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SECONDARY (CLASSES IX AND X)
ENGLISH (GRAD)

Poetry

William Wordsworth	:	Lucy Poems; The world is too much with us
P.B. Shelley	:	Ode to the West Wind; To a Skylark
John Keats	:	Ode to a Nightingale; The Autumn
Alfred Tennyson	:	Ulysses
Robert Browning	:	The Last Ride Together
Thomas Hardy	:	The Darkling Thrush
W.B. Yeats	:	The Wild Swans at Coole
Wilfred Owen	:	Strange Meeting
Walter de la Mare	:	The Listeners

Drama

Goldsmith	:	She Stoops to Conquer
George Bernard Shaw	:	Arms and the Man
John. Galworthy	:	Justice

Short Story and Essay

A. Short Story

Joseph Conard	:	Lagoon
Somerest Maughan	:	The Lotos Eater
O. Henry	:	The Gift of the Magi
H. E. Bates	:	The Ox

B. Essay

Charles Lamb	:	Dream Children: A Reverie
L.A. Hill	:	Principles of Good Writing

Grammar and Usage

Common Errors
Number, Gender, Tense, Voice, Mood
Agreement of Verbs, Use of Articles and Prepositions
Sentence Forms
Simple, Compound, Complex, Relative Clauses
Joining and Splitting of Sentences
Narration
Direct Speech and Indirect Speech

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SECONDARY (CLASSES IX AND X)
HINDI (GRAD)

हिन्दी साहित्य का इतिहास : धाराएँ और प्रवृत्तिगत अध्ययन

(क) काल विभाजन और नामकरण।

(ख) आदिकाल की प्रमुख प्रवृत्तियाँ।

(ग) पूर्व मध्यकाल : भक्तिकाव्य की प्रमुख धाराएँ- सगुण और निर्गुण, राम भक्ति शाखा, सूफी प्रेमाख्यानक काव्य की विशेषताएँ, संत काव्य की विशेषताएँ।

(घ) उत्तर मध्यकाल : रीतिकाल की धाराएँ और प्रवृत्तियाँ।

(ङ) आधुनिक काल : नवजागरण युग की प्रमुख प्रवृत्तियाँ, भारतेन्दु हरिश्चंद्र का योगदान, द्विवेदी युग, छायावाद, प्रगतिवाद, प्रयोगवाद, जनवाद।

(च) हिन्दी गद्य की प्रमुख विधाएँ : उपन्यास, कहानी और नाटक का विकास।

(छ) टिप्पणियाँ : सरहपा, पृथ्वीराज रासो, विद्यापति, अमीर खुसरो, रामानंद, अष्टछाप, रसखान, रहीम, उदंत मार्त्तण्ड; बालकृष्ण भट्ट, अयोध्या सिंह उपाध्याय ''हरिऔध'', रामचंद्र शुक्ल, माखनलाल चतुर्वेदी, सुमित्रानंदन पंत, गोदान, कामायनी, रामविलास शर्मा, मुक्तिबोध।

मध्ययुगीन काव्य : संपादक– ब्रजनारायण सिंह

(क) कबीर : साखी 1 से 30 :

रहस्य साधना, कबीर का विद्रोह और समाज दर्शन, कबीर के राम और तुलसी के राम में अंतर, कबीर की भक्ति भावना।

(ख) सूरदास : पद संख्या 1,4,5,7,10,11,14,17 तथा 20। सूर की भक्ति भावना, वात्सल्य वर्णन, भ्रमरगीत में वाग्वैदग्ध्य, सूर काव्य में मुरली का महत्व। भ्रमरगीत : विप्रलम्भ श्रृंगार का काव्य।

(ग) तुलसी : विनय पत्रिका 1,4,5, पुष्पवाटिका 7,8। भक्ति भावना, लोकमंगल की भावना, पुष्पवाटिका का काव्य माधुर्य।

(घ) बिहारी दोहा संख्या 1,3,6,7,8,10,11 13,14,15,22,23,24,27 और 28। रीति काव्य में बिहारी का स्थान, बिहारी की भाषा, दोहों में गागर में सागर।

(ङ) भूषण पद संख्या 1,3,5,7,10,14, तथा 15। भूषण की वीर भावना, भूषण का राष्ट्रप्रेम।

(च) प्रसाद, निराला, पंत और महादेवी की श्रेष्ठ रचनायें, सम्पादक : वाचस्पति पाठक।

(क) प्रसाद : हिमाद्रि तुंग श्रृंग से, जाग री, मेरे नाविक, अरी वरुणा की शांत कछार, तुमुल कोलाहल कलह में, छायावाद में स्थान, प्रेम और सौन्दर्य भावना, गीतितत्व।

(ख) निराला– भारती वंदना, वसंत आया, जागो फिर एक बार, बादल राग। स्नेह निर्झर बह गया है। काव्य सौष्ठव, राग और ओज तत्व, सरोज स्मृति की मार्मिकता मुक्त छंद।

(ग) महादेवी– जीवन विरह का जल जात, मधुर मधुर मेरे दीपक जल, तुम मुझमें प्रिय! फिर परिचय क्या, मैं नीर भरी दुख की बदली, है चिर महान। छायावाद में स्थान, विरह भावना, प्रगीत तत्व। आधुनिक युग की मीरा, रहस्यवाद।

(छ) एकत्र : संपादक बच्चन सिंह

अज्ञेय : काव्यगत विशेषताएँ नयी कविता और अज्ञेय।

नागार्जुन : काव्यगत विशेषताएँ।

(ज) ''गद्य के विविध रंग'' सपादक– दूध नाथ सिंह

प्रेमचद, हजारी प्रसाद द्विवेदी, महादेवी वर्मा, अज्ञेय और हरिशंकर परसाई के निबंध तथा निबंध शैली।

नाटक : ध्रुवस्वामिनी : प्रसाद

(झ) उपन्यास ''गबन'' प्रेमचन्द्र

(ञ) ''तमस'' भीष्म साहनी

(ट) कहानी संग्रह ''कथा भारती'' संपादक : लक्ष्मी नारायण लाल : कफन, आकाशदीप, पराया सुख, गदल।

(ठ) व्याकरण :

संज्ञा, सर्वनाम, संधि, समास, कारक का प्रयोग, क्रिया के विभिन्न भेद, काल, विशेषण के भेद, वाक्य संशोधन, वाच्य, प्रत्यय, उपसर्ग, सार संक्षेप, भाव विस्तार, मुहावरे।

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SECONDARY (CLASSES IX AND X)
HISTORY (GRAD)

I. Feature of the Indus Valley Civilization –decline of the Indus Valley Civilization – the Vedic Civilization – Sodas'a mahajanapadas – Buddhism and Jainism - The rise and fall of the Maurya Empire : Asoka's Dhamma – Imperial Guptas – Palas and Senas of Bengal.

II. The establishment of the Delhi Sultanate - The Slave dynasty – the Khilji and Tughluq Rulers – The administrative structure under the Sultanate – The Vijayanagar Empire.

III. Disintegration of the Sultanate – Babar – the importance of his invasion of India – Mughal – Afghan contest and Sher Shah Suri – Consolidation of the Mughal empire under Akbar – Territorial expansion under Akbar.

IV. An overview of the reigns of Jahangir and Shahjahan – Aurangzeb's expansionist policies – conflict with the Marathas – Shivaji – Aurangzeb and the disintegration of the Mughal empire.

V. Battles of Palasi and Buxer and the establishment of the Company's rule in Bengal – The Transfer of Diwani and its impact in Bengal – British expansion: Mysore and Maharastra – subsidiary alliance – the doctrine of lapse –annexation of the Punjab.

VI. Early resistance to the British rule-Wahabi and Farazi movements – Santal Rebellion – The Revolt of 1857; Western Education and social reform-Rammohan Ray, Young Bengal & Vidyasagar: Early stages of Indian nationalism – pre-Congress associations – foundation of the Congress – the nature of the early Congress.

VII. The rise of Extremism in Indian Politics – Anti partition and Swadeshi movement: Gandhi and Indian nationalism – Non- co – operation, Civil Disobedience, Quit India Movement: Muslim League and the demand for Pakistan – Partition and Independence.

VIII. The French Revolution of 1789 – the Reign of Terror: Robespierre – the rise of Napoleon Bonaparte – Napoleon's internal reconstruction – Napoleon and Europe : Expansion and collapse of the Napoleonic empire.

