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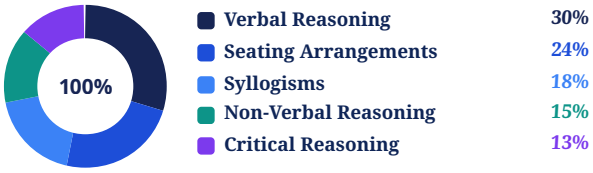
IUC ACADEMY NOTES

Complete Syllabus • Conceptual Flowcharts • Comparative Tables • Solved Practice Questions

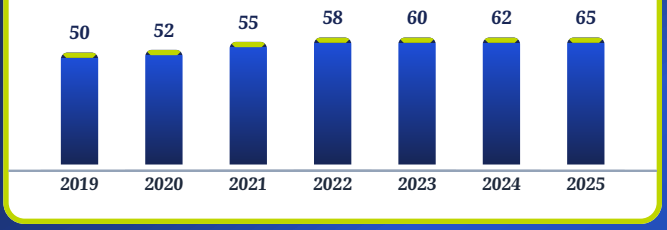
COMPLETE VERBAL, NON-VERBAL, ANALYTICAL & CRITICAL REASONING

Coding-Decoding, Number & Letter Series, Blood Relations, Direction Sense, Order & Ranking, Clocks & Calendars, Syllogism, Coded Inequalities, Seating Arrangements, Puzzles, Non-Verbal Cubes/Dice & Critical Reasoning

Topic-Wise Exam Weightage Distribution (%)



Previous Years' Question Trend Analysis



Target Competitive, Entrance & Departmental Examinations

SSC CGL/CHSL/GD/CPO • Railway NTPC/ALP/RPF • Banking PO/Clerk • UP/Delhi Police • AFCAT • CUET/CLAT • CSAT

Core Syllabus Pillars & Exam Question Weightage (%)

- Verbal Reasoning (Coding, Series, Analogy, Blood Relations, Direction) (30%)
- Seating Arrangements (Linear/Circular), Multi-Variable Puzzles & Input-Output (24%)
- Syllogisms (Only a Few / Possibility), Coded Inequalities & Venn Diagrams (18%)
- Non-Verbal Reasoning (Cubes, Dice, Figure Counting, Mirror/Water Image) (15%)
- Critical Reasoning (Assumptions, Arguments, Courses of Action, Inferences) (13%)

Complete Theory
NCERT & Official Sources

Visual Flowcharts
Comparative Matrices

Memory Tricks
Exam Trap Alerts

75+ Solved MCQs
One-Liner Capsules

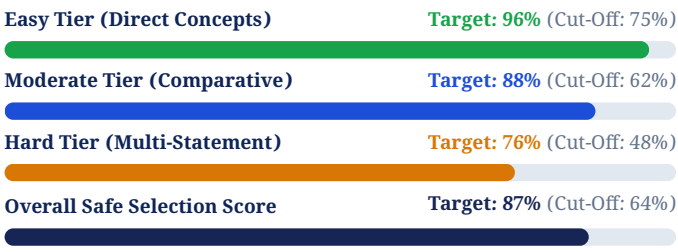
Preface, Exam Weightage Dashboard & Study Strategy — COMPLETE VERBAL, NON-VERBAL, ANALYTICAL & CRITICAL REASONING

IUC Academy (Inclusive Universal Careers Academy | www.iucacademy.com) • Official English Medium Study Notes

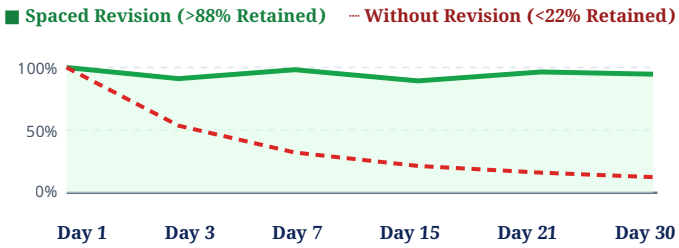
Dear Aspirants,

Modern competitive, entrance, and departmental promotion examinations demand a combination of deep conceptual clarity, statutory precision, and rapid revision tools. Prepared by **Inclusive Universal Careers Academy (IUC Academy — www.iucacademy.com)**, these comprehensive English-medium study notes integrate **structured chapter theory, 4-node conceptual process flowcharts, multi-column comparative tables, inline mathematical/scientific formulas, 'Did You Know?' boxes, 'Exam Trap Alert' callouts, 'Memory Trick' mnemonics, Chapter-End Analytical Synthesis Matrices, 75+ Step-by-Step Solved MCQs, and Rapid-Fire One-Liner Revision Capsules**.

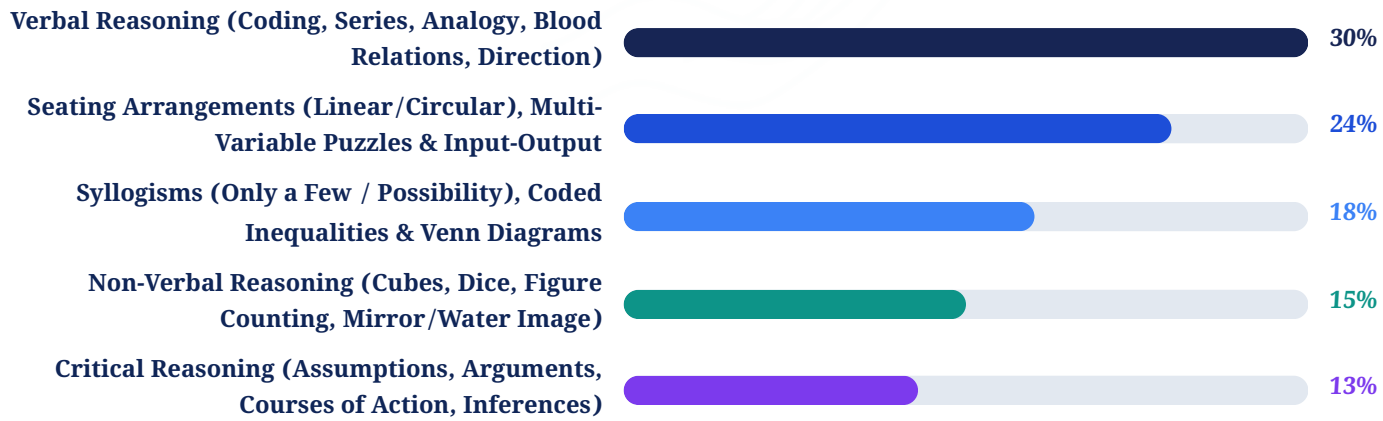
Target Accuracy vs Qualifying Cut-Off Benchmark (%)



Spaced Revision (1-3-7-21 Day Rule) & Retention Curve



Topic-Wise Exam Question Weightage Index (%)



Verified Official Curriculum & Statutory Reference Portals

- **SSC Official Portal** (https://ssc.gov.in/)
- **UPSC Official Portal** (https://upsc.gov.in/)
- **IUC Academy Official Portal** (https://www.iucacademy.com)

Detailed Table of Contents & Chapter Architecture

COMPLETE VERBAL, NON-VERBAL, ANALYTICAL & CRITICAL REASONING • Complete Chapters, Comparative Matrices, Solved MCQs & Rapid Revision

1. Chapter 1: Alphabetical Series, Coding-Decoding & Letter-Number Analogy

- 1.1 Positional Values and Reverse Alphabetical Mapping
- 1.2 Classification of Coding-Decoding Patterns

2. Chapter 2: Syllogism, Venn Diagrams & Logical Deductions

- 2.1 Categorical Propositions and Standard Venn Representations
- 2.2 Advanced Modifiers: "Only", "Only a Few", and Complementary Pairs

3. Chapter 3: Blood Relations, Coded Relationships & Direction Sense Test

- 3.1 Family Tree Hierarchy and Coded Relationship Generation Gap
- 3.2 Direction Sense, Pythagoras Displacement, and Shadow Geometry

4. Chapter 4: Linear, Circular & Polygon Seating Arrangements

- 4.1 Single-Row and Dual-Row Linear Arrangements
- 4.2 Circular, Square, and Rectangular Table Arrangements

5. Chapter 5: Analytical Puzzles — Floor, Box, Scheduling & Matrix Puzzles

- 5.1 Floor-Based, Flat-Floor, and Box-Stacking Puzzles
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6. Chapter 6: Clock Angles, Mirror-Water Time & Calendar Odd-Day Mathematics

- 6.1 Clock Mechanics, Angular Speeds, and Coincidence Formulas
- 6.2 Calendar Odd Days, Leap Year Rules, and Calendar Repetition

7. Chapter 7: Cubes, Standard & Open Dice, Counting Figures & Non-Verbal Spatial Reasoning

- 7.1 Standard vs. General Dice and Open Dice Folding Rules
- 7.2 Painted Cube Cutting and Analytical Figure Counting Formulas

8. Chapter 8: Critical Reasoning — Statement-Assumptions, Arguments, Conclusions & Courses of Action

- 8.1 Statement and Assumptions vs. Statement and Conclusions
- 8.2 Statement and Arguments, Courses of Action, and Cause-Effect

9. Solved Exam Practice Questions (MCQs)

10. Extended Comparative & Analytical Practice Set (Questions 36–75)

11. Rapid-Fire Last-Minute One-Liner Revision Capsule

Chapter 1: Alphabetical Series, Coding-Decoding & Letter-Number Analogy

Chapter Key Study Pillars — Chapter 1: Alphabetical Series, Coding-Decoding & Letter-Number Analogy

Key Study Pillar 1
Positional Values and Reverse Alphabetical Mapping

Key Study Pillar 2
Classification of Coding-Decoding Patterns

1.1 Positional Values and Reverse Alphabetical Mapping

• **Forward Alphabetical Indexing:** Every letter in the English alphabet corresponds to a fixed numerical index from A = 1 to Z = 26 as tested in Staff Selection Commission (SSC) competitive examinations and practiced on IUC Academy.

• **Reverse Alphabetical Indexing:** For any letter with forward position `P_forward`, its reverse position from Z = 1 to A = 26 is calculated using the linear identity `P_reverse = 27 - P_forward`.

• **Complementary Opposite Letter Pairs:** Two letters are complementary opposites if the sum of their forward positions equals 27 (`P_1 + P_2 = 27`), such as A(1)+Z(26), B(2)+Y(25), C(3)+X(24), D(4)+W(23), E(5)+V(22), F(6)+U(21), G(7)+T(20), H(8)+S(19), I(9)+R(18), J(10)+Q(17), K(11)+P(16), L(12)+O(15), and M(13)+N(14).

• **Left-Right Shift Rules in Alphanumeric Series:**

• Same-direction queries subtract positions: nth to the left of mth from the left end = `(m - n)` from the left end.

• Opposite-direction queries add positions: nth to the right of mth from the left end = `(m + n)` from the left end.

• Second-half reversal rule (N to Z reversed): if a required position `k` from the left exceeds 13, the actual letter index is `13 + (27 - k) = 40 - k`.

1.2 Classification of Coding-Decoding Patterns

• **Direct Letter-Shift Coding:** Each character shifts by a constant (`+k` or `-k`), alternating (`+2, -3, +2, -3`), prime-number (`+2, +3, +5, +7, +11`), or square/cube (`+1, +4, +9, +16`) offset across the word.

• **Cross-Diagonal and Pairwise Inversion Coding:** A 6-letter or 8-letter word is partitioned into equal halves of 3 or 4 letters; each half is inverted internally and then shifted by `+1` or `-1` across diagonal positions.

• **Number and Symbol Sum Coding:** Words are converted into numbers using:

• Direct sum of forward positional indices: `Sum = sum(P_i)`.

• Sum of reverse positional indices: `Reverse_Sum = (27 * n) - sum(P_i)`, where `n` is the total letter count.

• Vowel-consonant weighted coding: Vowels (`A=1, E=2, I=3, O=4, U=5`) are indexed separately while consonants retain standard indices or are multiplied by total letter count.

• **Chinese (Substitutional) Message Coding:** Three or four coded sentences share overlapping words; common words and common code tokens are eliminated systematically across statement pairs to isolate unique word-to-code mappings (SSC Official Portal).

• **Conditional Matrix and Binary Coding:** Candidates apply 4 to 5 explicit boundary conditions (for example: "If the first letter is a consonant and the last letter is a vowel, interchange their codes") before encoding the string.

Step-by-Step Conceptual Process Flowchart

STEP 1 Convert Letters to Numerical Indices (1-26)

STEP 2 Check Direct, Reverse (27-N), or Cross-Diagonal Shifts

STEP 3 Verify Vowel-Consonant or Length Multipliers

STEP 4 Apply Pattern Rule to Target Word

Coding Pattern Category	Core Mathematical / Logical Rule	Worked Illustration	Target Exam Weightage
Constant Forward Shift	`C_i = (P_i + k) mod 26`	`MIND (13,9,14,4) + 2 -> OKPF (15,11,16,6)`	SSC CGL, CHSL, MTS (2–3 Questions)
Complementary Opposite Pair	`C_i = 27 - P_i`	`TIGER (20,9,7,5,18) -> GRTVI (7,18,20,22,9)`	RRB NTPC, SSC GD, State Police
Diagonal Split & Shift	Split `n/2`, reverse each half, add `+1`	`MASTER -> SAM + RET -> TBN + SFU`	IBPS PO, SBI Clerk, SSC CGL Tier-II
Reverse Positional Sum	`Code = (27 * n) - Forward_Sum`	`CAT: Forward = 24; Reverse = (27*3) - 24 = 57`	UPSC CSAT, SSC Selection Post
Conditional Token Coding	Apply `If-Then` edge rules on 1st/ last elements	`A7#E%: Vowel start & symbol end -> both coded as $`	Banking Mains, RBI Grade B, Insurance

Did You Know?: In classical cryptography as referenced in NCERT Official Textbooks, the constant shift cipher (`C_i = (P_i + 3) mod 26`) is known as the Caesar Cipher, which forms the foundational logic of modern competitive exam coding-decoding tests on IUC Academy.

Exam Trap Alert: When counting letters "between" two given positions (for example, between the 5th letter from the left and the 18th letter from the left), never subtract simply (`18 - 5 = 13`); the number of strictly intermediate letters is `(18 - 5 - 1) = 12`.

★ **Memory Trick:** Remember the milestone checkpoints **EJOTY** (`E=5, J=10, O=15, T=20, Y=25`) and **CFILORUX** (`C=3, F=6, I=9, L=12, O=15, R=18, U=21, X=24`) to locate any letter's forward index within two seconds.

Chapter 1 Comprehensive Analytical & Statutory Revision Matrix

Core Sub-Domain	Key Concept / Provision	Verified Analytical Parameters & Exam Distinctions (SSC Official Portal)
Positional Values and Reverse Alphabetical Mapping	**Forward Alphabetical Indexing**	Every letter in the English alphabet corresponds to a fixed numerical index from A = 1 to Z = 26 as tested in Staff Selection Commission (SSC) competitive examinations and practiced on IUC Academy.

Core Sub-Domain	Key Concept / Provision	Verified Analytical Parameters & Exam Distinctions (SSC Official Portal)
Classification of Coding-Decoding Patterns	Reverse Alphabetical Indexing	For any letter with forward position `P_forward`, its reverse position from Z = 1 to A = 26 is calculated using the linear identity `P_reverse = 27 - P_forward`.
Positional Values and Reverse Alphabetical Mapping	Complementary Opposite Letter Pairs	Two letters are complementary opposites if the sum of their forward positions equals 27 (`P_1 + P_2 = 27`), such as A(1)+Z(26), B(2)+Y(25), C(3)+X(24), D(4)+W(23), E(5)+V(22), F(6)+U(21), G(7)+T(20), H(8)+S(19), I(9)+R(18), J(10)+Q(17), K(11)+P(16), L(12)+O(15), and M(13)+N(14).
Classification of Coding-Decoding Patterns	Direct Letter-Shift Coding	Each character shifts by a constant (`+k` or `-k`), alternating (`+2, -3, +2, -3`), prime-number (`+2, +3, +5, +7, +11`), or square/cube (`+1, +4, +9, +16`) offset across the word.
Positional Values and Reverse Alphabetical Mapping	Cross-Diagonal and Pairwise Inversion Coding	A 6-letter or 8-letter word is partitioned into equal halves of 3 or 4 letters; each half is inverted internally and then shifted by `+1` or `-1` across diagonal positions.
Classification of Coding-Decoding Patterns	Number and Symbol Sum Coding	Words are converted into numbers using
Positional Values and Reverse Alphabetical Mapping	Chinese (Substitutional) Message Coding	Three or four coded sentences share overlapping words; common words and common code tokens are eliminated systematically across statement pairs to isolate unique word-to-code mappings (SSC Official Portal).
Classification of Coding-Decoding Patterns	Conditional Matrix and Binary Coding	Candidates apply 4 to 5 explicit boundary conditions (for example: "If the first letter is a consonant and the last letter is a vowel, interchange their codes") before encoding the string.

Chapter *1* Multi-Statement Exam Verification Drills

Chapter 1 Statement-Verification Drill #1 — Both Statements Verified Correct

Statement-I (Forward Alphabetical Indexing): Every letter in the English alphabet corresponds to a fixed numerical index from A = 1 to Z = 26 as tested in Staff Selection Commission (SSC) competitive examinations and practiced on IUC Academy.

Statement-II (Reverse Alphabetical Indexing): For any letter with forward position `P_forward`, its reverse position from Z = 1 to A = 26 is calculated using the linear identity `P_reverse = 27 - P_forward`.

✓ **Exam Verification Key: Both Statement-I and Statement-II are factually accurate as per SSC Official Portal & IUC Academy.**

Chapter 1 Statement-Verification Drill #2 — Both Statements Verified Correct

Statement-I (Complementary Opposite Letter Pairs): Two letters are complementary opposites if the sum of their forward positions equals 27 (`P_1 + P_2 = 27`), such as A(1)+Z(26), B(2)+Y(25), C(3)+X(24), D(4)+W(23), E(5)+V(22), F(6)+U(21), G(7)+T(20), H(8)+S(19), I(9)+R(18), J(10)+Q(17), K(11)+P(16), L(12)+O(15), and M(13)+N(14).

