NUMBER SERIES

TYPES:

1. Prime number Series:

Ex.1 2, 3, 5, 7, 11, 13, …

(1) 15 (2) 17 (3) 18 (4) 19

Sol. The given series is prime number series. The next prime number is 17. **Answer: (2)**

Ex.2 2, 5, 11, 17, 23, …, 41.

(1) 29 (2) 31 (3) 37 (4) 39

Sol. The prime numbers are written alternately. **Answer: (2)**

2. Difference Series:

Ex.1 2, 5, 8, 11, 14, 17,…, 23.

(1) 19 (2) 21 (3) 20 (4) 18

Sol. The difference between the numbers is 3. (17 + 3 = 20) **Answer: (3)**

Ex.2 45, 38, 31, 24, 17,…, 3.

(1) 12 (2) 14 (3) 10 (4) 9

Sol. The difference between the numbers is 7. (17 – 7 = 10) **Answer: (3)**

3. Multiplication Series:

Ex.1 2, 6, 18, 54, 162,…, 1458.

(1) 274 (2) 486 (3) 1236 (4) 1032

Sol. The numbers are multiplied by 3 to get next number. (162 × 3 = 486) **Answer: (2)**

Ex.2 3, 12, 48, 192,…, 3072.

(1) 768 (2) 384 (3) 2376 (4) 1976

Sol. The numbers are multiplied by 4 to get the next number. (192 × 4 = 768) **Answer: (1)**

4. Division Series:

Ex.1 720, 120, 24,…, 2, 1

(1) 12 (2) 18 (3) 20 (4) 6

Sol. $\frac{720}{6} = 120$, $\frac{120}{5} = 24$, $\frac{24}{4} = 6$, $\frac{6}{3} = 2$, $\frac{2}{2} = 1$. **Answer: (4)**

Ex.2 32, 48, 72, 108,…, 243.

(1) 130 (2) 162 (3) 192 (4) 201

Sol. Number × 3/2 = next number. $32 \times \frac{3}{2} = 48$, $48 \times \frac{3}{2} = 72$, $72 \times \frac{3}{2} = 108$, $108 \times \frac{3}{2} = 162$ **Answer: (2)**

5. n^2 Series:

Ex.1 1, 4, 9, 16, 25,…, 49

(1) 28 (2) 30 (3) 32 (4) 36

Sol. The series is 1^2, 2^2, 3^2, 4^2, 5^2…, The next number is $6^2 = 36$. **Answer: (4)**

Ex.2 0, 4, 16, 36, 64,…, 144.

(1) 100 (2) 84 (3) 96 (4) 120

Sol. The series is 0^2, 2^2, 4^2, 6^2 etc. The next number is $10^2 = 100$. **Answer: (1)**

6. $n^2 – 1$ Series:

Ex.1 0, 3, 8, 15, 24, 35, 48,…

(1) 60 (2) 62 (3) 63 (4) 64

Sol. The series is $1^2 – 1$, $2^2 – 1$, $3^2 – 1$ etc. The next number is $8^2 – 1 = 63$. **Answer: (3)**

Another Logic: Difference between numbers is 3, 5, 7, 9, 11, 13 etc.

The next number is (48 + 15 = 63).

7. $n^2 + 1$ Series:

Ex.1 2, 5, 10, 17, 26, 37,…, 65.

(1) 50 (2) 48 (3) 49 (4) 51

Sol. The series is $1^2 + 1$, $2^2 + 1$, $3^2 + 1$ etc. The next number is $7^2 + 1 = 50$. **Answer: (1)**

8. $n^2 + n$ Series (or) $n^2 - n$ Series:

Ex.1 2, 6, 12, 20,…, 42.

(1) 28 (2) 30 (3) 32 (4) 36

Sol. The series is $1^2 + 1$, $2^2 + 2$, $3^2 + 3$, $4^2 + 4$ etc. The next number = $5^2 + 5 = 30$. **Answer: (2)**

Another Logic: The series is 1×2, 2×3, 3×4, 4×5. The next number is $5 \times 6 = 30$.

Another Logic: The series is $2^2 - 2$, $3^2 - 3$, $4^2 - 4$, $5^2 - 5$. The next number is $6^2 - 6 = 30$.

9. n^3 Series:

Ex.1 1, 8, 27, 64, 125, 216,…

(1) 256 (2) 343 (3) 365 (4) 400

Sol. The series is 1^3, 2^3, 3^3 etc. The missing number is $7^3 = 343$. **Answer: (2)**

10. $n^3 + 1$ Series:

Ex.1 2, 9, 28, 65, 126, 217, 344,…

(1) 513 (2) 500 (3) 428 (4) 600

Sol. The series is $1^3 + 1$, $2^3 + 1$, $3^3 + 1$ etc. The missing number is $8^3 + 1 = 513$. **Answer: (1)**

LETTER SERIES

Introduction:

In these types of problems a series of the letters of alphabet will be given which follow a pattern or a sequence. The letter series mainly consists of skipping of the letters.

To solve these types of problems, assign numbers 1 to 26 to the letters of the alphabet as shown below. In some cases it is useful to assign the numbers in the reverse order.

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

Here the table is showing both forward as well as reverse place value of any alphabet. A very important fact about the position of any alphabet is that both the sum of forward position and reverse position for any alphabet is always constant and equal to 27. Such as Sum of both positions of H is (8 + 19 = 27) or for W is (23 + 4 = 27).

We can also remember the relative positions of these alphabets by just remembering the word **EJOTY.**

Letters	**E**	**J**	**O**	**T**	**Y**
Position	5^{th}	10^{th}	15^{th}	20^{th}	25^{th}

Just remember the word EJOTY and its values i.e. 5, 10, 15, 20, 25

e.g. If you are asked to complete the series F, K, P, U, _

Then from EJOTY, you know that values of F = 6, K = 11, P = 16, U = 21 i.e. difference is 5, so the answer should be 21 + 5 = 26 i.e. Z

Various types of letter series are given below.

TYPE – 1

One Letter Series:

Ex.1 A, C, E, G, I, …

(1) J (2) K (3) L (4) M

Sol. The series is (+ 2). i.e., A + 2 = C; C + 2 = E; E + 2 = G;

G + 2 = I.