IX. The Vienna Congress (1815) – The Metternich System – The Revolutions of 1830-1848: the unification of Germany and Italy.

X. Colonialism and the Scramble for Africa – Germany's Welt Politik – Triple alliance and Triple Entente – the origins of the First World War – Peace settlement of 1919.

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SECONDARY (CLASSES IX AND X)
GEOGRAPHY (GRAD)

A. Geo-Tectonics:
Earth's Crust (Composition and Layering); Rocks (Origin, Types and Characteristics); Folds and Faults (Types and Landforms); Mountain Building and Plate Tectonics, Earthquakes (Causes and Effects) and Volcanoes.

B. Geomorphology:
Weathering; Mass Wasting; Landform and Process (Fluvial, Glacial, Wind, Karst and Marine); Normal Cycle of Erosion; Rejuvenation.

C. Oceanography:
Continental Shelf and Slope; Ocean Current; Topography of Ocean Floor; Ocean Deposits; Resources of the Oceans; Salinity and Temperature of ocean water.

D. Climatology:
Composition of the Atmosphere; Elements and Factors of Climate; Insolation; Heat Belts; Pressure Belts; Planetary Wind System; Cyclones; Monsoon.

E. Biogeography:
Soils (Factors and Processes of Formation, Soil Profile, Physical and Chemical Properties) World Soil Groups (Zonal, Azonal and Intra-Zonal); soil Erosion and Conservation; Plants (Factors of Plant Growth, Major types of Natural Vegetation; Forest conservation.

F. Environmental Geography:
Ecosystem (Principles and Components, Energy Flow, Food Chain, Food Web and Bio-geochemical Cycles); Environmental Degradation and Conservation; Meaning of Natural Environment; Man-Environment Relationship; Natural Regions and Environmental Adaptation of Human Life, Economy and Society.

G. Economic Resources:
Classification and Significance; Activity Components of Resource Utilization (Lumbering, Dairy Farming, Fishing, Mining, power generation, Agriculture and Industry).

H. Human Resource:
Population --- (Growth, Distribution, Age-Sex Composition, Migration Occupational composition --- Comparison between developed and developing nations).

I. Regional Geography of India:
Relief; Drainage; Climate; Soil; Forest resources, Power resources, Mineral Resources; Irrigation, Agriculture, Industry, Population; Trade and Transport, Basis of Regional divisions of India (Physical and Economic).

J. Statistical and Cartographic Techniques:
Scale; Cartographic Techniques of Representation; Topographical Map; Map Projection; Statistical Techniques.

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SECONDARY (CLASSES IX AND X)
LIFE SCIENCE (GRAD)

ZOOLOGY

Invertebrates:

1. Classification of major phyla upto subclasses with examples.
2. Structure and function of –Flagella, Cilia, Para podia, Ctenidium, Book lung, Nephrilia, Flame cells, Malpighian tubes, Green gland.

Chordates:

1. Classification of Amphibians, reptilians and mammalians upto order with examples.
2. Special features – Filter feeding in branchiostoma, Integumentory derivatives, Accessory respiratory organs, single and double circuit heart, aortic arches in vertebrates, origin and distribution of cranial nerves.

Cell Biology, Genetics & Molecular Biology:

1. Ultra structure and function of Plasma membrane, Mitochondria, Lissome & Ribosome.
2. Chromosome structure.
3. Cell cycle
4. Properties of DNA and RNA, DNA as genetic material
5. Mechanism of Replication, Transcription & Translation.
6. Cell division: Mitosis & Meiosis
7. Mendelism & neo-Mendelism
8. Modes of inheritance of Autosomal and sex-linked genes in man: Thalassemia and Hemophilia.
9. Mutation; Down syndrome & Kline fetter syndrome
10. Linkage and recombination
11. Sex determination in Drosophila and Man
12. Oncogane & Cancer

Developmental Biology:

1. Spermatogenesis & Oogenesis
2. Fertilization
3. Process of cleavage in frog and chick
4. Gastrulation in frog and chick
5. Placentation in mammals
6. Organizer concept.

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Evolution, Adaptation & Distribution:

1. Chemical basis of origin of life.
2. Darwinism and synthetic theory of evolution.
3. Hardy – Weinberg Equilibrium in relation to natural selection.
4. Adaptation: Aquatic, Volant & Desert.
5. Zoogeographical realms and their subdivisions with their characteristic fauna

Ecology & Wildlife:

1. Energy flow through ecosystem
2. Population ecology : Properties and growth forms.
3. Community ecology; Niche concept, Resource partitioning and species diversity.
4. Biodiversity: As resource. Principles of conservation of Biodiversity (in situ & ex situ)
5. Conservation of wildlife: purpose & methods, concept of National Park. Sanctuary & Biosphere Reserve, Conservation of Tigers.

Parasitology, Histology & Endocrinology:

1. Life History, pathogenecity and clinical features of Entamoeba histolytica *Ascaris, Fasciola hepatica, Plasmodium vivax.*
2. Immune response T & B lymphocytes, Antibody production in parasitic infection.
3. Histology of Pituitary, Thyroid and endocrine Pancreas and their hormonal functions in mammals.

Animal Physiology & Biochemistry:

1. Components of vertebrate blood, clotting & coagulation, ABO Blood group, Rh factor.
2. Physiology of nerve impulse & synaptic transmission.
3. Classification of Carbohydrates, Proteins and Lipids.
4. Enzymes: Classification, its properties and action
5. Vitamins – Chemical names, sources, deficiency, disorders for vitamins A, C and E

Economy Zoology:

1. Aquaculture: Induced breeding & Composite fish culture.
2. Sericulture: Silk varities in India, mulberry silkworm culture, diseases of silkworm and their control.
3. Pest: Biology & Control, of Paddy pest.
4. Animal husbandry: Common poultry breeds (Fowl), rearing methods, diseases & control.

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BOTANY

A. GENERAL BOTANY

Introduction: Concept of living object; Definition, basic structural organization of plant.

Cell
(a) Minimum requirements of a "Cell to be cell"
(b) Prokaryotes and eukaryotes; Characteristics and differences with reference to the plant cell wall composition.
(c) Structure and functions of cellular organelles.
(d) Chromosome: Ultra-structures and chemical compositions.
(e) Cell division: Mitosis, Meiosis, their significance.

B. PLANT ANATOMY

Plant Tissue – Definition, Classification, Distribution and Functions; Occurrence and Classification of Meristematic and Permanent tissues; Simple and Complex tissues. Primary structures of root, stem and leaf in angiospermic plants

C. ECOLOGY AND ENVIRONMENT

Divisions of ecology, ecological factors, plant succession, Adaptation of Hydrophytes, Xerophytes, Halophytes, General ideas about global warming and air pollution – a brief knowledge.

D. PLANT GROUPS

1. Salient features of Algae, Fungi, Bryophytes, Pteriodophytes, Gymnosperms and Angiosperms.
2. ALGAE: Life cycle patterns with one example in each pattern. Economic importance (as food, fodder, agar, algin)
3. FUNGI: Structure of mycelium; nutrition; Asexual Spore forms; Economics importance (alcohol, Penicillin and edible mushroom)
4. BRYOPHYTES & PTERIDOPHYTES: Structural organization and function of archegonia and antheridia
5. GYMONSPERMS & ANGIOSPERMS: Structural organization of male and female gametophytes.

E. PLANT PATHOLOGY: Necrosis, hypo plastic and hyper plastic symptoms of plant diseases. Disease control – a brief knowledge.

F. MORPHOLOGY: Inflorescence; pollination – types and contrivances: Placentation – types and example; Development of embryo-sac; Fertilization and post-fertilization changes.

G. TAXNOMY: Principles of artificial, natural and phylogenetic systems of classifications, Binomial nomenclature. Functions of Botanical Garden; Importance of Herbaria in Botanical Studies. Diagnostic characters and economic importance of the following families: Leguminosae (Fabaeae) , Solanaceae. Rubiaceae and Gramineae (Poaceae).

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H. PALEOBOTANY: Fossils – Types with examples; Applications of Paleobotany.