Statement-II (Direct Letter-Shift Coding): Each character shifts by a constant (`+k` or `-k`), alternating (`+2, -3, +2, -3`), prime-number (`+2, +3, +5, +7, +11`), or square/cube (`+1, +4, +9, +16`) offset across the word.

✓ **Exam Verification Key: Both Statement-I and Statement-II are factually accurate as per SSC Official Portal & IUC Academy.**

Chapter 1 Statement-Verification Drill #3 Both Statements Verified Correct

Statement-I (Cross-Diagonal and Pairwise Inversion Coding): A 6-letter or 8-letter word is partitioned into equal halves of 3 or 4 letters; each half is inverted internally and then shifted by `+1` or `-1` across diagonal positions.

Statement-II (Number and Symbol Sum Coding): Words are converted into numbers using

✓ **Exam Verification Key: Both Statement-I and Statement-II are factually accurate as per SSC Official Portal & IUC Academy.**

Chapter 1 Statement-Verification Drill #4 Both Statements Verified Correct

Statement-I (Chinese (Substitutional) Message Coding): Three or four coded sentences share overlapping words; common words and common code tokens are eliminated systematically across statement pairs to isolate unique word-to-code mappings (SSC Official Portal).

Statement-II (Conditional Matrix and Binary Coding): Candidates apply 4 to 5 explicit boundary conditions (for example: "If the first letter is a consonant and the last letter is a vowel, interchange their codes") before encoding the string.

✓ **Exam Verification Key: Both Statement-I and Statement-II are factually accurate as per SSC Official Portal & IUC Academy.**

Chapter 2: Syllogism, Venn Diagrams & Logical Deductions

Chapter Key Study Pillars — Chapter 2: Syllogism, Venn Diagrams & Logical Deductions

Key Study Pillar 1
Categorical Propositions and Standard Venn Representations

Key Study Pillar 2
Advanced Modifiers: "Only", "Only a Few", and Complementary Pairs

2.1 Categorical Propositions and Standard Venn Representations

• **Four Classical Categorical Propositions:** Logical syllogism in Staff Selection Commission (SSC) and banking examinations is governed by four standard propositions taught at IUC Academy:

• **Universal Affirmative (A-type):** "All A are B" — Set A is completely contained inside Set B (`A subset B`).

• **Universal Negative (E-type):** "No A is B" — Set A and Set B are mutually disjoint (`A intersection B = empty`).

• **Particular Affirmative (I-type):** "Some A are B" — Set A and Set B share at least one common element (`A intersection B != empty`).

• **Particular Negative (O-type):** "Some A are not B" — At least one portion of Set A lies permanently outside Set B (`A - B != empty`).

• **Definite vs. Possibility Conclusions:**

• A **Definite Conclusion** is true if and only if it holds in every valid minimum-overlap and maximum-overlap Venn diagram.

• A **Possibility Conclusion** ("is a possibility", "can be", "may be") is true if it holds in at least one valid Venn diagram without violating any given statement.

2.2 Advanced Modifiers: "Only", "Only a Few", and Complementary Pairs

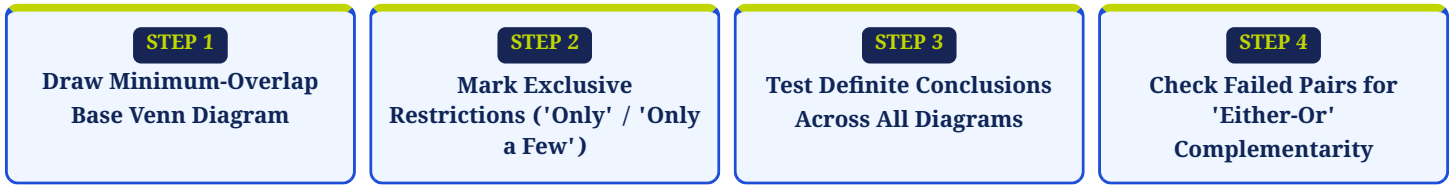
• **"Only A are B" Rule:** Translates strictly to **"All B are A"** along with the exclusive restriction that **B cannot intersect any other element except A**.

• **"Only a few A are B" Rule:** Simultaneously establishes two definite truths: **Some A are B** (I-type) AND **Some A are not B** (O-type). Consequently, "All A are B" is false even as a possibility, whereas "All B are A" remains a valid possibility!

• **Complementary Pair ("Either-Or") Conditions:** Two individually doubtful conclusions (`C_1` and `C_2`) form a valid **Either I or II follows** pair only when all three conditions are satisfied:

1. Both conclusions are individually false (uncertain/doubtful) in the base Venn diagram.
2. Both conclusions contain the exact same subject and predicate terms.
3. They belong to one of the three valid complementary combinations: **(Some + No)**, **(All + Some not)** with matching subject order, or **(Some + Some not)** where the exam follows modern logical union rules (note: in standard competitive exams, prioritize `Some A are B + No A is B` and `All A are B + Some A are not B`).

Step-by-Step Conceptual Process Flowchart



Statement Keyword / Modifier	Exact Logical Meaning	Valid Definite Conclusion(s)	Valid Possibility Conclusion(s)
All A are B	Every element of A is inside B	Some A are B; Some B are A	All B being A is a possibility
No A is B	Zero overlap between A and B	No B is A; Some A are not B; Some B are not A	None between A and B
Some A are B	At least 1% overlap between A and B	Some B are A	All A are B; All B are A; Some A are not B
Only a few A are B	Both `Some A are B` and `Some A are not B`	Some A are B; Some B are A; Some A are not B	All Bbeing A is a possibility
Only A are B	All B are exclusively inside A	All B are A; Some A are B; No B is C (any third set)	All A being B is a possibility (if no other set in A)

Did You Know?: The formal deductive method of categorical syllogisms was systematized by Aristotle in his treatise *Prior Analytics* and later visualised by mathematician John Venn in 1880 (NCERT Official Textbooks).

Exam Trap Alert: In "All A are B", the statement "Some B are not A" is **doubtful** (not definitely true), so "All B are A" + "Some B are not A" forms an **Either-Or** pair, whereas "All A are B" + "Some B are not A" does **not** form an Either-Or pair because the subject and predicate positions are swapped!

★ **Memory Trick:** For **Complementary Pairs**, use **S-S-C**: **S**ame Variables, **S**eparately Uncertain, **C**omplementary Form (`Some + No` or `All + Some Not` in identical order).

Chapter 2 Comprehensive Analytical & Statutory Revision Matrix

Core Sub-Domain	Key Concept / Provision	Verified Analytical Parameters & Exam Distinctions (SSC Official Portal)
Categorical Propositions and Standard Venn Representations	**Four Classical Categorical Propositions**	Logical syllogism in **Staff Selection Commission (SSC)** and banking examinations is governed by four standard propositions taught at **IUC Academy**
Advanced Modifiers: "Only", "Only a Few", and Complementary Pairs	**Universal Affirmative (A-type)**	"All A are B" — Set A is completely contained inside Set B (`A subset B`).
Categorical Propositions and Standard Venn Representations	**Universal Negative (E-type)**	"No A is B" — Set A and Set B are mutually disjoint (`A intersection B = empty`).
Advanced Modifiers: "Only", "Only a Few", and Complementary Pairs	**Particular Affirmative (I-type)**	"Some A are B" — Set A and Set B share at least one common element (`A intersection B != empty`).
Categorical Propositions and Standard Venn Representations	**Particular Negative (O-type)**	"Some A are not B" — At least one portion of Set A lies permanently outside Set B (`A - B != empty`).
Advanced Modifiers: "Only", "Only a Few", and Complementary Pairs	**"Only A are B" Rule**	Translates strictly to **"All B are A"** along with the exclusive restriction that **B cannot intersect any other element except A**.
Categorical Propositions and Standard Venn Representations	**"Only a few A are B" Rule**	Simultaneously establishes two definite truths: **Some A are B** (I-type) AND **Some A are not B** (O-type). Consequently, "All A are B" is false even as a possibility, whereas "All B are A" remains a valid possibility!
Advanced Modifiers: "Only", "Only a Few", and Complementary Pairs	**Complementary Pair ("Either-Or") Conditions**	Two individually doubtful conclusions (`C_1` and `C_2`) form a valid **Either I or II follows** pair only when all three conditions are satisfied

Chapter 2 Multi-Statement Exam Verification Drills

Chapter 2 Statement-Verification Drill #1 — Both Statements Verified Correct

Statement-I (Four Classical Categorical Propositions): Logical syllogism in Staff Selection Commission (SSC) and banking examinations is governed by four standard propositions taught at IUC Academy

Statement-II (Universal Affirmative (A-type)): "All A are B" — Set A is completely contained inside Set B (`A subset B`).

✓ **Exam Verification Key: Both Statement-I and Statement-II are factually accurate as per SSC Official Portal & IUC Academy.**

Chapter 2 Statement-Verification Drill #2 — Both Statements Verified Correct

Statement-I (Universal Negative (E-type)): "No A is B" — Set A and Set B are mutually disjoint (`A intersection B = empty`).

Statement-II (Particular Affirmative (I-type)): "Some A are B" — Set A and Set B share at least one common element (`A intersection B != empty`).

✓ **Exam Verification Key: Both Statement-I and Statement-II are factually accurate as per SSC Official Portal & IUC Academy.**

Chapter 2 Statement-Verification Drill #3 — Both Statements Verified Correct

Statement-I (Particular Negative (O-type)): "Some A are not B" — At least one portion of Set A lies permanently outside Set B (`A - B != empty`).

Statement-II ("Only A are B" Rule): Translates strictly to **"All B are A"** along with the exclusive restriction that **B cannot intersect any other element except A**.

✓ **Exam Verification Key: Both Statement-I and Statement-II are factually accurate as per SSC Official Portal & IUC Academy.**

Chapter 2 Statement-Verification Drill #4 — Both Statements Verified Correct

Statement-I ("Only a few A are B" Rule): Simultaneously establishes two definite truths: **Some A are B** (I-type) AND **Some A are not B** (O-type). Consequently, "All A are B" is false even as a possibility, whereas "All B are A" remains a valid possibility!

Statement-II (Complementary Pair ("Either-Or") Conditions): Two individually doubtful conclusions (`C_1` and `C_2`) form a valid **Either I or II follows** pair only when all three conditions are satisfied

✓ **Exam Verification Key: Both Statement-I and Statement-II are factually accurate as per SSC Official Portal & IUC Academy.**

Chapter 3: Blood Relations, Coded Relationships & Direction Sense Test

Chapter Key Study Pillars — Chapter 3: Blood Relations, Coded Relationships & Direction Sense Test

Key Study Pillar 1
Family Tree Hierarchy and Coded Relationship Generation Gap

Key Study Pillar 2
Direction Sense, Pythagoras Displacement, and Shadow Geometry

3.1 Family Tree Hierarchy and Coded Relationship Generation Gap

• **Standard Generation Hierarchy:** Family tree problems in Staff Selection Commission (SSC) and IUC Academy tests are mapped using vertical generation levels:

• **Generation +2:** Paternal Grandfather, Paternal Grandmother, Maternal Grandfather, Maternal Grandmother.

• **Generation +1:** Father, Mother, Paternal Uncle/Aunt, Maternal Uncle/Aunt, Father-in-law, Mother-in-law.

• **Generation 0:** Self, Spouse (Husband/Wife), Brother, Sister, Cousin, Brother-in-law, Sister-in-law.

• **Generation -1:** Son, Daughter, Nephew, Niece, Son-in-law, Daughter-in-law.

• **Generation -2:** Grandson, Granddaughter, Grand-nephew, Grand-niece.

• **Gender Elimination Technique in Coded Relations:** Never assume gender from a person's name (such as "Kamal", "Suman", or "Kiran"). Furthermore, in forward-coded expressions like `A @ B # C $ D`, the gender of the terminal element `D` can only be determined if the last operator is a spouse (`=`) or sibling/child operator whose backward definition fixes `D`'s gender.

3.2 Direction Sense, Pythagoras Displacement, and Shadow Geometry

• **Cardinal and Inter-Cardinal Angles:** The 4 cardinal directions (North, East, South, West) are separated by `90 degrees` each, while the 8-direction compass places North-East (NE), South-East (SE), South-West (SW), and North-West (NW) at `45 degrees` intervals.

• **Net Angular Rotation Formula:** Sum all Clockwise (CW) turns as positive (`+theta`) and all Anti-Clockwise (ACW) turns as negative (`-theta`). Compute `Net_Turn = sum(CW) - sum(ACW)` and apply that single net angle to the initial facing direction.

• **Shortest Straight-Line Distance (Pythagorean Theorem):** Resolve all horizontal movements into `Delta_X = Total_East - Total_West` and vertical movements into `Delta_Y = Total_North - Total_South`. The shortest distance between start and end points is `Distance = sqrt((Delta_X)^2 + (Delta_Y)^2)` (NCERT Official Textbooks).

• **Sunrise and Sunset Shadow Rules:**

• **Morning (Sunrise — Sun in the East):** Every shadow falls strictly toward the **West**. If a person faces North, their shadow falls to their **Left**; if facing South, to their **Right**.

• **Evening (Sunset — Sun in the West):** Every shadow falls strictly toward the **East**. If a person faces North, their shadow falls to their **Right**; if facing South, to their **Left**.

• **12:00 Noon:** The sun is vertically overhead, so **no shadow** is formed.

Step-by-Step Conceptual Process Flowchart



Scenario / Problem Type	Governing Rule / Formula	Key Condition	Exam Shortcut
"Only son of my grandfather"	Refers to speaker's Father (if no paternal uncle/aunt constraints)	Check if speaker is male or female (`His father` vs `Her father`)	Start evaluation from "my" and move outward
"Only child of my grandfather"	Speaker's Father (if paternal) OR Speaker's Mother (if maternal)	Gender of parent remains open unless specified	Do not assume "only child" means male

Scenario / Problem Type	Governing Rule / Formula	Key Condition	Exam Shortcut
Shortest Displacement	`D = sqrt((East - West)^2 + (North - South)^2)`	Standard triplets: `(3,4,5)`, `(5,12,13)`, `(6,8,10)`, `(8,15,17)`, `(7,24,25)`	Cancel opposite North/South & East/West vectors first
Morning Shadow (Sunrise)	Sun in East -> Shadow in West	Facing North -> Shadow on Left; Facing South -> Shadow on Right	Memorize **M-N-L** (Morning - North - Left)
Evening Shadow (Sunset)	Sun in West -> Shadow in East	Facing North -> Shadow on Right; Facing South -> Shadow on Left	Opposite of M-N-L -> **E-N-R** (Evening - North - Right)

Did You Know?: In English blood relation terminology used by Staff Selection Commission (SSC), "Brother-in-law" covers three distinct relationships: wife's brother, husband's brother, and sister's husband.

Exam Trap Alert: When a question asks **"How is A related to B?"**, always state the relationship of **A** from the perspective of **B** (what B calls A), never what A calls B!

★ **Memory Trick:** For shadow questions on IUC Academy, remember **MNL (Morning - North - Left)**: in the **M**orning, if you face **N**orth, your shadow is on your **L**eft. Every single flip (Morning to Evening, or North to South) flips Left to Right!

Chapter 3 Comprehensive Analytical & Statutory Revision Matrix

Core Sub-Domain	Key Concept / Provision	Verified Analytical Parameters & Exam Distinctions (SSC Official Portal)
Family Tree Hierarchy and Coded Relationship Generation Gap	**Standard Generation Hierarchy**	Family tree problems in Staff Selection Commission (SSC) and IUC Academy tests are mapped using vertical generation levels
Direction Sense, Pythagoras Displacement, and Shadow Geometry	**Generation +2**	Paternal Grandfather, Paternal Grandmother, Maternal Grandfather, Maternal Grandmother.
Family Tree Hierarchy and Coded Relationship Generation Gap	**Generation +1**	Father, Mother, Paternal Uncle/Aunt, Maternal Uncle/Aunt, Father-in-law, Mother-in-law.
Direction Sense, Pythagoras Displacement, and Shadow Geometry	**Generation 0**	Self, Spouse (Husband/Wife), Brother, Sister, Cousin, Brother-in-law, Sister-in-law.
Family Tree Hierarchy and Coded Relationship Generation Gap	**Generation -1**	Son, Daughter, Nephew, Niece, Son-in-law, Daughter-in-law.

Core Sub-Domain	Key Concept / Provision	Verified Analytical Parameters & Exam Distinctions (SSC Official Portal)
Direction Sense, Pythagoras Displacement, and Shadow Geometry	**Generation -2**	Grandson, Granddaughter, Grand-nephew, Grand-niece.
Family Tree Hierarchy and Coded Relationship Generation Gap	**Gender Elimination Technique in Coded Relations**	Never assume gender from a person's name (such as "Kamal", "Suman", or "Kiran"). Furthermore, in forward-coded expressions like **A @ B # C $ D**, the gender of the terminal element **D** can only be determined if the last operator is a spouse (**=**) or sibling/child operator whose backward definition fixes **D**'s gender.
Direction Sense, Pythagoras Displacement, and Shadow Geometry	**Cardinal and Inter-Cardinal Angles**	The 4 cardinal directions (North, East, South, West) are separated by **90 degrees** each, while the 8-direction compass places North-East (NE), South-East (SE), South-West (SW), and North-West (NW) at **45 degrees** intervals.
Family Tree Hierarchy and Coded Relationship Generation Gap	**Net Angular Rotation Formula**	Sum all Clockwise (CW) turns as positive (**+theta**) and all Anti-Clockwise (ACW) turns as negative (**-theta**). Compute **Net_Turn = sum(CW) - sum(ACW)** and apply that single net angle to the initial facing direction.
Direction Sense, Pythagoras Displacement, and Shadow Geometry	**Shortest Straight-Line Distance (Pythagorean Theorem)**	Resolve all horizontal movements into **Delta_X = Total_East - Total_West** and vertical movements into **Delta_Y = Total_North - Total_South**. The shortest distance between start and end points is **Distance = sqrt((Delta_X)^2 + (Delta_Y)^2)** (NCERT Official Textbooks).
Family Tree Hierarchy and Coded Relationship Generation Gap	**Morning (Sunrise — Sun in the East)**	Every shadow falls strictly toward the **West**. If a person faces North, their shadow falls to their **Left**; if facing South, to their **Right**.
Direction Sense, Pythagoras Displacement, and Shadow Geometry	**Evening (Sunset — Sun in the West)**	Every shadow falls strictly toward the **East**. If a person faces North, their shadow falls to their **Right**; if facing South, to their **Left**.
Family Tree Hierarchy and Coded Relationship Generation Gap	**12:00 Noon**	The sun is vertically overhead, so **no shadow** is formed.