The missing letter is I + 2 = K. **Answer: (2)**

Another Logic: Skip one letter is I + 2 = K.

After I skip J to get K; the missing letter is K.

Note: "Skip" process saves time.

Ex.2 **A, B, D, G, K, ...**

(1) P (2) N (3) O (4) L

Sol. The series is + 1, + 2, + 3 etc.

The missing letter is (K + 5) = P. **Answer: (1)**

Skip Process: First no letter is skipped, then 1, 2, 3 etc. letters are skipped to get next letter. Skip 4 letters after 'K' to get P.

Ex.3 B, E, H, K, N,…

(1) P (2) O (3) Q (4) R

Sol. The series is + 3. The missing letter is N + 3 = Q. **Answer: (3)**

Another Logic: Skip two letters to get the next letter. Skip Q, P after N to get Q.

The missing letter is Q.

Ex.4 B, D, G, I, L, N,…

(1) N (2) O (3) P (4) Q

Sol. The series is alternately + 2 and + 3. The missing letter is N + 3 = Q. **Answer: (4)**

Another Logic: Skip one and two letters alternately to get the next letter. Skip two letters O, P after N to get Q.

Ex.5 B, C, E, G, K,…

(1) M (2) N (3) O (4) P

Sol. If numbers are assigned, the series becomes prime number series.

The next prime number is 13 and the corresponding letter is M. **Answer: (1)**

Ex.6 A, E, I, O,…

(1) Q (2) R (3) U (4) S

Sol. The series is a series of Vowels. **Answer: (3)**

Ex.7 A, D, I, P,…

(1) U (2) V (3) X (4) Y

Sol. If numbers are assigned, the series becomes square series.

The next number is $5^2 = 25$ and the corresponding letter is Y. **Answer: (4)**

Ex.8 D, F, H, I, J, L,…

(1) M (2) N (3) O (4) P

Sol. If numbers are assigned, the series becomes composite number series.

The next composite number is 14 and the corresponding letter is N. **Answer: (2)**

Ex.9 A, Z, B, Y, C, X, D,…

(1) U (2) V (3) W (4) X

Sol. The sequence consists of two series A, B, C, D etc., and Z, Y, X, W etc. **Answer: (3)**

TYPE – 2

Two Letter Series:

The first letters of the series follow one logic and the second letters follow another logic. Also, the first two letters, the next two letters and so on follow a logic.

Ex.1 AM, BN, CO, DP, EQ,…

(1) FG (2) FR (3) GR (4) ER

Sol. The first letters are A, B, C, D, E, F and the second letters are M, N, O, P, Q and R. **Answer: (2)**

Ex.2 AB, DE, GH, JK, MN,…

(1) OP (2) NO (3) PQ (4) RS

Sol. After every set of letters one letter is skipped. Skip O to get next two letters PQ. **Answer: (3)**

Ex.3 AA, CE, EI, GO,…

(1) IU (2) IQ (3) IR (4) IT

Sol. The first letters follow a sequence of A, C, E, G, I. (+ 2 series) and the second letters are vowels.

Answer: (1)

TYPE – 3

Three Letter Series:

This sequence consists of 3 letters in each term. The first letters follow one logic, the second letters follow another logic and the third letters follow some other logic, (or the same logic in all the three cases)

Ex.1 ABD, CDF, EFH, GHJ,…

(1) IJK (2) IJL (3) HIJ (4) HIK

Sol. The first letters follow a sequence of A, C, E, G, I etc.
The second letters follow a sequence of B, D, F, H, J etc.
And the third letters form a sequence of D, F, H, J, L etc. **Answer: (2)**

Ex.2 CKZ, DLY, EMX, FNW,…

(1) GOV (2) GOU (3) GNU (4) GNV

Sol. The first letters form a series of C, D, E, F, G etc.
The second letters form a series of K, L, M, N, O etc, and the third letters form a series of Z, Y, X, W, V etc.
Answer: (1)

Ex.3 MAB, NEC, OIE, POG,…

(1) QPH (2) QUH (3) QUI (4) QUK

Sol. The first letters form a series of M, N, O, P, Q etc. The second letters form Vowels; the third letters form prime number series (if numbers are assigned to letters). **Answer: (4)**

Ex.4 ABC, CBA, DEF, FED, GHI, ...

(1) JKL (2) IHG (3) DFE (4) IJK

Sol. The second term is the reverse order of first term.
In addition to the above types a number of other types can also be identified. **Answer: (2)**

INSERTING THE MISSING CHARACTER

Introduction:

In these types of questions some geometrical figures will be given. The geometrical figures will be divided and subdivided into a number of parts, each part is filled with a number or a letter except one part. The numbers or the letters in the figures have certain pattern. The objective is to identify the pattern and find the missing number or letter.

TYPE – 1

Problem involving circles:

In this type of puzzle problems 3 circles with numbers outside the circle will be given. In the first two circles, the number inside the circle is written according to a particular relation. The objective is to find the number inside the third circle which follows the same relation as that of the first two circles.

A number of types of these problems can be identified with the aid of the arithmetic rules.

Various types of relations are:

(i) $e = a + b + c + d$

(ii) $e = a\ number \times (a + b + c + d)$

(iii) $e = \dfrac{(a + b + c + d)}{a\ number}$

(iv) $e = a\ number \times (abcd)$

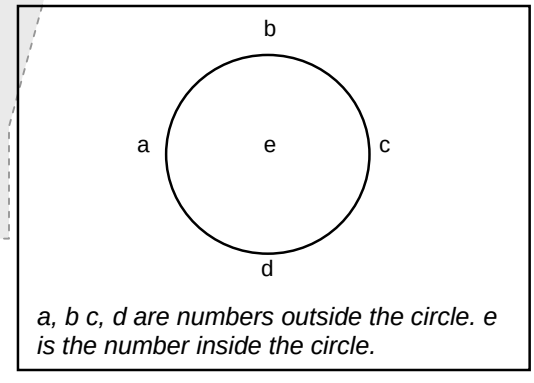
(v) $e = \dfrac{(abcd)}{a\ number}$

(vi) $e = \sqrt{(a + b + c + d)}$

(vii) $e = \dfrac{(\sqrt{a + b + c + d})}{2}$

(viii) $e = a\ number \times (\sqrt{a} + \sqrt{b} + \sqrt{c} + \sqrt{d})$

(ix) $e = \dfrac{\sqrt{a} + \sqrt{b} + \sqrt{c} + \sqrt{d}}{a\ number}$



a, b c, d are numbers outside the circle. e is the number inside the circle.

