Details of topics under each module

SECTION : VERBAL ABILITY AND READING COMPREHENSION

Module 1 – Verbal Ability

[VARC1 -VA]

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1. Para jumbles (Sentence Rearrangement)

- Jumbled sentences requiring logical sequencing.
- **Types of Para jumbles**:
    - 4/5-sentence rearrangement.
    - Para jumbles with a fixed opening/closing sentence.
- **Skills Developed**: Logical flow identification, sentence linking using connectors, and tone consistency.

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2. Sentence Elimination (Odd Sentence Out)

- Identifying the sentence that doesn't fit logically within a set of sentences.
- Analyzing the flow of ideas and coherence.

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3. Paragraph Summary

- Reading short paragraphs and identifying their central idea.
- Choosing the correct summary from options.
- **Focus Areas**: Precision, identifying main ideas, and eliminating fluff.

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4. Para Completion (Sentence Completion)

- Choosing the most appropriate concluding sentence for a paragraph.
- **Skills Developed**: Logical thought progression, understanding paragraph tone, and predicting next ideas.

5. Sentence Formation

- Identifying the grammatically correct and meaningful structure of sentences.
- Rearranging fragments of a sentence into a coherent whole.

Module 2 – Reading Comprehension

VARC2 -RC

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1. Reading Techniques and Strategies

- **Skimming and Scanning**:
    - Skim to identify the main idea, tone, and structure.
    - Scan for key information, keywords, and specific details.
- **Active Reading**:
    - Engaging with the text through mental summarization while reading.
- **Mind Mapping**:
    - Visualizing the flow of ideas, connecting main ideas, and identifying logical progressions in the passage.
- **Annotation and Note-Taking**:
    - Highlighting critical portions and creating mental/physical notes for quick recall.
- **Speed Reading**:

    - Techniques to improve reading speed while retaining comprehension.

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2. Understanding Structure of Passages

- Identifying **main idea**, **supporting details**, and the **author's purpose**.
- Recognizing the **logical flow** of ideas:
    - Introduction, development, and conclusion.
    - Problem-Solution or Cause-Effect structures.
- Differentiating between facts, inferences, and opinions.

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3. Enhancing Comprehension Skills

- **Inferring Meaning**:
    - Deriving implicit information that is not explicitly stated.
- **Tone and Attitude Identification**:
    - Understanding the author's stance (e.g., critical, descriptive, argumentative).
- **Contextual Vocabulary**:
    - Decoding meanings of unfamiliar words using context clues.
- **Summarization**:
    - Condensing a passage into its essence without losing meaning.

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4. Question Types and Solving Strategies

Train aspirants to approach all question types with tailored strategies, including:

- **Main Idea Questions**:
    - Identifying the overarching theme of the passage.
- **Detail-Based Questions**:
    - Locating specific information and understanding explicit details.
- **Inference-Based Questions**:
    - Drawing logical conclusions from the text.
- **Title and Tone Identification**:
    - Choosing the most appropriate title and understanding the passage's emotional tone.
- **Logical Structure Questions**:

    - Analyzing the flow and framework of the passage.
- **Vocabulary in Context**:
    - Answering word-meaning or synonym questions using contextual clues.
- **Fact vs. Opinion Questions**:
    - Distinguishing objective facts from subjective opinions.
- **Elimination Techniques**:
    - Training students to eliminate incorrect options logically and efficiently.

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5. Passage Diversity for Comprehensive Preparation

Candidates must be exposed to diverse reading materials to strengthen adaptability:

- **Topics Covered**:
    - Business, Economics, and Current Affairs
    - Science and Technology
    - Philosophy and Psychology
    - Literature and Art
    - History, Politics, and Social Issues
- **Style Variations**:
    - Descriptive, Narrative, Persuasive, Analytical, and Abstract writings.
- Exposure to long and short passages to practice pacing and question-solving under time constraints.