I. PLANT PHYSIOLOGY:
(a) Absorption: Water & Sales uptake by living cell
(b) Transpiration: Its role in ascent of sap
(c) Nutrition: Role of mineral elements in plants.
(d) Photosynthesis: Phytosynthetic pigments, Hill reaction, Photo phosphorylation, Calvin cycle.
(e) Respiration: Glycolysis, Krebs' cycle and ATP synthesis.
(f) Hormones: Definition, site of synthesis and role of auxin & ethylene. Role of synthetic hormones in agriculture

J. CYTOGENETICS & HEREDITY: Nature of gene; Linkage and Crossing-over; Mendelian Principles, Darwinism & Neo-Darwinism.

K. MICROBIOLOGY: Virus – general properties, structure of Bacteriophage and TMV; Electron microscopic structure of a bacterial cell. Role of bacteria in nitrogen cycle and maintenance of soil fertility. (N_2 - fixation, nitrification, denitrification and ammonification).

PHYSIOLOGY

1. **Units of Human Systems:** Structure function relationship of cell and its organelles and different tissues.

2. **Biochemical and Biophysical Principles involved in Human systems:** Definition and physiological significance of diffusion, osmosis, dialysis, ultra filtration, adsorption and absorption. Definition, classification and physiological importance of colldois. Definition of enzymes, co-enzymes and isozymes with examples. Factors influencing enzyme action.

3. **(a) Conservation of matter and energy in human systems:** Structures in relation to functions of alimentary tract. Composition, functions and regulations of secretion of digestive juices including bile. Digestion and absorption of dietry carbohydrates, proteins and fats.

(b) Nutrition: Definition of balanced diet. ACU. Marusmus, Kwashiorkar, PCM, Dietary fibers, Vitamins: definition, classification, functions deficiency symptoms and daily requirements, Hypervitaminosis.
Minerals ---- Dietary sources and nutritional importance.
BMR : Definition and factors affecting. R. Q.: Definition, factors affecting and significance, Biological value of protein.
SDA: Definition and importance.

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4. **Blood** --- Composition and functions. Origin and functions of plasma proteins. Plasmaphresis. Bone marrow. Formed elements of blood --- their formation and functions. Haemoglobin: Different types of compounds and derivatives. Blood volume and its regulation.
Coagulation of Blood: Mechanism and factors influencing, anticoagulants, and disorders of coagulation. Blood groups – ABO and Rh, Thalassemia. TC, DC, Haemoglobin estimation, Bleeding and clotting time. Anaemia – definition and types, Leukocytosis, Leukopenia, leukemia, leukemia, purpura – definitions.

5. **Cardiovascular System**: (a) Heart – Properties of cardiac muscle, Origin and propagation of cardiac impulse, various events (artrial and ventricular) of cardiac cycle, heart sounds, heart rate, cardiac output and factors affecting its regulation.

6. **Respiratory System:** Anatomy and histology of respiratory passage and organs. Role of respiratory muscles in respiration. Artificial respiration. Significance of anatomical and physiological dead space. Lung volumes and capacity. Exchange of respiratory gases between (i) lung and blood, and (ii) blood and tissues. Transport of O_2 and CO_2 in blood. Neural and chemical regulation of respiration. Hypoxia.

7. **Renal Physiology:**
Structure – function relationship of kidney. Mechanism of formation of urine and physiology of micturition. Acid-base regulation by the kidney. Non-excretory functions of kidney.

8. **Nerve-Muscle Physiology:**
Structures of different types of muscles. Muscular contraction and relaxation, Isotomic and isometric contractions. Properties of muscles.
Structure and classification of nerves. Origin and propagation of nerve impulse. Velocity of impulse in different types of nerve fibres. Properties of nerve fibre.
Synapses: Structures, different types and mechanism of synaptic transmission. Myoneural junction: Structure and mechanism of impulse transmission. Degeneration and regeneration of nerve fibre.

9. **Nervous System and Sensory Physiology:**

Reflex action --- Definition, reflex arc, classification, properties. Functions of spinal cord. Outline of functions of brain stem. A brief idea of structure, connections and functions of cerebellum. Functions of thalamus and hypothalamus. Cerebral cortex – Histological structures and localization of functions. Cerebrospinal fluid (CSF) – Composition, formation, circulation and functions.
Functions of sympathetic and parasympathetic nervous system.
Classification of general and special senses and their receptors.
Weber-Fechner law. Basic concept of receptor adaptation.
Olfaction and gestation – Structure of sensory organ, neural pathway of smell and taste sensation, mechanism of taste sensation, after taste. Olfactory aadaptation.
Audition – Structure of ear, auditory pathway, mechanism of hearing, pitch perception and perception of loudness.
Vision – Structure of the eyes, histology of retina, visual pathway, chemical changes of retina on exposure to light; mechanism and pathway of accommodation, error

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refraction, after image, light and dark adaptation elementary idea of colour vision and colour blindness.

10. Skin and Regulation of Body Temperature:

Structure and functions of skin. Insensible and sensible perspiration. Physiology of sweat secretion and its regulation. Regulation of body temperature.

11. Endocrine system:

Anatomy of endocrine system. Classification of Hormones. Basic concept of regulation of hormone actions. Elementary idea of hormone action. Histological structure, hormones and functions pituitary, thyroid, parathyroid, adrenal and pancreas. Hypothalamic control of anterior and posterior pituitary. Hypo and hyperactive states of pituitary gland, thyroid and adrenal cortex.
Brief idea of the origin and functions of rennin-angiogenesis, prostaglandins, erythropoietin and melatonin. Elementary idea of gastrointestinal hormones.

12. Reproductive Physiology:

Primary and accessory sex organs and secondary sex characters.
Testis – Histology, spermatogenesis, testicular hormones and their functions.
Ovary – Histology, Oogenesis, ovarian hormones and their functions.
Oestrus and menstrual cycles and their hormonal control.
Development of mammary gland and lactation.

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SECONDARY (CLASSES IX AND X)
MATHEMATICS (GRAD)

A. Classical Algebra:

1. Complex number: Definition on the basis of ordered pairs of real numbers. Algebra of complex numbers, modulus amplitude, conjugate, Argand diagram. Demovire's Theorem and its applications. Exponential, Sine, Cosine and Logarithm of a complex number. Definition of az (a 0). Inverse Circular and Hyperbolic functions.
2. Polynomial, Synthetic division. Remainder theorem: Fundamental theorem of Classical Algebra (statement only). Polynomials with real coefficients; the nth degree polynomial equation has exactly n roots. Nature of roots of an equation (surd or complex roots occur in pairs). Statement of Descrte's Rule of signs and its applications. General properties of equations. Multiple roots. Rolle's theorem and its application Relation between roots and co-efficeints, symmetric functions of roots. Transformation of equations. Cardan's method of solution of a cubic.
3. Determinants upto the third order. Definition of a determinant, Properties, Minors and cofactors. Product of two determinants. Adjoint, Symmetric, and Skew-symmetric determinants. Solutions of linear

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equations with not more than three variables by Cramer's Rule 4. Matrices of Real Numbers: Definition, Equality of matrices. Addition of matrices, Multiplication of a matrix by a scalar. Multiplication of matrices.Scaler matrix, identity matrix. Inverse of a non-singular square matrix. Elementary operations on matrices, Rank of a matrix; determination of rank either by considering minors or by Sweepout process. Consistency and solution of a system of linear equations with not more than three variables by matrix method.

B. Modern Algebra:

1. Basic concepts: Sets, Subsets, Equality sets, Operations on Sets. Union, Intersection and Complement. Verification of the laws of algebra of set and De Morgan's Laws. Cartesian product of two sets. Mappings One to one and onto mapping composition of mappings Identity and inverse mappings.
2. Introduction to Group Theory. Group Definition an examples taken from different branches (examples from number system, roots of unity 2 x 2 real matrices, non-singular real matrices of fixed order). Elementary properties using definition of group. Definition and example of subgroup.
3. Definitions and examples of Ring. Field, Sub-ring, Sub-field.
4. Concept of Vector Space over a field: Examples, Concepts of linear combinations Linear dependence and independence of finite set of finite set of vectors. Subspace, concepts of Generators and Basis of a finite dimensional vector space.
5. Real quadratic form involving not more than three variables - Problem only.
6. Characteristic equation of square Matrix of order not more than three. Determination of Eigen values and Eigen vectors – Problems only. Statement and illustration of Cayley – Hamilton theorem.