(x) $e = a\ number \times (\sqrt{a} \times \sqrt{b} \times \sqrt{c} \times \sqrt{d})$

(xi) $e = \dfrac{(\sqrt{a} + \sqrt{b} + \sqrt{c} + \sqrt{d})}{a\ number}$

(xii) $e = a\ number\ (a^2 + b^2 + c^2 + d^2)$

(xiii) $e = \dfrac{(a^2 + b^2 + c^2 + d^2)}{a\ number}$

(xiii) $e = \dfrac{(a + b + c + d)^2}{a\ number}$

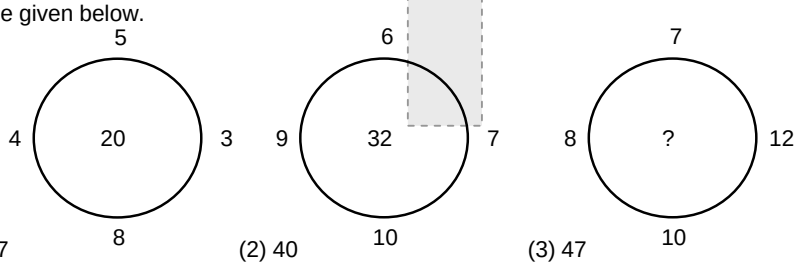
(xiv) e = (ac – bd) or (bd – ac)

(xv) e = (ac + bd) × a number

(xvi) $e = \dfrac{(ac + bd)}{a\ number}$

An attempt is made to cover all possible types of relations which generally appear in competitive examinations. However, a number of other types of relations can be identified. Some other miscellaneous relations are covered in the practice exercise. A candidate who practices the above relations can confidently answer the puzzle problems of Type I. Some examples are given below.

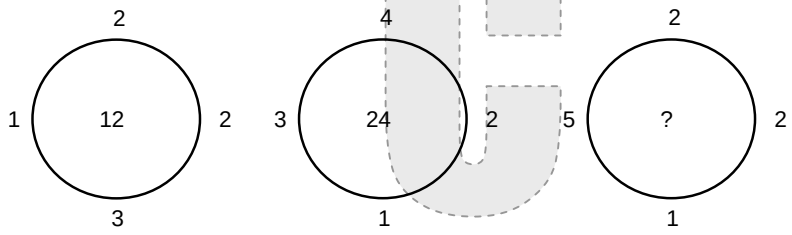
Ex.1



(1) 37 (2) 40 (3) 47 (4) 27

Sol. The rule in the first two figures is : the sum of the numbers outside the circle is equal to the number inside the circle. ∴ (4 + 5 + 3 + 8) = 20; (9 + 6 + 7 + 10) = 32
The missing number is (8 + 7 + 12 + 10) = 37. **Answer: (1)**

Ex.2



(1) 16 (2) 20 (3) 32 (4) 36

Sol. The rule in the first two figures is : the product of the numbers outside the circle is equal to the number inside the circle. **Answer: (2)**

TYPE – 2

Problems involving circles divided into parts:

In this type of problems a circle will be divided into 3 parts. An arithmetic operation on the numbers of parts gives the number in the third part. Every problem consists of 3 such figures and the rule that is applied in the first two figures holds good for the third figure also.

Various types of such problems can be identified using the arithmetic operations.

Various types are:

(i) $a \pm b = c$

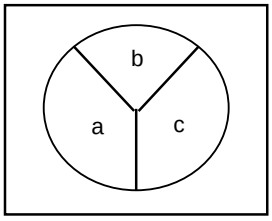
(ii) $ab = c$

(iii) (a + b) x n = c, where 'n' is a number.

(iv) $\sqrt{a^2 + b^2} = c$

(v) $\sqrt{a^2 - b^2} = c$

(vi) $\sqrt{a^2 \pm b} = c$



(vii) $\sqrt{a - b} = c$

(viii) $\frac{\sqrt{a^2 + b^2}}{2} = c$

(ix) $\sqrt[3]{a} \pm \sqrt[3]{b} = c$

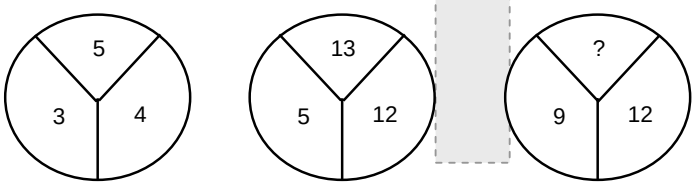
(x) $\frac{ab}{n} = c$

(xi) $(ab) \times n = c$

(xii) $(a \pm b)^3 = c$

Various other relations can also be given in the problems.

Ex.1

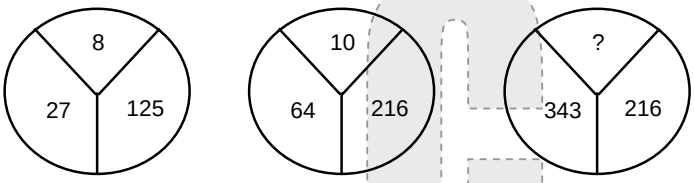


(1) 18 (2) 30 (3) 24 (4) 15

Sol. $\sqrt{3^2 + 4^2} = 5$; $\sqrt{5^2 + 12^2} = 13$.

