.4	Atomic Size	
6.5	Ionization Energy , electron affinity and electronegativity	
6.6	Types of bonds	
6.7	Modern Theories of Covalent Bond (VSEPR theory , VBT and MOT)	
6.8	Bond Energy ,Bond Length and Dipole moment	
6.9	The Effect of Bonding on the Properties of Compounds	
6.10	Exercise	

Chapter No.7: Thermochemistry

7.1	Introduction	
7.2	Spontaneous and non Spontaneous Reactions	
7.3	System Surrounding and State Function	
7.4	Internal Energy and First Law of Thermodynamics	
7.5	Enthalpy and Measurement of Enthalpy of a Reaction	

7.6	Hess's Law of Constant Heat Summation
7.7	Exercise

Chapter No.8: Chemical Equilibrium

8.1	Introduction (Reversible and Irreversible Reactions)
8.2	State of Chemical Equilibrium
8.3	Law of Mass Action
8.4	Units of Equilibrium Constants
8.5	Equilibrium Constants Expressions for Some Reactions
8.6	Applications of Equilibrium Constant
8.7	Le-Chatelier's Principle
8.8	Applications of Chemical Equilibrium in Industry
8.9	Ionic Product of Water
8.10	Ionization of Acid and Base
8.11	Lowry Bronsted Acid and Base Concept
8.12	Common Ion Effect
8.13	Buffer Solutions
8.14	Equilibria of Slightly Soluble Ionic Compound (Solubility Product)
8.15	Exercise

Chapter No.9: Solutions

9.1	Introduction (Concept of Solution)
9.2	Concentration Units of Solutions
9.3	Types of Solutions
9.4	Raoult's Law
9.5	Vapour Pressures of Liquid -Liquid Solution
9.6	Solubility and Solubility Curves
9.7	Colligative Properties of Solutions

9.8	Energetics of Solution
9.9	Hydration and Hydrolysis
9.10	Exercise

Chapter No.10: Electrochemistry

10.1	Introduction
10.2	Oxidation State and Balancing of Redox Equations
10.3	Electrochemical cells
10.4	Electrode potential
10.5	Electro chemical series
10.6	Modern batteries and fuel cells
10.7	Exercise

Chapter No.11: Reaction Kinetics

11.1	Introduction
11.2	Rate of Reaction
11.3	Order of Reaction
11.4	Half life Period
11.5	Determination of the Rate of a Chemical Reaction
11.6	Energy of Activation
11.7	Finding the Order of Reaction
11.8	Factors Affecting the Rate of Reactions
11.9	Catalysis
11.10	Exercise

❄ CLASS 11 – BIOLOGY ❄

Chapter No. 1: Introduction

1.1	Biology and Some Major Fields of Specialization			
1.2	Levels of Biological Organizations			
	1.2.1	Atomic and Subatomic Levels	1.2.2	Molecular Level
	1.2.3	Organelles and Cell	1.2.4	Tissue Level
	1.2.5	Organ and System	1.2.6	Individual
	1.2.7	Population	1.2.8	Community
1.3	Living World in Space			
1.4	Living World in Time			
	1.4.1	Pyretic Lineage	1.4.2	Biological method
1.5	Biology and Service of Mankind			
	1.5.1	Disease Control		
1.6	Protection and Conservation of Environment			
Exercise				

Chapter No. 2: Biological Molecules

2.1	Introduction to Biochemistry					
2.2	Importance of Carbon					
2.3	Importance of Water					
	2.3.1	Solvent properties	2.3.2	Heat Capacity	2.3.3	Heat of Vaporization
	2.3.4	Ionization of Water	2.3.5	Protection		
2.4	Carbohydrates					
2.5	Lipids					
2.6	Proteins					
	2.6.1	Structure of Proteins	2.6.2	Classification of Proteins		
2.7	Nucleic Acids					
	2.7.1	DNA	2.7.2	RNA		

2.8	Conjugated Molecules
Exercise	

Chapter No. 3: Enzymes

Introduction	
3.1	Introduction
3.2	Characteristics of Enzymes
3.3	Mechanism of Enzyme Action (Catalysis)
3.4	Factors Affecting the rate of Enzyme Action
3.5	Inhibitors
Exercise	

Chapter No. 4: The Cell

4.1	Emergence and Implication of Cell Theory			
4.2.	Structure of a Generalized cell			
	4.2.1	Cell membrane	4.2.2	Cell wall
	4.2.3	Cytoplasm	4.2.4	Endoplasmic reticulum
	4.2.5	Ribosomes	4.2.6	Golgi apparatus
	4.2.7	Lysosomes	4.2.8	Peroxisome
	4.2.9	Glyoxysomes	4.2.10	Vacuoles
	4.2. 11	cytoskeleton	4.2.12	Centriole
	4.2.13	Mitochondria	4.2.14	Plastids
4.3	Nucleus			
	4.3.1	Nuclear membrane		
	4.3.2	Nucleolus		
	4.3.3	chromosomes		
4.4	Prokaryotic and Eukaryotic cells			
Exercise				

Chapter No. 5: Variety of Life

5.1	Introduction			
5.2	Nomenclature			
5.3	Two to Five Kingdom Classification Systems			
5.4	Viruses			
	5.4.1	Characteristics of Viruses	5.4.2	Structure of Viruses
	5.4.3	Life Cycle of Bacteriophages	5.4.4	Classification of Viruses
	5.4.5	Some Viral Diseases	5.4.6	Retroviruses
	5.4.7	Acquired Immune Deficiency Syndrome (AIDS)		
	5.4.8	Hepatitis		
Exercise				

Chapter No. 6: Kingdom Prokaryote (Monera)

6.1	Discovery of Bacteria			
6.2	Occurrence of Bacteria			
6.3	Structure of Bacteria			
	6.3.1	Bacterial Cell Structure		
	6.3.2	Nutrition in Bacteria		
	6.3.3	Respiration in Bacteria		
	6.3.4	Growth and Reproduction		
6.4	Importance of Bacteria			
6.5	Control of Bacteria			
6.6	Use and Misuse of Antibiotics			
6.7	Characteristics of Cyanobacteria			
6.8	Economic Importance			
6.9	<i>Nostoc</i>			
Exercise				

Chapter No. 7: The Kingdom Protista (or Protoctista)

7.1	Introduction	
7.2	Historical Perspective	
7.3	Diversity among Protista	
7.4	Major Groups of Protista	
	7.4.1	Protozoa : Animal _ like Protists
	7.4.2	The Algae : Plant like Protists
	7.4.3	Fungus – like Protists
Exercise		

Chapter No. 8: Fungi: The Kingdom Of Recyclers

8.1	Introduction	
8.2	The Body of Fungus	
8.3	Nutrition in Fungi	

8.4	Reproduction	
8.5	Classification of Fungi	
	8.5.1	Zygomycota
	8.5.2	Ascomycota
	8.5.3	Basidiomycota
	8.5.4	Deuteromycota
8.6	Land Adaptations of Fungi	
8.7	Importance of Fungi	
Exercise		

Chapter No. 9: The Kingdom Plantae

9.1	Introduction	
9.2	Classification of Plantae	
9.3	Division Bryophyta	
9.4	Adaptation to land habitat	

9.5	Classification	
	9.5.1	Hepaticosida
	9.5.2	Bryopsida
	9.5.3	Anthocerosida
	9.5.4	Alternation of generation
	9.5.5	Significance of Alternation of generation
9.6	Division tracheophyta	
	9.6.1	Psilopsida
	9.6.2	Evolution of leaf
	9.6.3	Lycopsida
	9.6.4	Sphenopsida
	9.6.5	Pteropsida
9.7	Evolution of seed Habitat	
9.8	Class Gymnosperms	
	9.8.1	<i>Pinus</i> : Life cycle
9.9	Class Angiospermae	
	9.9.1	Life cycle of an Angiospermic plant
	9.9.2	Double fertilization
	9.9.3	Classification of Angiosperms
9.10	Angiospermic Families	
	9.10.1	Rosaceae
	9.10.2	Solanaceae
	9.10.3	Fabiaceae
	9.10.4	Caesalpiniaceae
	9.10.5	Mimoaceae
	9.10.6	Poaceae
Exercise		

Chapter No. 10: The Kingdom Animalia

10.1	Introduction	
10.2	Development of complexity in Animals	
10.3	Grade Radiata	
10.4	Grade Bilateria	
10.5	Diploblastic and Triploblastic organization	
	10.5.1	Acoelomates
	10.5.2	Pseudocoelomate
	10.5.3	coelomates
10.6	Parazoa	
	10.6.1	Phylum Porifera
10.7	Grade Radiata	
10.8	Grade Bilateria	
	10.8.1	Triploblastic animal: The Acoelomates
	10.8.1.1	Phylum: Platyhelminthes- Flat worms
	10.8.2	Triploblastic animal: The Pseudocoelomates
	10.8.2.1	Aschelminthes- Phylum Nemaodes- Round worms
	10.8.3	Triploblastic animal: The Acoelomates
	10.8.3.1	Phylum: Annelida- Segmented worms
	10.8.3.2	Phylum: Arthropoda- Animals with joined legs
	10.8.3.3	General organization of arthropods
	10.8.3.4	Phylum: Mollusca
	10.8.3.5	Phylum: Echinodermata- Spiny skinned animals
	10.8.3.6	Phylum Hemichordata
	10.8.3.7	Phylum chordata
	10.8.3.8	Subphylum Vertebrata (Crania) (Higher Chordates)
Exercise		