II GEOMETRY

A. ANALYTICAL GEOMETRY OF TWO DIMENSIONS.

1. Transformation of Rectangular axes.
   Translation, Rotation and their combinations. Invariants.
2. General Equation of second degree in x and y. Reduction to canonical forms classification of Conic.
3. Pair of straight lines: Condition that the general equation of second degree in x and y may represent two straight lines. Point of intersection of two intersecting straight lines. Angle between two lines given by $ax^2 + 2hxy + by^2 = 0$. Equation of Bisectors. Equation of two lines joining the origin to the points which a line meets a conic.
4. Equation of pair of tangents from an external point, chord of contact, poles and polars of ellipse and hyperbola.
5. Polar equations of straight lines and circles, polar equation of conic referred to a focus a pole. Equation of chord joining two points. Equations oftengents and normals.

B. ANALYTICAL GEOMETRY OF THREE DIMENSIONS:

1. Rectangular Cartesian co-ordinate. Distance between two points. Division of a line segment in a given ratio. Direction cosines and Direction ratios of a

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straight line. Projection of a line segment on another straight line. Angle between two straight lines.

2. Equation of a plane: General Form, Intercept and Normal Form. Angle between two planes. Signed distance of a point from a plane. Bisectors of angles between two intersection planes.
3. Equation of straight lines. General and symmetric form. Distance of a point from a line. Co planarity of two straight lines. Shortest distance between two skew-lines.

III DIFFERENT CALCULUS

1. Rational numbers Geometrical representation. Irrational numbers. Real numbers represented as points on a line – Linear continuum. Acquaintance with basic properties of real numbers (No deduction of Proof is included)
2. Sequence: Definition of bounds of a sequence and Monotone sequence. Limit of a sequence. Statement of theorems. Concept of convergence and divergence of monotone sequences – applications of the theorems, in particular, definition of e. Statement of Cauchy's general principle of convergence and its applications.
3. Infinite series of constant terms. Convergence and divergence (definitions). Cauchy's principle as applied to Infinite series (application only). Series of positive terms. Statements of comparison test, D'Alembert's Ratio test. Cauchy's root test Applications Alternating series: Statement of Leibnitz test and its applications.
4. Real valued functions defined on an interval: Limit of a function (Cauchy's definition). Algebra of limits. Continuity of a function at a point and in an interval. Acquaintances (no proof) with the important properties of continuous functions on closed intervals. Statement on existence of inverse function on a strictly monotone function and its continuity.
5. Derivative. Its geometrical and physical interpretation. Sign of derivative – Monotonic increasing and decreasing functions. Relation between continuity and derivability. Differential application in finding approximatuer. Successive derivative Leibnitz's theorem and its application.
6. Statement of Rolle's Theorem and its geometrical interpretation. Mean value Theorems of Langrance and indeterminate Forms. L. Hospital's Rules Application of the Principle of Maximum and Minimum for a function of single variables in geometrical physical and other problems.
7. Functions of two variables. Their geometrical representations. Limit and continuity (definitions only) for functions of two variables partial derivatives. Knowledge and use of chair rule. Differentiation of implicit functions of two variables (existence being assumed). Function of two variable successive partial derivatives Statement of Schwarz's Theorem on commutative property of mixed derivatives. Statement of Euler's Theorem on homogeneous function of two variables. Maxima and minima of functions of two variables.
8. Applications of Differential calculus: Tangent and normal. Envelope of family of curves (problems only)

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IV INTERGRAL CALCULUS

1. Integrations of the form ----

$$\int \frac{dx}{a + b\cos x} \quad \int \frac{1\sin x + m\cos x}{n\sin x + p\cos x}\, dx$$

and integration of rational functions.

2. Evaluation of definite Integrals.
3. Integration as the Limit of a sum (with equally spaced intervals).
4. Reduction formula of

$$\int \mathrm{Sin}^m x\, \mathrm{con}^n x\, dx \quad \int \frac{\sin^m x}{\sin^n x}\, dx \quad \int \tan^n x\, dx$$

and associated probles (m and n are non-negative integers)

5. Working knowledge of Double Integral
6. Rectification. Quadrature, volume and surface areas of solids formed by revolution of plane curves and areas.

IV INTERGRAL CALCULUS

1. Order, degree and solution of an ordinary differential equation (ODE) in presence of arbitrary constants. Formation of ODE, First order equations.
   (i) Variables separable.
   (ii) Homogeneous equations and equations reducible to homogeneous forms.
   (iii) Euler's and Bermoulli's Equations (Linear)
   (iv) Clairaut's Equation: General and Singular solutions.
2. Second order linear equations: Second order linear differential equations with constant coefficients. Euler's Homogeneous equations.

V VECTOR ALGEBRA

Definition of vector and scalar. Addition of vectors. Multiplication of vector by a scalar. Collinear and coplanar vectors, Scalar and vector products of two and three vectors. Simple applications to problems of Geometry.

VI ANALYTICAL DYNAMICS

1. Velocity and Acceleration of a particle. Expressions for velocity and acceleration in rectangular Cartesian and polar coordinates for a particle moving in a plane. Tangential and Normal components of velocity and acceleration of a particle moving along a plane curve.

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2. Concept of Force: Statement and explanation of Newton's laws of motion. Work, power and energy – Principles of conservation of Energy and Momentum. Motion under impulsive forces. Equations of motion of a particle moving in a straight ling.
3. Study of motion of a particle in a straight line order (i) constant forces (ii) variable forces (SHM, Inverse square law. Forced and Damped oscillation. Motion in an elastic string) Equation of energy. Conservative forces.
4. Motion in tow dimensions: Projectiles in vacuo and in a medium with resistance varying linearly with velocity. Motion under forces varying as distance from a fixed point.
5. Central orbit.

VII LINEAR PROGRAMMING

Motivation of Linear Programming problem. Statements of L.P.P. Formulation of L.P.P. L.P.P. in matrix forms. Convex Set, Hyper plane, Extreme points. Convex Poly hedron. Basic solutions and Basic Feasible solutions (B.F.S.) The set of all feasible solutions of an L.P.P. in a convex set. The objective Function of an L.P.P. assumes its optimal value at an extreme point of the convex set of feasible solutions. Fundamental Theorem of L.P.P. (Statement only) Reduction of a feasible solution to a B. F.S. Standard form of an L.P.P. Solution by graphical method (for two variables) by simplex method (not more than four variables). Feasibility and optimality condition. Method of penalty concept of duality. Duality Theory. The dual of the dual is the primal. Relation between the objective values of dual and the primal problems. Dual problems with almost one unrestricted. Variable, one constraint of equality. Transportation and Assignment problem and their optimal solutions.

VIII NUMERICAL METHODS

1. Approximate numbers, significant figures, rounding-off numbers.
   Error : - absolute, relative and percentage
2. Operator **D, N** and **E** (Definition and some relations among them).
3. Interpolations: --- The problem of interpolation, Simple problems regarding difference table, Newton's forward and backward interpolation formula.
4. Numerical Integration: Simple problems using trapezoidal and Simpon's 1/3 rule.
5. Solution of Equations: Location of root (tabular method)
   Bisection Method, Newton – Raphson Method – Numerical problems.

IX ELEMENTS OF PROBABILITY THEORY AND STATISTICS

1. Introduction: Variables, Statistics, Population & sample.
   Discrete and continuous variables. Frequency distributions.
2. Measure of Central tendencies: A.M. Medina, Mode.
3. Measures of Dispersions: Range, mean deviation, Standard deviation, variance.

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4. Elements of Probability Theory: Concept of sample spaces. Event and random variables. Classical definition of Probability. Total probability, compound probability, conditional Probability. Bayes theorem.

