

CHAPTER 6: CODING & DECODING

SSC CGL Reasoning - Complete Chapter Guide

Letter Coding | Number Coding | Symbol Coding | Pattern Recognition | SSC CGL Exam Focus

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Chapter Overview: This chapter covers various coding and decoding techniques including letter coding, number coding, symbol coding, and mixed coding patterns essential for SSC CGL reasoning section.

6.1 UNDERSTANDING CODING-DECODING

What is Coding-Decoding?

Definition: Coding is the process of converting a word, phrase, or message into a particular code using specific patterns or rules. Decoding is the reverse process of converting the code back to the original message.

Key Insight: Coding-decoding tests your ability to identify patterns, apply logical rules, and work systematically with letters, numbers, and symbols.

Types of Coding-Decoding

Letter Coding

- Alphabet position based
- Forward/backward shifting
- Letter-to-letter coding
- Word pattern coding
- Mixed letter coding

Number Coding

- Letter position numbers
- Mathematical operations
- Digit sum/product coding
- Number-to-letter coding
- Mixed number coding

Symbol Coding

- Symbol replacement
- Pattern-based symbols
- Mixed symbol coding
- Conditional coding
- Complex symbol patterns

6.2 LETTER CODING TECHNIQUES

Alphabet Position System

1	A	2	B	3	C	4	D	5	E	6	F	7	G
8	H	9	I	10	J	11	K	12	L	13	M	14	N
15	O	16	P	17	Q	18	R	19	S	20	T	21	U
		22	V	23	W	24	X	25	Y	26	Z		

Key Position Formulas:

- Forward Position: A=1, B=2, C=3, ..., Z=26
- Reverse Position: Z=1, Y=2, X=3, ..., A=26
- Reverse = 27 - Forward Position
- Modular Arithmetic: 27 = 1, 28 = 2, etc.

Common Letter Coding Patterns

Popular Coding Patterns:

- **Forward Shift** - A→B, B→C, C→D (Add 1)
- **Backward Shift** - A→Z, B→Y, C→X (Subtract 1)
- **Fixed Addition** - A→D, B→E, C→F (Add 3)
- **Fixed Subtraction** - A→X, B→Y, C→Z (Subtract 3)
- **Opposite Letters** - A→Z, B→Y, C→X (27 - position)
- **Vowel-Consonant** - Different rules for vowels and consonants

Example: If CAT is coded as DBU, how is DOG coded?

Solution:

C→D (C+1=D)

A→B (A+1=B)

T→U (T+1=U)

Pattern: Each letter +1 position

DOG: D+1=E, O+1=P, G+1=H

Answer: **EPH**

6.3 NUMBER CODING METHODS

Position-Based Number Coding

Direct Position Coding

- A=1, B=2, C=3, ..., Z=26
- Word sum coding
- Average position coding
- Reverse position coding
- Mixed position coding

Mathematical Operations

- Addition/subtraction
- Multiplication/division
- Digit sum operations
- Prime number coding
- Square/cube coding

Complex Number Coding

- Multiple operations
- Conditional coding
- Pattern-based coding
- Mixed rules coding
- Multi-level coding

Example: If APPLE = $1+16+16+12+5 = 50$, then MANGO = ?

Solution:

A=1, P=16, P=16, L=12, E=5

Sum = $1+16+16+12+5 = 50$

MANGO: M=13, A=1, N=14, G=7, O=15

Sum = $13+1+14+7+15 = 50$

Answer: 50

Digit-Based Coding

Digit Sum Coding Patterns:

- 1 **Simple Digit Sum** - Sum of all digits
- 2 **Digital Root** - Repeated digit sum until single digit
- 3 **Digit Product** - Product of all digits
- 4 **Position Digit Sum** - Sum of position digits

5 Mixed Operations - Combination of operations

6.4 SYMBOL CODING PATTERNS

Symbol Replacement Coding

Symbol Coding Strategies:

- Each symbol represents a specific letter/number
- Symbols may follow positional patterns
- Look for visual similarities between symbols and letters
- Check for mathematical relationships
- Identify grouping patterns in symbols

Example: If @ represents A, # represents B, \$ represents C, then what does @#\$ represent?

Solution:

@ = A
= B
\$ = C
@#\$ = ABC
Answer: ABC

Complex Symbol Patterns

Pattern Type	Description	Example
Direct Replacement	Each symbol directly replaces a letter	★=A, ♠=B, ♣=C
Position-Based	Symbols follow alphabet position patterns	★=1, ♠=2, ♣=3 (A,B,C)
Mathematical	Symbols represent mathematical operations	★=+, ♠=-, ♣=×
Conditional	Symbol meaning changes based on position	First ★=A, Second ★=B

6.5 MIXED CODING PATTERNS

Letter-Number Mixed Coding

Mixed Coding Examples:

Pattern 1: A1, B2, C3, D4 (Letter + Position)

Pattern 2: 1A, 2B, 3C, 4D (Position + Letter)

Pattern 3: A1Z, B2Y, C3X (Letter + Position + Reverse)

Pattern 4: 1Z2, 2Y3, 3X4 (Complex mixed patterns)

Decoding Exercise:

If CODE is written as DPEB, how is BOOK written?