Chapter No. 11: Bioenergetics

11.1	Introduction	
11.2	Photosynthesis (Conversion of solar energy into chemical energy)	
	11.2.1	Water and Photosynthesis
11.3	Chloroplasts- The site of Photosynthesis in Plants	
11.4	Photosynthetic Pigments	
	11.4.1	Chlorophylls
	11.4.2	Carotenoids
11.5	Light- The driving energy	
11.6	Role of Carbon dioxide: A photosynthetic Reactant	
11.7	Reaction of Photosynthesis	
	11.7.1	Light dependant reaction
	11.7.2	Chemiosmosis
	11.7.3	Light independent reaction
11.8	Respiration	
	11.8.1	Anaerobic Respiration
	11.8.2	Aerobic Respiration
	11.8.3	Cellular Respiration
Exercise		

Chapter No. 12: Nutrition

12.1	Introduction	
12.2	Autotrophic Nutrition	
	12.2.1	Mineral nutrition in Plant
	12.2.2	Mineral element deficiency
12.3	Heterotrophic Nutrition	
12.4	Methods in Plant Nutrition	
	12.4.1	Saprophytic Nutrition

	12.4.2	Parasitic Nutrition
	12.4.3	Symbiotic Nutrition
	12.4.4	Nutrition in insectivorous Plants
12.5	Methods of animal nutrition	
12.6	Digestion and Absorption	
	12.6.1	Digestion in <i>Amoeba</i>
	12.6.2	Digestion in <i>Hydra</i>
	12.6.3	Digestion in <i>Planaria</i>
	12.6.4	Digestion in <i>Cockroach</i>
	12.6.5	Digestion in Man
	12.6.6	Digestion in <i>Amoeba</i>
Exercise		

Chapter No. 13: Gaseous Exchange

13.1	Need of respiratory gas exchange	
13.2	Advantages and Disadvantages of gas exchange in air and water	
13.3	Gas exchange in Plants	
	13.3.1	Photorespiration and its consequence
	13.3.2	Ribulose 1,5 bisphosphate reacts with oxygen in photorespiration
13.4	Respiratory organs in Representative Aquatic and Terrestrial animals	
	13.4.1	Properties of Respiratory surfaces in animals
	13.4.2	Respiration in <i>Hydra</i>
	13.4.3	Respiration in Earthworm
	13.4.4	Respiration in Cockroach
	13.4.5	Respiration in Fish
	13.4.6	Respiration in Frog
	13.4.7	Respiration in bird
	13.4.8	Respiration in Man
13.5	Mechanism of Voluntary and involuntary regulation of breathing in Man	

	13.5.1	Inspiration
	13.5.2	Expiration
13.6	Transport of Respiratory Gases	
	13.6.1	Transport of Oxygen
	13.6.2	Transport of Carbon dioxide
13.7	Respiratory disorders	
13.8	Role of respiratory Pigments	
13.9	Lung Capacities	
Exercise		

Chapter No. 14: Transport

14.1	Introduction	
14.2	Need for transport of material	
14.3	Transport in Plants	
	14.3.1	Uptake and transport of minerals and water
	14.3.2	Uptake of water by roots
	14.3.3	Water potential
	14.3.4	Plasmid and pressure potential
14.4	Ascent of sap	
	14.4.1	Cohesion tension theory
	14.4.2	Root pressure
	14.4.3	Imbibition
	14.4.4	Bleeding
14.5	Types of transpiration	
	14.5.1	Cuticular transpiration
	14.5.2	Lenticular transpiration
	14.5.3	Stomatal transpiration
14.6	Opening and closing of stomata	
	14.6.1	Starch sugar hypothesis

	14.6.2	Influx of K ⁺ ion
	14.6.3	Factors affecting the rate of transpiration
	14.6.4	Transpiration as necessary evil
14.7	Translocation of organic solutes	
	14.7.1	Phloem Transport
	14.7.2	Pattern of transport
	14.7.3	The mechanism of phloem translocation/transport
14.8	Transport in Animals	
	14.8.1	Transportation in <i>Hydra</i>
	14.8.2	Transportation in <i>Planaria</i>
14.9	Circulatory system	
	14.9.1	Characteristics of circulatory system
	14.9.2	Open and closed circulatory system
	14.9.3	Vertebrate blood circulatory system
14.10	Transportation in man	
	14.10.1	The circulatory fluid- the blood
	14.10.1.1	Function of blood
	14.10.1.2	Disorders
	14.10.1.2.1	Leukemia
	14.10.1.2.2	Thalassaemia
	14.10.1.2.3	Edema
	14.10.2	Pumping organ- The heart
	14.10.2.1	Mechanism of heart excitation and contraction
	14.10.2.2	Electrocardiogram
	14.10.2.3	Artificial pace maker
	14.10.2.4	Blue babies
	14.10.3	Blood vessels
	14.10.3.1	Blood pressure and rate of flow of blood
	14.10.3.2	Hypertension

	14.10.3.3	Thrombus and hypertension
	14.10.3.4	Heart attack
	14.10.3.5	Stroke
	14.10.3.6	Hemorrhage
14.11	Lymphatic system	
14.12	Immunity and its types	
Exercise		

❁ جماعت گیارہویں - اسلامیات ❁

اسلامیات برائے جماعت گیارہویں (منجانب ٹیکٹ بک بورڈ)

باب اول، بنیادی عقائد				1
1.1	توحید	1.2	رسالت	1.3
		1.4	آسمانی کتابیں	1.5
		1.5	آخرت	سوالات
باب دوم، اسلامی شخص				2
2.1	اللہ تعالیٰ اور رسول اللہ صلی اللہ علیہ وسلم کی محبت و اطاعت	2.2	حقوق العباد	
2.3	معاشرتی ذمہ داریاں	سوالات		
باب سوم، اُسوہ رسول اکرم صلی اللہ علیہ وآلہ وسلم				3
3.1	رحمتہ للعالمین	3.2	انوت	
3.3	مساوات	3.4	صبر و استقلال	
3.5	عفو و درگزر	3.6	ذکر	
سوالات				
باب چہارم، تعارف قرآن و حدیث				4
4.1	تعارف قرآن	4.2	تعارف حدیث	
4.3	منتخب آیات	4.4	منتخب احادیث	
سوالات				

❖ جماعت گیارہویں - اردو ❖

اردو ٹیکسٹ بک (حصہ نثر)

اسوۂ حسنہ ﷺ	1.1					
اپنی مدد آپ	1.2					
سر سید کے عادات و خصائل	1.3					
ابوالقاسم زہرا وہی	1.4					
ادیب کی عزت	1.5					
اوور کوٹ	1.6					
سفارش	1.7					
چراغ کی لو	1.8					
مکتوبات غالب	1.9					
مکتوبات اقبال	1.10					
لاہور کا جغرافیہ	1.11					
دوستی کا پھل	1.12					
کیا واقعی دنیا گول ہے	1.13					
اور آنا گھر میں مرغیوں کا	1.14					
1.15	1.16	سلیبس اردو	1.17	مرکزی خیال اور خلاصہ	1.18	مشقی سوالات

اردو ٹیکسٹ بک (حصہ نظم)

حمد	2.1
نعت	2.2
تسلیم و رضا	2.3

				میدان کربلا میں صبح کا منظر	2.4
				مستقبل کی جھلک	2.5
				برسات	2.6
				بلال استقبال	2.7
				خطاب بہ جوانانِ اسلام	2.8
				پیغام	2.9
				ایپسٹریکٹ آرٹ	2.10
				قطعات	2.11
				لوکل بس	2.12
				وحدانیت	2.13
				تشریح	2.14
	2.16	مرکزی خیال اور خلاصہ	2.15		
		مشقی سوالات			

اردو ٹیکسٹ بک (حصہ غزل)

				جس سر کو غرور آج ہے، یاں تاج وری کا	3.1
				گل کو ہوتا ہے صبا! قراراے کاش	3.2
				ہوائے دور مئے نوشگوار، راہ میں ہے	3.3
				یہ آرزو تھی، تجھے گل کے روبرو کرتے	3.4
				پھرے راہ سے وہ، یہاں آتے آتے	3.5
				ناظر سے یا لحاظ سے، میں مان تو گیا	3.6
				اثر اس کو ذرا نہیں ہوتا	3.7
				ٹھانی تھی دل میں اب نہ ملیں گے کسی سے ہم	3.8
				بھلاتا لاکھ ہوں لیکن برابر یاد آتے ہیں	3.9
				رسم جفا کامیاب، دیکھیے کب تک رہے	3.10
				نہ گنواؤ ناؤک نیم کش، دل ریزہ ریزہ گنوا دیا	3.11
				کب یاد میں تیرا ساتھ نہیں، کب بات میں تیرا بات نہیں	3.12