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পাঠক্রম

বাংলা [Secondary (Classes IX & X)

১। পাঠ্যপুস্তক (Text) নির্ভর প্রশ্ন

পশ্চিমবঙ্গ মধ্যশিক্ষা পর্ষদ প্রকাশিত 'সাহিত্য সঞ্চয়ন' (প্রথম ভাষা- নবম ও দশম শ্রেণি), 'সাহিত্য সম্ভার' (দ্বিতীয়ভাষা- নবম ও দশম শ্রেণি), 'প্রোফেসর শঙ্কুর ডায়রি', 'কোনি' অবলম্বনে প্রশ্ন রচিত হবে।

ক. প্রশ্নের বিষয়: লেখক পরিচয়, বিষয়বস্তু, চরিত্র এবং রসবিচার

খ. উদ্ধৃত অংশের ভিত্তিতে বিশেষ টীকা, ব্যাখ্যা, ভাষানির্ভর প্রশ্ন

২। সাহিত্যের ইতিহাস:

ক. প্রাচীন ও মধ্যযুগ

- চর্যাপদ
- শ্রীকৃষ্ণকীর্তন
- চন্ডীদাস, বিদ্যাপতি, জ্ঞানদাস, গোবিন্দদাস
- মুকুন্দ চক্রবর্তী, ভারতচন্দ্র রায়, বিজয় গুপ্ত, কেতকাদাস ক্ষেমানন্দ, ঘনরাম চক্রবর্তী
- কৃত্তিবাস ওঝা, মালাধর বসু, কাশীরাম দাস
- বৃন্দাবন দাস, কৃষ্ণদাস কবিরাজ
- আলাওল, দৌলত কাজি
- রামপ্রসাদ সেন, কমলাকান্ত ভট্টাচার্য

খ. আধুনিক যুগ (বিশ শতক পর্যন্ত)

বিষয়: উল্লেখযোগ্য গ্রন্থ সম্পর্কে পরিচিতি এবং তাদের গুরুত্ব পর্যালোচনা

গদ্য (প্রবন্ধ) সাহিত্য: বিদ্যাসাগর, বঙ্কিমচন্দ্র, রবীন্দ্রনাথ ঠাকুর, প্রমথ চৌধুরী, সুনীতিকুমার চট্টোপাধ্যায়, সৈয়দ মুজতবা আলী, জগদীশ চন্দ্র বসু, বিনয় ঘোষ

কাব্য সাহিত্য: মধুসূদন, বিহারীলাল, রবীন্দ্রনাথ ঠাকুর, নজরুল, যতীন্দ্রনাথ সেনগুপ্ত, বুদ্ধদেব বসু, জীবনানন্দ দাশ, বিষ্ণু দে, সুভাষ মুখোপাধ্যায়, শক্তি চট্টোপাধ্যায়

কথাসাহিত্য: বঙ্কিমচন্দ্র, রবীন্দ্রনাথ ঠাকুর, শরৎচন্দ্র, তারাশঙ্কর, মানিক বন্দ্যোপাধ্যায়, বিভূতিভূষণ বন্দ্যোপাধ্যায়, পরশুরাম, প্রেমেন্দ্র মিত্র, বনফুল, আশাপূর্ণা দেবী, মহাশ্বেতা দেবী, লীলা মজুমদার, সতীনাথ ভাদুড়ী, সমরেশ বসু

নাটক: মধুসূদন দত্ত, দীনবন্ধু মিত্র, গিরিশচন্দ্র ঘোষ, দ্বিজেন্দ্রলাল রায়, রবীন্দ্রনাথ ঠাকুর

৩। বাংলা সাহিত্য: নতুন দিগন্ত (অনুবাদ ও অনুষঙ্গ):

ক. ভারতীয় সাহিত্য: কালিদাস, শূদ্রক, কবীর, ইকবাল, ভানুভক্ত, অমৃত প্রীতম, প্রেমচন্দ, বিজয় তেন্ডুলকার, গোপীনাথ মহান্তি, আইয়াপ্পা পানিক্কর

খ. আন্তর্জাতিক সাহিত্য: শেক্সপিয়র, টলস্টয়, চেকভ, মপাসাঁ, গ্যোয়েট, নেরুদা, গাবরিয়েল গার্সিয়া মার্কেজ, ল্যাংস্টন হিউজ, আর্নেসট হেমিংওয়ে, টি.এস.এলিয়ট

৪। **ইংরেজী থেকে বাংলায় অনুবাদ**

৫। **ব্যাকরণ:**

- **ধ্বনি ও ধ্বনি পরিবর্তন:**
  ক। ধ্বনি- বাংলা ধ্বনির শ্রেণিবিভাগসহ বিস্তারিত আলোচনা।
  খ। ধ্বনি পরিবর্তনের কারণ ও পরিবর্তনের বিভিন্ন রীতি।
  গ। সন্ধি
  - **শব্দগঠন:** উপসর্গ, অনুসর্গ, ধাতু ও প্রত্যয়
  - **বাংলা শব্দ-ভান্ডার**
  - **শব্দ ও পদ:** বিশেষ্য- বিশেষণ-সর্বনাম-অব্যয়-ক্রিয়া বিস্তারিত আলোচনা
  - **কারক ও অ-কারক সম্পর্ক:** শ্রেণিবিভাগ, বিভক্তি ও অনুসর্গ অনুযায়ী কারকের শ্রেণিবিভাগ
  - **সমাস:** পরিভাষা ও তাদের ব্যাখ্যা, শ্রেনিবিভাগ
  - **বাক্য:**
    ক. বাক্য নির্মাণের শর্ত- যোগ্যতা, আকাঙ্ক্ষা, আসক্তি
    খ. উদ্দেশ্য ও বিধেয় সম্পর্কে ধারণা
    গ. বিশেষ্যখন্ড, ক্রিয়াবিশেষণখন্ড, ক্রিয়াখন্ড
    ঘ. বাক্যের গঠনগত ও অর্থগত শ্রেণিবিভাগ
    ঙ. বাক্যের রূপান্তর- গঠন ও অর্থ অনুসারে
  - **বাচ্য:** শ্রেণিবিভাগ বাচ্য পরিবর্তন

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SECONDARY (CLASSES IX AND X)
PHYSICAL SCIENCE (GRAD)

PHYSICS

MECHANICS AND GENERAL PROPERTIES OF MATTER

Rest and motion, reference frame, displacement, velocity and acceleration, momentum, kinematical equations in one, two and three dimensions, elementary problems.

Review of elementary vector algebra, Newton's laws of motion; inertia, units of force, impulse and impulsive forces; conservation of linear momentum; elastic collision of particles moving in the same line; static and kinetic friction; co-efficient of friction.

Definition of work, relevant units. Mechanical energy, Kinetic and potential, conservation of energy; the case of a freely falling body. Power-definitions, units.

Newton's law of universal gravitation on (Statement and mathematical relation), constant of gravitation (definition and value with units, no experimental determination) Definitions of the terms strees, strain elastic limit, Hooke's law, moduli of elasticity.

Archimedes principal, statement Transmission of fluid pressure, pascals law, principle of multiplication of force.

Viscosity: Definition units, dimension, Poiseulle's equation for flow of liquid in narrow tubes, streamline and turbulent motions, critical velocity, Stoke's law for highly viscous liquids.

Surface Tension: Definition, Surface tension and surface energy. Capillary rise, rise of liquid through a capillary tube of insufficient length.

HEAT

Nature of heat and temperature, Thermal expansion of solids and liquids.: Co-efficient of linear, superficial and cubical expansion of solids; their relation. Real and apparent expansion of liquids; relation between expansion co-efficient. Boyle's law. Equation of state of an ideal gas; volume and pressure co-efficient; Absolute scale of temperature. Heat as a form of energy; relation between calorie and erg; specific heats of gases (elementary ideas). Heat engine, Carnot cycle efficiency, power generation.

Definition and explanation of the terms; conduction, convection and radiation of heat.

LIGHT

Reflection on plane and curved surfaces, Laws of reflection, definition of real and virtual images, definition of centre of curvature, pole, principal axis, principal focus, focal length of a curved surface.

Refraction of light, laws of refraction definition of refractive index (relative and absolute); total internal reflection, critical angle, relationship between refractive index and critical angle. Formation of mirages.

Convex and concave lenses – Different cases of image formation for both types of lenses.

Basic definition – principal axis, principal foci, power of lenses.

Convex lens as a magnifying glass.

Dispersion of light, pure and impure spectra – definition only

Interference: Definition, sustained interference, Newton's ring.

Diffraction: Definition, Fresnel & Fraunhofer class of diffraction. Difference between Fresnel & Fraunhofer class of diffraction.

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SOUND

Simple harmonic motion, periodic motion, time period, frequency, amplitude and phase (definition only) Free vibrations-longigudinal and transverse. Characteristics of progressive waves, wavelength, amplitude of wave, time period, frequency, velocity of wave and their relation. Laws of reflection and refraction of sound waves, formation of echo, Characteristics of standing or stationery wave and comparison with progressive wave.