Chapter *3* Multi-Statement Exam Verification Drills

Chapter 3 Statement-Verification Drill #1 — **Both Statements Verified Correct**

Statement-I (Standard Generation Hierarchy): Family tree problems in Staff Selection Commission (SSC) and IUC Academy tests are mapped using vertical generation levels

Statement-II (Generation +2): Paternal Grandfather, Paternal Grandmother, Maternal Grandfather, Maternal Grandmother.

✔ **Exam Verification Key: Both Statement-I and Statement-II are factually accurate as per SSC Official Portal & IUC Academy.**

Chapter 3 Statement-Verification Drill #2 — Both Statements Verified Correct

Statement-I (Generation +1): Father, Mother, Paternal Uncle/Aunt, Maternal Uncle/Aunt, Father-in-law, Mother-in-law.
Statement-II (Generation 0): Self, Spouse (Husband/Wife), Brother, Sister, Cousin, Brother-in-law, Sister-in-law.

✓ **Exam Verification Key: Both Statement-I and Statement-II are factually accurate as per SSC Official Portal & IUC Academy.**

Chapter 3 Statement-Verification Drill #3 — Both Statements Verified Correct

Statement-I (Generation -1): Son, Daughter, Nephew, Niece, Son-in-law, Daughter-in-law.
Statement-II (Generation -2): Grandson, Granddaughter, Grand-nephew, Grand-niece.

✓ **Exam Verification Key: Both Statement-I and Statement-II are factually accurate as per SSC Official Portal & IUC Academy.**

Chapter 3 Statement-Verification Drill #4 — Both Statements Verified Correct

Statement-I (Gender Elimination Technique in Coded Relations): Never assume gender from a person's name (such as "Kamal", "Suman", or "Kiran"). Furthermore, in forward-coded expressions like `A @ B # C $ D`, the gender of the terminal element `D` can only be determined if the last operator is a spouse (`=`)
or sibling/child operator whose backward definition fixes `D`'s gender.
Statement-II (Cardinal and Inter-Cardinal Angles): The 4 cardinal directions (North, East, South, West) are separated by `90 degrees` each, while the 8-direction compass places North-East (NE), South-East (SE), South-West (SW), and North-West (NW) at `45 degrees` intervals.

✓ **Exam Verification Key: Both Statement-I and Statement-II are factually accurate as per SSC Official Portal & IUC Academy.**

Chapter 3 Statement-Verification Drill #5 — Both Statements Verified Correct

Statement-I (Net Angular Rotation Formula): Sum all Clockwise (CW) turns as positive (`+theta`) and all Anti-Clockwise (ACW) turns as negative (`-theta`). Compute `Net_Turn = sum(CW) - sum(ACW)` and apply that single net angle to the initial facing direction.

Statement-II (Shortest Straight-Line Distance (Pythagorean Theorem)): Resolve all horizontal movements into `Delta_X = Total_East - Total_West` and vertical movements into `Delta_Y = Total_North - Total_South`. The shortest distance between start and end points is `Distance = sqrt((Delta_X)^2 + (Delta_Y)^2)` (NCERT Official Textbooks).

✓ **Exam Verification Key: Both Statement-I and Statement-II are factually accurate as per SSC Official Portal & IUC Academy.**

Chapter 3 Statement-Verification Drill #6 — Both Statements Verified Correct

Statement-I (Morning (Sunrise — Sun in the East)): Every shadow falls strictly toward the **West**. If a person faces North, their shadow falls to their **Left**; if facing South, to their **Right**.

Statement-II (Evening (Sunset — Sun in the West)): Every shadow falls strictly toward the **East**. If a person faces North, their shadow falls to their **Right**; if facing South, to their **Left**.

✓ **Exam Verification Key: Both Statement-I and Statement-II are factually accurate as per SSC Official Portal & IUC Academy.**

Chapter 4: Linear, Circular & Polygon Seating Arrangements

Chapter Key Study Pillars — Chapter 4: Linear, Circular & Polygon Seating Arrangements

Key Study Pillar 1	Key Study Pillar 2
Single-Row and Dual-Row Linear Arrangements	**Circular, Square, and Rectangular Table Arrangements**

4.1 Single-Row and Dual-Row Linear Arrangements

• **Single-Row Orientation Rules:**

• **Facing North:** A person's Left hand points toward the Left end (West), and their Right hand points toward the Right end (East).

• **Facing South:** A person's Left hand points toward the Right end (East), and their Right hand points toward the Left end (West).

• **Parallel Dual-Row ("Facing Each Other") Rules:**

• Row 1 (Top Row) faces **South**, while Row 2 (Bottom Row) faces **North**.

• "A sits diagonally opposite to B" means A and B sit at opposite extreme ends of different rows.

• **Syntactic Connectors in Seating Clues:**

• **"AND" / "BUT" / "WHILE":** Always refers back to the **first person (Subject)** of the clause. Example: "*A sits third to the left of B and is an immediate neighbour of C*" -> **A** is the immediate neighbour of C.

• **"WHO" / "WHOM" / "WHOSE":** Always refers to the **immediately preceding person (Object)** just before the relative pronoun. Example: "*A sits third to the left of B, who is an immediate neighbour of C*" -> **B** is the immediate neighbour of C (SSC Official Portal).

4.2 Circular, Square, and Rectangular Table Arrangements

• **Total Permutations Along a Circular Table:** For `n` distinct individuals seated along the perimeter of a symmetrically unmarked circular table, the number of distinct circular arrangements is `(n - 1)!`; if clockwise and anti-clockwise orientations are indistinguishable (such as beads on a necklace), it is `(n - 1)! / 2` (NCERT Official Textbooks).

• **Inside vs. Outside Facing on a Circular Table:**

• **Facing Center (Inside):** Moving toward the **Left** = moving **Clockwise (CW)**; moving toward the **Right** = moving **Anti-Clockwise (ACW)**.

• **Facing Away from Center (Outside):** Moving toward the **Left** = moving **Anti-Clockwise (ACW)**; moving toward the **Right** = moving **Clockwise (CW)**.

• **Opposite Seat Condition:** For an even number of persons `N` seated equidistantly along a circle, the person sitting directly opposite to seat `k` is at seat `(k + N/2) mod N`. Between any two opposite persons on an `N`-seat circular table, there are exactly `(N/2 - 1)` persons on either side.

Step-by-Step Conceptual Process Flowchart



Seating Configuration	Left Movement Direction	Right Movement Direction	Opposite Person Separation (N Persons)
Linear Row — Facing North	Toward West (Left End)	Toward East (Right End)	Not applicable (unless dual parallel rows)
Linear Row — Facing South	Toward East (Right End)	Toward West (Left End)	Faces counterpart in North-facing row
Circular Table — Facing Center	Clockwise (CW)	Anti-Clockwise (ACW)	**(N/2 - 1)** persons between opposite pair
Circular Table — Facing Outside	Anti-Clockwise (ACW)	Clockwise (CW)	**(N/2 - 1)** persons between opposite pair
Square Table (4 Corner + 4 Mid-Side)	Depends on Corner (In/Out) vs Mid-Side facing	Opposite to Left direction	Corner faces opposite Corner; Mid-Side faces Mid-Side

Did You Know?: For an 8-person circular arrangement where every seat is numbered 1 to 8 (making seats distinguishable via an external landmark), the number of total arrangements returns to **8! = 40,320** rather than **7! = 5,040** (IUC Academy).

Exam Trap Alert: "Three persons sit between A and B" means A and B are at the **4th position** relative to each other (**Gap = 3**, **Positional Shift = Gap + 1 = 4**). Conversely, "A sits third to the right of B" means there are only **two** persons between A and B!

★ **Memory Trick:** Remember **C-L-I (Clockwise = Left = Inside)**: when facing **I**nside the center, moving **L**eft goes **C**lockwise.

Chapter 4 Comprehensive Analytical & Statutory Revision Matrix

Core Sub-Domain	Key Concept / Provision	Verified Analytical Parameters & Exam Distinctions (SSC Official Portal)
Single-Row and Dual-Row Linear Arrangements	**Facing North**	A person's Left hand points toward the Left end (West), and their Right hand points toward the Right end (East).
Circular, Square, and Rectangular Table Arrangements	**Facing South**	A person's Left hand points toward the Right end (East), and their Right hand points toward the Left end (West).
Single-Row and Dual-Row Linear Arrangements	**"AND" / "BUT" / "WHILE"**	Always refers back to the **first person (Subject)** of the clause. Example: "*A sits third to the left of B and is an immediate neighbour of C*" -> **A** is the immediate neighbour of C.
Circular, Square, and Rectangular Table Arrangements	**"WHO" / "WHOM" / "WHOSE"**	Always refers to the **immediately preceding person (Object)** just before the relative pronoun. Example: "*A sits third to the left of B, who is an immediate neighbour of C*" -> **B** is the immediate neighbour of C (SSC Official Portal).
Single-Row and Dual-Row Linear Arrangements	**Total Permutations Along a Circular Table**	For **n** distinct individuals seated along the perimeter of a symmetrically unmarked circular table, the number of distinct circular arrangements is **(n - 1)!**; if clockwise and anti-clockwise orientations are indistinguishable (such as beads on a necklace), it is **(n - 1)! / 2** (NCERT Official Textbooks).

Core Sub-Domain	Key Concept / Provision	Verified Analytical Parameters & Exam Distinctions (SSC Official Portal)
Circular, Square, and Rectangular Table Arrangements	**Facing Center (Inside)**	Moving toward the **Left** = moving **Clockwise (CW)**; moving toward the **Right** = moving **Anti-Clockwise (ACW)**.
Single-Row and Dual-Row Linear Arrangements	**Facing Away from Center (Outside)**	Moving toward the **Left** = moving **Anti-Clockwise (ACW)**; moving toward the **Right** = moving **Clockwise (CW)**.
Circular, Square, and Rectangular Table Arrangements	**Opposite Seat Condition**	For an even number of persons `N` seated equidistantly along a circle, the person sitting directly opposite to seat `k` is at seat `(k + N/2) mod N`. Between any two opposite persons on an `N`-seat circular table, there are exactly `(N/2 - 1)` persons on either side.

Chapter 4 Multi-Statement Exam Verification Drills

Chapter 4 Statement-Verification Drill #1 — Both Statements Verified Correct

Statement-I (Facing North): A person's Left hand points toward the Left end (West), and their Right hand points toward the Right end (East).

Statement-II (Facing South): A person's Left hand points toward the Right end (East), and their Right hand points toward the Left end (West).

✓ **Exam Verification Key: Both Statement-I and Statement-II are factually accurate as per SSC Official Portal & IUC Academy.**

Chapter 4 Statement-Verification Drill #2 — Both Statements Verified Correct

Statement-I ("AND" / "BUT" / "WHILE"): Always refers back to the **first person (Subject)** of the clause. Example: "*A sits third to the left of B and is an immediate neighbour of C*" -> **A** is the immediate neighbour of C.

Statement-II ("WHO" / "WHOM" / "WHOSE"): Always refers to the **immediately preceding person (Object)** just before the relative pronoun. Example: "*A sits third to the left of B, who is an immediate neighbour of C*" -> **B** is the immediate neighbour of C (SSC Official Portal).

✓ **Exam Verification Key: Both Statement-I and Statement-II are factually accurate as per SSC Official Portal & IUC Academy.**

Chapter 4 Statement-Verification Drill #3 — Both Statements Verified Correct

Statement-I (Total Permutations Along a Circular Table): For `n` distinct individuals seated along the perimeter of a symmetrically unmarked circular table, the number of distinct circular arrangements is `(n - 1)!`; if clockwise and anti-clockwise orientations are indistinguishable (such as beads on a necklace), it is `(n - 1)! / 2` (NCERT Official Textbooks).

Statement-II (Facing Center (Inside)): Moving toward the **Left** = moving **Clockwise (CW)**; moving toward the **Right** = moving **Anti-Clockwise (ACW)**.

✓ **Exam Verification Key: Both Statement-I and Statement-II are factually accurate as per SSC Official Portal & IUC Academy.**

Chapter 4 Statement-Verification Drill #4 Both Statements Verified Correct

Statement-I (Facing Away from Center (Outside)): Moving toward the **Left** = moving **Anti-Clockwise (ACW)**; moving toward the **Right** = moving **Clockwise (CW)**.

Statement-II (Opposite Seat Condition): For an even number of persons `N` seated equidistantly along a circle, the person sitting directly opposite to seat `k` is at seat `(k + N/2) mod N`. Between any two opposite persons on an `N`-seat circular table, there are exactly `(N/2 - 1)` persons on either side.

✓ **Exam Verification Key: Both Statement-I and Statement-II are factually accurate as per SSC Official Portal & IUC Academy.**

Chapter *5:* Analytical Puzzles — Floor, Box, Scheduling & Matrix Puzzles

Chapter Key Study Pillars — Chapter 5: Analytical Puzzles — Floor, Box, Scheduling & Matrix Puzzles

Key Study Pillar 1
Floor-Based, Flat-Floor, and Box-Stacking Puzzles

Key Study Pillar 2
Day, Month-Date, Age, and Order-Ranking Puzzles

5.1 Floor-Based, Flat-Floor, and Box-Stacking Puzzles

• **Standard Floor Numbering Convention:** In multi-storey building puzzles asked in Staff Selection Commission (SSC) and banking exams, the **Lowest Base Floor is numbered 1**, the floor immediately above it is numbered 2, and so on up to the top floor `N`.

• **Floor-with-Flats Matrix:** When each floor has two flats (Flat P and Flat Q, where Flat P is to the West of Flat Q):

• "A lives immediately above B" in a multi-flat building strictly requires that A and B live in the **same flat column** (both in Flat P or both in Flat Q) on consecutive floors unless explicitly stated otherwise.

• **Unnumbered Box-Stacking Puzzles:** Unlike floor puzzles, box puzzles do not have a fixed base-to-top frame initially; construct floating relative chains (for example, `Box M — [_] — [_] — Box K`) and merge chains only when the total vertical span approaches the maximum box count.

5.2 Day, Month-Date, Age, and Order-Ranking Puzzles

• **Month-Date Parity Anchor:** Always mark the exact number of days (`30` or `31`, or `28/29` for February) alongside each month in the left margin of your grid:

• **31-Day Months:** January, March, May, July, August, October, December.

• **30-Day Months:** April, June, September, November.

• **Order and Ranking Equations:**

• Total persons in a single row: `Total = Rank_Left + Rank_Right - 1` (IUC Academy).

• **Non-Overlapping (Maximum) Case:** When `Total >= (Rank_Left + Rank_Right + Between)`, the formula is `Total_Max = Rank_Left + Rank_Right + Between`.

• **Overlapping (Minimum) Case:** When `Total < (Rank_Left + Rank_Right)`, the minimum number of persons is `Total_Min = Rank_Left + Rank_Right - Between - 2` (valid only when `Between <= min(Rank_Left, Rank_Right) - 2`).

• **Position Interchange Rule:** If A and B interchange positions, `New_Rank_A - Old_Rank_A = New_Rank_B - Old_Rank_B`, and `Persons_Between = |New_Rank_A - Old_Rank_A| - 1`.

Step-by-Step Conceptual Process Flowchart

STEP 1 Lock Fixed Parameter Column (Floors 8-1 or Months/Dates)

STEP 2 Place Direct & Parity-Constrained Clues (Even/Odd/30-Day)

STEP 3 Link Multi-Gap Floating Chains ('3 Boxes Between X and Y')

STEP 4 Fill Remaining Slots Using Negative Elimination

Puzzle Variant	Fixed Base Column	High-Priority Anchor Clues	Critical Verification Rule
Floor Puzzle (1 to 8)	Floor numbers `8, 7, 6, 5, 4, 3, 2, 1`	"Lives on an odd prime floor above 4" (`Floor 5` or `7`)	"Two floors between A and B" -> ` Floor_A - Floor_B = 3`
Month & Date Puzzle	Chronological Month + Date pairs	"Born in a month having 30 days on an even date"	Check adjacent across month boundaries (`May 25` is immediately before `June 12`)
Box Stack Puzzle	None initially (floating slots)	Chain with widest span (e.g., 4 boxes between P and Q)	Total span cannot exceed total number of boxes
Designation / Hierarchy	Senior-most to Junior-most (`CEO -> Clerk`)	"At most two persons are senior to X"	"Senior to" = higher rank; "Older than" = higher chronological age
Linear Order & Ranking	Left-to-Right Rank Axis	`Total = Left + Right - 1`	Check whether problem asks for Minimum (Overlapping) or Maximum total

Did You Know?: According to combinatorial principles in NCERT Official Textbooks, fixing a single parity-constrained variable (such as placing an entity on one of only two 30-day months in a 6-month puzzle) reduces the remaining state space by over 75%.

Exam Trap Alert: In floor or scheduling puzzles, the phrase **"A lives three floors above B"** means `Floor_A = Floor_B + 3` (which implies there are **two** floors between them, NOT three!).

★ **Memory Trick:** Remember **"Above + N = Gap of (N - 1)"**: "3rd floor above" or "3 days before" always leaves `3 - 1 = 2` intermediate slots between the two entities.

Chapter 5 Comprehensive Analytical & Statutory Revision Matrix

Core Sub-Domain	Key Concept / Provision	Verified Analytical Parameters & Exam Distinctions (SSC Official Portal)
Floor-Based, Flat-Floor, and Box-Stacking Puzzles	**Standard Floor Numbering Convention**	In multi-storey building puzzles asked in Staff Selection Commission (SSC) and banking exams, the **Lowest Base Floor is numbered 1**, the floor immediately above it is numbered 2, and so on up to the top floor `N`.