		کچھ غلط تو نہیں تھا، میرا تنہا ہونا	3.13
		اب تو کچھ اور ہی اعجاز دکھایا جائے	3.14
	مشقی سوالات	3.16	تشریح
			3.15

اردو قواعد و انشا

علم بیان	4.1	اصطلاحات شعری	4.2	فقرات کی درستی	4.3	تانیص	4.4
مکالمہ نویسی	4.5						
رؤداد	4.6						
درخواست	4.7						
رسیدات	4.7						

❄ CLASS 12 – MATHEMATICS ❄

*All definitions, examples, exercises, theorems and corollaries will be included in QAT which are given in PTB

Unit. 1: Functions And Limits

1.1	Introduction				
	1.1.1	Concept of Function	1.1.2	Definition (Function – Domain – Range)	
	1.1.3	Notation and Value of a Function	1.1.4	Graphs of Algebraic functions	
	1.1.5	Graphs of functions defined piece-wise.			
1.2	Types of functions				
	1.2.1	Algebraic Functions			
		1.2.1.1	Polynomial Function	1.2.1.2	Linear Function
		1.2.1.3	Identity Function	1.2.1.4	Constant Function
		1.2.1.5	Rational Function		
	1.2.2	Trigonometric Functions	1.2.3	Inverse Trigonometric Function	
	1.2.4	Exponential Function	1.2.5	Logarithmic Function	
	1.2.6	Hyperbolic Function	1.2.7	Inverse Hyperbolic Function	
	1.2.8	Explicit Function	1.2.9	Implicit Function	
	1.2.10	Even Function	1.2.11	Odd Function	
1.3	Composition of Functions and Inverse of a Function				
	1.3.1	Composition of Functions	1.3.2	Inverse of a Function	
	1.3.3	Algebraic Method to find the Inverse Function			
1.4	Limit of a Function and Theorems on Limits				
	1.4.1	Meaning of the Phrase “x approaches zero”			
	1.4.2	Meaning of the Phrase “x approaches infinity”			
	1.4.3	Meaning of the Phrase “x approaches a”			
	1.4.4	Concept of Limit of a Function			
		1.4.4.1	By finding the area of circumscribing regular polygon		

	1.4.4.2	Numerical Approach	
1.4.5	Limit of a Function		
1.4.6	Theorems on limits of Functions		
Theorem 1:	The limit of the sum of two functions is equal to the sum of their limits.		
Theorem 2:	The limit of difference of two functions is equal to the difference of their limits.		
Theorem 3:	If “k” is any real number then $\lim_{x \rightarrow a} [kf(x)] = k \lim_{x \rightarrow a} f(x) = kL$		
Theorem 4:	The limit of the product of the functions is equal to the product of their limits.		
Theorem 5:	The limit of the quotient of the functions is equal to the quotient of their limits provided the limit of the denominator is non-zero.		
Theorem 6:	Limit of $[f(x)]^n$, where “n” is an integer.		
1.5	Limits of important Functions		
1.5.1	$\lim_{x \rightarrow a} \frac{x^n - a^n}{x - a} = na^{n-1}$, where “n” is an integer and $a > 0$		
	Case 1:	Suppose “n” is a positive integer	
	Case 2:	Suppose “n” is a negative integer	
1.5.2	$\lim_{x \rightarrow 0} \frac{\sqrt{x+a} - \sqrt{a}}{x} = \frac{1}{2\sqrt{a}}$		
1.5.3	Limit at Infinity		
	1.5.3.1	Limit as $x \rightarrow +\infty$	1.5.3.2 Limit as $x \rightarrow -\infty$
	Theorem:	$\lim_{x \rightarrow +\infty} \frac{a}{x^p} = 0$ and $\lim_{x \rightarrow -\infty} \frac{a}{x^p} = 0$, where “a” is any real number	
1.5.4	Method for evaluating the limits at infinity		
1.5.5	$\lim_{x \rightarrow +\infty} \left(1 + \frac{1}{n}\right)^n = e$		
	1.5.5.1	Deduction $\lim_{x \rightarrow 0} (1+x)^{1/x} = e$	
1.5.6	$\lim_{x \rightarrow 0} \frac{a^x - 1}{x} = \log_e a$		
	1.5.6.1	Deduction $\lim_{x \rightarrow 0} \left(\frac{e^x - 1}{x}\right) = \log_e e = 1$	
1.5.7	The Sandwich Theorem		

	1.5.8	If “ θ ” is measured in radian, then $\lim_{\theta \rightarrow 0} \frac{\sin \theta}{\theta} = 1$
1.6	Continuous and Discontinuous Functions	
	1.6.1	One sided Limits
	1.6.2	Criterion for Existence of Limit of a Function
	1.6.3	Continuity of a function at a number
1.7	Graphs	
	1.7.1	Graph of the Exponential Function $f(x) = a^x$
	1.7.2	Graph of the Exponential Function $f(x) = e^x$
	1.7.3	Graph of Common Logarithmic Function $f(x) = \lg x$
	1.7.4	Graph of Natural Logarithmic Function $f(x) = \ln x$
	1.7.5	Graph of implicit Functions
	1.7.6	Graph of parametric Equations
	1.7.7	Graph of Discontinuous Functions
	1.7.8	Graphical solution of the equations

Unit. 2: Differentiation

2.1	Introduction		
	2.1.1	Dependent and Independent variable	
	2.1.2	Average rate of change	2.1.3 Derivative of a function
2.2	Finding $f'(x)$ from definition of derivative.		
	2.2.1	Derivation of x^n where $n \in Z$	
	2.2.2	Differentiation of expressions of the types $(ax + b)^n$ and $\frac{1}{(ax + b)^n}$, where “ $n = 1, 2, 3, \dots$ ”	
2.3	Theorems on differentiation		
	2.3.1	$\frac{d}{dx}(c) = 0$	2.3.2 $\frac{d}{dx}(x^n) = nx^{n-1}$
			2.3.3 $y = cf(x)$
	2.3.4	Derivative of a sum or a difference of functions	

	2.3.5	Derivative of a product (The product Rule)
	2.3.6	Derivative of a Quotient (The Quotient Rule)
	2.3.7	The Reciprocal Rule
2.4	The Chain Rule	
2.5	Derivatives of Inverse Functions	
2.6	Derivatives of a Function given in the form of parametric equations	
2.7	Differentiation of Implicit Relations	
2.8	Derivatives of Trigonometric Functions	
2.9	Derivatives of Inverse Trigonometric Functions	
2.10	Derivative of exponential functions	
2.11	Derivative of the logarithmic functions	
2.12	Logarithmic Differentiation	
2.13	Derivative of hyperbolic functions	
2.14	Derivatives of the inverse hyperbolic functions	
2.15	Successive differentiation (or higher derivatives)	
2.16	Series expansions of functions	
2.17	Tailor series expansions of functions	
2.18	Geometrical interpretation of a derivative	
2.19	Increasing and Decreasing functions	
2.20	Relative Extrema	
2.21	Critical values and critical points	
	2.21.1	Application of Maxima and Minima

Unit. 3: Integration

3.1	Introduction	
	3.1.1	Differentials of variables
	3.1.2	Distinguishing between dy and δy
	3.1.3	Finding $\frac{dy}{dx}$ by using differentials
	3.1.4	Simple application of differentials
3.2	Integration as anti-derivative (Inverse of derivative)	
	3.2.1	Some standard formulae for anti-derivatives
	3.2.2	Theorems on Anti-derivatives
	3.2.3	Anti-derivatives of $[f(x)]^n f'(x)$ and $[f(x)]^{-1} f'(x)$
3.3	Integration by method of substitution	
3.4	Some useful substitutions	
3.5	Integration by parts	
3.6	Integration involving partial fractions	
	Case 1:	Non-repeated linear factors.
	Case 2:	Repeated and non-repeated linear factors.
	Case 3:	Linear and non-repeated irreducible quadratic factors or non repeated irreducible quadratic factors.
3.7	The definite integrals	
	3.7.1	The area under the curve
3.8	Application of definite integrals	
3.9	Differential equations	
	3.9.1	Solution of a differential equation of first order
	3.9.2	Initial conditions

Unit. 4: Introduction to Analytic Geometry

4.1	Introduction	
	4.1.1	The distance formula
	4.1.2	Point dividing the join of two points in a given ratio
4.2	Translation and Rotation of Axes	
4.3	Equations of straight lines	
	4.3.1	Slope or Gradient of a straight line joining two points
	4.3.2	Equation of a straight line parallel to the x-axis (or perpendicular to the y-axis)
	4.3.3	Equation of a straight line parallel to the y-axis (or perpendicular to the x-axis)
	4.3.4	Derivation of standard forms of equations of straight lines
	4.3.5	A linear equation in two variables represents a straight line
	4.3.6	Transform the general linear equations to standard forms
	4.3.7	Position of a point with respect to a line
4.4	Two and three straight lines	
	4.4.1	The point of intersection of two straight lines
	4.4.2	Condition of concurrency of three straight lines
	4.4.3	Equation of lines through the point of intersection of two lines
	4.4.4	Distance of a point from a line
	4.4.5	Distance between two parallel lines
	4.4.6	Area of a triangular region whose vertices are given
4.5	Angle between two lines	
	4.5.1	Equation of straight line in matrix form
4.6	Homogeneous equation of the second degree in two variables	
	4.6.1	Homogeneous equation
	4.6.2	To find measure of angle between the lines represented by $ax^2 + 2hxy + by^2 = 0$