The missing number is $\sqrt{9^2 + 12^2} = \sqrt{81 + 144} = \sqrt{225} = 15$. **Answer: (4)**

Ex.2



(1) 12 (2) 13 (3) 9 (4) 14

Sol. $\sqrt[3]{27} + \sqrt[3]{125} = 8$; $\sqrt[3]{64} + \sqrt[3]{216} = 10$. The missing number is $\sqrt[3]{343} + \sqrt[3]{216} = 7 + 3 = 13$. **Answer: (2)**

TYPE – 3

Problems involving Triangles:

In this type of problems 3 triangles will be given with numbers outside and inside. The number inside will be obtained by operating some arithmetic rule on the numbers outside the triangle. Generally, the numbers outside the circle are at the 3 vertices. The number inside the third triangle also follows the same rule as that of the first two triangles.

As in the previous cases, a number of various arithmetic operations can be identified as mentioned below:

(i) $n(a + b + c) = d$, n is a number.

(ii) $\frac{(a + b + c)}{n} = d$

(iii) $\left(\frac{abc}{n}\right) = d$

(iv) $\sqrt{a^2 + b^2 + c^2} = d$

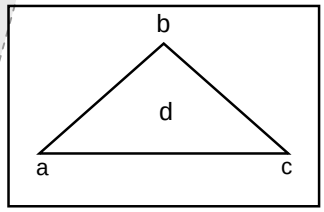
(v) $\sqrt[3]{a} + \sqrt[3]{b} + \sqrt[3]{c} = d$

(vi) $a^2 + b^2 + c^2 = d$

(vii) $\sqrt{a + b + c} = d$

(viii) $a^3 + b^3 + c^3 = d$

(ix) $\sqrt{abc} = d$

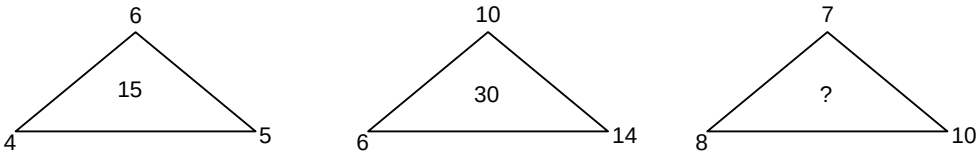


a, b, c → numbers at the 3 vertices

d → number inside the triangle.

Many other such types of relations can be identified.

Ex.1



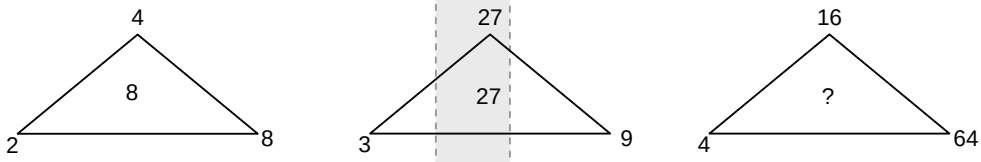
(1) 25 (2) 30 (3) 45 (4) 60

Sol. The sum of the numbers at the 3 vertices of the triangle is equal to the number inside.

$\therefore$ (4 + 6 + 5) = 15; (6 + 10 + 14) = 30

The missing number is (8 + 7 + 10) = 25. **Answer: (1)**

Ex.2



(1) 64 (2) 125 (3) 16 (4) 88

Sol. $\sqrt{2 \times 4 \times 8}$ = 8; $\sqrt{3 \times 27 \times 9}$ = 27. The missing number is $\sqrt{4 \times 16 \times 64}$ = 64. **Answer: (1)**

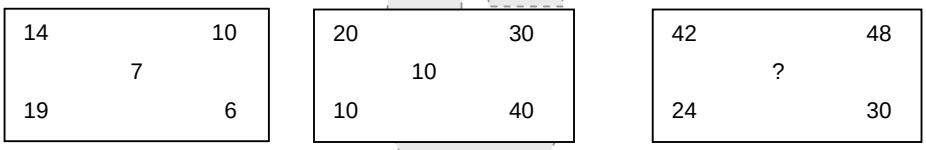
TYPE – 4

Problems involving squares (A):

This type of problems consists of 3 squares with five numbers inside the square. Of the five numbers four numbers are at the four corners of the square and one number at the middle with some arithmetic pattern. The pattern in the first two squares follows in the third square also.

Various arithmetic rules involving four numbers is already given in the first type of problems.

Ex.1



(1) 12 (2) 13 (3) 14 (4) 15

Sol. $\sqrt{14 + 10 + 6 + 19}$ = 7; $\sqrt{20 + 30 + 40 + 10}$ = 10

The missing number is $\sqrt{42 + 48 + 30 + 24} = \sqrt{144}$ = 12. **Answer: (1)**

TYPE – 5

Problems involving squares (B) – Magic squares:

In this type of problems, a square is divided into nine parts, three along row wise and 3 along column wise. Of the nine parts, eight parts are filled with one part left vacant or with a question mark. Some arithmetic rule follows either column wise or row wise.

Ex.1

48	23	62
12	10	42
36	13	?

(1) 50 (2) 40 (3) 10 (4) 20

Sol. (48 – 12) = 36; (23 – 10 = 13). → Column wise.

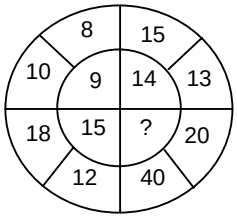
The missing number is (62 – 42) = 20. **Answer: (4)**

TYPE – 6

Problems involving two concentric circles divided into parts:

This type of problems consists of numbers in various parts, with a pattern of numbers in a particular area.

Ex.1



(1) 8 (2) 10 (3) 30 (4) 50

Sol. $\left(\frac{10+8}{2}\right)=9$; $\left(\frac{18+12}{2}\right)=15$; $\left(\frac{15+13}{2}\right)=14$ The missing is $\left(\frac{40+20}{2}\right)=30$. **Answer: (3)**

CODING / DECODING

Introduction:

For conveying secret messages from one place to another, especially in Defence Services, coding is used. The codes are based on various principles/patterns such that the message can be easily be deciphered at the other end. Now-a-days, in certain competitive examinations, such questions are given to judge the candidates' intelligence and mental ability. They are required to encode and decode words and sentences after observing the pattern and principles involved. These questions can be broadly classified into 5 main categories, as follows :

(i) Coding with Letters of Alphabets
(ii) Coding with Numerical Digits (Numbers)
(iii) Mixed Coding (Both Alphabetical and Numerical)
(iv) Coding with Arbitrary Signs / Symbols
(v) Miscellaneous Type

TYPE – 1

Coding with Letters of Alphabet:

In these questions, the letters of the alphabets are exclusively used. These letters do not stand for themselves but are allotted some artificial values based on some logical patterns/analogies. By applying those principles or observing the pattern involved, the candidates are required to decode a coded word or encode a word. These can be further classified into the following categories :

Simple Analogical Letter Coding:

These are also called arbitrary codes. There are 2 definite principles/pattern involved. Codes are based on the analogy of one example from which different codes are to be formed.