Core Sub-Domain	Key Concept / Provision	Verified Analytical Parameters & Exam Distinctions (SSC Official Portal)
Day, Month-Date, Age, and Order-Ranking Puzzles	Floor-with-Flats Matrix	When each floor has two flats (Flat P and Flat Q, where Flat P is to the West of Flat Q)
Floor-Based, Flat-Floor, and Box-Stacking Puzzles	Unnumbered Box-Stacking Puzzles	Unlike floor puzzles, box puzzles do not have a fixed base-to-top frame initially; construct floating relative chains (for example, `Box M — [_] — [_] — Box K`) and merge chains only when the total vertical span approaches the maximum box count.
Day, Month-Date, Age, and Order-Ranking Puzzles	Month-Date Parity Anchor	Always mark the exact number of days (`30` or `31`, or `28/29` for February) alongside each month in the left margin of your grid
Floor-Based, Flat-Floor, and Box-Stacking Puzzles	31-Day Months	January, March, May, July, August, October, December.
Day, Month-Date, Age, and Order-Ranking Puzzles	30-Day Months	April, June, September, November.
Floor-Based, Flat-Floor, and Box-Stacking Puzzles	Non-Overlapping (Maximum) Case	When `Total >= (Rank_Left + Rank_Right + Between)`, the formula is `Total_Max = Rank_Left + Rank_Right + Between`.
Day, Month-Date, Age, and Order-Ranking Puzzles	Overlapping (Minimum) Case	When `Total < (Rank_Left + Rank_Right)`, the minimum number of persons is `Total_Min = Rank_Left + Rank_Right - Between - 2` (valid only when `Between <= min(Rank_Left, Rank_Right) - 2`).
Floor-Based, Flat-Floor, and Box-Stacking Puzzles	Position Interchange Rule	If A and B interchange positions, `New_Rank_A - Old_Rank_A = New_Rank_B - Old_Rank_B`, and `Persons_Between = |New_Rank_A - Old_Rank_A| - 1`.

Chapter 5 Multi-Statement Exam Verification Drills

Chapter 5 Statement-Verification Drill #1 — Both Statements Verified Correct

Statement-I (Standard Floor Numbering Convention): In multi-storey building puzzles asked in Staff Selection Commission (SSC) and banking exams, the **Lowest Base Floor is numbered 1**, the floor immediately above it is numbered 2, and so on up to the top floor `N`.

Statement-II (Floor-with-Flats Matrix): When each floor has two flats (Flat P and Flat Q, where Flat P is to the West of Flat Q)

✓ **Exam Verification Key: Both Statement-I and Statement-II are factually accurate as per SSC Official Portal & IUC Academy.**

Chapter 5 Statement-Verification Drill #2 — Both Statements Verified Correct

Statement-I (Unnumbered Box-Stacking Puzzles): Unlike floor puzzles, box puzzles do not have a fixed base-to-top frame initially; construct floating relative chains (for example, `Box M — [_] — [_] — Box K`) and merge chains only when the total vertical span approaches the maximum box count.

Statement-II (Month-Date Parity Anchor): Always mark the exact number of days (`30` or `31`, or `28/29` for February) alongside each month in the left margin of your grid

✓ **Exam Verification Key: Both Statement-I and Statement-II are factually accurate as per SSC Official Portal & IUC Academy.**

Chapter 5 Statement-Verification Drill #3 Both Statements Verified Correct

Statement-I (31-Day Months): January, March, May, July, August, October, December.
Statement-II (30-Day Months): April, June, September, November.

✓ **Exam Verification Key: Both Statement-I and Statement-II are factually accurate as per SSC Official Portal & IUC Academy.**

Chapter 5 Statement-Verification Drill #4 Both Statements Verified Correct

Statement-I (Non-Overlapping (Maximum) Case): When `Total >= (Rank_Left + Rank_Right + Between)`, the formula is `Total_Max = Rank_Left + Rank_Right + Between`.
Statement-II (Overlapping (Minimum) Case): When `Total < (Rank_Left + Rank_Right)`, the minimum number of persons is `Total_Min = Rank_Left + Rank_Right - Between - 2` (valid only when `Between <= min(Rank_Left, Rank_Right) - 2`).

✓ **Exam Verification Key: Both Statement-I and Statement-II are factually accurate as per SSC Official Portal & IUC Academy.**

Chapter 6: Clock Angles, Mirror-Water Time & Calendar Odd-Day Mathematics

Chapter Key Study Pillars — Chapter 6: Clock Angles, Mirror-Water Time & Calendar Odd-Day Mathematics

Key Study Pillar 1
Clock Mechanics, Angular Speeds, and Coincidence Formulas

Key Study Pillar 2
Calendar Odd Days, Leap Year Rules, and Calendar Repetition

6.1 Clock Mechanics, Angular Speeds, and Coincidence Formulas

• **Angular Speeds of Clock Hands:** A circular clock dial spans `360 degrees` divided into 12 hour sectors (`30 degrees` each) and 60 minute spaces (`6 degrees` each):

• **Minute Hand Speed:** Covers `360 degrees` in 60 minutes = `6 degrees per minute`.

• **Hour Hand Speed:** Covers `30 degrees` in 60 minutes = `0.5 degrees per minute`.

• **Relative Angular Speed:** The minute hand gains `6 - 0.5 = 5.5 degrees` (`11/2 degrees`) over the hour hand every minute, or `55 minute spaces` in 60 minutes (hence the multiplier `12/11`).

• **Universal Clock Angle Formula:** At `H` hours and `M` minutes, the angle `Theta` between the hour hand and minute hand is:

• `Theta = |30H - (11/2)M|`

• If `Theta > 180 degrees`, the reflex angle is `Theta`, and the interior acute/obtuse angle is `360 - Theta` (SSC Official Portal).

• **Exact Minute Calculation for Target Angle `Theta`:** Between `H` and `(H+1)` o'clock, the hands are at angle `Theta` at `M = (2/11) (30H +/- Theta)` minutes past `H`.

• **Mirror Image and Water Image of a Clock:**

• **Vertical Mirror Image:** Subtract given time from `11:60` (or `23:60` if between 11:00 and 1:00).

• **Horizontal Water Image:** Subtract given time from `18:30` (if minutes `<= 30`) or `17:90` (if minutes `> 30`).

6.2 Calendar Odd Days, Leap Year Rules, and Calendar Repetition

• **Ordinary Year vs. Leap Year:**

• **Ordinary Year (365 days):** `365 = 52 weeks + 1 odd day`. Starts and ends on the **same day of the week**.

• **Leap Year (366 days):** `366 = 52 weeks + 2 odd days`. Ends on the day **immediately following** its first day.

• **Century Leap Year Rule:** A non-century year is a leap year if divisible by `4`; a century year (`1700, 1800, 1900, 2000`) is a leap year ONLY if divisible by `400`. Thus, every 400 consecutive years contain exactly `(24 * 3) + 25 = 97` leap years!

• **Century Odd-Day Reference Values:**

• `100 years` = 76 ordinary + 24 leap = `761 + 242 = 124 days = 5 odd days`.

• `200 years` = `5 * 2 = 10 days = 3 odd days`.

• `300 years` = `5 * 3 = 15 days = 1 odd day`.

• `400 years` = `(5 * 4 + 1) = 21 days = 0 odd days` (repeats every multiple of 400 years: `800, 1200, 1600, 2000`).

• **Whole-Calendar Repetition Shortcuts:**

• `Leap Year (LY)` repeats after **28 years** (unless crossing a non-leap century like 1900).

• `LY + 1` repeats after **6 years**.

• `LY + 2` and `LY + 3` repeat after **11 years** (IUC Academy).

Step-by-Step Conceptual Process Flowchart

STEP 1 — Split Target Date into Completed Centuries + Completed Years + Current Year Days

STEP 2 — Compute Odd Days (Mod 7) for Each Component

STEP 3 — Sum Total Odd Days and Divide by 7

STEP 4 — Map Remainder (0=Sun, 1=Mon, ..., 6=Sat) to Weekday

Clock / Calendar Concept	Governing Mathematical Formula	Frequency per 12 Hours / 24 Hours / Century	Exam Special Exception
Coincidence (`0 degrees` Overlap)	`M = (60/11) * H`	11 times in 12 hrs; 22 times in 24 hrs	Between 11 and 1 o'clock, coincides only once at 12:00
Straight Line Opposite (`180 degrees`)	`M = (2/11) (30H +/- 180)`	11 times in 12 hrs; 22 times in 24 hrs	Between 5 and 7 o'clock, opposite only once at 6:00
Right Angle (`90 degrees`)	`M = (2/11) (30H +/- 90)`	22 times in 12 hrs; 44 times in 24 hrs	Loses 1 occurrence between 2–4 and 1 between 8–10

Clock / Calendar Concept	Governing Mathematical Formula	Frequency per 12 Hours / 24 Hours / Century	Exam Special Exception		
Century Odd Days (**100, 200, 300, 400**)	**Odd Days = 5, 3, 1, 0**	Last days of a century can ONLY be: Fri(5), Wed(3), Mon(1), Sun(0)	Century can NEVER end on Tuesday, Thursday, or Saturday		
Calendar Year Repetition	`LY: +28	LY+1: +6	LY+2/3: +11`	Preserves both Jan 1 weekday and 365/366 length	Break rule if a non-leap century (**1700, 1800, 1900**) falls inside span

Did You Know?: In 400 consecutive years of the Gregorian calendar, the 29th day of a month occurs **4,497 times** (**400 * 11 = 4,400** in non-February months plus **97** times on February 29 in leap years), whereas February 29 itself occurs **97 times**!

Exam Trap Alert: Read carefully whether the exam asks "*How many times does the 29th date occur in 400 years?*" (**4,497**) versus "*How many leap years (29th February) occur in 400 years?*" (**97**).

★ **Memory Trick:** For **Century Odd Days (5, 3, 1, 0)**, remember that the **Last Day of a Century** can only be **Sun(0), Mon(1), Wed(3), or Fri(5)**; the **First Day of a Century** can only be **Mon, Tue, Thu, or Sat** (Monday is the only day that can be both first and last day of a century!).

Chapter *6* Comprehensive Analytical & Statutory Revision Matrix

Core Sub-Domain	Key Concept / Provision	Verified Analytical Parameters & Exam Distinctions (SSC Official Portal)
Clock Mechanics, Angular Speeds, and Coincidence Formulas	**Angular Speeds of Clock Hands**	A circular clock dial spans **360 degrees** divided into 12 hour sectors (**30 degrees** each) and 60 minute spaces (**6 degrees** each)
Calendar Odd Days, Leap Year Rules, and Calendar Repetition	**Minute Hand Speed**	Covers **360 degrees** in 60 minutes = **6 degrees per minute**.
Clock Mechanics, Angular Speeds, and Coincidence Formulas	**Hour Hand Speed**	Covers **30 degrees** in 60 minutes = **0.5 degrees per minute**.
Calendar Odd Days, Leap Year Rules, and Calendar Repetition	**Relative Angular Speed**	The minute hand gains **6 - 0.5 = 5.5 degrees** (**11/2 degrees**) over the hour hand every minute, or **55 minute spaces** in 60 minutes (hence the multiplier **12/11**).

Core Sub-Domain	Key Concept / Provision	Verified Analytical Parameters & Exam Distinctions (SSC Official Portal)
Clock Mechanics, Angular Speeds, and Coincidence Formulas	**Universal Clock Angle Formula**	At `H` hours and `M` minutes, the angle `Theta` between the hour hand and minute hand is
Calendar Odd Days, Leap Year Rules, and Calendar Repetition	**Exact Minute Calculation for Target Angle** `Theta`	Between `H` and `(H+1)` o'clock, the hands are at angle `Theta` at `M = (2/11) (30H +/- Theta)` minutes past `H`.
Clock Mechanics, Angular Speeds, and Coincidence Formulas	**Vertical Mirror Image**	Subtract given time from `11:60` (or `23:60` if between 11:00 and 1:00).
Calendar Odd Days, Leap Year Rules, and Calendar Repetition	**Horizontal Water Image**	Subtract given time from `18:30` (if minutes `<= 30`) or `17:90` (if minutes `> 30`).
Clock Mechanics, Angular Speeds, and Coincidence Formulas	**Ordinary Year (*365 days*)**	`365 = 52 weeks + 1 odd day`. Starts and ends on the **same day of the week**.
Calendar Odd Days, Leap Year Rules, and Calendar Repetition	**Leap Year (*366 days*)**	`366 = 52 weeks + 2 odd days`. Ends on the day **immediately following** its first day.
Clock Mechanics, Angular Speeds, and Coincidence Formulas	**Century Leap Year Rule**	A non-century year is a leap year if divisible by `4`; a century year (`1700, 1800, 1900, 2000`) is a leap year ONLY if divisible by `400`. Thus, every 400 consecutive years contain exactly `(24 * 3) + 25 = 97` leap years!

Chapter *6* Multi-Statement Exam Verification Drills

Chapter 6 Statement-Verification Drill #1 — Both Statements Verified Correct

Statement-I (Angular Speeds of Clock Hands): A circular clock dial spans `360 degrees` divided into 12 hour sectors (`30 degrees` each) and 60 minute spaces (`6 degrees` each)

Statement-II (Minute Hand Speed): Covers `360 degrees` in 60 minutes = `6 degrees per minute`.

✓ **Exam Verification Key: Both Statement-I and Statement-II are factually accurate as per SSC Official Portal & IUC Academy.**

Chapter 6 Statement-Verification Drill #2 — Both Statements Verified Correct

Statement-I (Hour Hand Speed): Covers `30 degrees` in 60 minutes = `0.5 degrees per minute`.

Statement-II (Relative Angular Speed): The minute hand gains `6 - 0.5 = 5.5 degrees` (`11/2 degrees`) over the hour hand every minute, or `55 minute spaces` in 60 minutes (hence the multiplier `12/11`).

✓ **Exam Verification Key: Both Statement-I and Statement-II are factually accurate as per SSC Official Portal & IUC Academy.**

Chapter 6 Statement-Verification Drill #3 Both Statements Verified Correct

Statement-I (Universal Clock Angle Formula): At `H` hours and `M` minutes, the angle `Theta` between the hour hand and minute hand is

Statement-II (Exact Minute Calculation for Target Angle `Theta`): Between `H` and `(H+1)` o'clock, the hands are at angle `Theta` at `M = (2/11) (30H +/- Theta)` minutes past `H`.

✓ **Exam Verification Key: Both Statement-I and Statement-II are factually accurate as per SSC Official Portal & IUC Academy.**

Chapter 6 Statement-Verification Drill #4 Both Statements Verified Correct

Statement-I (Vertical Mirror Image): Subtract given time from `11:60` (or `23:60` if between 11:00 and 1:00).

Statement-II (Horizontal Water Image): Subtract given time from `18:30` (if minutes `<= 30`) or `17:90` (if minutes `> 30`).

✓ **Exam Verification Key: Both Statement-I and Statement-II are factually accurate as per SSC Official Portal & IUC Academy.**

Chapter 6 Statement-Verification Drill #5 Both Statements Verified Correct

Statement-I (Ordinary Year (365 days)): `365 = 52 weeks + 1 odd day`. Starts and ends on the **same day of the week**.

Statement-II (Leap Year (366 days)): `366 = 52 weeks + 2 odd days`. Ends on the day **immediately following** its first day.

✓ **Exam Verification Key: Both Statement-I and Statement-II are factually accurate as per SSC Official Portal & IUC Academy.**

Chapter 7: Cubes, Standard & Open Dice, Counting Figures & Non-Verbal Spatial Reasoning

Chapter Key Study Pillars — Chapter 7: Cubes, Standard & Open Dice, Counting Figures & Non-Verbal Spatial Reasoning

Key Study Pillar 1
Standard vs. General Dice and Open Dice Folding Rules

Key Study Pillar 2
Painted Cube Cutting and Analytical Figure Counting Formulas

7.1 Standard vs. General Dice and Open Dice Folding Rules

• **Standard Dice vs. General (Ordinary) Dice:**

• **Standard Dice:** No two visible adjacent faces sum to 7, and every pair of opposite faces sums strictly to 7 (`1 <-> 6`, `2 <-> 5`, `3 <-> 4`).

• **General Dice:** At least one pair of visible adjacent faces sums to 7 (`Face_A + Face_B = 7`), so opposite faces must be deduced using multiple views (SSC Official Portal).

• **Three Golden Rules for Multi-View Dice Deduction:**

1. **One-Face Common Rule (Clockwise Rotation):** If two views share exactly one common face, write the faces in **Clockwise order** starting from the common face in both views; matching vertical columns are opposite pairs, and the missing 6th number is opposite the common face.

2. **Two-Faces Common Rule:** If two views share two common faces, the remaining **third unshared faces** in both views are strictly opposite to each other.

3. **Adjacent Elimination Rule:** A face can never be opposite to any of its 4 adjacent neighbours.

• **Open (Unfolded) Dice Alternate-Square Rule:** On any straight horizontal or vertical strip of 3 or 4 squares in an unfolded net, **alternate squares (separated by 1 square)** fold to become opposite faces (`Square 1 <-> Square 3` and `Square 2 <-> Square 4`). Two opposite faces can **NEVER** be seen together or hidden together in a valid 3D perspective view.

7.2 Painted Cube Cutting and Analytical Figure Counting Formulas

• **Painted Cube Slicing Formulas (`n = L / l`, Total Small Cubes = `n^3`):** When a large cube of side `L` painted on all 6 faces is sliced into `n^3` smaller equal cubes of side `l` (requiring `3*(n - 1)` total cuts) (NCERT Official Textbooks):

• **3-Faces Painted (Corner Cubes):** Always `8` (for `n >= 2`).

• **2-Faces Painted (Middle-Edge Cubes):** `12 * (n - 2)`.

• **1-Face Painted (Central-Face Cubes):** `6 * (n - 2)^2`.

• **0-Face Painted (Inner Core Cubes):** `(n - 2)^3`.