Unit. 5: Linear Inequalities and Linear Programming

5.1	Introduction	
5.2	Linear Inequalities	
	5.2.1	Graphing of a linear inequality in two variables
5.3	Region bounded by 2 or 3 simultaneous inequalities	
5.4	Problem Constraints	
5.5	Feasible Solution set	
5.6	Linear Programming	
5.7	Linear Programming Problems	

Unit. 6: Conic sections

6.1	Introduction	
	6.1.1	Equation of a circle
	6.1.2	General form of an equation of a circle
	6.1.3	Equations of circles determined by given conditions
6.2	Tangents and Normal's	
	6.2.1	Length of the tangent to a circle (Tangential distance)
6.3	Analytic proofs of Important properties of a circle	
6.4	Parabola	
	6.4.1	General form of an equation of a Parabola
	6.4.2	Other standard Parabolas
	6.4.3	Graph of the Parabola
6.5	Ellipse and Its Elements	
	6.5.1	Standard form of an Ellipse
	6.5.2	Graph of an Ellipse
6.6	Hyperbola and Its Elements	
	6.6.1	Standard equation of Hyperbola

	6.6.2	Graph of the Hyperbola
6.7	Tangents and Normal's	
6.8	Intersection of two conics	
6.9	Translation and Rotation of Axes	
6.10	The General equation of second degree	

Unit. 7: Vectors

7.1	Introduction	
	7.1.1	Geometric Interpretation of vector
	7.1.2	Multiplication of vector by a scalar
	7.1.3	Addition and subtraction of two vectors
	7.1.4	Position vector
	7.1.5	Vectors in a plane
	7.1.6	Properties of magnitude of a vector
	7.1.7	Another notation for representing vectors in plane
	7.1.8	A unit vector in the direction of another given vector
	7.1.9	The ratio formula
	7.1.10	Vector Geometry
7.2	Introduction of vector in space	
	7.2.1	Concept of a vector in space
	7.2.2	Properties of vectors
	7.2.3	Another notation for representing vectors in space
	7.2.4	Distance between two points in space
	7.2.5	Direction angles and direction cosines of a vector
7.3	The scalar product of two vectors	
	7.3.1	Deductions of the important results
	7.3.2	Perpendicular (Orthogonal) vectors

	7.3.3	Properties of dot product
	7.3.4	Analytical expression of dot product (dot product of vectors in their component form)
	7.3.5	Angle between two vectors
	7.3.6	Projection of one vector upon another vector
7.4	The cross product or vector product of two vectors	
	7.4.1	Derivation of useful results of cross products
	7.4.2	Properties of cross product
	7.4.3	Analytical expression of $\underline{u} \times \underline{v}$ (Determinant formula for $\underline{u} \times \underline{v}$)
	7.4.4	Parallel vectors
	7.4.5	Area of Parallelogram
	7.4.6	Area of Triangle
7.5	Scalar triple product of vectors	
	7.5.1	Analytical expression of $\underline{u} \cdot (\underline{v} \times \underline{w})$
	7.5.2	The volume of the parallelepiped
	7.5.3	The volume of the Tetrahedron
	7.5.4	Application of vectors in Physics and Engineering

❄ CLASS 12 – ENGLISH ❄

1: Reading & Writing Book II (Modern Prose & Heroes)

1.1	Lesson No.1	The Dying Sun
1.2	Lesson No.2	Using the Scientific Method
1.3	Lesson No.3	Why Boys Fail In College
1.4	Lesson No.4	End OF Term
1.5	Lesson No.5	On Destroying Books
1.6	Lesson No.6	The Man Who Was In Hospital
1.7	Lesson No.7	My Financial Career
1.8	Lesson No.8	China’s Way To Progress
1.9	Lesson No.9	Hunger And Population Explosion
1.10	Lesson No.10	The Jewel Of The World
1.11	Lesson No.11	First Year At Harrow
1.12	Lesson No.12	Hitch Hiking Across the Sahara
1.13	Lesson No.13	Sir Alexander Fleming
1.14	Lesson No.14	Louis Pasteur
1.15	Lesson No.15	Mustafa Kamal
1.16	Reading Comprehension	
1.17	Synonyms	1.18 MCQs
1.19	Write the answer of the questions (100-150 words)	
1.20	Short Question Answers	
1.21	Character Sketches	

2: Good Bye Mr. Chips Book IV (Novel)

1.1	Chapter 1 to 18 (Complete Novel)
1.2	Synonyms
1.3	Character Sketches
1.4	Write the short answers of the questions
1.5	Choose the correct answer
1.6	Write the answer of the questions (100-150 words)
1.7	Mark the statement true or false

3: Grammar

2.1	Use of prepositions		
2.2	Sentence Correction		
2.3	Translate the passage into English	2.4	Idioms / Phrases
2.5	Essay Writing	2.6	Paragraph Writing

❄ CLASS 12 – PHYSICS ❄

Note: All exercises (MCQs, Short Questions, Problems) and examples will be included in QAT which are given in PTB.

Chapter No. 12: Electrostatics

12.1	Coulomb's Law
12.2	Field of Force
12.3	Electric Field Lines
12.4	Applications of Electrostatics
	12.4.1 Xerography (Photocopier)
	12.4.2 Inkjet Printer
12.5	Electric Flux
12.6	Electric Flux Through a Surface enclosing a Charge
12.7	Gauss's Law
12.8	Application of Gauss's Law
	12.8.1 Intensity of Field inside a Hollow Charged Sphere
	12.8.2 Electric Intensity due to an Infinite Sheet of Charge
	12.8.3 Electric Intensity between Two Oppositely Charged Parallel Plates
12.9	Electric Potential
	12.9.1 Electric Field as Potential Gradient
	12.9.2 Electric Potential at a Point due to a Point Charge
12.10	Electron Volt
12.11	Electric and Gravitational Forces (Comparison)
12.12	Charge on an Electron by Millikan's Method
12.13	Capacitor
12.14	Capacitance of a Parallel Plate Capacitor
12.15	Electric Polarization of Dielectrics
12.16	Energy Stored in a Capacitor
12.17	Charging and Discharging a Capacitor

Chapter No. 13: Current Electricity

13.1	Electric Current			
	13.1.1	Current Direction	13.1.2	Current through a Metallic Conductor
13.2	Source of Current			
13.3	Effect of Current			
13.4	Ohm's Law			
	13.4.1	Review of Series and Parallel Combinations of a Resistor		
13.5	Resistivity and its dependence Upon Temperature			
13.6	Color Code for Carbon Resistances			
	13.6.1	Rheostat	13.6.2	Thermistors
13.7	Electrical Power and Power Dissipation in Resistors			
13.8	Electromotive Force (EMF) and Potential Difference			
	13.8.1	Maximum Power Output		
13.9	Kirchhoff's Rules			
	13.9.1	Kirchhoff's First Rule	13.9.2	Kirchhoff's Second Rule
13.10	Wheatstone Bridge			
13.11	Potentiometer			

Chapter No. 14: Electromagnetism

14.1	Magnetic Field due to Current in a Long Straight Wire		
14.2	Force on a Current Carrying Conductor in a Uniform Magnetic Field		
14.3	Magnetic Flux and Flux Density		
14.4	Ampere's Law and Determination of Flux Density B		
	14.4.1	Field Due to a Current Carrying Solenoid	
14.5	Force on a Moving Charge in a Magnetic Field		
14.6	Motion of a Charged Particle in an Electric and Magnetic Field		
14.7	Determination of e/m of an Electron		
14.8	Cathode Ray Oscilloscope		

14.9	Torque on a Current Carrying Coil		
14.10	Galvanometer		
	Ammeter	Voltmeter	Ohmmeter
14.11	AVO Meter- multi Meter		
	Voltage Measuring Part of AVO Meter	Current measuring Part of AVO Meter	
	Resistance Measuring Part of AVO Meter	Digital Multimeter	

Chapter No. 15: Electromagnetic Induction

15.1	Induced EMF and Induced Current		
15.2	Motional EMF		
15.3	Faraday's Law and Induced EMF		
15.4	Lenz's Law and Direction of Induced EMF		
15.5	Mutual Induction	15.6	Self induction
15.7	Energy Stored in an Inductor	15.8	Alternating Current Generator
15.9	D.C. Generator	15.10	Back Motor Effect in Generators
15.11	D.C. Motor	15.12	Back EMF Effect in Motors
15.13	Transformer		

Chapter No. 16: Alternating Current

16.1	Alternating Current	16.2	A.C. Circuits
16.3	A.C. Through a Resistor	16.4	A.C. Through a Capacitor
16.5	A.C. Through an Inductor	16.6	Impedance
16.7	R-C and R-L series Circuit	16.8	Power in A.C circuits
16.9	Series Resonance Circuit	16.10	Parallel Resonance Circuit
16.11	Three phase A.C Supply	16.12	Principle of Metal Detectors
16.13	Choke	16.14	Electromagnetic Waves
16.15	Principle of Generation, Transmission and Reception of Electromagnetic Waves		
16.16	Modulation		