Ex.1 If NETWORK is coded as O P C T R S Q, how is CROPS written in that code; is written in actual code?

Sol.

N	=	O		C	=	T
E	=	P		R	=	O
T	=	C	then	O	=	N
W	=	T		P	=	E
O	=	R		S	=	R
R	=	S				
K	=	Q				

Hence CROPS can be coded as TONER.

Ex.2 The code 'TABLESTESF' stands for the word 'BELONGINGS' how will you code the following :

(1) LONG (2) ON (3) GIN (4) SONG (5) NO
(6) SING (7) SINGS (8) GONE (9) IS (10) GO

Sol. The coding is done as follows:

(1) BLES (2) LE (3) STE (4) FLES (5) EL

(6) FTES (7) FTESF (8) SLEA (9) TF (10) SL

Ex.3 If INLAND is coded as BSTRSI, make codes of the following letters.

(1) IN (2) LAND (3) INN (4) AND (5) AN

(6) LAID

Sol. The coding is done as follows:

(1) BS (2) TRSI (3) BSS (4) RSI (5) RS

(6) TRBI

Ex.4 If EWFGHONTISO stands for OBSERVATION, code the following letters.

(1) RATION (2) RATE (3) SEAT (4) NOT (5) NOTE

(6) BEST

Sol. The coding is as follows:

(1) HNTISO (2) HNTG (3) FGNT (4) OST (5) OSTG

(6) WGFT

Ex.5 If PROMISED is coded as RMNIOSTD, decode the following codes.

(1) RNST (2) MNIT (3) DOI (4) RMNST (5) SOM

(6) INMT

Sol. The decoding is as follows:

(1) POSE (2) ROME (3) DIM (4) PROSE (5) SIR

(6) MORE

Ex.6 Column A contains certain words numbered from (1) to (6). Column B goes with the codes for column A, but with different order. You have to match the words of column A with their respective coded word in column B. The pattern of coding used here is BLADES = CMBEFT.

Column (A)		**Column (B)**	
(1)	BASE	(1)	CBE
(2)	BALE	(2)	CBTF
(3)	SALE	(3)	CFE
(4)	SAD	(4)	CBMF
(5)	BAD	(5)	TBE
(6)	BED	(6)	TBMF

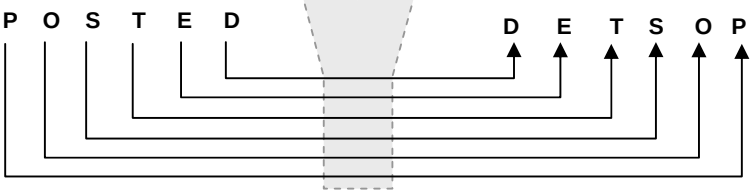
Sol. A (1) B (2), A (2) B (4), A (3) B (6), A (4) B (5), A (5) B (1), A (6) B (3).

Letter Coding on Specific Pattern:

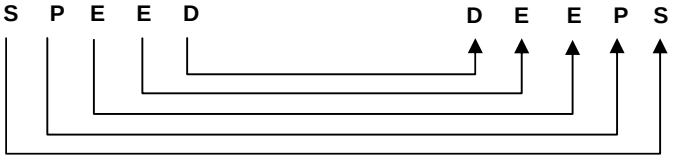
In such questions, letters of alphabets are no doubt allotted artificial values but based on certain specific pattern/principles. The candidates are required first to observe the specific pattern involved and then proceed with coding or decoding; as the case may be.

Ex.1 If POSTED is coded as DETSOP, how will be word SPEED be coded?

Sol. A careful observation of the above example will reveal that letters of the first word have been reversed



Similarly,



Ex.2 If GREET is coded as FQDDS, decode the following codes:

(1) KDS (2) SNQD (3) CNBI (4) CDDO (5) ONS

(6) ANRR

Sol. Here, each letter is allotted the value of its preceding letter in the sequence; the pattern of coding used here is B = A, C = B. Based on this pattern, the answers to the above questions will be follows:

(1) LET (2) TORE (3) DOCK (4) DEEP (5) POT

(6) BOSS

Ex.3 If A = E, how will you code the following words.

(1) BLACK (2) ACT (3) BAT (4) CADRE (5) LOOT

(6) FOOL

Sol. (1) FPEGO (2) EGX (3) FEX (4) GEHVI (5) PSSX

(6) JSSP

Ex.4 If "CAT" is coded as "DEBCUV", how will you code "RACE".

Sol. The pattern of coding is such that each letter has been allotted value of 2 letters following the sequence, i.e. A = BC, B = CD, C = DE, etc.

Hence, the word RACE will be coded as "STBCDEFG"

Based on the above principle, try to code the following.

(1) FATHER (2) DATED (3) LATE (4) FAKES (5) MAIN

(6) PLANE

Sol. (1) G H B C U V F G S T (2) E F B C U V F G E F

(3) M N B C U V F G (4) G H B C L M F G TU

(5) N O B C J K O P (6) Q R M N B C O P F G

Ex.5 Column (A) contains coded words and column (B) contains equivalent decoded words given in a different serial order. Match the words of the column (A) with column (B) and indicate the first and last letters of the coded word in column A from the answer choices.

The pattern of coding is Q = P, S = R, U = T, etc.

Column (1)	**Column (B)**
(1) USJN	(1) WORK
(2) CPOF	(2) SHORT
(3) MPPU	(3) FEET
(4) GFFU	(4) LOOT
(5) TIPSU	(5) BONE
(6) XPSL	(6) TRIM

Sol. A (1) B (6), A (2) B (5), A (3) B (4), A (4) B (3), A (5) B (2), A (6) B (1).