• **Analytical Figure Counting Shortcuts (IUC Academy):**

• **Triangles in a Base-Divided Apex Triangle (`k` base parts, `h` horizontal lines):** `Total = [k (k + 1) / 2] h`.

• **Triangles in a Square/Rectangle with Both Diagonals (`m` inner parts):** `Total = 2 * m` (for example, 4 parts -> 8 triangles; 8 parts -> 16 triangles).

• **Squares in an `m x n` Grid (`m >= n`):** `sum(m - i)(n - i)`; *for a symmetric* `n x n` *chessboard grid:* `n(n + 1)*(2n + 1) / 6`.

• **Rectangles (Including Squares) in an `m x n` Grid:** `[m(m + 1) / 2] [n(n + 1) / 2]`; *for an* `n x n` *grid:* `[n(n + 1) / 2]^2`.

Step-by-Step Conceptual Process Flowchart

STEP 1 — Compute Division Ratio n = Big_Side / Small_Side

STEP 2 — Apply Cube Formulas (8, 12(n-2), 6(n-2)^2, (n-2)^3)

STEP 3 — For Dice, Identify 1-Common or Alternate Open-Net Pairs

STEP 4 — Eliminate Views Showing Two Opposite Faces Together

Spatial / Geometric Problem	Exact Algebraic Formula	Sample Value (`n = 4` or `4x4` Grid)	Verification Check
Cube Cuts for `n^3` Pieces	`Total_Cuts = 3 * (n - 1)`	For `n = 4` (`64` cubes): `3 * 3 = 9 cuts`	Minimum cuts when all 3 axes have equal divisions
2-Face & 1-Face Painted Cubes	`2-Face = 12(n-2)`; `1-Face = 6` (n-2)^2	For `n = 4`: `2-Face = 24`; `1-Face = 24`	`8 + 24 + 24 + 8 = 64 = 4^3` total cubes
Squares in `n x n` Grid	`n(n + 1)(2n + 1) / 6`	For `4 x 4` grid: `459 / 6 = 30 squares`	Sum of squares: `1^2 + 2^2 + 3^2 + 4^2 = 30`
Total Rectangles in `n x n` Grid	`[n*(n + 1) / 2]^2`	For `4 x 4` grid: `(10)^2 = 100 rectangles`	Pure rectangles (excluding squares) = `100 - 30 = 70`

Spatial / Geometric Problem	Exact Algebraic Formula	Sample Value (`n = 4` or `4x4` Grid)	Verification Check
Symmetric Apex Triangle (`n` tiers)	`floor[n(n + 2)(2n + 1) / 8]`	For `n = 4`: `469 / 8 = 27 triangles`	Standard sequence: `n=1->1, n=2->5, n=3->13, n=4->27, n=5->48`

Did You Know?: On an `8 x 8` standard chessboard, the total number of squares is `8917 / 6 = 204`, while the total number of rectangles (including squares) is `(36)^2 = 1,296` (NCERT Official Textbooks).

Exam Trap Alert: Remember that **every square is mathematically a rectangle**, so "Total Rectangles" (`[n(n+1)/2]^2`) always includes squares! Only subtract squares if the question specifically asks for "*rectangles that are NOT squares*".

★ **Memory Trick:** Memorize the **Symmetric Triangle Formula Sequence** `1, 5, 13, 27, 48, 78` for `n = 1, 2, 3, 4, 5, 6` tiers so you never waste time applying `floor[n(n+2)(2n+1)/8]` during the exam.

Chapter 7 Comprehensive Analytical & Statutory Revision Matrix

Core Sub-Domain	Key Concept / Provision	Verified Analytical Parameters & Exam Distinctions (SSC Official Portal)
Standard vs. General Dice and Open Dice Folding Rules	**Standard Dice**	No two visible adjacent faces sum to 7, and every pair of opposite faces sums strictly to 7 (`1 <-> 6`, `2 <-> 5`, `3 <-> 4`).
Painted Cube Cutting and Analytical Figure Counting Formulas	**General Dice**	At least one pair of visible adjacent faces sums to 7 (`Face_A + Face_B = 7`), so opposite faces must be deduced using multiple views (SSC Official Portal).
Standard vs. General Dice and Open Dice Folding Rules	**One-Face Common Rule (Clockwise Rotation)**	If two views share exactly one common face, write the faces in **Clockwise order** starting from the common face in both views; matching vertical columns are opposite pairs, and the missing 6th number is opposite the common face.
Painted Cube Cutting and Analytical Figure Counting Formulas	**Two-Faces Common Rule**	If two views share two common faces, the remaining **third unshared faces** in both views are strictly opposite to each other.
Standard vs. General Dice and Open Dice Folding Rules	**Adjacent Elimination Rule**	A face can never be opposite to any of its 4 adjacent neighbours.
Painted Cube Cutting and Analytical Figure Counting Formulas	**Open (Unfolded) Dice Alternate-Square Rule**	On any straight horizontal or vertical strip of 3 or 4 squares in an unfolded net, **alternate squares (separated by 1 square)** fold to become opposite faces (`Square 1 <-> Square 3` and `Square 2 <-> Square 4`). Two opposite faces can **NEVER** be seen together or hidden together in a valid 3D perspective view.

Core Sub-Domain	Key Concept / Provision	Verified Analytical Parameters & Exam Distinctions (SSC Official Portal)
Standard vs. General Dice and Open Dice Folding Rules	Painted Cube Slicing Formulas (`n = L / l`, Total Small Cubes = `n^3`)	When a large cube of side `L` painted on all 6 faces is sliced into `n^3` smaller equal cubes of side `l` (requiring `3*(n - 1)` total cuts) (NCERT Official Textbooks)
Painted Cube Cutting and Analytical Figure Counting Formulas	3-Faces Painted (Corner Cubes)	Always `8` (for `n >= 2`).
Standard vs. General Dice and Open Dice Folding Rules	Triangles in a Base-Divided Apex Triangle (`k` base parts, `h` horizontal lines)	`Total = [k (k + 1) / 2] h`.
Painted Cube Cutting and Analytical Figure Counting Formulas	Triangles in a Square/ Rectangle with Both Diagonals (`m` inner parts)	`Total = 2 * m` (for example, 4 parts -> 8 triangles; 8 parts -> 16 triangles).
Standard vs. General Dice and Open Dice Folding Rules	Squares in an `m x n` Grid (`m >= n`)	`sum(m - i)(n - i)`; *for a symmetric* `n x n` *chessboard grid:* `n(n + 1)*(2n + 1) / 6`.
Painted Cube Cutting and Analytical Figure Counting Formulas	Rectangles (Including Squares) in an `m x n` Grid	`[m(m + 1) / 2] [n(n + 1) / 2]`; *for an* `n x n` *grid:* `[n(n + 1) / 2]^2`.

Chapter 7 Multi-Statement Exam Verification Drills

Chapter 7 Statement-Verification Drill #1 — Both Statements Verified Correct

Statement-I (Standard Dice): No two visible adjacent faces sum to 7, and every pair of opposite faces sums strictly to 7 (`1 <-> 6`, `2 <-> 5`, `3 <-> 4`).

Statement-II (General Dice): At least one pair of visible adjacent faces sums to 7 (`Face_A + Face_B = 7`), so opposite faces must be deduced using multiple views (SSC Official Portal).

✓ **Exam Verification Key: Both Statement-I and Statement-II are factually accurate as per SSC Official Portal & IUC Academy.**

Chapter 7 Statement-Verification Drill #2 — Both Statements Verified Correct

Statement-I (One-Face Common Rule (Clockwise Rotation)): If two views share exactly one common face, write the faces in **Clockwise order** starting from the common face in both views; matching vertical columns are opposite pairs, and the missing 6th number is opposite the common face.

Statement-II (Two-Faces Common Rule): If two views share two common faces, the remaining **third unshared faces** in both views are strictly opposite to each other.

✓ **Exam Verification Key: Both Statement-I and Statement-II are factually accurate as per SSC Official Portal & IUC Academy.**

Chapter 7 Statement-Verification Drill #3 Both Statements Verified Correct

Statement-I (Adjacent Elimination Rule): A face can never be opposite to any of its 4 adjacent neighbours.
Statement-II (Open (Unfolded) Dice Alternate-Square Rule): On any straight horizontal or vertical strip of 3 or 4 squares in an unfolded net, **alternate squares (separated by 1 square)** fold to become opposite faces (`Square 1 <-> Square 3` and `Square 2 <-> Square 4`). Two opposite faces can **NEVER** be seen together or hidden together in a valid 3D perspective view.

✓ **Exam Verification Key: Both Statement-I and Statement-II are factually accurate as per SSC Official Portal & IUC Academy.**

Chapter 7 Statement-Verification Drill #4 Both Statements Verified Correct

Statement-I (Painted Cube Slicing Formulas (`n = L / l`, Total Small Cubes = `n^3`)): When a large cube of side `L` painted on all 6 faces is sliced into `n^3` smaller equal cubes of side `l` (requiring `3*(n - 1)` total cuts) (NCERT Official Textbooks)
Statement-II (3-Faces Painted (Corner Cubes)): Always `8` (for `n >= 2`).

✓ **Exam Verification Key: Both Statement-I and Statement-II are factually accurate as per SSC Official Portal & IUC Academy.**

Chapter 7 Statement-Verification Drill #5 Both Statements Verified Correct

Statement-I (Triangles in a Base-Divided Apex Triangle (`k` base parts, `h` horizontal lines)): `Total = [k (k + 1) / 2] h`.
Statement-II (Triangles in a Square/Rectangle with Both Diagonals (`m` inner parts)): `Total = 2 * m` (for example, 4 parts -> 8 triangles; 8 parts -> 16 triangles).

✓ **Exam Verification Key: Both Statement-I and Statement-II are factually accurate as per SSC Official Portal & IUC Academy.**

Chapter 7 Statement-Verification Drill #6 Both Statements Verified Correct

Statement-I (Squares in an `m x n` Grid (`m >= n`)): `sum(m - i)(n - i)`; *for a symmetric* `n x n` *chessboard grid:* `n`(n + 1)*(2n + 1) / 6.
Statement-II (Rectangles (Including Squares) in an `m x n` Grid): `[m(m + 1) / 2] [n(n + 1) / 2]`; *for an* `n x n` *grid:* `[n`(n + 1) / 2]^2.

✓ **Exam Verification Key: Both Statement-I and Statement-II are factually accurate as per SSC Official Portal & IUC Academy.**

Chapter *8:* Critical Reasoning — Statement-Assumptions, Arguments, Conclusions & Courses of Action

Chapter Key Study Pillars — Chapter 8: Critical Reasoning — Statement-Assumptions, Arguments, Conclusions & Courses of Action

Key Study Pillar 1
Statement and Assumptions vs. Statement and Conclusions

Key Study Pillar 2
Statement and Arguments, Courses of Action, and Cause-Effect

8.1 Statement and Assumptions vs. Statement and Conclusions

• **Assumption (Unsaid Premise):** An assumption is a hidden, unstated premise taken for granted by the speaker *before* making the statement. If the assumption is negated and the main statement collapses or becomes meaningless (the **Negation Test**), then the assumption is **Implicit** (SSC Official Portal).

• **Core Rules for Implicit Assumptions:**

• Official public notices, warnings, advertisements, and government appeals are **always assumed to be read, heeded, and effective**.

• Extreme/exclusive words (**Only**, **Every**, **Solely**, **Never**, **Definitely**) in an assumption usually render it **Invalid/Explicitly False** unless that exact exclusivity is stated in the text.

• **Conclusion (Logical Consequence):** A conclusion must be 100% derivable *directly* from the information explicitly provided in the statement without bringing in external assumptions. Restatement of the premise or a strict subset of a universal claim in the statement is valid (IUC Academy).

8.2 Statement and Arguments, Courses of Action, and Cause-Effect

• **Strong vs. Weak Arguments:**

• **Strong Argument:** Addresses the core issue directly, relies on empirical logic, constitutional principles, or public welfare, and explains *why* a policy should or should not be adopted.

• **Weak Argument:** Relies on copycat comparisons ("*Country X did it, so we should too*"), emotional exaggeration, ambiguous generalizations, or merely restates the question.

• **Course of Action (Administrative Remedies):**

• Must be **practically feasible**, **proportionate** to the severity of the problem, and must **reduce or solve** the root problem without creating a larger secondary crisis.

• Harsh/extreme termination actions ("*Shut down all factories permanently*", "*Dismiss all officials immediately without inquiry*") are almost always **Invalid**.

• **Cause and Effect Analysis:**

• Check **Chronological Precedence** (the cause must precede the effect in time) and **Direct Causal Mechanism**; if two events are both consequences of a third common factor (for example, rising vegetable prices and damaged highways both caused by torrential monsoon floods), classify them as **Effects of a Common Cause**.

Step-by-Step Conceptual Process Flowchart

STEP 1
Identify Statement Scope & Author's Core Intent

STEP 2
Apply Negation Test for Assumptions / Direct Proof for Conclusions

STEP 3
Eliminate Extreme Modifiers ('Only', 'Never', 'All') & Copycat Arguments

STEP 4
Select Proportionate, Feasible Administrative Remedies

Critical Reasoning Type	Core Question Asked	Golden Validation Test	Automatic Elimination Red Flags
Statement & Assumption	What did the author take for granted *before* speaking?	**Negation Test:** Negating the assumption destroys the statement's purpose	Restatements, contrary claims, or extreme words (**Only**, **Alone**)
Statement & Conclusion	What follows with 100% certainty *after* reading the text?	**Strict Containment Test:** Zero outside knowledge required	Speculations, future predictions, or generalizations beyond text
Statement & Argument	Is the 'Yes/No' reasoning substantive or superficial?	**Causal & Public-Policy Test:** Explains concrete impact with evidence	Foreign imitation ("Country X does it"), emotional rhetoric, truisms

Critical Reasoning Type	Core Question Asked	Golden Validation Test	Automatic Elimination Red Flags
Course of Action	Does this administrative step practically solve or mitigate the crisis?	**Feasibility & Proportionality Test:** Solves issue without new harm	Extreme bans, mass firing without inquiry, fatalistic inaction
Cause & Effect	Did Event A directly trigger Event B, or do both share a root cause?	**Temporal + Direct Mechanism Test:** Cause precedes and drives Effect	Reversing chronology or confusing correlated symptoms

Did You Know?: In civil services and Staff Selection Commission (SSC) Tier-II exams, critical reasoning items evaluate administrative decision-making aligned with constitutional proportionality and natural justice (**Audi alteram partem** — hear the other side before punishment).

Exam Trap Alert: Do **not** apply real-world personal opinions to **Statement & Conclusion** questions; if the statement says "*All politicians are honest*", you must treat that premise as 100% factual for that question!

★ **Memory Trick:** Use **P-R-E-P** for **Course of Action** on IUC Academy: **P**ractical, **R**oot-cause focused, **E**thically proportionate, and **P**reventive of future recurrence.

Chapter *8* Comprehensive Analytical & Statutory Revision Matrix

Core Sub-Domain	Key Concept / Provision	Verified Analytical Parameters & Exam Distinctions (SSC Official Portal)
Statement and Assumptions vs. Statement and Conclusions	**Assumption (Unsaid Premise)**	An assumption is a hidden, unstated premise taken for granted by the speaker *before* making the statement. If the assumption is negated and the main statement collapses or becomes meaningless (the **Negation Test**), then the assumption is **Implicit** (SSC Official Portal).
Statement and Arguments, Courses of Action, and Cause-Effect	**Conclusion (Logical Consequence)**	A conclusion must be 100% derivable *directly* from the information explicitly provided in the statement without bringing in external assumptions. Restatement of the premise or a strict subset of a universal claim in the statement is valid (IUC Academy).
Statement and Assumptions vs. Statement and Conclusions	**Strong Argument**	Addresses the core issue directly, relies on empirical logic, constitutional principles, or public welfare, and explains *why* a policy should or should not be adopted.
Statement and Arguments, Courses of Action, and Cause-Effect	**Weak Argument**	Relies on copycat comparisons ("*Country X did it, so we should too*"), emotional exaggeration, ambiguous generalizations, or merely restates the question.

Chapter 8 Multi-Statement Exam Verification Drills

Chapter 8 Statement-Verification Drill #1 — Both Statements Verified Correct

Statement-I (Assumption (Unsaid Premise)): An assumption is a hidden, unstated premise taken for granted by the speaker *before* making the statement. If the assumption is negated and the main statement collapses or becomes meaningless (the **Negation Test**), then the assumption is **Implicit** (SSC Official Portal).

Statement-II (Conclusion (Logical Consequence)): A conclusion must be 100% derivable *directly* from the information explicitly provided in the statement without bringing in external assumptions. Restatement of the premise or a strict subset of a universal claim in the statement is valid (IUC Academy).

✓ **Exam Verification Key: Both Statement-I and Statement-II are factually accurate as per SSC Official Portal & IUC Academy.**

Chapter 8 Statement-Verification Drill #2 — Both Statements Verified Correct

Statement-I (Strong Argument): Addresses the core issue directly, relies on empirical logic, constitutional principles, or public welfare, and explains *why* a policy should or should not be adopted.

Statement-II (Weak Argument): Relies on copycat comparisons (*"Country X did it, so we should too"*), emotional exaggeration, ambiguous generalizations, or merely restates the question.

✓ **Exam Verification Key: Both Statement-I and Statement-II are factually accurate as per SSC Official Portal & IUC Academy.**

Solved Exam Practice Questions (MCQs)

Practice Question #1 — Solved Exam MCQ

1. **In a certain code language, `VICTORY` is written as `YLFWRUB`. How will `SUCCESS` be written in that code language?** (SSC Official Portal)
(A) VXFFHVV
(B) VYEEHVV
(C) VXEEIVV
(D) TWDDGTT
Answer: (A) VXFFHVV — **Explanation:** Each letter is shifted forward by `+3` positions (`S+3=V, U+3=X, C+3=F, C+3=F, E+3=H, S+3=V, S+3=V`).