Chapter No. 17: Physics of Solids

17.1	Classification of Solids	17.2	Mechanical Properties of Solids
17.2.1	Deformation in solids	17.2.1	Elastic Constants
17.2.3	Elastic Limit and yield strength	17.2.4	Strain Energy in deformed Materials
17.3	Electrical properties of Solids	17.3.1	Energy Band Theory
17.3.2	Intrinsic and Extrinsic Semi-Conductor		
17.3.3	Electrical Conduction by Electrons and holes in semiconductors		
17.4	Superconductors	17.5	Magnetic properties of Solids
	17.5.1	Hysteresis Loop	

Chapter No. 18: Electronics

18.1	Brief Review of P-N Junction and its Characteristics		
18.1.1	Forward Biased P-N junction	18.1.2	Reverse Biased P-N Junction
18.2	Rectification	18.2.1	Half Wave Rectification
18.2.2	Full Wave Rectification	18.3	Specially designed P-N Junction
18.4	Transistors	18.4.1	Current Flow in a N-P-N transistor
18.5	Transistor as an Amplifier	18.6	Transistor as a Switch
18.7	Operational Amplifier	18.8	Op-Amp as Inverting Amplifier
18.9	Op-Amp as Non-Inverting Amplifier	18.10	Op-Amp as a Comparator
18.11	Comparator as a Night Switch	18.12	Digital Systems
18.13	Fundamental Logic Gates(OR Gate, AND Gate & Not Gate		
18.14	Other Logic Gates(NOR Gate, NAND Gate		
18.14.1	Exclusive OR Gate (XOR)	18.14.2	Exclusive NOR gate (XNOR)
18.15	Applications of Gates in Control Systems		

Chapter No. 19: Dawn of Modern Physics

19.1	Relative Motion	19.2	Frames of Reference
19.3	Special theory of Relativity	19.4	Black Body Radiation

19.5	Interaction of Electromagnetic Radiation with Matter		
19.5.1	Photoelectric effect	19.5.2	Photocell
19.5.3	Compton Effect	19.5.4	Pair Production
19.6	Annihilation of Matter	19.7	Wave Nature of Particles
19.7.1	Davisson And Germer Experiment	19.7.2	Wave Particle Duality
19.7.3	Uses of wave Nature of Particles	19.7.4	Electron Microscope
19.8	Uncertainty Principle		

Chapter No. 20: Atomic Spectra

20.1	Atomic Spectra	20.1.1	Atomic Spectrum of Hydrogen
20.2	Bohr's Model of the Hydrogen Atom		
20.2.1	Quantized Radii	20.2.2	Quantized Energies
20.3	Inner Shell transitions and Characteristics X-Rays		
20.3.1	Hydrogen Emission Spectrum	20.3.2	Continuous X-rays Spectrum
20.3.3	Properties and uses of X-rays	20.3.4	CAT Scanner
20.3.5	Biological Effects X-rays	20.4	Uncertainty within the atom
20.5	Laser	20.5.1	Spontaneous and Stimulated Emissions
20.5.2	Population Inversion & Laser Action	20.5.3	Helium Neon Laser
20.5.4	Uses of laser in Medicine and Industry		

Chapter No. 21: Nuclear Physics

21.1	Atomic Nucleus	21.2	Isotopes and Mass Spectrograph
21.3	Mass Defect and Binding Energy	21.4	Radioactivity and Nuclear Transmutation
21.5	Half Life	21.6	Interaction of Radiation with Matter
21.7	Radiation Detectors	21.7.1	Wilson Cloud Chamber
21.7.2	Geiger Muller Counter	21.7.3	Solid State Detector
21.8	Nuclear Reactions	21.9	Nuclear Fission
21.9.1	Fission Chain Reaction	21.9.2	Nuclear Reactor and its types
21.10	Fusion Reaction	21.10.1	Nuclear Reaction in the Sun

21.11	Radiation Exposure	21.12	Biological Effects of Radiation
21.13	Biological and Medical uses of Radiation		
21.13.1	Tracer Techniques	21.13.2	Medical Diagnostics and Therapy
21.14	Basic Forces of Nature	21.15	Building Blocks of Matter

❄ CLASS 12 – CHEMISTRY ❄

Chapter No. 1: Periodic Classification of Elements and Periodicity

1.1	Introduction
1.2	Historical Background
1.3	The Modern Periodic Table (Periods and groups)
1.4	Periodic Trends in Physical Properties
1.5	Periodic Relationship in Compounds
1.6	The Position of Hydrogen
1.7	Exercise

Chapter No.2: S-Block Elements

2.1	Introduction
2.2	Electronic Configurations of S-Block Elements
2.3	Occurrence of Alkali and Alkaline Earth Metals
2.4	Peculiar Behaviour of Lithium and Beryllium
2.5	General Behaviour of Alkali and Alkaline Earth Metals
2.6	Commercial Preparation of Sodium by Downs Cell
2.7	Commercial Preparation of Sodium Hydroxide by the Diaphragm Cell
2.8	Role of Gypsum in Agriculture and Industry
2.9	Role of Lime in Agriculture and Industry
2.10	Exercise

Chapter No.3: Group IIIA AND group IV A Elements

3.1	Introduction of Group IIIA Elements
3.2	Occurrence (Boron and Aluminum)
3.3	Peculiar Behaviour of Boron
3.4	Compounds of Boron
3.5	Reactions of Aluminum

3.6	Group IVA Elements
3.7	Occurrence (Carbon and Silicon)
3.8	Peculiar Behaviour of Carbon
3.9	Compounds of Carbon and Silicon
3.10	Semiconductors
3.11	Use of Lead Compounds in Paints
3.12	Exercise

Chapter No.4: Group VA AND Group VI A Elements

4.1	Introduction of Group VA Elements
4.2	General Characteristics
4.3	Nitrogen and its Compound
4.4	Phosphorous and its Compound
4.5	Group VIA Elements
4.6	Occurrence
4.7	Compression of Oxygen and Sulphur
4.8	Suphuric Acid
4.9	Use of Lead Compounds in Paints
4.10	Exercise

Chapter No.5: The Halogens and The Noble Gases

5.1	Introduction
5.2	Occurrence
5.3	Peculiar Behaviour of Fluorine
5.4	Oxidizing properties
5.5	Compounds of Halogens
5.6	Commercial uses of Halogens and their Compounds
5.7	Noble Gases
5.8	Introduction of Noble Gases

5.9	Compounds of Xenon
5.10	Fluorides of Xenon
5.11	Xenon Oxyfluorides
5.12	Applications of Noble Gases
5.13	Exercise

Chapter No.6: Transition Elements

6.1	Introduction
6.2	Typical and non typical transition elements
6.3	Properties transition elements
6.4	General Characteristics
6.5	Complex compounds
6.6	Iron industries
6.7	Corrosion
6.8	Chromates and Dichromates & their properties
6.9	Potassium permanganates and their properties
6.10	Exercise

Chapter No. 7: Fundamental Principles of Organic Chemistry

7.1	Introduction
	7.1.1 Modern Definition Of Organic Chemistry
7.2	Some Features Of Organic Compounds
7.3	Importance Of Organic Chemistry
7.4	Sources Of Organic Compounds
7.5	Cracking Of Petroleum
7.6	Reforming
7.7	Classifications Of Organic Compounds
7.8	Functional Group
7.9	Hybridization Of Orbitals And The Shapes Of Molecules

7.10	Isomerism	
	7.10.	Types Of Isomerism
7.11	Exercise	

Chapter No. 8: Aliphatic Hydrocarbons

8.1	Introduction	
8.2	Nomenclature	
	8.2.1	Common or Trivial Names
	8.2.2	IUPAC Names
	8.2.3	Nomenclature Of alkanes
	8.2.4	Nomenclature Of Alkenes
	8.2.5	Nomenclature Of Alkynes
8.3	Alkanes Or Paraffins	
	8.3.1	General Methods Of Preparations
	8.3.2	Physical Properties
	8.3.3	Reactivity Of Alkanes
	8.3.4	Reactions
	8.3.5	Uses Of Methane
8.4	Alkenes	
	8.4.1	General Methods Of Preparation
	8.4.2	Physical Properties
	8.4.3	Reactivity Of a π – Bond (pi-bond)
	8.4.4	Reactions Of Alkenes
	8.4.5	Uses Of Ethene
8.5	Alkynes	
	8.5.1	General Methods Of Preparation
	8.5.2	Physical Characteristics
	8.5.3	Reactivity Of Alkynes
	8.5.4	Reactions
	8.5.5	Uses Of Ethyne
	8.5.6	Comparison Of Reactivities Of Alkanes, Alkenes And Alkynes
8.6	Exercise	