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6. Time Management in RC

- Prioritizing passages: **Easy vs. Hard**, **Short vs. Long**.
- Allocating time to each passage:
    - Reading and understanding (60-70% time).
    - Answering questions efficiently (30-40% time).
- Balancing accuracy with speed.

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7. Improving Reading Ability Through Practice

- Introducing students to **high-quality reading material** for daily practice:
    - Editorials: The Hindu, The Indian Express, Economic Times

    - Magazines: The Economist, Scientific American, National Geographic
    - Books: Fiction and non-fiction across genres to improve vocabulary and critical thinking.
- **Daily Reading Targets**:
    - Practicing 2-3 passages per day with proper analysis.

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8. Mock Practice and Analysis

- **Sectional Tests**: Focused RC tests to simulate exam conditions.
- **Detailed Performance Review**:
    - Identifying strengths and areas of improvement.
    - Discussion of error patterns (e.g., misreading, overthinking).
- **Strategy Refinement**: Tailoring an individual's approach to maximize their score.

Module 3 – Grammer, Critical Reasoning

[VARC3 -GCR]

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1. Grammar and Sentence Correction

- Fundamental grammar rules:
    - Subject-Verb Agreement.
    - Tense Usage.
    - Modifiers.
    - Pronouns and Prepositions.
    - Articles, Conjunctions, and Adverbs.
- **Error Spotting**: Identifying and correcting grammatical errors in sentences.
- **Sentence Correction**: Selecting the grammatically correct version of a given sentence.

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2. Vocabulary Building

- **Contextual Vocabulary**: Learning words through passages.

- **Word Usage**: Synonyms, antonyms, idioms, and phrases.
- Root words, prefixes, and suffixes to enhance word recognition.
- Word substitution problems (e.g., one-word substitutions).

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3. Critical Reasoning

- Strengthening and weakening arguments.
- Identifying assumptions and inferences.
- Logical reasoning to evaluate arguments.
- Focus on deductive and inductive reasoning techniques.

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4. Fact, Inference, and Judgement (FIJ)

- Differentiating between facts, inferences, and opinions/judgements.
- Skills developed: Analytical reading and logical categorization.

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5. Cloze Test

- Fill-in-the-blank exercises for paragraphs with missing words.
- Developing contextual understanding of word choices.

SECTION : QUANTITATIVE ABILITY

Module 1 – Number System

[QA1 – NS]

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1. Basics of Numbers

- Types of numbers: Natural, Whole, Integers, Rational, Irrational, and Real numbers.
- Classification: Prime numbers, composite numbers, co-prime numbers, and perfect numbers.
- Properties of numbers: Even, odd, positive, negative, and their arithmetic rules.

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2. Divisibility Rules

- Divisibility tests for numbers (2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, etc.).
- Applications of divisibility rules in problem-solving.

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3. Factors and Multiples

- Prime factorization of numbers.
- Highest Common Factor (HCF) and Least Common Multiple (LCM).
- Relationship between HCF and LCM of numbers.
- Applications of HCF and LCM in word problems.

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4. Remainders

- Basic remainder theorem.
- Euler's theorem and Fermat's theorem (applications).
- Finding remainders using **cyclicity** and **patterns**.
- Applications in divisibility-based problems.

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5. Digit-Based Problems

- Sum and product of digits of a number.
- Finding missing digits in a number.
- Problems involving reversing digits and digital roots.
- Concept of **casting out nines** to verify calculations.

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6. Number Properties

- Properties of even and odd numbers.
- Properties of squares, cubes, and higher powers.
- Properties of prime numbers (tests for primality, prime gaps, etc.).
- Concept of **cyclicity of numbers** and patterns in powers.
- Applications in determining units digits and last two digits of powers.

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7. Remainder Cyclicity and Patterns

- Units digit and last two digits of large powers.

- Understanding the cyclicity of numbers (e.g., powers of 2, 3, 7, and 9).
- Finding remainders for powers using modular arithmetic.