Ex.6 If "EGHJKMKM" is the code for "FILL", how will you code the following :

(1) QSDFRTSU (2) SUDFKMKM (3) EGDFDFKM

(4) CENPDFRT (5) KMNPRTSU (6) ACDFCERT

Sol. The pattern of coding is such that the sequence follows the letters in between, each pair of letters in the code. Pattern is AC = B, BD = C, CE = D, etc.

(1) REST (2) TELL (3) FEEL

(4) DOES (5) LOST (6) BEDS

TYPE – 2

Coding with Numerical Digits:

The pattern of coding with numerical digits is similar to that of coding with alphabets except the use of numerical digits with the assignment of some artificial values. The values are allotted based on some specific pattern which has to be discerned by the candidate in order to solve the problem in the quickest possible time.

If TRAIN is coded as 23456, how will you code TIN and RAIN?

The answer will be 256 for TIN and 3456 for RAIN. T = 2, R = 3, A = 4, I = 5, and N = 6. These values have been allotted arbitrary; based on logical relationship, the candidates will be able to solve the problem.

Analogical Coding with Numerical Digits:

Analogical coding with numerical digits involves the method of coding where the letters of alphabets are allotted numerical values and the pattern of coding is based on the analogy of the example given in the question. There are no set of principles or patterns involved. Candidates are required to study the examples given before getting started with the exercise.

Ex.1 If SELDOM is coded as "1 2 4 3 6 5", how will you code the following words?

(A) DOES (B) SOLE (C) LED

(D) DOLE (E) LODE (F) ODE

Choices:

(A)	(1) 3 6 2 1	(2) 6 2 3 1	(3) 1 6 3 2	(4) 6 2 1 3
(B)	(1) 1 4 6 2	(2) 1 6 4 2	(3) 1 4 2 6	(4) 1 6 2 4
(C)	(1) 4 3 2	(2) 3 2 4	(3) 4 2 3	(4) 4 2 6
(D)	(1) 3 6 4 1	(2) 3 6 4 2	(3) 3 6 2 4	(4) 3 6 4 1
(E)	(1) 4 6 2 3	(2) 4 6 3 2	(3) 6 3 2 4	(4) 4 3 6 2
(F)	(1) 6 2 3	(2) 2 3 6	(3) 6 3 2	(4) 6 3 4

Sol. If SELDOM stand for code 124365 which means S = 1, E = 2, L = 4, D = 3, O = 6, and M = 5. Based on this analogy, the correct answer will be,

(A) (1) (B) (2) (C) (3)

(D) (2) (E) (2) (F) (3)

Ex.2 If "1 3 4 8 2 6 7 5 9" is the code for "O B S E R V A N T" how will you code the following words?

(A) SERVANT (B) SOBER (C) BENT

(D) OVATE (E) ORATE (F) NOTES

Choices:

(A)	(1) 4 8 2 6 7 5 9	(2) 4 8 2 6 7 6 0	(3) 4 8 2 6 7 5 0	(4) 4 2 8 6 7 5 9
(B)	(1) 4 1 3 8 2	(2) 4 1 3 8 1	(3) 4 3 1 8 2	(4) 4 1 3 2 8
(C)	(1) 3 8 9 5	(2) 3 8 5 9	(3) 3 5 8 9	(4) 9 8 3 5
(D)	(1) 1 7 6 9 8	(2) 1 7 6 8 9	(3) 1 6 7 9 8	(4) 9 8 7 6 1
(E)	(1) 1 7 2 9 8	(2) 1 2 7 9 8	(3) 1 2 7 8 9	(4) 8 9 2 7 1
(F)	(1) 9 1 5 8 4	(2) 5 1 9 8 4	(3) 5 9 1 8 4	(4) 8 4 9 1 5

Sol. In the example, you'll observe O = 1, B = 3, S = 4, E = 8 R = 2, V = 6, A = 7, N = 5 and T = 9.

Based on this analogy the correct answers will be :

(A) (1) (B) (1) (C) (2)

(D) (3) (E) (2) (F) (2)

Ex.3 The code 6 7 4 5 3 2 7, stands for B E C A U S E. Decode the following codes

(1) 4 5 3 2 7 (2) 6 5 2 7 (3) 4 5 2 7 (4) 6 7 7 (5) 4 7 5 2 7 (6) 3 2 7

Sol. (1) CAUSE (2) BASE (3) CASE (4) BEE (5) CEASE (6) USE

Ex.4 If 4 0 6 5 4 2 5 7 is the code for S T A N D I N G, decode the following codes.

(1) 4 0 6 7 (2) 6 5 4 (3) 4 0 6 2 5 (4) 42 5 2 5 7 (5) 4 6 5 4 (6) 4 0 2 5 7

Sol. (1) STAG (2) AND (3) STAIN (4) DINING (5) SAND (6) STING

Coding with Specific Pattern:

This is the pattern of coding which exhibits the natural correlation of Arabic numbers with alphabetic letters. For instance, alphabets A to Z are assigned the numeric codes from 1 to 26 where each letter gets the assignment in the pattern as follow A = 1, B = 2, C = 3, etc.

The sequence is classified as follows :

Forward sequence (e.g. A = 1, B = 2, etc.)

Backward sequence (e.g. Z = 1, Y = 2, A = 26, etc.)

Random Sequence (e.g. A = 2, B = 3 or A = 4, B = 6, C = 8 or any other pattern following a particular sequence).

Forward Sequence:

Ex. If 'PACE' is code as 16-1-3-5, how will you code the following :

(1) ACTED (2) BAIL (3) RACE (4) FRAME (5) GLAD

(6) GAIN

Sol. (1) 1-3-20-5-4 (2) 2-1-9-12 (3) 18-1-3-5 (4) 6-18-1-13-5 (5) 7-12-1-4
(6) 7-1-9-14

Backward Sequence:

Ex. If GREAT is coded as 20-9-22-26-7, how will you code the following words :
(1) FATE (2) DATE (3) MATE (4) RATE (5) GATE

Sol. (1) 21-26-7-22 (2) 23-26-7-22 (3) 14-26-7-22 (4) 9-26-7-22 (5) 20-26-7-22

Random sequence:

The sequence will not follow a specific pattern of assignment as in other cases but will surely show a pattern at a strict analysis. The pattern can be established by various ways but in every case a set principle/pattern is involved which has to be discovered by careful examination of the example given in the question.