Vibration of air column in a tube closed at one end open at both ends.

Beats-simple explanation.

MAGNETISM, ELECTROSTATICS, CURRENT ELECTRICITY

Permanent and temporary magnet – Explanations only. Definition-magnetic meridian, magnetic field, magnetic intensity. Magnetic lines of force.

Definitions only – Magnetic permeability and susceptibility, dia, para and ferromagnetic substance.

Definition: Declination, Dip and Horizontal component of earth's magnetic field; their explanation.

Coulomb's law of force between two point charges, permittivity, electrostatic unit of charge, electric intensity. Potential difference between two points; e.s.u. of potential, practical unit of potential.

Development of e.m.f. in the cell, defects of cell, Ohm's law, volt, ampere and ohm; resistance, resistivity, factors on which resistance of a conductor depends, combination of resistances in series and parallel. Equivalent resistance. Kirchoff's laws.

Joule's law, Mechanical equivalent of heat (Definition)

Electrical energy, power unit of power and energy, Board of trade unit of electrical energy.

Thermo-electricity, Seebeck and pelitier effect, thermo e.m.f. Thermo current, thermo couple.

Faraday's laws of electrolysis, chemical and electrochemical equivalents.

Ampere's swimming rule, right hand rule, Maxwell's cork-screw rule, Fleming's left hand rule, Fundamental motor rule, Fleming's right hand rule, construction of galvanometer, ammeter and voltmeter, Magnetic induction, Magnetic flux, flux density, Faraday's law of induction, Lenz's law of induction. Definition of rms and mean value of A.C. voltage and current.

MODERN PHYSICS

Induction of electricity through gases, Cathode ray and their principal properties, X-rays properties, nature of X-rays use X-rays.

Photo electric phenomena. Compton effect.

Bohr's Model of atom; fundamental postulates (deduction of Bohr's formula is not required) de Broglie and Planck hypothesis.

Fundamental constituent of atom. Principal constituents of nucleus; atomic number, isotopes. Mass number.

N-type and P-type semiconductor. Diode as rectifier. Zener diode.

Transistor, amplifier, oscillator, communication principal, modulation and demodulation, optical communication and fiber optics.

Radio-active decay law-statement only. Half-life and decay constant. Radio-isotopes-artificial transmutation of elements with simple illustration. Nuclear fission-mention of their importance and uses.

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CHEMISTRY

Unit-1: Atomic Structure, Radioactivity, Nuclear Chemistry and Chemical Periodicity

A. Bohr Model of atom. Bohr's theory (including simple mathematical treatment for hydrogen atom); Sommerfeld model (simple idea); Quantum numbers and their significance, Pauli Exclusion Principle, energy order of orbitals, electronic configuration of atoms; nature & shapes of s & p orbitals (qualitative treatment).

B. Nuclear Chemistry – Natural radioactivity, nuclear radioactivity, nuclear stability (neutron-proton) ratio, binding energy); Law of radioactive disintegration, times for fractional disintegrations. The Uranium series, group displacement law, Isotops, Isobars, Isotones. Elementary idea of nuclear reactions (details not required) artificial radioactivity, fission and fusion reactions (simple examples), separation of isotopes (principles of diffusion & thermal methods) and their uses in medicine and agriculture, radio carbon dating.

C. Periodic classification of elements of the basis of electronic configuration. Major periodic properties. Atomic & ionic radii. Ionization potential, electron affinity & elector negativity (qualitative treatment only) and their variation in respect of s- and p- block elements.

Unit-2: Gaseous State of Matter, Ideal and Non-Ideal Solutions, Phase Equalibria and Colloids.

A. The gaseous state, Laws of partial pressure & volumes; Graham's law of diffusion; Kinetic theory of gases; mean, r.m.s. and the most probable velocities, ideal gas laws from kinetic theory; Kinetic energies of gas molecules, specific heats of gases. Dumas' and Victor Meyer's method for determination of vapour densities; limiting densities, abnormal vapour denisities. Real gases, Amagat's Curves, Andrew's curves, Andrew's isothermals, the critical state, van der Waal's equation, its application at the critical state.

B. The colligative properties of dilute solution. Osmosis, osmotic pressure, lowering of vapour pressure, elevation of boiling point & depression of freezing point-experimental determination, relevant laws, their applications & conditions of validity; abnormal colligative effects.

C. Conductance of electrolytic solution – its experimental determination. Specific, equivalent & molar conductances, their variation with concentration; conductance at infinite dilution. Kohlrausch's law. Ion conductance. Ionic mobility; transport number, determination by Hittorf's method. Application of conductance measurement; determination of ionization constants of weak electrolytes, solubility of sparingly soluble salts, Conduct metric titrations.

D. The phase equalibria - The phase rule (derivation not required); phase diagrams of one component systems; water & sulphur; Applications of phase rule; Henry's law, Nernst distribution law; distillation behaviour of completely miscible binary liquid mixtures.

E. The colloidal state- Classification (dispersion, association & macromolecular colloids); preparation purification & stability (lyophobic & lyophilic); peptisation & coagulation; properties – physical, colligative, optical, kinetic & electrical. Protective colloids, gold number, isoelectric point.

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Unit-3: Chemical Thermodynamics, Chemical Kinetics and Their Applications, Acid-Base and Redox Equalibria

A. Thermodynamic systems & surroundings, the properties of variables of state, the internal energy & the enthalpy. First law, reversible & irreversible processes, the maximum work, the thermodynamic criteria of ideal gases, P-V-T relationship of ideal gas under isothermal & adiabatic conditions, Joule Thomson effect. Thermo chemistry: Heats of reaction at constant pressure & constant volume; thermo chemical equations in terms of enthalpy changes, the standard heats of combustion, formation & transition; Heat of solution; Hess's Law. The Carnot cycle, second law of thermodynamics, elementary idea of entropy; Helmholtz free energy & Gibb's free energy; their relevance in respect of spontaneity or otherwise of physico chemical processes.

B. Chemical equilibrium: law of mass action, Kp & Kc; Le-Chatelier & Braun's principle of mobile equilibrium; simple illustrations of homogeneous chemical equalibria, variation of equilibrium constant with temperature; van't Hoff equation (derivation not required).

C. Ionic equilibria, water as an ionizing solvent, ionic product of water, pH of aqueous solutions, measurement of pH, (hydrogen electrode & colour maching methods); Acid-Base theory: Bronsted- Lowry concept, Lewis concept, Molecular structural effects on acid-base properties. Ostwald's dilution law; solubility product & its applications, common ion effect. Salt hydrolysis, buffer solutions and their pH. Acid-base indicators.

D. Electromotive force; reversible & irreversible electrodes – chemical cells; standard cells; measurement of e.m.f.; Electrode potentials, type of electrodes; standard electrode potentials (std. hydrogen electrode), their significance; E.M.F. series; Nernst equations for electrode potential (with derivation0, Reference electrodes.

E. Chemical Kinetics – molecularity & order of reactions, rate equations; experimental determination of rate constants, chain reactions & photochemical reactions (simple illustrations only), Catalysis: its criteria, simple illustrations of homogeneous & heterogeneous catalysis, auto & iduced catalysis; catalyst poisons, catalyst promoters; enzyme catalysis.

Unit -4: Chemical Bonding and Structure

A. Chemical bonds – ionic, convalent (polar, non polar) type and nature of bond of carbon with $H_2O_2N_2$ halogen and carbon; co-ordinate bond, hydrogen-bonding and its effect on physical properties, intermolecular forces, hybrid orbials (involving s & p orbitals) of carbon & its stereochemistry; optical and geometrical isomerism (ene unsaturation & two asymmetric centres). Structure of simple binary molecules: AX_1, AX_2, AX_3, AX_4 (relating to [s & p] hybrid orbitals only); bond polarity, simple ideas of electro negativity, dipoe moment, metallic bond.

B. Qualitative ideas of inductive, resonance & electromeric effects, hyper conjugation, simple ideas of mechanisms of electrophilic & nucleophilic substitutions (definition with examples); condensation, free radical, polymerization, and addition reactions.

C. Double & complex salts; perfect & imperfect complexes. .Werner theory of coordination, isomerism for coordination number 4 and 6. IUPAC nomenclature of co-ordination compounds (mononuclear complexes only), chelate complexes and their applications in chemical analysis.