Chapter No. 9: Aromatic Hydrocarbon

9.1	Introduction	
9.2	Nomenclature	
9.3	Benzene	
	9.3.1	Structure Of Benzene

	9.3.2	Straight Chain Structures Ruled Out
	9.3.	Kekule' s Structure
	9.3.	X-Ray Studies Of Benzene Structure
	9.3.5	Modern Concepts About The Structure Of Benzene (Atomic Orbital Treatment Of Benzene)
	9.3.	The Stability Of Benzene
	9.3.	The Resonance Method
9.4	Preparation Of Benzene	
9.5	Reactions of benzene	
	9.5.1	General Pattern Of Reactivity Of Benzene Toward Electrophiles
	9.5.2	Electrophilic Substitution Reactions
	9.5.	Reactions in Which Benzene Ring Is Involved
	9.5.	Orientation In Electrophilic Substitution Reactions
9.6	Comparison Of Reactivities Of Alkanes, Alkenes and Benzene	
9.7	Exercise	

Chapter No. 10: Alkyl Halides

10.1	Introduction	
10.2	Nomenclature Of Alkyl Halides	
10.3	Methods Of Preparation Of Alkyl Halides	
10.4	Reactivity Of Alkyl Halides	
10.5	Reactions Of Alkyl Halides	
	10.5.	Nucleophilic Substitution Reactions
	10.5.	Mechanism Of Nucleophilic Substitution Reactions
	10.5.	β - Elimination Reactions
10.6	Grignard Reagent	
10.7	Exercise	

Chapter No. 11: Alcohols , Phenols and Ethers

11.1	Introduction		
11.2	Alcohols		
	11.2.	Nomenclature Of Alcohols	
	11.2.	Industrial Preparation Of Alcohols	
	11.2.	Physical Properties	
	11.2.	Reactions Of Alcohols	
	11.2.	Reactions In Which C - O Bond Is Broken	
	11.2.	Reactions Involving The Cleavage Of O - H Bond	
	11.2.	Some Other Reactions Of Alcohols	
11.3	Distinction Between Primary , Secondary And Tertiary Alcohols		
11.4	Uses Of Alcohols		
11.5	Phenol		
	11.5.1	Preparation Of Phenol	11.5.2 Physical Properties
	11.5.3	Reactions Of Phenol	11.5.4 Acidic Behaviour Of Phenol
	11.5.5	Reactions Of Phenol Due To – OH Group	11.5.6 Reactions Of Phenol Due To Benzene Ring
11.6	Ethers		
	11.6.1	Nomenclature	
	11.6.2	Preparation Of Ethers	
	11.6.3	Physical Properties	
	11.6.4	Chemical Reactivity	
11.7	Exercise		

Chapter No. 12: Aldehydes And Ketones

12.1	Introduction		
12.2	Nomenclature		
12.3	Preparation Of Aldehydes And Ketones		
12.4	Reactivity Of Carbonyl Group		
12.5	Reactions Of Carbonyl Compounds		
	12.5.1	Nucleophilic Addition Reactions	

	12.5.2	Reduction Reactions
	12.5.3	Oxidation Reactions
12.6	Identification Of Carbonyl Compounds	
12.7	Uses	
12.8	Exercise	

Chapter No. 13: Carboxylic Acids

13.1	Introduction			
13.2	Nomenclature Of Carboxylic Acids			
	13.2.1	Common Or Trivial Names	13.2.2	The IUPAC Nomenclature
13.3	General Methods Of Preparation			
13.4	Physical Characteristics			
13.5	Reactivity Of Carboxyl Group			
13.6	Reactions Of Carboxylic Acid			
13.7	Acetic Acid			
	13.7.1	Laboratory Methods	13.7.2	Manufacture Of Acetic Acid
	13.7.3	Physical Characteristics	13.7.4	Reactions Of Acetic Acid
	13.7.5	Uses Of Acetic Acid		
13.8	Amino Acids			
	13.8.1	Essential And Non Essential Amino Acids		
	13.8.2	Nomenclature Of Amino Acids	13.8.3	Structure Of Amino Acids
	13.8.4	Acidic And Basic Characters Of Amino Acids		
	13.8.5	Synthesis Of Amino Acids		
	13.8.6	Reactions Of Amino Acids		
	13.8.7	Test Of Amino Acids		
	13.8.8	Peptides And Proteins		
13.9	Exercise			

Chapter No. 14: Macromolecule

14.1	Introduction
14.2	Structure of polymers
14.3	Types of polymers
14.4	Polymerization process
14.5	Brief Description of Synthetic polymers
14.6	Biopolymers (Structure ,Reaction , Properties and Uses)
14.7	Enzymes their types and applications
14.8	Nucleic acids
14.9	Exercise

Chapter No. 15: Common Chemical Industries in Pakistan

15.1	Introduction
15.2	Fertilizers
15.3	Classification of fertilizers
15.4	Cement Industry
15.5	Paper Industry
15.6	Exercise

Chapter No. 16: Environmental Chemistry

16.1	Introduction		
16.2	Component of environment		
16.3	Types of pollution		
16.4	The effects of polluted air on environment		
16.5	Water Pollution		
16.6	Industrial waste effluents	16.7	Factors Effecting the Quality of Water
16.8	Solid Waste Management	16.9	Exercise

❄ CLASS 12 – BIOLOGY ❄

Chapter No. 15: Homeostasis

Concepts In Homeostasis					
15.1	Osmoregulation				
	15.1.1	Water relation of Cell			
	15.1.2	Balance of water and solutes in the body			
15.2	Osmoregulation In Plants				
	15.2.1	Hydrophytes	15.2.2	Mesophytes	15.2.3 Xerophytes
15.3	Osmoregulation In Animals				
15.4	Osmoregulation In Different Environment				
	15.4.1	Marine	15.4.2	Fresh water	15.4.3 Terrestrial
15.5	Excretion				
15.6	Excretion In Plants				
15.7	Excretion In Animals				
15.8	Nature Of Excretory Products in Relation to Habitats				
15.9	Excretion In Representative Animals				
	15.9.1	Excretion in Hydra		15.9.2	Excretion in Planaria
	15.9.3	Excretion in Earthworm		15.9.4	Excretion in Cockroach
15.10	Excretion In Vertebrates				
	15.10.1	Excretion in Human		15.10.2	Excretory Organ (Liver)
	15.10.3	Urinary System		15.10.4	Concentration of Excretory Products
	15.10.5	Kidney as Osmoregulatory Organ			
15.11	Kidney Problems and Cures				
	15.11.1	Kidney Stones	15.11.2	Lithotripsy	15.11.3 Renal Failure
	15.11.4	Dialysis		15.11.5	Kidney Transplant

15.12	Thermoregulation	
	15.12.1	High Temperature
	15.12.2	Low Temperature
15.13	Mechanisms In Animals	
	15.13.1	Body Heat, Heat Gain and Loss
	15.13.2	Temperature Classification of Animals
15.14	Regulation of Heat Exchange between Animals and Environment	
	15.14.1	Structural Adaptations
	15.14.2	Physiological Adaptations
	15.14.3	Behavioral Adaptations
15.15	Thermoregulation In Mammals(Regulatory Strategies)	
	15.15.1	In Cold Temperature
	15.15.2	In Warm Temperature
15.16	Thermostat Function and Feedback Controls in Human	
15.17	Temperature in fever (Pyrexia)	
15.18	Exercise	

Chapter No. 16: Support And Movements

Concept And Need						
16.1	Support In Plants					
	16.1.1	Sclerenchyma Cells	16.1.2	Collenchyma Cells		
16.2	Movements In Plants					
	16.2.1	Types of movements				
		<ul style="list-style-type: none"> • Autonomic Movements • Paratonic Movements 				
	16.2.2	Role of Plant Growth In Plants Movement				
16.3	Support And Movements In Animals					
	16.3.1	Hydrostatic Skeleton	16.3.2	Exoskeleton	16.3.3	Endoskeleton

16.4	Human Skeleton					
	16.4.1	Axial Skeleton	16.4.2	Appendicular Skeleton	16.4.3	Joints
16.5	Deformities Of Skeleton					
	16.5.1	Genetic Causes		16.5.2	Hormonal Causes	
	16.5.3	Nutritional Causes		16.5.4	Disc-Slip	
	16.5.5	Spondylosis	16.5.6	Sciatica	16.5.7	Arthritis
16.6	Repair Of Broken Bones					
16.7	Muscles					
	16.7.1	Smooth Muscles	16.7.2	Cardiac Muscles	16.7.3	Skeletal Muscles
16.8	Sliding Filament Model					
	16.8.1	How the bridges are controlled				
	16.8.2	Controlling the Actin-Myosin Interaction By Ca^{++} Ions				
	16.8.3	Energy for Muscle Contraction				
	16.8.4	Muscles Fatigue	16.8.5	Tetany	16.8.6	Cramp
16.9	Arrangement Of Skeletal Muscles For Movement Of Skeleton					
	16.9.1	Movement of Bones				
16.10	Locomotion In Proctocista And Invertebrates					
	16.10.1	Locomotion in Euglena	16.10.2	Locomotion Paramecium		
	16.10.3	Locomotion Amoeba	16.10.4	Locomotion Jelly Fish		
	16.10.5	Locomotion Earthworm	16.10.6	Locomotion in Cockroach		
	16.10.7	Locomotion in Snail	16.10.8	Locomotion in Star Fish		
16.11	Locomotion And Skeleton In Vertebrates					
	16.11.1	Swimming in Fish		16.11.2	Locomotion in Amphibian	
	16.11.3	Locomotion in Reptiles		16.11.4	Locomotion in Air	
	16.11.5	Locomotion in Mammals				
16.12	Evolutionary Changes in the arrangement of bones and related mode of locomotion in major groups of vertebrates					
16.13	Exercise					