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8. Progressions and Sequences

- Arithmetic Progression (AP) and Geometric Progression (GP).
- Sum of n terms in AP and GP.
- Special sequences: Harmonic Progression, Fibonacci sequence.
- Applications in sums, averages, and divisibility.

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9. Miscellaneous

- Previous year's problems.
- CAT-specific shortcuts, tricks, and elimination techniques.

Module 2 – Arithmetic

[QA2 – ARTM]

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1. Percentages

- Understanding percentage calculations.
- Conversion between fractions, ratios, and percentages.
- Successive percentage changes.
- Percentage increase and decrease.
- Applications in profit-loss, discounts, and data interpretation.

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2. Ratios and Proportions

- Concept of ratios, proportions, and variations.
- Equivalent ratios and comparison of ratios.
- Direct and inverse proportions.
- Applications in mixtures and solutions.

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3. Averages

- Basic average calculations.
- Weighted averages.
- Average speed problems.
- Applications in age-related problems and group averages.

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4. Profit, Loss, and Discount

- Cost price, selling price, and marked price concepts.
- Percentage profit and loss.
- Successive discounts and effective discount calculations.
- Applications in real-life scenarios like trading and taxation.

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5. Simple and Compound Interest

- Basics of interest: Principal, rate, and time.
- Difference between simple interest and compound interest.
- Effective rate of interest for compound interest over different time intervals.
- Growth and depreciation-based questions.

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6. Time, Speed, and Distance

- Understanding the relationship between speed, time, and distance.
- Average speed calculations.
- Relative speed (trains, boats, upstream, and downstream problems).
- Applications of time and speed in circular tracks and races.

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7. Time and Work

- Basics of work efficiency.
- Work done by individuals, groups, and alternate working patterns.
- Work and wages problems.
- Pipes and cisterns (inflow and outflow of water).

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8. Mixtures and Alligation

- Basic mixture concepts.

- Rule of alligation for two or more mixtures.
- Applications in ratio-based questions and profit-loss problems.

9. Misc

- Shortcut methods
- Previous Year's questions

Module 3 – Algebra

[QA3 – ALGB]

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1. Basics of Algebra

- **Algebraic Expressions**: Operations on algebraic expressions, simplification techniques, and substitution.
- **Indices and Surds**: Laws of exponents, fractional powers, roots, and simplification of expressions involving surds.
- **Polynomials**: Basic operations, degree of polynomials, factorization techniques (e.g., splitting the middle term, using identities).

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2. Linear Equations

- **Single Variable Linear Equations**: Basics and quick solving methods.
- **Simultaneous Linear Equations**: Two or more equations with multiple variables; elimination and substitution methods.
- **Word Problems**: Translating problems into linear equations, solving for real-world application.

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3. Quadratic Equations

- **Basics and Forms**: Standard form ax2+bx+c=0ax^2 + bx + c = 0ax2+bx+c=0, roots of quadratic equations.
- **Solving Quadratics**:
    - Factorization
    - Quadratic formula
    - Completing the square

- **Nature of Roots**: Discriminant and conditions for real, equal, or imaginary roots.
- **Maximum/Minimum Values**: Vertex form and solving for maxima/minima in quadratic equations.
- **Application Problems**: Word problems involving quadratic equations.

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4. Inequalities

- **Linear Inequalities**: Solving inequalities and graphical representation.
- **Quadratic Inequalities**: Sign analysis method, graphical representation of inequalities.
- **Modulus Functions**: Solving equations and inequalities involving absolute values.

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5. Functions and Graphs

- **Basics of Functions**: Definition, domain, range, and types of functions (e.g., linear, quadratic).
- **Graphs of Functions**: Understanding and sketching graphs for y=ax+by = ax + by=ax+b, y=ax2+bx+cy = ax^2 + bx + cy=ax2+bx+c, y=|x|y = |x|y=|x|, etc.
- **Transformations of Functions**: Shifting, reflection, and scaling of graphs.
- **Logarithmic and Exponential Functions**: Properties, solving equations involving logarithms and exponents.