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Unit- 5: Chemistry of Elements & their Compounds (1)

A. Noble Gases: Occurrence & isolation of noble gases (from liquid air – no technical detail required); uses of noble gases; Xenon fluorides; preparations, properties & uses.

B. Study of the elements & their compounds (as mentioned below with regard to their preparation, properties bonding and uses unless otherwise mentioned)

(i) Boron and Aluminium: Boron trifluoride & trichloride; borazine, boron nitride; boron trioxide, $NaBH_4$, boric acid & borax, Al_2O_3, $AlCl_3$, $LiALH_4$, alum.

(ii) Carbon, Silicon Germanium, Tin & Lead: General comparative study of carbon & silicon with respect to their normal hydrides, halides, oxides & oxy acids, Silicon carbide; Sodium silicate; Silicate; Silicic acid, Silca gel, Hydrofluosilicic acid, Silicon tetrafluoride and tetrachloride, Calcium carbide.

(iii) Nitrogen, Phosphorus, Arsenic, Antimony and Bismuth: Comparative study of the elements and their compounds (like normal hydrides, halides, oxides and oxyacids) Hydroxylamine, Hydrazine and Hydrazoic acid, Sodium bismuthate.

(iv) Oxygen, Sulphur, Selenium & Telelurium: Comparative study of the elements and their compounds (hydrides, halides, oxides and oxyacids, sodium thiosulphate; Peroxymono- and Peroxydi-sulphuric acids, selenium dioxide. Deuterium and its oxide, hydrogen peroxide, ozone.

(v) Halogens: Comparative study of Fluorine, Chlorine, Bromine and Iodine with respect to their reactivity. Hydracids and their properties; Oxides and oxyacids of chlorine, perchloric acid, interhalogens, pseudohalogens and ploy halides.

Unit – 6 Chemistry of Elements & Their Compounds (2)

A. Metals: Occurrence: principles of extraction , purification and uses of the following metals (with emphasis on the Indian context); Li, Ag, Au, Sn, Pb, Cr, Mn, Co, Ni, Hg. Chemistry of the important compounds of these metals. General characteristics of the first row transition metals. Comparative study: Li-Na-K, Be-Mg-Ca-Sr-Ba, Cr-Mn-Fe, Co-Ni-Fe, Co-Ni-Fe, Co-Ni, Cu-Ag-Au, Zn-Cd-Hg.

B. Redox Reactions: Ion-electron method of balancing equations: Equivalent weight of oxidants and reductans: Chemical problems involving oxidimetry and reductimetry (in relation to the estimation of common metal ions: Fe, Cu, Mon, C_n)

Unit – 7: Chemistry of Carbon Compounds (1)

A. Petrolium as the industrial sources of aliphatic hydrocarbons. General methods of preparation, properties & reactions of alkanes upto five carbon atoms; Alkens upto four carbon. Cis-trans isomerism; Alkadienes; Butadiene, Isoprene; Akynes upto four carbon atoms. Mechanism of chlorination of methane, bromination of ethylene, Markownikoff's rule, haloalkanes, haloform reaction. Detection and estimation of C, H and N in organic compounds.

B. Monohydric alcohols upto four carbon atoms. Dihydiric alcohol: ethylene glycon; Trihydric alcohol: glycerol, Mechanism of dehydration of ethanol to ethylene;

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ethers;

C. Aliphatic aldehydes and ketones upto four carbon atoms. Mechanism of bas-catalysed aldol condensation of acetaldehyde.

D. Synthesis and important reactions of aliphatic monobasic carboxylic acids, Acid chlorides, Acid anyhydrides, esters, amides, nitriles. Dicarboxylc acids-Oxalic acid, malonic acid; Hydroxy acids-Lactic acid, Malic acid, Trataric acid.

Unit – 8: Chemistry of Carbon Compounds (2)

A. General Methods of preparation, properties and reactions of Primary, Secondary and Tertiary amines upto four carbon atoms; Quaternary ammounium salts, micelles (examples and uses)

B. Preparation and Synthetic uses of (i) Grignard reagents, (ii) Ethyl acetoacetate and (iii) Diethyl malonate.

C. Classification of carbohydrates; preparation, properties, reactions of glucose and fructose; Conversion of glucose to fructose and vice versa, Constitution of glucose and fructose including pyranose structure, Haworth's structure, Disaccharides, inversion of sucrose.

Unit – 9: Chemistry of Carbon Compounds (3)

A. General Methods of preparation, properties and reactions of Benzene, Toluene, Xylene; modern strusctural idea of benzene; Orientation, Aromaticity; Friedel Craft's reaction and its mechanism.

B. Aromatic nitro compounds, Nitrobenzene, o-, m- and p- Nitroanlines, Aromatic diazo compounds: Benzene diazonium salts, Pheny-hydrazene; Benzene sulfonic acid.

C. Aromatic hydroxyl compounds Phenol, Picric acid: Benzyl Alcohol; Aromatic aldehydes and ketones – Benzaldehyde, Salicylaldehyde, Benzophenone, Acetophenone.

D. Aromatic carboxylic acids and their derivaties – Benzoic acid, Salicylic acid, Phyenyl acetic acid, Cinnamic acid, Phthalilc acid, Benzoyl chloride, Behzoice anhydride, Ethyle benzoate, Methylsalicylate, Acetysalicylic acid, Benzamide, Benzonirile; Mechanism of Cannizzaro reaction of Benzaldehyde.

E. Idea of structural formula (only) of the following compounds: Pyrrole, Furan Thiophene, Pyridine and Quinoline.

Unit – 10: Application Oriented Chemistry

A. Chemical Analyses: Principles & Applications.

Gravimetric and titrimetric (acid-base, redox and complexometric EDTA) estimation of common cations and anions. Analysis of complex materials: ores, alloys, water and air samples, inorganic and organic samples, drugs and pharmaceuticals. Error analysis.

B. Chemistry in Industry.

Production and technical uses of stainless steels, alloy steels, non-ferrous alloy and amalgams. Chemistry of electroplating, anodizing. Galvartizing and photography. Solid, liquid and gaseous fuels, coal based chemicals and petrochemicals (C_1 to C_3 compounds). Glass and ceramic materials, Port-land cement (composition and setting). Chemical fertilizers and biofertilizers. Polymers: Polythene, P.V.C.,

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natural and synthetic rubbers, synthetic fibres: Nylon-66, polyesters. Biopolymers and biodegradable polymers.

C. **Technical materials:**

Drugs, pharmaceuticals and fermentation chemicals: preparation /extraction/isolation/purification and uses of aspirin, paracetamol enovid, sulfadiazine, quinine, chloroquine, vitamin C. Phenobarbital, metronidazole, chlorpromazine; ethyl alcohol, citric acid, lactic acid, Vitamin B_{12}, penicillin.

Constituents and formulations of paints and varnishes, oil-base paints, latex paints and backed-on paints (alkyl resins). Synthetic dyes: methyl orange, congo red, Malachite green, crystal violet, indogo, alizarin, anline yellow.

D. **Domestic & Useful Materials:**

Fats-oils-detergents, edible and inedible oils of vegetable origin, hydrogenation of unsaturated oils, production of vanaspati and margarine, toilet soaps and washing soaps; Cosmatics and perfumes; Hair dyes, creams suntun lotions, face poweder, talcum powder, tooth powder, tooth paste, shampoos: uses of geraniol, jasmine, civetone amylactate. Pesticides and food additives: Production applications and residual toxicity of gamaxene, DDT, aldrin, parathion, malathion, paraquat, decamethrin. Food flavours, food colours and preservatives, artificial sweetners, acidulants and alkalies, edible emulsifers and foaming agents, sequesterants (uses and abuses of).