Chapter No. 17: Coordination and Control

Introduction						
17.1	Coordination In Plants Control Through Hormones					
17.2	Plant Movements					
	17.2.1	Responses to environmental stresses in plants				
	17.2.2	Defense against pathogens in plants				
17.3	Biological Clocks And Circadian Rhythms					
17.4	Plant Hormones					
	17.4.1	Auxins	17.4.2	Gibberellins	17.4.3	Cytokinins
	17.4.4	Abscisic acid		17.4.5	Ethene	
17.5	Coordination In Animals					
17.6	Nervous Coordination					
	17.6.1	Receptors	17.6.2	Neurons	17.6.3	Effectors
	17.6.4	Working of sensory receptors with special reference to skin				
17.7	Reflex Arc					
17.8	Nerve Impulse					
17.9	Synapse					
17.10	Evolution of Nervous system					
17.11	Human Nervous System					
	17.11.1	Central Nervous System		17.11.2	Peripheral Nervous System	
	17.11.3	Autonomic Nervous System				
17.12	Nervous Disorders					
	17.12.1	Effect of Drug on coordination				
17.13	Chemical Coordination					
	17.13.1	Hormones				
17.14	Endocrine Glands of Mammals					
	17.14.1	Hypothalamus		17.14.2	The Pituitary Gland	
	17.14.3	Thyroid Gland		17.14.4	Parathyroids	

	17.14.5	Islets of Langerhans	17.14.6	Adrenals		
	17.14.7	Gut	17.14.8	Gonads	17.14.9	Feedback Mechanism
17.15	Comparison of Nervous Coordination And Chemical Coordination					
17.16	Behavior					
	17.16.1	Innate Behavior	17.16.2	Instincts & Learning		
17.17	Learning Behavior					
	17.17.1	Imprinting	17.17.2	Habituation		
	17.17.3	Conditioning or conditioned reflex type I				
	17.17.4	Operant conditioning or conditioned reflex type II				
	17.17.5	Latent learning	17.17.6	Insight learning		
17.18	Exercise					

Chapter No. 18: Reproduction

Introduction				
18.1	Reproduction in Plants			
	18.1.1	Parthenocarpy	18.1.2	Seed Dormancy
	18.1.3	Fruit set and Fruit ripening		
18.2	Photoperiodism			
18.3	Vernalization			
18.4	Reproduction In Animals			
18.5	Asexual Reproduction			
	18.5.1	Tissue Culturing and Cloning	18.5.2	Identical Twins
18.6	Sexual Reproduction			
18.7	Reproduction In Man			
	18.7.1	Male and Female reproductive systems		
	18.7.2	Female Reproductive cycle	18.7.3	Birth
18.8	Test Tube Babies			
18.9	Sexually Transmitted Diseases(STD)			
18.10	Exercise			

Chapter No. 19: Growth And Development

Introduction				
19.1	Growth and Development in Plants			
	19.1.1	Apical Meristems	19.1.2	Intercalary Meristems
	19.1.3	Lateral Meristems	19.1.4	Types of Growth
	19.1.5	Conditions of Growth	19.1.6	Differentiation
	19.1.7	Growth Correlation		
19.2	Growth and Development in Animals			
	19.2.1	Development of Chick	19.2.2	Mechanisms of Development
	19.2.3	Role of Cytoplasm in Development	19.2.4	Role of Nucleus in Development
	19.2.5	Concept of Differentiation	19.2.6	Embryonic Induction
19.3	Aging			
19.4	Regeneration			
19.5	Abnormal Development			
19.6	Exercise			

Chapter No. 20: Chromosomes And DNA

Introduction					
20.1	Types of Chromosomes	20.2	Composition of Chromosomes		
20.3	DNA As Hereditary Material	20.4	The Chromosomal Theory of Inheritance		
20.5	Chemical Nature of DNA				
	20.5.1	Watson-Crick Model of DNA			
20.6	DNA Replication				
	20.6.1	The Meselson-Stahl Experiment	20.6.2	The Replication Process	
20.7	What Is A Gene				
	20.7.1	One-gene/one-polypeptide	20.7.2	How DNA encodes protein structure	
20.8	Cells use RNA to make Protein				
20.9	Types of RNA	20.10	Transcription	20.11	Genetic Code

20.12	Translation	20.13	Mutation	20.14	Exercise
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Chapter No. 21: Cell Cycle

Introduction					
21.1	Interphase				
21.2	Mitosis				
21.2.1	Karyokinesis	21.2.2	Prophase	21.2.3	Metaphase
21.2.4	Anaphase	21.2.5	Telophase	21.2.6	Cytokinesis
21.3	Importance of mitosis				
21.4	Cancer (uncontrolled division)				
21.5	Meiosis				
21.5.I	Meiosis I				
	21.5.1	Prophase I	21.5.2	Metaphase I	
	21.5.3	Anaphase I	21.5.4	Telophase I	
21.5.2	Meiosis II				
21.6	Importance of meiosis				
21.7	Meiotic error				
	21.7.1	Down's syndrome	21.7.2	Klinefelter's syndrome	21.7.3 Tunner's syndrome
21.8	Necrosis and apoptosis				
21.9	Exercise				

Chapter No. 22: Variation and Genetics

Introduction					
22.1	Genes, Alleles and gene pool				
22.2	Mendel's laws of inheritance				
	22.2.1	Mendel's interpretations	22.2.2	Test cross	22.2.3 Dihybrid and dihybrid cross
21.3	Dominance relationships				

	22.3.1	Complete dominance	22.3.2	Incomplete dominance
	22.3.3	Co dominance	22.3.4	Over dominance
22.4.1	Multiple alleles			
	22.4.1	ABO blood group system	22.4.2	Rh blood group system
22.5	Meiosis II			
22.6	Epistasis			
	22.6.1	Bombay phenotype		
22.7	Pleiotropy			
22.8	Continuous varying traits			
22.9	Gene linkage			
22.10	Crossing over			
	22.10.1	Cross over or Recombinant frequency		
22.11	Sex determination			
22.11.1	Sex chromosomes	22.11.2	Patterns of sex determination	
22.11.3	Comparison of chromosomal determination of sex between Drosophila and Humans			
22.11.4	Sex determination in plants			
22.12	Sex linkage			
22.12.1	Sex linkage in Drosophila	22.12.2	Sex linkage in Humans	
22.12.3	Sex limited trait	22.12.4	Sex influenced trait	
22.13	Diabetes mellitus and its genetic basis			
22.14	Exercise			

Chapter No. 23: Biotechnology

Introduction	
23.1	Cloning of a gene
23.1.1	Recombinant DNA technology

	23.1.1.1	How to get a gene	23.1.1.2	Molecular scissor: Restriction enzyme
	23.1.1.3	Molecular carrier: vector	23.1.1.4	Recombinant DNA
	23.1.1.5	Expression of Recombinant DNA	23.1.1.6	Genomic library
23.2	Polymerase chain reaction			
23.3	Analysis a DNA			
23.4	Gene sequencing			
23.5	Human genome project			
23.6	Biotechnology products			
	23.6.1	Transgenic bacteria	23.6.2	Transgenic Plants
			23.6.3	Transgenic animals
23.7	Cloning of transgenic animals			
23.8	Gene therapy			
23.9	Tissue culture			
23.10	Genetic engineering of plants			
	23.10.1	Agricultural plants with improved traits	23.10.2	Production of products
23.11	Exercise			

Chapter No. 24: Evolution

Introduction				
24.1	Concept of evolution VS special creation			
24.2	Evolution from prokaryotes to eukaryotes			
24.3	Inheritance of acquired characters			
24.4	Charles Darwin			
24.5	Neo Darwinism			
23.6	Evidence of evolution			
24.7	Population, Gene pool, Allele and Genotype frequencies			
24.8	Hardy Weinberg Theorem			
	24.8.1	Factor affecting gene frequencies		
24.9	Endangers species			

24.10	Exercise
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Chapter No. 25: Ecosystem

Introduction				
25.1	Ecosystem			
	25.1.1	Biosphere	25.1.2	Autecology
	25.1.3	Syncology		
25.2	Components of Ecosystem			
	25.2.1	Biotic Component	25.2.2	A biotic component
	25.2.3	Process in ecosystem and interaction between biotic and abiotic components		
25.3	Succession			
	25.3.1	Two major form of succession		
25.4	Predation and its significance			
25.5	Parasitism and its significance			
25.6	Symbiosis			
25.7	Mutualism			
25.8	Commensalism			
25.9	Grazing			
25.10	Biogeochemical cycles			
	25.10.1	Nitrogen cycle	25.10.2	Nitrogen depletion and its
25.11	The flow of energy in food chain of an ecosystem			
25.12	Exercise			