Practice Question #2 — Solved Exam MCQ

2. **If `MACHINE` is coded as `19-7-9-14-15-20-11`, how will `DANGER` be coded?** (IUC Academy)
(A) 11-7-20-16-11-24
(B) 10-7-20-13-11-24
(C) 13-7-20-9-11-25
(D) 10-8-21-13-12-24
Answer: (B) 10-7-20-13-11-24 — **Explanation:** Each letter's forward position (`P_i`) is increased by `+6`: `D(4)+6=10, A(1)+6=7, N(14)+6=20, G(7)+6=13, E(5)+6=11, R(18)+6=24`.

Practice Question #3 Solved Exam MCQ

3. **If `GO = 32` and `SHE = 49`, then `SOME` will be equal to:** (SSC Official Portal)
(A) 52
(B) 56
(C) 58
(D) 62
Answer: (B) 56 — **Explanation:** Sum of reverse alphabetical positions (`27 - P_i`): `S(27-19=8) + O(27-15=12) + M(27-13=14) + E(27-5=22) = 56`.

Practice Question #4 Solved Exam MCQ

4. **Which letter is 8th to the right of the 12th letter from the left end of the English alphabet?** (IUC Academy)
(A) S
(B) T
(C) U
(D) V
Answer: (B) T — **Explanation:** Opposite directions (`Left + Right`) add up: `12 + 8 = 20th` letter from the left end, which is `T`.

Practice Question #5 Solved Exam MCQ

5. **Find the missing number in the series:** `7, 15, 31, 63, 127, ?` (SSC Official Portal)
(A) 254
(B) 255
(C) 256
(D) 253
Answer: (B) 255 — **Explanation:** Pattern follows `T_(n+1) = 2T_n + 1`: `127` 2 + 1 = 255.

Practice Question #6 Solved Exam MCQ

6. **Statements: (I) Some mangoes are yellow. (II) Some tixo are mangoes. Conclusions: I. Some mangoes are green. II. Tixo is a yellow.** (SSC Official Portal)
(A) Only conclusion I follows
(B) Only conclusion II follows
(C) Either I or II follows
(D) Neither I nor II follows
Answer: (D) Neither I nor II follows — **Explanation:** "Green" is not mentioned in the statements, and there is no definite relation between `tixo` and `yellow`.

Practice Question #7 Solved Exam MCQ

7. **Statements: (I) Only a few rivers are oceans. (II) All oceans are glaciers. Conclusions: I. All rivers can never be oceans. II. Some rivers are glaciers.** (IUC Academy)
(A) Only I follows
(B) Only II follows
(C) Both I and II follow
(D) Neither I nor II follows
Answer: (C) Both I and II follow — **Explanation:** "Only a few rivers are oceans" means `Some rivers are oceans` AND `Some rivers are not oceans`, so all rivers can never be oceans (I is true), and the overlap of rivers with oceans lies inside glaciers (II is true).

Practice Question #8 Solved Exam MCQ

8. **Statements: (I) Some desks are chairs. (II) No chair is a table. Conclusions: I. Some desks are tables. II. No desk is a table.** (SSC Official Portal)
(A) Only I follows
(B) Only II follows
(C) Either I or II follows
(D) Both I and II follow
Answer: (C) Either I or II follows — **Explanation:** While **Some desks are not tables** is definitely true, both **Some desks are tables** and **No desk is a table** are individually uncertain and form a complementary **Some + No** pair with identical variables.

Practice Question #9 Solved Exam MCQ

9. **Pointing to a photograph, Bajpai said, "He is the son of the only daughter of the father of my brother." How is Bajpai related to the man in the photograph?** (SSC Official Portal)
(A) Nephew
(B) Brother
(C) Father
(D) Maternal Uncle
Answer: (D) Maternal Uncle — **Explanation:** "Father of my brother" = Bajpai's father; "Only daughter of my father" = Bajpai's sister; "Son of Bajpai's sister" = Nephew, so Bajpai is his Maternal Uncle.

Practice Question #10 Solved Exam MCQ

10. **If A + B means A is the mother of B; A - B means A is the brother of B; A % B means A is the father of B; and A x B means A is the sister of B, which shows that P is the maternal uncle of Q?** (IUC Academy)
(A) **Q - N + M x P**
(B) **P + S x N - Q**
(C) **P - M + N x Q**
(D) **Q - S % P**
Answer: (C) **P - M + N x Q** — **Explanation:** **P - M** means P is brother of M; **M + N** means M is mother of N; **N x Q** means N is sister of Q. Thus M is mother of Q and P is M's brother (maternal uncle of Q).

Practice Question #11 Solved Exam MCQ

11. **A man walks 5 km toward South and then turns to the right. After walking 3 km he turns to the left and walks 5 km. Now in which direction is he from the starting place?** (SSC Official Portal)
(A) West
(B) South
(C) North-East
(D) South-West
Answer: (D) South-West — **Explanation:** Net movement: **5 km South + 5 km South = 10 km South**, and **3 km West** (right turn from South is West). Hence he is South-West of the starting point.

Practice Question #12 Solved Exam MCQ

12. **Rohan walks 12 km North, turns East and walks 5 km. What is the shortest distance between his starting point and final point?** (NCERT Official Textbooks)
(A) 13 km
(B) 15 km
(C) 17 km
(D) 14 km
Answer: (A) 13 km — **Explanation:** By Pythagoras theorem, `Distance = sqrt(12^2 + 5^2) = sqrt(144 + 25) = sqrt(169) = 13 km`.

Practice Question #13 Solved Exam MCQ

13. **One morning after sunrise, Suresh was standing facing a pole. The shadow of the pole fell exactly to his right. Which direction was Suresh facing?** (SSC Official Portal)
(A) East
(B) South
(C) West
(D) North
Answer: (B) South — **Explanation:** In the morning, the shadow falls toward the West. Since West is to Suresh's right, Suresh must be facing South.

Practice Question #14 Solved Exam MCQ

14. **In a row of 40 students facing North, Ramesh is 14th from the left end. What is his rank from the right end?** (IUC Academy)
(A) 26th
(B) 27th
(C) 25th
(D) 28th
Answer: (B) 27th — **Explanation:** `Rank_Right = Total - Rank_Left + 1 = 40 - 14 + 1 = 27th`.

Practice Question #15 Solved Exam MCQ

15. **In a row of boys, A is 10th from the left and B is 9th from the right. When they interchange positions, A becomes 15th from the left. How many boys are there in the row?** (SSC Official Portal)
(A) 23
(B) 24
(C) 22
(D) 25
Answer: (A) 23 — **Explanation:** A's new position from left (15th) equals B's old position from right (9th). `Total = 15 + 9 - 1 = 23`.

Practice Question #16 Solved Exam MCQ

16. **Eight persons A, B, C, D, E, F, G, H sit along a circular table facing the center in clockwise order at equal distances. If C sits exactly in the North, who sits in the South-West?** (IUC Academy)
(A) F
(B) G
(C) H
(D) E
Answer: (C) H — **Explanation:** Clockwise from North (`C`): `C=N, D=NE, E=E, F=SE, G=S, H=SW, A=W, B=NW`. Thus `H` sits in the South-West.

Practice Question #17 Solved Exam MCQ

17. **Six friends P, Q, R, S, T, and U sit along a circular table facing the center. P sits second to the right of Q, who sits immediately to the left of R. S sits opposite to R. Who sits opposite to P?** (SSC Official Portal)
(A) Q
(B) R
(C) T or U
(D) S
Answer: (C) T or U — **Explanation:** Seat indices (1 to 6 anti-clockwise): `Q=1, R=2, P=3, S=5`. Seat opposite `P(3)` is Seat `6`, which is occupied by either `T` or `U`.

Practice Question #18 Solved Exam MCQ

18. **What is the angle between the minute hand and the hour hand of a clock when the time is 4:20?** (SSC Official Portal)
(A) 0 degrees
(B) 10 degrees
(C) 5 degrees
(D) 20 degrees
Answer: (B) 10 degrees — **Explanation:** `Theta = |30H - (11/2)M| = |304 - 5.520| = |120 - 110| = 10 degrees`.

Practice Question #19 Solved Exam MCQ

19. **At what exact time between 3 o'clock and 4 o'clock will the hands of a clock coincide?** (IUC Academy)
(A) 15 minutes past 3
(B) 16 and 4/11 minutes past 3
(C) 16 and 2/11 minutes past 3
(D) 17 and 1/11 minutes past 3
Answer: (B) 16 and 4/11 minutes past 3 — **Explanation:** `M = (60/11) H = (60/11) 3 = 180/11 = 16 and 4/11 minutes` past 3.

Practice Question #20 Solved Exam MCQ

20. **If a clock shows 8:25 in a vertical plane mirror, what is the actual time?** (SSC Official Portal)
(A) 3:35
(B) 4:35
(C) 3:25
(D) 4:25
Answer: (A) 3:35 — **Explanation:** Subtract from `11:60`: `11:60 - 08:25 = 03:35`.

Practice Question #21 Solved Exam MCQ

21. **How many times are the hands of a clock at right angles (`90 degrees`) in a 24-hour day?** (SSC Official Portal)
(A) 22
(B) 24
(C) 44
(D) 48
Answer: (C) 44 — **Explanation:** The hands form a right angle 22 times every 12 hours, and `22 * 2 = 44 times` in 24 hours.

Practice Question #22 Solved Exam MCQ

22. **If 1st January 2006 was a Sunday, what was the day of the week on 1st January 2010?** (SSC Official Portal)
(A) Thursday
(B) Friday
(C) Saturday
(D) Sunday
Answer: (B) Friday — **Explanation:** Odd days from Jan 1, 2006 to Jan 1, 2010: **2006(1) + 2007(1) + 2008(2, leap year) + 2009(1) = 5 odd days**. **Sunday + 5 = Friday**.

Practice Question #23 Solved Exam MCQ

23. **What was the day of the week on 15th August 1947?** (IUC Academy)
(A) Thursday
(B) Friday
(C) Saturday
(D) Wednesday
Answer: (B) Friday — **Explanation:** **1600 yrs(0) + 300 yrs(1) + 46 yrs(11 leap + 35 ord = 57 = 1 odd day) + Jan-Aug 15, 1947 (3+0+3+2+3+2+3+15 = 31 = 3 odd days)**. Total = **0 + 1 + 1 + 3 = 5** = Friday.

Practice Question #24 Solved Exam MCQ

24. **The calendar for the year 2025 will be identical to the calendar for which upcoming year?** (SSC Official Portal)
(A) 2031
(B) 2036
(C) 2030
(D) 2033
Answer: (A) 2031 — **Explanation:** **2025 = 2024 (Leap Year) + 1**. A **LY + 1** year repeats after **+6** years: **2025 + 6 = 2031**.

Practice Question #25 Solved Exam MCQ

25. **Which of the following cannot be the last day of a century?** (SSC Official Portal)
(A) Monday
(B) Wednesday
(C) Tuesday
(D) Friday
Answer: (C) Tuesday — **Explanation:** Century odd days can only be **5 (Fri), 3 (Wed), 1 (Mon), or 0 (Sun)**. Tuesday, Thursday, and Saturday can never be the last day of a century.

Practice Question #26 Solved Exam MCQ

26. **A large solid cube is painted red on all six faces and then cut into 125 smaller identical cubes. How many small cubes have exactly two faces painted?** (NCERT Official Textbooks)
(A) 24
(B) 36
(C) 48
(D) 54
Answer: (B) 36 — **Explanation:** Since **n^3 = 125**, **n = 5**. Cubes with 2 faces painted = **12 (*n* - 2) = 12 (5 - 2) = 36**.

Practice Question #27 Solved Exam MCQ

27. **In the same 125-cube problem (`n = 5`), how many small cubes have NO face painted at all?** (IUC Academy)
(A) 8
(B) 16
(C) 27
(D) 36
Answer: (C) 27 — **Explanation:** Cubes with 0 faces painted = `(n - 2)^3 = (5 - 2)^3 = 3^3 = 27`.

Practice Question #28 Solved Exam MCQ

28. **Two positions of a dice are shown: View 1 shows `(2, 3, 5)` and View 2 shows `(2, 4, 6)` such that moving clockwise from `2` gives `2 -> 3 -> 5` in View 1 and `2 -> 4 -> 6` in View 2. Which number is opposite to `1`?** (SSC Official Portal)
(A) 2
(B) 3
(C) 5
(D) 6
Answer: (A) 2 — **Explanation:** By the One-Face Common Rule, `3 <-> 4` and `5 <-> 6`, so the common face `2` is opposite to the unseen number `1`.

Practice Question #29 Solved Exam MCQ

29. **How many squares are there in a standard `5 x 5` square grid?** (NCERT Official Textbooks)
(A) 50
(B) 55
(C) 60
(D) 45
Answer: (B) 55 — **Explanation:** `Total Squares = n(n + 1)(2n + 1) / 6 = 5 6 11 / 6 = 55`.

Practice Question #30 Solved Exam MCQ

30. **How many triangles are formed inside a square when both of its main diagonals and both mid-point joining lines (forming 8 small inner compartments) are drawn?** (SSC Official Portal)
(A) 12
(B) 14
(C) 16
(D) 18
Answer: (C) 16 — **Explanation:** For a square divided by diagonals and mid-lines into `m = 8` inner triangles, `Total Triangles = 2 m = 2 8 = 16`.

Practice Question #31 Solved Exam MCQ

31. **Statement: "Please do not lean out of the running train" — a notice in a railway compartment. Assumptions: I. People generally pay attention to such notices. II. Leaning out of a running train is dangerous.** (SSC Official Portal)
(A) Only assumption I is implicit
(B) Only assumption II is implicit
(C) Both I and II are implicit
(D) Neither I nor II is implicit
Answer: (C) Both I and II are implicit — **Explanation:** Every public safety warning assumes people will heed it (I) and is issued because the prohibited act poses a real hazard (II).

Practice Question #32 Solved Exam MCQ

32. **Statement: "Should all the unauthorized structures in the city be demolished?" Arguments: I. No, where will the residents of such houses live? II. Yes, this will give a clear message to the general public and they will refrain from constructing unauthorized buildings.** (IUC Academy)
(A) Only argument I is strong
(B) Only argument II is strong
(C) Both I and II are strong
(D) Neither I nor II is strong
Answer: (B) Only argument II is strong — **Explanation:** Upholding statutory building laws and deterring illegal encroachments is a strong legal and public-policy argument, whereas excusing illegality cannot override the rule of law.

Practice Question #33 Solved Exam MCQ

33. **Statement: A large number of people in Ward X of the city are diagnosed to be suffering from a fatal malaria type. Courses of Action: I. The city municipal authority should take immediate steps to carry out extensive fumigation in Ward X. II. The people in the area should be advised to take steps to avoid mosquito bites.** (SSC Official Portal)
(A) Only I follows
(B) Only II follows
(C) Either I or II follows
(D) Both I and II follow
Answer: (D) Both I and II follow — **Explanation:** Both vector-control fumigation by authorities (I) and preventive citizen advisory (II) are practical, complementary public-health measures.

Practice Question #34 Solved Exam MCQ

34. **In a class, 60% of students play cricket, 50% play football, and 20% play both games. What percentage of students play neither cricket nor football?** (NCERT Official Textbooks)
(A) 10%
(B) 15%
(C) 20%
(D) 25%
Answer: (A) 10% — **Explanation:** `n(C union F) = n(C) + n(F) - n(C intersection F) = 60% + 50% - 20% = 90%`. Thus `Neither = 100% - 90% = 10%`.

Practice Question #35 Solved Exam MCQ

35. **Statement:** `P >= Q > R = S <= T < U`. **Conclusions: I.** `P > S` **II.** `U > R` (IUC Academy)
(A) Only I is true
(B) Only II is true
(C) Both I and II are true
(D) Neither I nor II is true
Answer: (C) Both I and II are true — **Explanation:** From `P >= Q > R = S`, we get `P > S` (I is true). From `R = S <= T < U`, we get `R < U` or `U > R` (II is true).

Extended Comparative & Analytical Practice Set (Questions *36* to *75*)

Practice Question #36 High-Yield Comparative MCQ

Q36. With reference to Coding Pattern Category and Core Mathematical / Logical Rule, which of the following is accurately matched with "Constant Forward Shift"?

(A) `C_i = (P_i + k) mod 26`
(B) `C_i = 27 - P_i`
(C) Split `n/2`, reverse each half, add `+1`
(D) `Code = (27 * n) - Forward_Sum`

Correct Answer: (A) | **Explanation:** For **Constant Forward Shift** (Coding Pattern Category), the verified Core Mathematical / Logical Rule is `C_i = (P_i + k) mod 26`. Furthermore, `MIND (13,9,14,4) + 2 -> OKPF (15,11,16,6)`. (Source: SSC Official Portal & IUC Academy).

Practice Question #37 High-Yield Comparative MCQ

Q37. With reference to Coding Pattern Category and Core Mathematical / Logical Rule, which of the following is accurately matched with "Complementary Opposite Pair"?

(A) Split `n/2`, reverse each half, add `+1`
(B) `C_i = 27 - P_i`
(C) `Code = (27 * n) - Forward_Sum`
(D) Apply `If-Then` edge rules on 1st/last elements

Correct Answer: (B) | **Explanation:** For **Complementary Opposite Pair** (Coding Pattern Category), the verified Core Mathematical / Logical Rule is `C_i = 27 - P_i`. Furthermore, `TIGER (20,9,7,5,18) -> GRTVI (7,18,20,22,9)`. (Source: SSC Official Portal & IUC Academy).

Practice Question #38 High-Yield Comparative MCQ

Q38. With reference to Coding Pattern Category and Core Mathematical / Logical Rule, which of the following is accurately matched with "Diagonal Split & Shift"?

(A) `Code = (27 * n) - Forward_Sum`
(B) Apply `If-Then` edge rules on 1st/last elements
(C) Split `n/2`, reverse each half, add `+1`
(D) Every element of A is inside B

Correct Answer: (C) | **Explanation:** For **Diagonal Split & Shift** (Coding Pattern Category), the verified Core Mathematical / Logical Rule is **Split `n/2`, reverse each half, add `+1`**. Furthermore, `MASTER -> SAM + RET -> TBN + SFU`. (Source: SSC Official Portal & IUC Academy).

Practice Question #39 High-Yield Comparative MCQ

Q39. With reference to Coding Pattern Category and Core Mathematical / Logical Rule, which of the following is accurately matched with "Reverse Positional Sum"?