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6. Progressions and Series

- **Arithmetic Progression (AP)**: General terms, sum of nnn-terms, application-based problems.
- **Geometric Progression (GP)**: General terms, sum of finite and infinite terms, practical applications.
- **Harmonic Progression (HP)**: Definition and relation between AP, GP, and HP.
- **Special Series**: Sum of squares and cubes of the first nnn natural numbers.

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7. Logarithms

- **Logarithmic Properties**: Laws of logarithms, base conversions, and simplification.
- **Exponential Equations**: Solving problems using exponent-log relations.
- **Application Problems**: Word problems involving exponential growth/decay and compound interest.

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9. Misc

- **Shortcut Techniques**: Approaches for quick elimination of options, approximations, and back-substitution.
- **CAT-Level Practice**: Solve previous years' CAT questions on algebra for familiarity and accuracy.

Module 4 – Geometry

[QA4 – GEOM]

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1. Lines and Angles

- Basic geometric terms: Line, ray, segment, and types of angles (acute, obtuse, reflex, etc.).
- Properties of angles: Complementary, supplementary, adjacent, vertical, and linear pairs.
- Angle sum property of triangles and polygons.
- Parallel lines and transversal properties.
- Internal and external angles of polygons.

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2. Triangles

- **Types of Triangles**: Equilateral, isosceles, scalene, right-angled triangles.
- Basic properties of triangles: Angle sum property, Pythagoras theorem, and inequalities.
- Similarity and congruence of triangles (criteria: SSS, SAS, ASA, RHS).
- Basic proportionality theorem (Thales theorem) and its applications.
- Centroid, orthocenter, incenter, and circumcenter of triangles.
- **Area of triangles**: Using base-height formula, Heron's formula, and trigonometric methods.

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3. Circles

- Basic terms: Radius, chord, diameter, tangent, arc, sector, and segment.
- Properties of tangents: Tangent-secant theorem and properties of tangents drawn from an external point.
- **Angle properties**: Angles subtended by a chord, arc, and cyclic quadrilaterals.

- Length of chord and arc.
- Area of sectors and segments.

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4. Quadrilaterals and Polygons

- **Types of Quadrilaterals**: Square, rectangle, rhombus, parallelogram, trapezium, and kite.
- Properties of quadrilaterals: Diagonals, angles, sides, and symmetry.
- Formulae for area and perimeter of quadrilaterals.
- Properties and area of regular polygons (hexagon, pentagon, etc.).

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5. Coordinate Geometry

- Cartesian plane and plotting points.
- Distance formula between two points.
- Midpoint and section formula.
- Area of a triangle using coordinate geometry.
- Equation of a line: Slope-intercept form, point-slope form, and general form.
- Slope of parallel and perpendicular lines.
- Finding angles between lines.
- Equation of a circle: Standard form and general form.

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6. Mensuration

- **2D Figures**:
    - Area and perimeter of triangles, quadrilaterals, and circles.
    - Area of sectors and segments of circles.
    - Area of composite figures involving 2D shapes.
- **3D Figures**:
    - Volume, surface area, and lateral surface area of cubes, cuboids, cylinders, cones, spheres, hemispheres, and pyramids.
    - Problems on frustums of cones.

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7. Trigonometry

- Basic trigonometric ratios: Sine, cosine, tangent, cotangent, secant, cosecant.

- Values of trigonometric ratios for standard angles (0°, 30°, 45°, 60°, and 90°).
- Trigonometric identities:
    - sin⁡2θ+cos⁡2θ=1\sin^2 \theta + \cos^2 \theta = 1sin2θ+cos2θ=1
    - 1+tan⁡2θ=sec⁡2θ1 + \tan^2 \theta = \sec^2 \theta1+tan2θ=sec2θ
    - 1+cot⁡2θ=csc⁡2θ1 + \cot^2 \theta = \csc^2 \theta1+cot2θ=csc2θ
- Heights and distances: Solving problems involving angles of elevation and depression.
- Applications of trigonometry in solving triangles and finding areas.