Chapter No. 26: Some Major Ecosystem

Introduction				
26.1	Climate			
26.2	Aquatic or Hydrospheric ecosystem			
	26.2.1	Productivity of Aquatic ecosystem	26.2.2	Intervention of man in aquatic system
	26.2.3	Intervention of man in aquatic system		

26.3	Terrestrial or Lithospheric Ecosystem					
	26.3.1	Adaptation of Terrestrial Ecosystem	26.3.2	Division of Terrestrial Ecosystem		
26.4	Some major ecosystem of Pakistan					
	26.4.1	Temperate deciduous forest	26.4.2	Coniferous Alpine Boreal forest	26.4.3	Grassland ecosystem
	26.4.4	Desert ecosystem	26.4.5	Tundra ecosystem		
26.5	Human and ecosystem					
26.6	Exercise					

Chapter No. 27: Man and its environment

Introduction						
27.1	Renewable and non renewable resources					
27.2	Degradation and depletion of resources					
	27.2.1	Modification of environment				
27.3	Men's impact on its environment					
	27.3.1	Population, food, and needs of population control				
27.4	Deforestation and afforestation					
	27.4.1	Importance of forest	27.4.2	Forest and climate	27.4.3	Forest and biodiversity
27.5	Pollution					
	27.5.1	Types of Pollution				
	27.5.1.1	Air or atmospheric pollution	27.5.1.2	Green house effects	27.5.1.3	Acid rain
27.6	Water pollution					
	27.6.1	Eutrophication or algal bloom	27.6.2	Industrial effluents		
	27.6.3	Insecticides, herbicides and fertilizers				
27.7	Health and diseases					
27.8	Classification and causes of diseases					

✽ جماعت بارہویں - مطالعہ پاکستان ✽

مطالعہ پاکستان برائے جماعت بارہویں (منجانب ٹیکسٹ بک بورڈ)

باب اول، اسلامی جمہوریہ پاکستان کا قیام					1
1.1	نظریہ پاکستان	1.2	قائد اعظم اور نظریہ پاکستان	1.3	علامہ اقبال اور نظریہ پاکستان
1.4	نظریہ پاکستان کے اجزائے ترکیبی	1.5	پاکستان --- مسلمانان برصغیر کی جدوجہد کا نتیجہ	1.6	تحریک علی گڑھ
1.7	آل انڈیا مسلم لیگ کا قیام	1.8	تحریک خلافت	1.9	مطالبہ پاکستان کے محرکات
1.10	قرارداد پاکستان	1.11	کرپس مشن	1.12	شملہ کانفرنس 1945
1.13	انتخابات 1946-1945	1.14	کابینہ مشن پلان 1946	1.15	عبوری حکومت 1946
1.16	3 جون 1947 کا منصوبہ	1.17	قانون آزادی ہند 1947		
باب دوم، اسلامی جمہوریہ پاکستان کی ابتدائی مشکلات					2
2.1	ابتدائی مشکلات	2.2	قومی استحکام		
2.3	پاکستان کے متعلق قائد اعظم کی سیاسی بصیرت	2.4	مسائل کے حل کے لیے مناسب لائحہ عمل		
باب سوم، اسلامی جمہوریہ پاکستان کا جغرافیہ					3
3.1	پاکستان کا محل وقوع	3.2	پاکستان کے طبعی حدود	3.3	پاکستان کی آب و ہوا
3.4	پاکستان کے موسم	3.5	آب و ہوا کے لحاظ سے پاکستان کے علاقے	3.6	بارش کا موسم
3.7	آب و ہوا کے انسانی زندگی پر اثرات	3.8	سیاحت کی کشش	3.9	معاشی عدم توازن
3.10	پاکستان بحیثیت گزرگاہ برائے افغانستان اور وسطی ایشیا	3.11	نقشہ فہمی		
باب چہارم، پاکستان کو اسلامی جمہوریہ بنانے کے اقدام					4
4.1	قرارداد مقاصد	4.2	بنیادی اصولوں کی کمیٹی	4.3	پاکستان کے دستاویز میں اسلامی دفعات
4.4	پاکستان میں نفاذ اسلام کے لیے اقدامات	4.5	شہریوں کے حقوق و فرائض	4.6	انسانی حقوق
باب پنجم، پاکستان کا حکومتی ڈھانچہ اور اچھا نظام حکومت					5
5.1	وفاقی حکومت اور دیگر ادارے	5.2	وفاقی انتظامیہ	5.3	اہم حیدار

5.4	صوبائی حکومت کی تنظیم	5.5	مقامی حکومتیں	5.6	اچھا نظام حکومت اور اسلام
5.7	حضرت عمرؓ کا نظام حکومت	5.8	اختیارات کی تقسیم اور اچھا نظام حکومت	5.9	اچھا نظام حکومت میں روکاؤئیں اور ان کا حل
باب ششم، اسلامی جمہوریہ پاکستان کی ثقافت					
6.1	پاکستانی حوالے سے پرانی تہذیب	6.2	پاکستان کا ثقافتی ورثہ	6.3	پاکستانی ثقافت کی نمایاں خصوصیات
6.4	صنعتی توازن	6.5	اسلام میں خواتین کے حقوق		
باب ہفتم، اسلامی جمہوریہ پاکستان کی زبانیں					
7.1	قومی رابطے کی زبان — اردو	7.2	پاکستان کی علاقائی زبانیں		
باب ہشتم، قومی یکجہتی اور خوشحالی					
8.1	قومی یکجہتی اور سالمیت	8.2	قومی یکجہتی و سالمیت کی اہمیت	8.3	اسلامی جمہوری ریاست اور قومی یکجہتی و سالمیت
8.4	پاکستان میں قومی یکجہتی و سالمیت کے مسائل				
باب نہم، اسلامی جمہوریہ پاکستان میں معاشی منصوبہ بندی اور ترقی					
9.1	معاشی منصوبہ بندی کی اہمیت	9.2	زرعی ترقی	9.3	صنعتی ترقی
9.4	تجارت اور کامرس	9.5	قدرتی وسائل	9.6	تعلیم
9.7	صحت	9.8	انفارمیشن ٹیکنالوجی	9.9	پاکستان کی معاشی منصوبہ بندی
باب دہم، اسلامی جمہوریہ پاکستان کی خارجہ پالیسی					
10.1	پاکستان کی خارجہ پالیسی کے مقاصد	10.2	پاکستان کی خارجہ پالیسی کی تشکیل کے ذرائع	10.3	پاکستان اور عالمی برادری
معروضی سوالات					

✽ جماعت بارہویں - اردو ✽

اردو ٹیکٹ بک (حصہ نثر)

تشکیل پاکستان	1.2	مناقب عمر بن عبدالعزیز	1.1
محنت پسند خردمند	1.4	نواب محسن الملک	1.3
پہلی فتح	1.6	اکبری کی حائقین	1.5
ہوائی	1.8	دستک	1.7
قرطبہ کا قاضی	1.10	مولانا ظفر علی خان	1.9
مولوی نذیر احمد	1.12	مواصلات کے جدید ذرائع	1.11
ایوب عباسی	1.14	ایک سفر نامہ، جو کہیں کا بھی نہیں	1.13
مشقی سوالات	1.16	تشریح مطالب بحوالہ متن و سیاق و سباق	1.15

اردو ٹیکٹ بک (حصہ نظم)

نعت	2.2	حمد	2.1
اسلامی مساوات	2.4	خدا سر سبز رکھے اس چمن کو	2.3
آدمی	2.6	سراج راہرو	2.5
ایک کوہستانی سفر کے دوران میں	2.8	نوجوان سے خطاب	2.7

تقطعات	2.10	تغییر	2.9
مشقی سوالات	2.12	تشریح	2.11
		نظم کا خلاصہ	2.13

اردو ٹیکٹ بک (حصہ غزل)

کیا فرق داغ و گل میں، اگر گل میں بو نہ ہو	3.2	کام مردوں کے جو ہیں، سو وہی کرتے ہیں	3.1
نہ گیا کوئی عدم کو دل شاداں لے کر	3.4	دنیا میں جب تک کہ میں اندوہ گین رہا	3.3
کسی کو دے کے دل کوئی نواخ نفاں کیوں ہو	3.6	بسکہ دشوار ہے ہر کام کا آساں ہونا	3.5
نہ تخت و تاج میں، نے لشکر و سپاہ میں ہے	3.8	جب عشق سکھاتا ہے آدابِ خود آگاہی	3.7
اے ہم سخن وفا کا تقاضا ہے اب یہی	3.10	دل میں اک لہری اٹھی ہے ابھی	3.9
سکوں درکار ہے لیکن سکوں حاصل نہیں ہوتا	3.12	اداسی، بے دلی، آشفقتہ عالی میں کمی کب تھی	3.11
مشقی سوالات	3.14	اشعار کی تشریح	3.13

اردو قواعد و انشا

فاعل، مفعول کے ساتھ فعل کی مطابقت	4.2	تشبیہ، استعارہ، تلمیح، مطلع، مقطع، قافیہ، ردیف کی تعریف اور مثالیں	4.1
رموز اوقاف کا صحیح استعمال	4.4	حروف کا صحیح استعمال	4.3
		مضمون نویسی	4.5
		خط نویسی	4.6
		آب بندی	4.7