Ex.1 If FRANCE is coded 9-21-4-6-8, code the following words after discerning the principle/pattern involved in this example :
(1) INDIA (2) CANADA (3) GERMANY
(4) NEPAL (5) PERU (6) KENYA

Sol. The pattern of assignment is read as given in the following table.

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

Based on above pattern, the answers will be follows :
(1) 12-17-7-12-4 (2) 6-4-17-4-7-4 (3) 10-8-21-16-4-17-2
(4) 17-8-19-4-15 (5) 19-8-21-24 (6) 14-8-17-2-4

Ex.2 If BREAD is coded as "2-18-0-0-4", how will you code the following?
(1) COOL (2) COME (3) BROOM
(4) GROOM (5) SHEETAL (6) CREAM
A strict analysis of the question reads that the vowels 'E' & 'A' are assigned the code '0'. The rest of the letters follow the regular sequence of numerical assignment, i.e. B = 2, C = 3, etc. Based on the above pattern, the answers are follows: Remaining letters of alphabet will follow the same order, i.e. B = 2, C = 3, D = 4 etc.

Sol. (1) 3-0-0-12 (2) 3-0-13-0 (3) 2-18-0-0-13
(4) 7-18-0-0-13 (5) 19-8-0-0-20-0-12 (6) 3-18-0-0-13

Ex.3 If 6 – 12 – 1 – 19 – 8 = FLASH and 6 – 15 – 15 – 12 – 9 – 19 – 8 = FOOLISH, find the sum with all the letters put together.
(A) LATE (B) MAKE (C) ICED
(D) ACT (E) FACT (F) LAND

Choices:

(A)	(1) 38	(2) 59	(3) 56	(4) 58
(B)	(1) 32	(2) 30	(3) 34	(4) 36
(C)	(1) 22	(2) 23	(3) 21	(4) 24
(D)	(1) 23	(2) 22	(3) 20	(4) 24
(E)	(1) 41	(2) 51	(3) 21	(4) 30
(F)	(1) 42	(2) 29	(3) 31	(4) 30

Sol.

(A) LATE = 12 + 1 + 20 + 5 = 38, hence the answer is (1).
(B) MAKE = 13 + 1 + 11 + 5 = 30 hence the answer is (2).
(C) ICED = 9 + 3 + 5 + 4 = 21 hence the answer is (3).
(D) ACT = 1 + 3 + 20 = 24 hence the answer is (4).
(E) FACT = 6 + 1 + 3 + 20 = 30 hence the answer is (4).
(F) LAND = 12 + 1 + 14 + 4 = 31 hence the answer is (3).

TYPE – 3

Mixed Coding (Letters + Digits):

Mixed coding takes the pattern of coding with both the letters of alphabets and numerical assignment. The candidates are required to study the analogy given in question.

Ex.1 If "A – 3 – T – 5 – D" stands for ACTED and "D1T5D" stands for "DATED", how will you code the following

(1) FADED (2) LOCATE (3) BAILED
(4) FAILED (5) PRESS (6) DREAM

Ans. (1) F1D5D (2) L15C1T5 (3) B 1 I 12E4
(4) F1I12E4 (5) P 18E 19S (6) D 18 E 1 M

Ex.2 Decode the following:

(1) R 9 L 5 D (2) A 3 I 4 (3) 5A20I14G
(4) B 1 I 12 (5) K 9L 12 (6) B 1 I 12E4

Ans. (1) RILED (2) ACID (3) EATING
(4) BAIL (5) KILL (6) BAILED

Ex.3 Decode the following:

(1) F 1 D 5 D (2) A 9 D 9 N 7 (3) R 5 Q 21 I 18 E 4
(4) D 5 A 12 I 14 G (5) O 2 S 5 R 22 E (6) A 3 I 4

Ans. (1) F A D E D (2) A I D I N G (3) R E Q U I R E D
(4) D E A L I N G (5) O B S E R V E (6) A C I D

Coding with Arbitrary Signs / Symbols:

The pattern of coding here takes an extensive use of arbitrary signs and symbols. A careful deciphering of the codes is required to decode the question series.

Ex.1 If "M I S S I O N" is coded "★! ? ? ! ϕ $" and " LENS" is coded "@#$?", then how will you code "L I O N E S S"?

Ans. A careful deciphering of the two codes reads the following:

M	I	S	O	L	E	N
★	!	?	ϕ	@	#	$

Therefore, L I O N E S S will be coded as "@ ! ϕ $ # ? ?"

TYPE – 4

Miscellaneous Types

Decoding the Rule Applied:

This part of coding test required a careful examination of rules followed to code a certain word. Only after the analysis of the pattern applied in coding, you can decode them.

Example: Study the five different ways of coding marked (1), (2), (3), (4) & (5). A specific rule has been applied to codify each of them. Can you find out the rule of coding applied in the question that follows;

F R A N C E
- (1) N C E F R A
- (2) F A C R N E
- (3) E C N A R F
- (4) A C E F N R
- (5) F E R C A N

	WORD	CODE
1.	C A N A D A	C N D A A A
2.	K E N Y A	K A E Y N
3.	N A T I O N S	S N O I T A N
4.	V A N D A N A	V N A A A D N
5.	V A R D H M A N	N A M H D R A V
6.	V A R I O U S	A I O R U S V
7.	C A R E E R	E E R C A R
8.	P O P U L A T I O N	P N O O P I U T L A
9.	M E D I C I N E	M D C N E I I E
10.	A P T I T U D E	A D E I P T T U

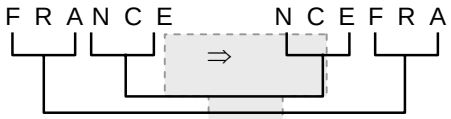
Answers:

1. (2) 2. (5) 3. (3) 4. (2) 5. (3) 6. (4) 7. (1) 8. (5)
9. (2) 10. (4)

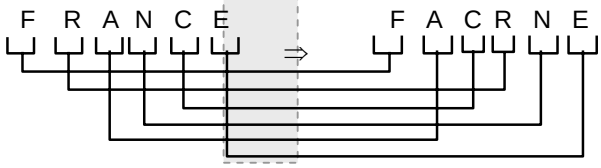
Explanations

The rules by which the different pattern of coding is made are as follows.