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8. Misc

- Shortcut techniques
- Previous year's questions

Module 5 – Set Theory, Probability, Statistics, Permutation and Combination

[QA5 – STPS]

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1. Set Theory

- **Basic Concepts**: Definition of sets, subsets, power sets, universal sets, and empty sets.
- **Types of Sets**: Finite, infinite, equal, equivalent, disjoint, and overlapping sets.
- **Operations on Sets**: Union, intersection, difference, and complement of sets.
- **Venn Diagrams**: Representing relationships between sets using Venn diagrams.
- **Applications in Problem Solving**:
    - Solving problems involving 2 or 3 overlapping sets.
    - Practical scenarios with set operations (e.g., students in different courses).
- **De Morgan's Laws**: Complement of unions and intersections.

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2. Probability

- **Basic Probability**: Definition of probability, sample space, events, and outcomes.
- **Types of Events**: Mutually exclusive, exhaustive, independent, and dependent events.
- **Classical vs. Empirical Probability**: Theoretical framework for probability.
- **Addition Rule of Probability**: For mutually exclusive and non-mutually exclusive events.

- **Multiplication Rule of Probability**: Independent and dependent events.
- **Conditional Probability**: Basics and applications in CAT-type problems.
- **Bayes' Theorem**: Concept and problem-solving approach.
- **Random Variables**: Introduction to discrete and continuous random variables.
- **Expected Value and Mean**: Calculation of expectation for simple events.
- **Applications**: Questions on dice, cards, coins, and real-life scenarios.

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3. Permutation and Combination (P&C)

- **Basic Counting Principles**:
    - Multiplication and addition principles for counting possibilities.
- **Factorials**: Definition and applications.
- **Permutations**:
    - Arrangement of objects in a line and circle.
    - Permutations with repetition.
    - Permutations under restrictions (e.g., certain positions fixed).
- **Combinations**:
    - Selection of objects.
    - Problems on groups and teams.
- **Special Cases and Applications**:
    - Permutations and combinations of similar objects.
    - Problems involving “at least” and “at most” scenarios.
- **Applications in Probability**: Solving probability questions involving P&C.

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4. Statistics

- **Basic Concepts**: Data collection, types of data (discrete vs. continuous).
- **Measures of Central Tendency**:
    - Mean, median, and mode.
    - Weighted averages and their applications.
- **Measures of Dispersion**:
    - Range, variance, and standard deviation.
- **Quartiles and Percentiles**: Calculation and interpretation.

5. Misc

- Shortcut methods
- Previous year's questions

SECTION : Data Interpretation and Logical Reasoning

Module 1 – Data Interpretation

[DILR1 – DI]

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1. Tables and Data Analysis

- Understanding tabular data.
- Calculating percentages, ratios, averages, growth rates, and comparisons.
- Multi-variable tables requiring interpretation.
- Missing data problems (filling gaps with logical deductions).

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2. Bar Graphs

- Vertical and horizontal bar graphs.
- Comparative analysis between different categories or time periods.
- Stacked bar graphs (multiple data on one axis).
- Solving questions requiring trend identification or proportion analysis.

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3. Line Graphs

- Single and multiple line graphs.
- Trend analysis, slopes, and growth rates.
- Problems requiring identification of changes over time or peaks and troughs.

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4. Pie Charts

- Understanding percentage distributions.
- Solving problems involving parts of a whole and sector-wise analysis.

- Multi-pie charts requiring comparisons.
- Combination with tables or other graphs for integrated questions.

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5. Mixed Graphs

- Data presented in a combination of two or more forms (e.g., line graphs + bar charts, pie charts + tables).
- Extracting insights by correlating data across multiple graphs.
- Handling questions that involve cross-format comparisons.