(A) Apply **If-Then** edge rules on 1st/last elements
(B) Every element of A is inside B
(C) Zero overlap between A and B
(D) **Code = (27 * n) - Forward_Sum**

Correct Answer: (D) | **Explanation:** For **Reverse Positional Sum** (Coding Pattern Category), the verified Core Mathematical / Logical Rule is **Code = (27 * n) - Forward_Sum**. Furthermore, **CAT: Forward = 24; Reverse = (27*3) - 24 = 57**. (Source: SSC Official Portal & IUC Academy).

Practice Question #40 High-Yield Comparative MCQ

Q40. With reference to Coding Pattern Category and Core Mathematical / Logical Rule, which of the following is accurately matched with "Conditional Token Coding"?

(A) Apply **If-Then** edge rules on 1st/last elements
(B) Every element of A is inside B
(C) Zero overlap between A and B
(D) At least 1% overlap between A and B

Correct Answer: (A) | **Explanation:** For **Conditional Token Coding** (Coding Pattern Category), the verified Core Mathematical / Logical Rule is **Apply If-Then edge rules on 1st/last elements**. Furthermore, **A7#E%: Vowel start & symbol end -> both coded as $**. (Source: SSC Official Portal & IUC Academy).

Practice Question #41 High-Yield Comparative MCQ

Q41. With reference to Statement Keyword / Modifier and Exact Logical Meaning, which of the following is accurately matched with "All A are B"?

(A) Zero overlap between A and B
(B) Every element of A is inside B
(C) At least 1% overlap between A and B
(D) Both **Some A are B** and **Some A are not B**

Correct Answer: (B) | **Explanation:** For **All A are B** (Statement Keyword / Modifier), the verified Exact Logical Meaning is **Every element of A is inside B**. Furthermore, Some A are B; Some B are A. (Source: SSC Official Portal & IUC Academy).

Practice Question #42 High-Yield Comparative MCQ

Q42. With reference to Statement Keyword / Modifier and Exact Logical Meaning, which of the following is accurately matched with "No A is B"?

(A) At least 1% overlap between A and B
(B) Both **Some A are B** and **Some A are not B**
(C) Zero overlap between A and B
(D) All B are exclusively inside A

Correct Answer: (C) | **Explanation:** For **No A is B** (Statement Keyword / Modifier), the verified Exact Logical Meaning is **Zero overlap between A and B**. Furthermore, No B is A; Some A are not B; Some B are not A. (Source: SSC Official Portal & IUC Academy).

Practice Question #43 High-Yield Comparative MCQ

Q43. With reference to Statement Keyword / Modifier and Exact Logical Meaning, which of the following is accurately matched with “Some A are B”?

(A) Both **Some A are B** and **Some A are not B**
(B) All B are exclusively inside A
(C) Refers to speaker's Father (if no paternal uncle/aunt constraints)
(D) At least 1% overlap between A and B

Correct Answer: (D) | **Explanation:** For **Some A are B** (Statement Keyword / Modifier), the verified Exact Logical Meaning is **At least 1% overlap between A and B**. Furthermore, Some B are A. (Source: SSC Official Portal & IUC Academy).

Practice Question #44 High-Yield Comparative MCQ

Q44. With reference to Statement Keyword / Modifier and Exact Logical Meaning, which of the following is accurately matched with “Only a few A are B”?

(A) Both **Some A are B** and **Some A are not B**
(B) All B are exclusively inside A
(C) Refers to speaker's Father (if no paternal uncle/aunt constraints)
(D) Speaker's Father (if paternal) OR Speaker's Mother (if maternal)

Correct Answer: (A) | **Explanation:** For **Only a few A are B** (Statement Keyword / Modifier), the verified Exact Logical Meaning is **Both Some A are B and Some A are not B**. Furthermore, Some A are B; Some B are A; Some A are not B. (Source: SSC Official Portal & IUC Academy).

Practice Question #45 High-Yield Comparative MCQ

Q45. With reference to Statement Keyword / Modifier and Exact Logical Meaning, which of the following is accurately matched with “Only A are B”?

(A) Refers to speaker's Father (if no paternal uncle/aunt constraints)
(B) All B are exclusively inside A
(C) Speaker's Father (if paternal) OR Speaker's Mother (if maternal)
(D) **D = sqrt((East - West)^2 + (North - South)^2)**

Correct Answer: (B) | **Explanation:** For **Only A are B** (Statement Keyword / Modifier), the verified Exact Logical Meaning is **All B are exclusively inside A**. Furthermore, All B are A; Some A are B; No B is C (any third set). (Source: SSC Official Portal & IUC Academy).

Practice Question #46 High-Yield Comparative MCQ

Q46. With reference to Scenario / Problem Type and Governing Rule / Formula, which of the following is accurately matched with “"Only son of my grandfather"”?

(A) Speaker's Father (if paternal) OR Speaker's Mother (if maternal)
(B) **D = sqrt((East - West)^2 + (North - South)^2)**
(C) Refers to speaker's Father (if no paternal uncle/aunt constraints)
(D) Sun in East -> Shadow in West

Correct Answer: (C) | **Explanation:** For **"Only son of my grandfather"** (Scenario / Problem Type), the verified Governing Rule / Formula is **Refers to speaker's Father (if no paternal uncle/aunt constraints)**. Furthermore, Check if speaker is male or female (**His father** vs **Her father**). (Source: SSC Official Portal & IUC Academy).

Practice Question #47 High-Yield Comparative MCQ

Q47. With reference to Scenario / Problem Type and Governing Rule / Formula, which of the following is accurately matched with ""Only child of my grandfather""?

(A) `D = sqrt((East - West)^2 + (North - South)^2)`
(B) Sun in East -> Shadow in West
(C) Sun in West -> Shadow in East
(D) Speaker's Father (if paternal) OR Speaker's Mother (if maternal)

Correct Answer: (D) | **Explanation:** For **"Only child of my grandfather"** (Scenario / Problem Type), the verified Governing Rule / Formula is **Speaker's Father (if paternal) OR Speaker's Mother (if maternal)**. Furthermore, Gender of parent remains open unless specified. (Source: SSC Official Portal & IUC Academy).

Practice Question #48 High-Yield Comparative MCQ

Q48. With reference to Scenario / Problem Type and Governing Rule / Formula, which of the following is accurately matched with "Shortest Displacement"?

(A) `D = sqrt((East - West)^2 + (North - South)^2)`
(B) Sun in East -> Shadow in West
(C) Sun in West -> Shadow in East
(D) Toward West (Left End)

Correct Answer: (A) | **Explanation:** For **Shortest Displacement** (Scenario / Problem Type), the verified Governing Rule / Formula is `D = sqrt((East - West)^2 + (North - South)^2)`. Furthermore, Standard triplets: `(3,4,5)`, `(5,12,13)`, `(6,8,10)`, `(8,15,17)`, `(7,24,25)`. (Source: SSC Official Portal & IUC Academy).

Practice Question #49 High-Yield Comparative MCQ

Q49. With reference to Scenario / Problem Type and Governing Rule / Formula, which of the following is accurately matched with "Morning Shadow (Sunrise)"?

(A) Sun in West -> Shadow in East
(B) Sun in East -> Shadow in West
(C) Toward West (Left End)
(D) Toward East (Right End)

Correct Answer: (B) | **Explanation:** For **Morning Shadow (Sunrise)** (Scenario / Problem Type), the verified Governing Rule / Formula is **Sun in East -> Shadow in West**. Furthermore, Facing North -> Shadow on Left; Facing South -> Shadow on Right. (Source: SSC Official Portal & IUC Academy).

Practice Question #50 High-Yield Comparative MCQ

Q50. With reference to Scenario / Problem Type and Governing Rule / Formula, which of the following is accurately matched with "Evening Shadow (Sunset)"?

(A) Toward West (Left End)
(B) Toward East (Right End)
(C) Sun in West -> Shadow in East
(D) Clockwise (CW)

Correct Answer: (C) | **Explanation:** For **Evening Shadow (Sunset)** (Scenario / Problem Type), the verified Governing Rule / Formula is **Sun in West -> Shadow in East**. Furthermore, Facing North -> Shadow on Right; Facing South -> Shadow on Left. (Source: SSC Official Portal & IUC Academy).

Practice Question #51 High-Yield Comparative MCQ

Q51. With reference to Seating Configuration and Left Movement Direction, which of the following is accurately matched with "Linear Row — Facing North"?

(A) Toward East (Right End)
(B) Clockwise (CW)
(C) Anti-Clockwise (ACW)
(D) Toward West (Left End)

Correct Answer: (D) | **Explanation:** For **Linear Row — Facing North** (Seating Configuration), the verified Left Movement Direction is **Toward West (Left End)**. Furthermore, Toward East (Right End). (Source: SSC Official Portal & IUC Academy).

Practice Question #52 High-Yield Comparative MCQ

Q52. With reference to Seating Configuration and Left Movement Direction, which of the following is accurately matched with "Linear Row — Facing South"?

(A) Toward East (Right End)
(B) Clockwise (CW)
(C) Anti-Clockwise (ACW)
(D) Depends on Corner (In/Out) vs Mid-Side facing

Correct Answer: (A) | **Explanation:** For **Linear Row — Facing South** (Seating Configuration), the verified Left Movement Direction is **Toward East (Right End)**. Furthermore, Toward West (Left End). (Source: SSC Official Portal & IUC Academy).

Practice Question #53 High-Yield Comparative MCQ

Q53. With reference to Seating Configuration and Left Movement Direction, which of the following is accurately matched with "Circular Table — Facing Center"?

(A) Anti-Clockwise (ACW)
(B) Clockwise (CW)
(C) Depends on Corner (In/Out) vs Mid-Side facing
(D) Floor numbers **8, 7, 6, 5, 4, 3, 2, 1**

Correct Answer: (B) | **Explanation:** For **Circular Table — Facing Center** (Seating Configuration), the verified Left Movement Direction is **Clockwise (CW)**. Furthermore, Anti-Clockwise (ACW). (Source: SSC Official Portal & IUC Academy).

Practice Question #54 High-Yield Comparative MCQ

Q54. With reference to Seating Configuration and Left Movement Direction, which of the following is accurately matched with "Circular Table — Facing Outside"?

(A) Depends on Corner (In/Out) vs Mid-Side facing
(B) Floor numbers **8, 7, 6, 5, 4, 3, 2, 1**
(C) Anti-Clockwise (ACW)
(D) Chronological Month + Date pairs

Correct Answer: (C) | **Explanation:** For **Circular Table — Facing Outside** (Seating Configuration), the verified Left Movement Direction is **Anti-Clockwise (ACW)**. Furthermore, Clockwise (CW). (Source: SSC Official Portal & IUC Academy).

Practice Question #55 High-Yield Comparative MCQ

Q55. With reference to Seating Configuration and Left Movement Direction, which of the following is accurately matched with "Square Table (4 Corner + 4 Mid-Side)"?

(A) Floor numbers `8, 7, 6, 5, 4, 3, 2, 1`
(B) Chronological Month + Date pairs
(C) None initially (floating slots)
(D) Depends on Corner (In/Out) vs Mid-Side facing

Correct Answer: (D) | **Explanation:** For **Square Table (4 Corner + 4 Mid-Side)** (Seating Configuration), the verified Left Movement Direction is **Depends on Corner (In/Out) vs Mid-Side facing**. Furthermore, Opposite to Left direction. (Source: SSC Official Portal & IUC Academy).

Practice Question #56 High-Yield Comparative MCQ

Q56. With reference to Puzzle Variant and Fixed Base Column, which of the following is accurately matched with "Floor Puzzle (1 to 8)"?

(A) Floor numbers `8, 7, 6, 5, 4, 3, 2, 1`
(B) Chronological Month + Date pairs
(C) None initially (floating slots)
(D) Senior-most to Junior-most (`CEO -> Clerk`)

Correct Answer: (A) | **Explanation:** For **Floor Puzzle (1 to 8)** (Puzzle Variant), the verified Fixed Base Column is **Floor numbers** `8, 7, 6, 5, 4, 3, 2, 1`. Furthermore, "Lives on an odd prime floor above 4" (`Floor 5` or `7`). (Source: SSC Official Portal & IUC Academy).

Practice Question #57 High-Yield Comparative MCQ

Q57. With reference to Puzzle Variant and Fixed Base Column, which of the following is accurately matched with "Month & Date Puzzle"?

(A) None initially (floating slots)
(B) Chronological Month + Date pairs
(C) Senior-most to Junior-most (`CEO -> Clerk`)
(D) Left-to-Right Rank Axis

Correct Answer: (B) | **Explanation:** For **Month & Date Puzzle** (Puzzle Variant), the verified Fixed Base Column is **Chronological Month + Date pairs**. Furthermore, "Born in a month having 30 days on an even date". (Source: SSC Official Portal & IUC Academy).

Practice Question #58 High-Yield Comparative MCQ

Q58. With reference to Puzzle Variant and Fixed Base Column, which of the following is accurately matched with "Box Stack Puzzle"?

(A) Senior-most to Junior-most (`CEO -> Clerk`)
(B) Left-to-Right Rank Axis
(C) None initially (floating slots)
(D) `M = (60/11) * H`

Correct Answer: (C) | **Explanation:** For **Box Stack Puzzle** (Puzzle Variant), the verified Fixed Base Column is **None initially (floating slots)**. Furthermore, Chain with widest span (e.g., 4 boxes between P and Q). (Source: SSC Official Portal & IUC Academy).

Practice Question #59 High-Yield Comparative MCQ

Q59. With reference to Puzzle Variant and Fixed Base Column, which of the following is accurately matched with "Designation / Hierarchy"?

(A) Left-to-Right Rank Axis
(B) `M = (60/11) * H`
(C) `M = (2/11) (30H +/- 180)`
(D) Senior-most to Junior-most (`CEO -> Clerk`)

Correct Answer: (D) | **Explanation:** For **Designation / Hierarchy** (Puzzle Variant), the verified Fixed Base Column is **Senior-most to Junior-most (`CEO -> Clerk`)**. Furthermore, "At most two persons are senior to X". (Source: SSC Official Portal & IUC Academy).

Practice Question #60 High-Yield Comparative MCQ

Q60. With reference to Puzzle Variant and Fixed Base Column, which of the following is accurately matched with "Linear Order & Ranking"?

(A) Left-to-Right Rank Axis
(B) `M = (60/11) * H`
(C) `M = (2/11) (30H +/- 180)`
(D) `M = (2/11) (30H +/- 90)`

Correct Answer: (A) | **Explanation:** For **Linear Order & Ranking** (Puzzle Variant), the verified Fixed Base Column is **Left-to-Right Rank Axis**. Furthermore, `Total = Left + Right - 1`. (Source: SSC Official Portal & IUC Academy).

Practice Question #61 High-Yield Comparative MCQ

Q61. With reference to Clock / Calendar Concept and Governing Mathematical Formula, which of the following is accurately matched with "Coincidence (`0 degrees` Overlap)"?

(A) `M = (2/11) (30H +/- 180)`
(B) `M = (60/11) * H`
(C) `M = (2/11) (30H +/- 90)`
(D) `Odd Days = 5, 3, 1, 0`

Correct Answer: (B) | **Explanation:** For **Coincidence (`0 degrees` Overlap)** (Clock / Calendar Concept), the verified Governing Mathematical Formula is `M = (60/11) * H`. Furthermore, 11 times in 12 hrs; 22 times in 24 hrs. (Source: SSC Official Portal & IUC Academy).

Practice Question #62 High-Yield Comparative MCQ

Q62. With reference to Clock / Calendar Concept and Governing Mathematical Formula, which of the following is accurately matched with "Straight Line Opposite (`180 degrees`)"?

(A) `M = (2/11) (30H +/- 90)`
(B) `Odd Days = 5, 3, 1, 0`
(C) `M = (2/11) (30H +/- 180)`
(D) `LY: +28

Correct Answer: (C) | **Explanation:** For **Straight Line Opposite (`180 degrees`)** (Clock / Calendar Concept), the verified Governing Mathematical Formula is `M = (2/11) (30H +/- 180)`. Furthermore, 11 times in 12 hrs; 22 times in 24 hrs. (Source: SSC Official Portal & IUC Academy).

Practice Question #63 High-Yield Comparative MCQ

Q63. With reference to Clock / Calendar Concept and Governing Mathematical Formula, which of the following is accurately matched with "Right Angle (90 degrees)"?

(A) **Odd Days = 5, 3, 1, 0**
(B) `LY: +28
(C) **Total_Cuts = 3 * (n - 1)**
(D) **M = (2/11) (30H +/- 90)**

Correct Answer: (D) | **Explanation:** For **Right Angle (90 degrees)** (Clock / Calendar Concept), the verified Governing Mathematical Formula is **M = (2/11) (30H +/- 90)**. Furthermore, 22 times in 12 hrs; 44 times in 24 hrs. (Source: SSC Official Portal & IUC Academy).

Practice Question #64 High-Yield Comparative MCQ

Q64. With reference to Clock / Calendar Concept and Governing Mathematical Formula, which of the following is accurately matched with "Century Odd Days (100, 200, 300, 400)"?

(A) **Odd Days = 5, 3, 1, 0**
(B) `LY: +28
(C) **Total_Cuts = 3 * (n - 1)**
(D) **2-Face = 12(*n*-2)**; **1-*Face* = 6** (n-2)^2

Correct Answer: (A) | **Explanation:** For **Century Odd Days (100, 200, 300, 400)** (Clock / Calendar Concept), the verified Governing Mathematical Formula is **Odd Days = 5, 3, 1, 0**. Furthermore, Last days of a century can ONLY be: Fri(5), Wed(3), Mon(1), Sun(0). (Source: SSC Official Portal & IUC Academy).

Practice Question #65 High-Yield Comparative MCQ

Q65. With reference to Clock / Calendar Concept and Governing Mathematical Formula, which of the following is accurately matched with "Calendar Year Repetition"?