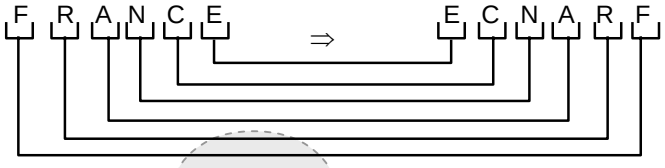
(1) The former part (FRA) gets transferred after the latter part (NCE). The coding is made in the order given below:



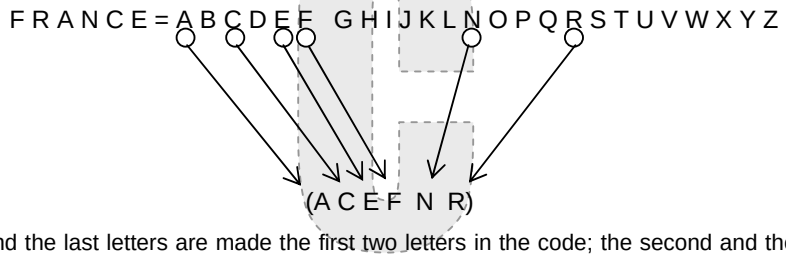
(2) The pattern is that every letters gets transferred on the adjacent line of the code.



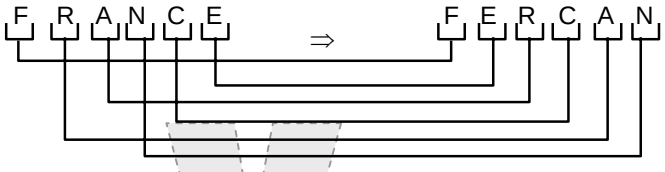
(3) The sequence is the backward rearrangement of letter.



(4) The sequence is the rearrangement of letters with respect to the order of regular letters of alphabets.



(5) The first and the last letters are made the first two letters in the code; the second and the fifth letter are made the third and fourth letters in the code; the third and the fourth letters are made the last two letters respectively.



Contrasting and Marking Comparisons:

A set of words are given in column I and codes have been formed in column II. Here in such questions some alphabets/letter are underline in column I and the corresponding codes in column II has been jumbled up thus making the question more difficult to correspond. To find the formula to decode these type of question some logical rule/principle is found by comparing or making contracts in all the questions. An example has been given below:

Example

In the following question the capital letters in column I are codified in small letters in column II. The small letters are not arranged in the same order on the capital letters. Study the column (I) and (II) together and determine the small letters for the corresponding underlined capital letter in column (I).

	Column (I)	**Column (II)**
1.	D I G I T	w b z b m
2.	T I G E R	m b z x k
3.	F E V E R	x k y o x
4.	G I T A R	m t z b k
5.	L I V E R	b e x o k

Keys: 1. w 2. m 3. y 4. z 5. e

Explanation

If we compare question (1) & (2) we find that there are 3 alphabets (T, I, G) common and there corresponding small letters will be (m, z, b) though not in the same order. This leaves us with (D and R) with small alphabets (w and k). Therefore, we have now,

Either 'w or k' is D's code

Now, if we taken (2) and (3), we find that 'w' is not present is column II of either (2) or (3) and D is not there in column II of either (2) & (3) the or conclude that D = w and therefore R = k.

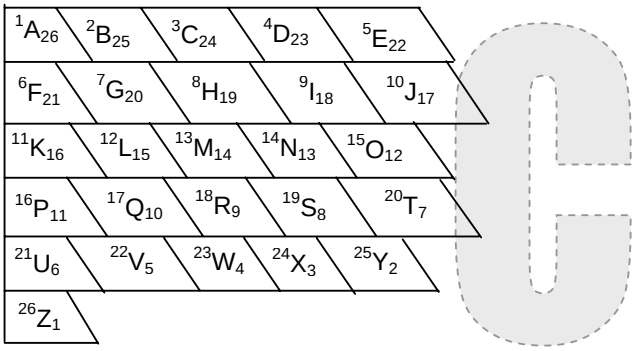
Now, carrying on with this finding, we see in question (3) and (5) there are two common elements in column I, V, E & R. Since E comes twice in (3), therefore code for E = x which leads to V = 0 and F = y in question is (1), I comes twice, this leads to I = b. So we are left with 'T' and 'G', which are either 'z' or 'm'.

Now, we cannot conclude anything more from these clues, but can fit in above observation to see what relation capital letters have with small letters.

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
			w	x	y			b									k				o				
t	U	v	w	x	y	z	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	p	q	r	s

Therefore, G = z and T = m

Mathematical/Algebraic Operations



The code is always the sum of letters with the assignment of numbers put in the regular order. The order reads either in a forward sequence or a backward sequence. Consider the table given below.

Ex.1 If DOLLY is 68, then how much will be SEEMA?

(1) 65 (2) 86 (3) 43 (4) 33

Sol. The coding is the sum of forward sequence of alphabets

DOLLY $\Rightarrow$ 4 + 15 + 12 + 12 + 25 = 68

SEEMA $\Rightarrow$ 19 + 5 + 5 + 13 +1 = 43, hence the answer is (3).

Ex.2 If NEERAJ is 109, then how much will be SHEETAL?

(1) 119 (2) 98 (3) 125 (4) 100

Sol. The coding is the sum of backward sequence of alphabets:

NEERAJ $\Rightarrow$ 13 + 22 + 22 + 9 + 26 + 15 = 109

SHEETAL $\Rightarrow$ 8 + 19 + 22 + 22 + 7 + 26 + 15 = 119, hence the answer is (1).