E. **Environmental Chemistry**

Environmental segments: atmosphere, hydrosphere, lithosphere and biosphere. Environmental cycles: hydrologic cycle, carbon-oxygen-, nitrogen-, phosphorus-, and sulfur cycles. Composition and structure of the atmosphere, Ozone layer and its importance, air pollutants and their sources, air pollution control measures. Environmental role of water, major water pollutants, water quality parameters, water treatment (domestic, industrial and waste water)

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SECONDARY (CLASSES IX AND X)

TELEGU (GRAD)

Degree 1st year — Old Poetry

I.	Sakuntalopakhyanam	-	Adiparvam – 4th Canto-Poems 65 to 109 by Nannaya
II.	Bejja Mahadevikatha	-	Basavapuranam IIIrd Canto Paluniki Somana
III.	Drowpadi Paridevanam	-	Udyaga Parvam – IIIrd Canto – TIKKANA
IV.	Srikrishnuni Balyakreedalu	-	Harivamsam ERRANA
V.	Chiruthonda Nambikadha	-	Haravilasam Srinadhudu

MODERN POETRY

1.	Desabhakti	-	Geerajada Appa Rao
2.	Probodham	-	Rayaprolu Subha Rao
3.	Krisheevaludu	-	D. Rami Reddy
4.	Kinnera Nadakalu	-	Dr. Viswanadha Satyanarayan
5.	Penneti Pata	-	Vidwan Viswam
6.	Gabbilam	-	Jahshuva

Non-detailed - Kalateeta Kyaklulu by Sreedeir

Prosoday - Vrittalu - Ataveladi Tetageeti

Grammar - Balavyakaranam, Sandhi, Samasa Parichadas

Alam Karas - Upama, Utpresha, RUPAKAM

B.A. Degree IInd year - Old Poetry

1.	Prahlada Charita	-	Potana
2.	Satyabhama Santwanan	-	Timmana
3.	Nigama Sarma Akka	-	Tenali Ramakrishna
4.	Seeta Pratiyagam	-	Kankanti Papa Raju

MODERN POETRY

1.	Pratigna	-	Sri Rangam Sreenivas Rao
2.	Artageetam	-	Tilak
3.	Mahanothrodayan	-	Dasaradhi
4.	Lakuma Thyagam	-	C. Narayana Reddy
5.	Nadesam Naprajalu	-	Gunturu Seshendra Sarma

All the books prescribed above may be available - Maruti Publishing House Hyderabad - 500029
Ph: 24753066

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SECONDARY (CLASSES IX AND X)
URDU (GRAD)

PROSE :-

DASTAN :- Mir Amman Dehlavi - Bagh - o - Bahar باغ و بہار سے
Piece Qissa Azad Bakht Ka "قصہ آزاد بخت کا"

SHORT STORY :- Prem Chand - Kafan کفن
Or
Rajendar Singh Bedi - Lajwanti لاجونتی

DRAMA :- Agha Hashr Kashmiri - "Khubsoorat Bala" آغا حشر کاشمیری خوبصورت بلا

ESSAY :- Sir Syed Ahmed Khan - "Talim - o - Tarbiyat" سرسید احمد خان از "تعلیم و تربیت"

KHAKA :-

POETRY :- Rashid Ahmed Siddiqi - From Ganj hai Grammaya - "Mohd. Ali"
گنجہائے گرانمایہ سے 'محمد علی'

GAHZALS :-
- Mir - First 3 Ghazals from Diwan -e- Mir (Radif الف)
- Sauda - First 2 Ghazals from Diwan - e - Sauda (Radif الف)
- Ghalib- First 3 Ghazals from Diwan -e- Ghalib (Radif الف)
- Ghalib - First 1 Ghazals from Diwan - e- Ghalib (Radif ی)
- Momin - First 2 Ghazals from Diwan - e- Momin (Radif الف)
- Wahsat - First 2 Ghazals from Diwan - e- Wahshat (Radif الف)

NAZMEN :-
- Iqbal - Masjid -e- Qartaba مسجد قرطبہ
- Faiz - Humjo Tarik Rahon Mein Mare Gaye ہم جو تاریک راہوں میں مارے گئے

MASNAVI :- Mir Hasan - Piece (Sehrul Beyan) سحرالبیان

GRAMMAR :- Gender - Phrases - Opposites محاورہ - ضد -

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SECONDARY (CLASSES IX AND X)
NEPALI (GRAD)

उपन्यास :

१. सुनेली रेखा– इन्द्र सुन्दास

कथा :

१. सम्मेलन कथा संग्रह, सम्पा– लक्ष्मीदेवी सुन्दास, नेपाली साहित्य सम्मेलन, दार्जीलिङ

निम्नलिखित कथाहरू मात्र–

इन्द्र सुन्दास– अनुताप

वीर विक्रम गुरु– कुरबुराको भाले।

रवीन्द्र कुमार मोक्तान– गोरखे जीप।

मदनन्द पौड्याल– खबरदार।

देवकुमारी थापा– कुकुरको छाउरो।

नन्द खड्खिम– एउटा पुरानो कोट।

मटिल्डा राई– टोटलाको फूल।

राधिका राया– उनी गएको गोरेटो।

प्रकाश कोविद– पगली बोजू।

सानू लामा– स्वारूनी मान्छे।

कविता :

१. सम्मेलन कविता संग्रह, सम्पा लक्ष्मीदेवी सुन्दास
नेपाली साहित्य सम्मेलन, दार्जीलिङ

निम्नलिखित कविताहरू मात्र :–

सन्त ज्ञान दिलदास– उदयलहरी।

बालकृष्ण सम– मेरो नुहाउने कोठा।

लक्ष्मीप्रसाद देवकोटा– एक विद्यान।

गोपालसिंह नेपाली– त्यो नील गगन कस्तो होला।

तुलसी अपतन– अदृहष्ट छाडु

वीरेन्द्र– साक्षी।

अगमसिंह गिरी– हाम्रो आकाशमनि पनि हुन्छ उज्यालो।

हरिभक्त कटुवाल– मन त फलामकै भए असल हुन्छ।

प्रेम शेपा 'विरोकी'– मलाई थरै लाग्छा

डिल्लीराम तिमसिना– विसंज्ञ विर्सन्न है।

१. टिपन-टापन– पारसमणि प्रधान (सम्पूर्ण)

नेपाली साहित्येतिहासको सामान्य परिचय

नेपाली व्याकरण रचना–

१. लिङ्ग, वचन, काल, पक्ष, पुरुष, कारक, भाव, वाच्य।

२. सन्धि, समास, कृत् र तद्धित् प्रत्यय युक्त शब्द।

३. नेपाली वर्तनी र लिपि।

४. छन्द– अर्थ परिभाषा, प्रकार : चौपाया, अनुष्टुप, तोटक, शार्दूलविक्रीडित, शिखरिनी, मालिनी, स्रग्धरा, इन्द्रवज्रा, भुजङ्गप्रयात, मन्दाक्रान्ता द्रुतविलम्बित, स्याउरे, सेलो, सवाई।

५. अलङ्कार– अर्थ, परिभाषा, प्रकार, अनुप्रास, यमक, श्लेस, उपमा, रूपक, उत्प्रेक्षा, अपहुति, दीपक, अनन्वय, भ्रान्ति, लोकोक्ति, प्रश्नालङ्कार,

६. रचना– निबन्ध लेखन, पत्र लेखन, रिपोर्ताज, कथा लेखन, विज्ञापन।

नाटक :

क. नेपाली एकाङ्की यात्रा– रामलाल अधिकारी

निम्नलिखित अंश मात्र–

१. तुलसीबहादुर छत्री– सिद्धार्थको संबोधि

२. शिवकुमार राई– तीन गेंजहीको चन्द्रलोक यात्रा

३. मोहन थापा– अनि विहान हुन्छ

४. रामलाल अधिकारी– म भात खान्नँ

५. मनबहादुर मुखिया– बारुदको बादलमा

६. मोहन पुकार– टीका

७. टंक शर्मा– मगन्ते सभा

८. बालकृष्ण सम– मुकुन्द-इन्दिरा

निबन्ध

१. निबन्ध चन्दन– सम्पा घनश्याम नेपाल

निम्नलिखित पाठहरू मात्र :

१. गङ्गाप्रसाद प्रधान– स्कूले जीवन

२. पारसमणि प्रधान– नेपाली हाम्रो मातृभाषा

३. मनसिंह गुरुङ– जापान जर्मन सन्धि

४. बालकृष्ण सम– बङ्दाहामा शिकार

५. हृत्यचन्द्रसिंह प्रधान– तस्वीर

६. रामकृष्ण शर्मा– कविको धन

७. भाइचन्द शर्मा– नेपाली जीवनमा रामायण

८. शङ्कर लामिछाने– गोधूली संसार

९. अच्छा राई 'रसिक'– अनुहार

१०. कृष्णप्रसाद ज्ञावाली– परेवाको कलरव

११. रामलाल अधिकारी– पटेको मूर्ख