Solution Steps:

C → D (C+1)

O → P (O+1)

D → E (D+1)

E → B (E-3 or pattern change)

Actually, let's check: C+1=D, O+1=P, D+1=E, E-3=B

BOOK: B+1=C, O+1=P, O+1=P, K-3=H

Answer: **CPPH**

Conditional Coding

Conditional Coding Rules:

- Different rules for vowels and consonants
- Position-based condition changes
- Odd-even position different coding
- Capital-small letter different rules
- Word length based coding changes
- First-last letter special coding

6.6 PRACTICE QUESTIONS WITH SOLUTIONS

Letter Coding Questions

Q1. If WORK is coded as XPSL, how is JOB coded?

- A) KPC
- B) KPE
- C) KQC
- D) KQC

Answer: A) KPC

Solution: $W+1=X$, $O+1=P$, $R+1=S$, $K+1=L$

Pattern: Each letter + 1 position

JOB: $J+1=K$, $O+1=P$, $B+1=C \rightarrow KPC$

Q2. If ZEBRA is coded as YDAQZ, how is TIGER coded?

- A) SHFDQ
- B) SHFDS
- C) SHFDQ
- D) SHFDR

Answer: A) SHFDQ

Solution: $Z-1=Y$, $E-1=D$, $B-1=A$, $R-1=Q$, $A-1=Z$

Pattern: Each letter - 1 position ($A-1=Z$)

TIGER: $T-1=S$, $I-1=H$, $G-1=F$, $E-1=D$, $R-1=Q \rightarrow SHFDQ$

Number Coding Questions

Q3. If CAT = 3120, then DOG = ? ($A=1$, $B=2$, ..., $Z=26$)

- A) 4157
- B) 4156
- C) 4158
- D) 4159

Answer: A) 4157

Solution: $C=3$, $A=1$, $T=20 \rightarrow 3120$

DOG: $D=4$, $O=15$, $G=7 \rightarrow 4157$

Mixed Coding Questions

Q4. In a certain code, 'RATIONAL' is written as 'RATINOLA'. How is 'TRIBAL' written in that code?

- A) TIRBAL
- B) TIRLBA
- C) TRIALB
- D) TIRABL

Answer: B) TIRLBA

Solution: RATIONAL → RATINOLA

Pattern: First 3 letters same, next 2 swapped, last 3 in reverse

RAT (same) + IO (swap) + NAL (reverse) → RAT + IN + OLA

TRIBAL: TRI (same) + BA (swap) + L (single letter remains) → TRI + AB + L

Wait, let's check pattern properly

Actually: RAT (1-3 same), I (4th), O (5th swapped with 6th?), NAL (7-8-9?)

Better approach: RATIONAL has 8 letters: 1-2-3 same, 4-5 swap with 6-7?, 8 same?

Let me analyze: R-A-T-I-O-N-A-L → R-A-T-I-N-O-L-A

Positions: 1(R),2(A),3(T) same, 4(I)↔5(O) swap? No, I(4) and O(5) became I(4) and N(6)?

Actually: 1-2-3 same, 4-5-6-7-8 rearranged as 4-6-5-8-7

So TRIBAL: 1-2-3 same (TRI), 4-5-6 as 4-6-5 (B-A-L → B-L-A)

Answer: TRI + B + L + A = TIRLBA

6.7 SSC CGL EXAM STRATEGY

Time Management & Approach

Exam Strategy for Coding-Decoding:

1. **Quick Pattern Identification** - Identify coding type (10 seconds)
2. **Test Simple Patterns First** - Check +1/-1 shifts (15 seconds)
3. **Verify with Multiple Letters** - Confirm pattern consistency (10 seconds)
4. **Apply to Required Word** - Code/decode systematically (15 seconds)
5. **Check Answer Options** - Match with calculated result (5 seconds)
6. **Verify Special Cases** - Check A/Z boundaries (5 seconds)
7. **Select and Move** - Don't overcomplicate

Common SSC CGL Coding Patterns:

- Letter +1/-1 shifts
- Number position coding
- Mixed letter-number coding
- Symbol replacement
- Word rearrangement
- Mathematical operations
- Conditional coding rules

Common Mistakes to Avoid

Critical Coding Errors:

- Forgetting A/Z boundary conditions
- Miscounting alphabet positions
- Overlooking vowel-consonant rules
- Missing pattern changes in long words
- Confusing forward and reverse coding
- Calculation errors in number coding
- Not verifying with all given examples
- Rushing without understanding pattern

6.8 REVISION & PRACTICE PLAN

Daily Practice Routine

4-Week Preparation Plan:

Week 1: Basic Letter Coding & Position System (20 questions/day)
Week 2: Number Coding & Mathematical Patterns (25 questions/day)
Week 3: Mixed Coding & Complex Patterns (25 questions/day)
Week 4: Speed Practice & Mock Tests (30 questions/day)

Effective Coding Practice:

- Memorize alphabet positions thoroughly
- Practice quick mental calculations
- Learn to recognize common patterns quickly
- Work on speed and accuracy simultaneously
- Practice different coding types daily
- Review mistakes to identify weak areas
- Time yourself to improve efficiency

Key Formulas & Patterns

Pattern Type	Key Formula/Pattern
Forward Shift	$\text{New Position} = \text{Original Position} + n$
Backward Shift	$\text{New Position} = \text{Original Position} - n$
Reverse Coding	$\text{New Position} = 27 - \text{Original Position}$
Number Coding	Sum of letter positions in word
Digital Root	Sum digits repeatedly until single digit
Boundary Handling	If position > 26, subtract 26; if < 1, add 26