(A) **Total_Cuts = 3 * (n - 1)**
(B) `LY: +28
(C) **2-Face = 12(*n*-2)**; **1-*Face* = 6** (n-2)^2
(D) **n(*n* + 1)(2n + 1) / 6**

Correct Answer: (B) | **Explanation:** For **Calendar Year Repetition** (Clock / Calendar Concept), the verified Governing Mathematical Formula is **`LY: +28**. Furthermore, LY+1: +6. (Source: SSC Official Portal & IUC Academy).

Practice Question #66 High-Yield Comparative MCQ

Q66. With reference to Spatial / Geometric Problem and Exact Algebraic Formula, which of the following is accurately matched with "Cube Cuts for n^3 Pieces"?

(A) **2-Face = 12(*n*-2)**; **1-*Face* = 6** (n-2)^2
(B) **n(*n* + 1)(2n + 1) / 6**
(C) **Total_Cuts = 3 * (n - 1)**
(D) **[n*(n + 1) / 2]^2**

Correct Answer: (C) | **Explanation:** For **Cube Cuts for n^3 Pieces** (Spatial / Geometric Problem), the verified Exact Algebraic Formula is **Total_Cuts = 3 * (n - 1)**. Furthermore, For **n = 4** (**64** cubes): **3 * 3 = 9 cuts**. (Source: SSC Official Portal & IUC Academy).

Practice Question #67 High-Yield Comparative MCQ

Q67. With reference to Spatial / Geometric Problem and Exact Algebraic Formula, which of the following is accurately matched with "2-Face & 1-Face Painted Cubes"?

(A) **n(*n* + 1)(2n + 1) / 6**
(B) **[n*(n + 1) / 2]^2**
(C) **floor[n(*n* + 2)(2n + 1) / 8]**
(D) **2-Face = 12(*n*-2)** ; **1-*Face* = 6** (n-2)^2

Correct Answer: (D) | **Explanation:** For **2-Face & 1-Face Painted Cubes** (Spatial / Geometric Problem), the verified Exact Algebraic Formula is **2-Face = 12(*n*-2)** ; **1-*Face* = 6** **(n-2)^2**. Furthermore, For **n = 4** : **2-Face = 24** ; **1-Face = 24**. (Source: SSC Official Portal & IUC Academy).

Practice Question #68 High-Yield Comparative MCQ

Q68. With reference to Spatial / Geometric Problem and Exact Algebraic Formula, which of the following is accurately matched with "Squares in n x n Grid"?

(A) **n(*n* + 1)(2n + 1) / 6**
(B) **[n*(n + 1) / 2]^2**
(C) **floor[n(*n* + 2)(2n + 1) / 8]**
(D) What did the author take for granted *before* speaking?

Correct Answer: (A) | **Explanation:** For **Squares in n x n Grid** (Spatial / Geometric Problem), the verified Exact Algebraic Formula is **n(*n* + 1)(2n + 1) / 6**. Furthermore, For **4 x 4** grid: **459 / 6 = 30 squares**. (Source: SSC Official Portal & IUC Academy).

Practice Question #69 High-Yield Comparative MCQ

Q69. With reference to Spatial / Geometric Problem and Exact Algebraic Formula, which of the following is accurately matched with "Total Rectangles in n x n Grid"?

(A) **floor[n(*n* + 2)(2n + 1) / 8]**
(B) **[n*(n + 1) / 2]^2**
(C) What did the author take for granted *before* speaking?
(D) What follows with 100% certainty *after* reading the text?

Correct Answer: (B) | **Explanation:** For **Total Rectangles in n x n Grid** (Spatial / Geometric Problem), the verified Exact Algebraic Formula is **[n*(n + 1) / 2]^2**. Furthermore, For **4 x 4** grid: **(10)^2 = 100 rectangles**. (Source: SSC Official Portal & IUC Academy).

Practice Question #70 High-Yield Comparative MCQ

Q70. With reference to Spatial / Geometric Problem and Exact Algebraic Formula, which of the following is accurately matched with "Symmetric Apex Triangle (n tiers)"?

(A) What did the author take for granted *before* speaking?
(B) What follows with 100% certainty *after* reading the text?
(C) **floor[n(*n* + 2)(2n + 1) / 8]**
(D) Is the 'Yes/No' reasoning substantive or superficial?

Correct Answer: (C) | **Explanation:** For **Symmetric Apex Triangle (n tiers)** (Spatial / Geometric Problem), the verified Exact Algebraic Formula is **floor[n(*n* + 2)(2n + 1) / 8]**. Furthermore, For **n = 4** : **469 / 8 = 27 triangles**. (Source: SSC Official Portal & IUC Academy).

Practice Question #71 High-Yield Comparative MCQ

Q71. With reference to Critical Reasoning Type and Core Question Asked, which of the following is accurately matched with "Statement & Assumption"?

(A) What follows with 100% certainty *after* reading the text?
(B) Is the 'Yes/No' reasoning substantive or superficial?
(C) Does this administrative step practically solve or mitigate the crisis?
(D) What did the author take for granted *before* speaking?

Correct Answer: (D) | **Explanation:** For **Statement & Assumption** (Critical Reasoning Type), the verified Core Question Asked is **What did the author take for granted *before* speaking?**. Furthermore, Negation Test: Negating the assumption destroys the statement's purpose. (Source: SSC Official Portal & IUC Academy).

Practice Question #72 High-Yield Comparative MCQ

Q72. With reference to Critical Reasoning Type and Core Question Asked, which of the following is accurately matched with "Statement & Conclusion"?

(A) What follows with 100% certainty *after* reading the text?
(B) Is the 'Yes/No' reasoning substantive or superficial?
(C) Does this administrative step practically solve or mitigate the crisis?
(D) Did Event A directly trigger Event B, or do both share a root cause?

Correct Answer: (A) | **Explanation:** For **Statement & Conclusion** (Critical Reasoning Type), the verified Core Question Asked is **What follows with 100% certainty *after* reading the text?**. Furthermore, Strict Containment Test: Zero outside knowledge required. (Source: SSC Official Portal & IUC Academy).

Practice Question #73 High-Yield Comparative MCQ

Q73. With reference to Critical Reasoning Type and Core Question Asked, which of the following is accurately matched with "Statement & Argument"?

(A) Does this administrative step practically solve or mitigate the crisis?
(B) Is the 'Yes/No' reasoning substantive or superficial?
(C) Did Event A directly trigger Event B, or do both share a root cause?
(D) `C_i = (P_i + k) mod 26`

Correct Answer: (B) | **Explanation:** For **Statement & Argument** (Critical Reasoning Type), the verified Core Question Asked is **Is the 'Yes/No' reasoning substantive or superficial?**. Furthermore, Causal & Public-Policy Test: Explains concrete impact with evidence. (Source: SSC Official Portal & IUC Academy).

Practice Question #74 High-Yield Comparative MCQ

Q74. With reference to Critical Reasoning Type and Core Question Asked, which of the following is accurately matched with "Course of Action"?

(A) Did Event A directly trigger Event B, or do both share a root cause?
(B) `C_i = (P_i + k) mod 26`
(C) Does this administrative step practically solve or mitigate the crisis?
(D) `C_i = 27 - P_i`

Correct Answer: (C) | **Explanation:** For **Course of Action** (Critical Reasoning Type), the verified Core Question Asked is **Does this administrative step practically solve or mitigate the crisis?**. Furthermore, Feasibility & Proportionality Test: Solves issue without new harm. (Source: SSC Official Portal & IUC Academy).

Practice Question #75 High-Yield Comparative MCQ

Q75. With reference to Critical Reasoning Type and Core Question Asked, which of the following is accurately matched with "Cause & Effect"?

(A) `C_i = (P_i + k) mod 26`
(B) `C_i = 27 - P_i`
(C) Split `n/2`, reverse each half, add `+1`
(D) Did Event A directly trigger Event B, or do both share a root cause?

Correct Answer: (D) | **Explanation:** For **Cause & Effect** (Critical Reasoning Type), the verified Core Question Asked is **Did Event A directly trigger Event B, or do both share a root cause?**. Furthermore, Temporal + Direct Mechanism Test: Cause precedes and drives Effect. (Source: SSC Official Portal & IUC Academy).

Rapid-Fire Last-Minute One-Liner Revision Capsule

1. The sum of forward and reverse alphabetical positions of any English letter is always **27** (`P_forward + P_reverse = 27`) (IUC Academy).
2. The five milestone letters **EJOTY** stand at positions **5, 10, 15, 20, and 25** respectively.
3. The eight multiples-of-3 milestone letters **CFILORUX** stand at positions **3, 6, 9, 12, 15, 18, 21, and 24**.
4. In an alphabetical series, **Left + Left = Subtract**, **Right + Right = Subtract**, and **Left + Right = Add** (SSC Official Portal).
5. The exact middle letter between position `L` from the left and position `R` from the left is located at `(L + R) / 2`.
6. The number of letters strictly between position `L` and position `R` (`R > L`) is `(R - L - 1)`.
7. In Syllogism, **"Only A are B"** converts to **"All B are A"** with B barred from touching any third set.
8. **"Only a few A are B"** simultaneously establishes **"Some A are B"** AND **"Some A are not B"**.
9. Under "Only a few A are B", **"All B are A"** is a valid possibility, but **"All A are B"** is strictly false.
10. **"A few"**, **"At least some"**, **"Mostly"**, **"Generally"**, and **"60% of"** are all treated as **"Some"** (I-type proposition).
11. **"Each"**, **"Every"**, **"Any"**, and **"100% of"** are all treated as **"All"** (A-type proposition).
12. **"None"**, **"Never"**, and **"0% of"** are all treated as **"No"** (E-type proposition).
13. An **Either-Or** complementary pair requires: (1) Same variables, (2) Both individually doubtful, and (3) `Some + No` or `All + Some Not` (same subject order).
14. A restatement of a single given premise in Syllogism is treated as a valid definite conclusion in modern SSC exams (SSC Official Portal).
15. In Blood Relations, **"My father's only child"** is the **Speaker himself/herself**.
16. **"My mother's only son"** can be the **Speaker (if male)** or the **Speaker's brother (if the speaker is female)**.
17. Never infer a person's gender from their first name in Blood Relation or Seating Arrangement questions.
18. In Seating Arrangement clues, **"Who / Whom / Whose"** always refers to the **second (immediately preceding) person**.

19. In Seating Arrangement clues, **"And / But / While"** always refers to the **first person (subject)** of the sentence.

20. When facing the **Center** of a circular table, **Left = Clockwise** and **Right = Anti-Clockwise** (IUC Academy).

21. When facing **Outside** a circular table, **Left = Anti-Clockwise** and **Right = Clockwise**.

22. For `8` persons along a circular table, sitting "opposite" means there are **3 persons** on each side between them.

23. "Three persons sit between A and B" means A sits **4th** to the left or right of B.

24. At **Sunrise (Morning)**, the sun is in the East and all shadows fall toward the **West**.

25. At **Sunset (Evening)**, the sun is in the West and all shadows fall toward the **East**.

26. At **12:00 Noon**, the sun is vertically overhead and **zero shadow** is cast.

27. Facing **North in the Morning** places your shadow on your **Left**; facing **South in the Morning** places it on your **Right**.

28. Standard Pythagorean triplets used in Direction Sense are **(3,4,5), (5,12,13), (6,8,10), (8,15,17), (7,24,25), and (9,40,41)** (NCERT Official Textbooks).

29. Total persons in a single linear row = **Rank from Left + Rank from Right - 1**.

30. Minimum total persons in an overlapping row = **Left + Right - Between - 2**.

31. The minute hand moves **6 degrees per minute**; the hour hand moves **0.5 degrees per minute**.

32. The minute hand gains **5.5 degrees per minute** over the hour hand.

33. The angle between clock hands at `H:M` is `Theta = |30H - (11/2)M|` (SSC Official Portal).

34. Clock hands coincide (`0 degrees`) **11 times in 12 hours** and **22 times in 24 hours** (missing once between 11 and 1).

35. Clock hands are opposite (`180 degrees`) **11 times in 12 hours** and **22 times in 24 hours** (missing once between 5 and 7).

36. Clock hands are in a straight line (`0 degrees` or `180 degrees`) **22 times in 12 hours** and **44 times in 24 hours**.

37. Clock hands form a right angle (`90 degrees`) **22 times in 12 hours** and **44 times in 24 hours**.

38. Vertical **Mirror Time** is found by subtracting the given time from `11:60` (or `23:60`).

39. Horizontal **Water Time** is found by subtracting the given time from `18:30` (or `17:90`).

40. An **Ordinary Year (365 days)** has **1 odd day** and starts and ends on the **same day of the week**.

41. A **Leap Year (366 days)** has **2 odd days** and ends on the **next consecutive weekday** after its starting day.

42. A century year (`1700, 1800, 1900, 2000`) is a leap year **only if divisible by 400**.

43. There are **97 leap years** in every 400 consecutive years (`24 + 24 + 24 + 25 = 97`).

44. The number of odd days in **100, 200, 300, and 400 years** is **5, 3, 1, and 0** respectively (IUC Academy).

45. The last day of a century can **NEVER** be **Tuesday, Thursday, or Saturday**.

46. A **Leap Year** calendar repeats after **28 years**; `LY + 1` repeats after **6 years**; `LY + 2` **and** `LY + 3` repeat after **11 years**.

47. In any **Ordinary Year**, the months **January and October** start on the exact same day of the week.

48. In any **Leap Year**, the months **January, April, and July** start on the exact same day of the week.

49. In a **Standard Dice**, the sum of any two opposite faces is always 7 (`1-6, 2-5, 3-4`).

50. In an **Open Dice**, alternate squares along a straight line (separated by 1 square) are **opposite faces**.

51. When a cube is cut into `n^3` smaller cubes, the minimum number of straight cuts required is `3 * (n - 1)` (NCERT Official Textbooks).

52. For a painted cube cut into `n^3` small cubes, **3-face painted (corner) cubes** = **8** (constant for `n >= 2`).

53. For a painted cube cut into `n^3` small cubes, **2-face painted (edge) cubes** = `12 * (n - 2)`.

54. For a painted cube cut into `n^3` small cubes, **1-face painted (face-center) cubes** = `6 * (n - 2)^2`.

55. For a painted cube cut into `n^3` small cubes, **0-face painted (inner core) cubes** = `(n - 2)^3`.

56. Number of squares in an `n x n` grid = `n (n + 1) (2n + 1) / 6` (`8x8 chessboard = 204 squares`).

57. Number of rectangles (including squares) in an `n x n` grid = `[n * (n + 1) / 2]^2` (`8x8 chessboard = 1,296 rectangles`).

58. Number of diagonals in a convex polygon of `n` sides = `n * (n - 3) / 2` (NCERT Official Textbooks).

59. Total handshakes among `n` persons where everyone shakes hands once = `n (n - 1) / 2`; *total gifts exchanged* = `n (n - 1)`.

60. In **Coded Inequalities**, a chain with opposing symbols (`>` and `<` between two elements) immediately renders any single definite relation between them **False** (SSC Official Portal).

IUC Academy *1-3-7-21* Day Spaced-Revision & Self-Assessment Tracker (www.iucacademy.com)

Chapter / Study Section	Day 1 (First Read)	Day 3 (Active Recall)	Day 7 (MCQ Drill)	Day 21 (Exam Ready)
1. Chapter 1: Alphabetical Series, Coding-Decoding & Letter-Number Analogy	☐ Completed (100% Concept Clarity)	☐ Flowchart & Tables Revised	☐ 75+ MCQs Solved (>85% Accuracy)	☐ **Final Rapid Recall Ready**
2. Chapter 2: Syllogism, Venn Diagrams & Logical Deductions	☐ Completed (100% Concept Clarity)	☐ Flowchart & Tables Revised	☐ 75+ MCQs Solved (>85% Accuracy)	☐ **Final Rapid Recall Ready**
3. Chapter 3: Blood Relations, Coded Relationships & Direction Sense Test	☐ Completed (100% Concept Clarity)	☐ Flowchart & Tables Revised	☐ 75+ MCQs Solved (>85% Accuracy)	☐ **Final Rapid Recall Ready**
4. Chapter 4: Linear, Circular & Polygon Seating Arrangements	☐ Completed (100% Concept Clarity)	☐ Flowchart & Tables Revised	☐ 75+ MCQs Solved (>85% Accuracy)	☐ **Final Rapid Recall Ready**
5. Chapter 5: Analytical Puzzles — Floor, Box, Scheduling & Matrix Puzzles	☐ Completed (100% Concept Clarity)	☐ Flowchart & Tables Revised	☐ 75+ MCQs Solved (>85% Accuracy)	☐ **Final Rapid Recall Ready**
6. Chapter 6: Clock Angles, Mirror-Water Time & Calendar Odd-Day Mathematics	☐ Completed (100% Concept Clarity)	☐ Flowchart & Tables Revised	☐ 75+ MCQs Solved (>85% Accuracy)	☐ **Final Rapid Recall Ready**
7. Chapter 7: Cubes, Standard & Open Dice, Counting Figures & Non-Verbal Spatial Reasoning	☐ Completed (100% Concept Clarity)	☐ Flowchart & Tables Revised	☐ 75+ MCQs Solved (>85% Accuracy)	☐ **Final Rapid Recall Ready**
8. Chapter 8: Critical Reasoning — Statement-Assumptions, Arguments, Conclusions & Courses of Action	☐ Completed (100% Concept Clarity)	☐ Flowchart & Tables Revised	☐ 75+ MCQs Solved (>85% Accuracy)	☐ **Final Rapid Recall Ready**
9. Solved Exam Practice Questions (MCQs)	☐ Completed (100% Concept Clarity)	☐ Flowchart & Tables Revised	☐ 75+ MCQs Solved (>85% Accuracy)	☐ **Final Rapid Recall Ready**
10. Extended Comparative & Analytical Practice Set (Questions 36–75)	☐ Completed (100% Concept Clarity)	☐ Flowchart & Tables Revised	☐ 75+ MCQs Solved (>85% Accuracy)	☐ **Final Rapid Recall Ready**
11. Rapid-Fire Last-Minute One-Liner Revision Capsule	☐ Completed (100% Concept Clarity)	☐ Flowchart & Tables Revised	☐ 75+ MCQs Solved (>85% Accuracy)	☐ **Final Rapid Recall Ready**