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6. Caselets

- Data presented in paragraph form with embedded clues.
- Identifying data points and extracting key values for calculation.
- Logical deduction to solve puzzles embedded in DI.
- Real-world scenarios involving surveys, sales reports, or production data.

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7. Venn Diagrams for Data Representation

- Understanding set theory applied to data interpretation.
- Solving problems on union, intersection, and complements of sets.
- Multi-set Venn diagrams requiring logical analysis.

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8. Charts and Scatter Plots

- Scatter plots and correlation analysis.
- Analyzing relationships between two variables.
- Trend identification and outlier detection.

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9. Quantitative Calculations in DI

- Percentages, fractions, and ratios.
- Averages and weighted averages.
- Growth rates (CAGR) and trend extrapolation.
- Approximation techniques for quick calculations.

Module 2 – Logical Reasoning 1

[DILR2 – LR1]

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1. Arrangements

- **Linear Arrangements**: Placing objects or people in a straight line based on given conditions.
- **Circular Arrangements**: Problems where objects/people are placed around a circular or semi-circular table.
- **Complex Arrangements**: Incorporating additional attributes (e.g., color, professions, seating order) into linear or circular arrangements.

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2. Puzzles

- **Grid-Based Puzzles**: Solving problems using tables (e.g., matching conditions of people, places, and objects).
- **Scheduling Problems**: Time-table and scheduling tasks under constraints.
- **Distribution Puzzles**: Assigning objects to different categories based on given rules.
- **Order and Ranking**: Determining positions or ranks of people based on clues (e.g., tallest to shortest, oldest to youngest).

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4. Blood Relations

- **Family Tree Problems**: Analyzing relationships like brother, sister, cousin, etc., using diagrams.
- **Complex Relations**: Multi-generational relationship problems involving mixed clues.

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5. Games and Tournaments

- **Knockout and League Format**: Understanding rules, scoring, and progression in tournaments.
- **Point-Based Games**: Allocating points to players or teams and determining results.

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6. Quantitative Reasoning within LR

- Problems that combine logical reasoning with mathematical calculations (e.g., age problems, work allocation, or profit-loss reasoning).

7. Decision Making

- **Situational Judgment**: Analyzing given situations and choosing the most logical or ethical decision.
- **Ranking Alternatives**: Problems requiring prioritization based on a given set of constraints

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Module 3 – Logical Reasoning 2

[DILR3 – LR2]

1. Coding-Decoding

- **Letter and Number Codes**: Problems where alphabets or numbers follow a pattern.
- **Symbol-Based Codes**: Understanding symbolic language or decoding problems involving relationships.

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2. Series and Sequences

- **Number Series**: Identifying the next term or missing term based on arithmetic, geometric, or logical patterns.
- **Alphabet Series**: Completing series using logical progressions of letters.
- **Mixed Series**: Combining numbers, alphabets, and symbols into a logical sequence.

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3. Venn Diagrams and Set Theory

- **Set-Based Problems**: Solving union, intersection, and complement of sets using Venn diagrams.
- **Complex Set Puzzles**: Problems involving 2, 3, or more sets with overlapping conditions.

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4. Input-Output and Machine Problems

- **Logical Sequencing**: Rearranging elements in a specific pattern based on given rules.

- **Step-Wise Processing**: Identifying the logic behind input-output transformation and solving for missing steps.

5. Logical Deductions

- **Syllogisms**: Understanding Venn diagrams and solving statements like "All A are B" or "Some B are C."
- **Binary Logic**: True/false-based reasoning problems where you derive conclusions from given statements.
- **Critical Reasoning**:
    - Identifying assumptions, conclusions, and arguments.
    - Cause and effect reasoning.
    - Strengthening and weakening arguments.

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6. Logical Connectives

- **Statements and Conclusions**: Drawing valid inferences from conditional statements (e.g., if-else, either-or).
- **Truth and Lie Statements**: Solving puzzles based on truth-tellers and liars.
