Chapter 1

Series

NUMBER SERIES

In this type of series, the set of given numbers in a series are related to one another in a particular pattern or manner. The relationship between the numbers may be

(i)   consecutive odd/even numbers,
(ii) Consecutive prime numbers,
(iii) Squares/cubes of some numbers with/without variation of addition or subtraction of some number,
(iv) Sum/product/difference of preceding number(s),
(v)   Addition/subtraction/multiplication/division by some number, and
(vi) Many more combinations of the relationships given above.

ILLUSTRATION 1 :

Find the missing term in the following sequence.
5, 11, 24, 51, 106, ...

Sol.   Double the number and then add to it
1, 2, 3, 4 etc.
Thus the next term is $2 \times 106 + 5 = 217$.

ILLUSTRATION 2 :

Complete the series 4, 9, 16, 25, ...
(1)   32   (2)   42
(3)   55   (4)   36

Sol. **(4)**   Each number is a whole square.

ILLUSTRATION 3:

Find the wrong term in the series
3, 8, 15, 24, 34, 48, 63.
(1)   15   (2)   12
(3)   34   (4)   63

Sol. **(3)** $8 - 3 = 5$
$15 - 8 = 7$
$24 - 15 = 9$
$34 - 24 = 10$
$48 - 34 = 14$
$63 - 48 = 15$

Obviously difference should be 11 & 13 instead of 10 & 14. Therefore, 34 is the wrong term.

ILLUSTRATION 4 :

Complete the given series 4, 9, 13, 22, 35..........
(1)   57   (2)   70
(3)   63   (4)   75

Sol. **(1)** $4 + 9 = 13$, $13 + 9 = 22$ etc.

ILLUSTRATION 5 :

Complete the given series 66, 36, 18, ...
(1)   9   (2)   3
(3)   6   (4)   8

Sol. **(4)** $6 \times 6 = 36$; $3 \times 6 = 18$; $1 \times 8 = 8$.

ILLUSTRATION 6 :

Complete the given series 61, 67, 71, 73, 79, ...
(1)   81   (2)   82
(3)   83   (4)   85

Sol. **(3)**   Prime number series. 83 is the next prime number.

ILLUSTRATION 7 :

Complete the given series 8, 24, 12, 36, 18, 54, ...
(1)   27   (2)   29
(3)   31   (4)   32

Sol. **(1)**   Multiply by 3 and divide the result by 2.

Next term is $\dfrac{54}{2} = 27$

ALPHABET SERIES

In this type of question, a series of single, pairs or groups of letters or combinations of letters and numbers is given. The terms of the series form a certain pattern as regards the position of the letters in the English alphabet.

In the following questions, various terms of a letter series are given with one term missing as shown. Choose the missing term out of the options.

ILLUSTRATION 8 :

AZ, GT, MN, ... , YB
(1)   KF   (2)   RX
(3)   SH   (4)   TS

Sol. **(3)**   The logic is +6 and –6.
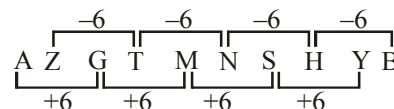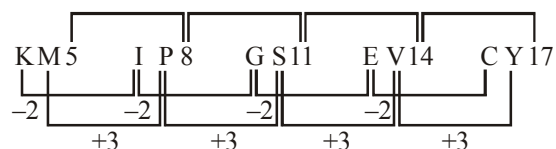

ILLUSTRATION 9 :

Choose the missing term from the given options.
KM5, IP8, GS11, EV14, ...
(1)   BX17   (2)   BY17
(3)   CY18   (4)   CY17

Sol. **(4)**   Logic for the letters is –2, +3 steps, numbers added is 3.

DIRECTIONS (ILLUSTRATION 10-12) : In each of the following questions, various terms of an alphabet series are given with one or more terms missing as shown by '?'. Choose the missing terms out of the given alternatives.

ILLUSTRATION 10 :

U, B, I, P, W, ?

(1) D   (2) F

(3) Q   (4) Z

Sol. **(1)**   U $\xrightarrow{+7}$ B $\xrightarrow{+7}$ I $\xrightarrow{+7}$ P $\xrightarrow{+7}$ W $\xrightarrow{+7}$ (D)

ILLUSTRATION 11 :

A, B, B, D, C, F, D, H, E, ?, ?

(1) E, F   (2) F, G

(3) F, I   (4) J, F

Sol. **(4)** The given sequence is a combination of two series :

I.   1st, 3rd, 5th, 7th, 9th, 11th terms i.e. A, B, C, D, E ?

II.   2nd, 4th, 6th, 8th, 10th terms i.e. B, D, F, H ?

    Clearly, I consists of consecutive letters while II consists of alternate letters. So, the missing letter in I is F, while that in II is J.

So, the missing terms i.e. 10th and 11th terms are J and F respectively.

ILLUSTRATION 12 :

UPI, ?, ODP, MBQ, IAW

(1) RHJ   (2) SHJ

(3) SIJ   (4) THK

Sol. **(2)**

1st letter : U $\xrightarrow{-2}$ (S) $\xrightarrow{-4}$ O $\xrightarrow{-2}$ M $\xrightarrow{-4}$ I

2nd letter : P $\xrightarrow{-8}$ (H) $\xrightarrow{-4}$ D $\xrightarrow{-2}$ B $\xrightarrow{-1}$ A

3rd letter : I $\xrightarrow{+1}$ (J) $\xrightarrow{+6}$ P $\xrightarrow{+1}$ Q $\xrightarrow{+6}$ W

CONTINUOUS PATTERN SERIES :

This type of question usually consists of a series of small letters which follow a certain pattern. However, some letters are missing from the series. These missing letters are then given in a proper sequence as one of the alternatives.

DIRECTIONS (ILLUSTRATION 13-17) : In each of the following letters series, some of the letters are missing which are given in that order as one of the alternatives below it. Choose the correct alternative.

ILLUSTRATION 13 :

.... bcc .... ac .... aabb .... ab cc

(1) aabca   (2) abaca

(3) bacab   (4) bcaca

Sol. **(3)** The series is b̲ b c c a̲ a / c c̲ a a b b / a̲ a b b̲ c c. The letter pairs move in a cyclic order.

ILLUSTRATION 14 :

a .... bccb .... ca .... cca .... baab c

(1) ababc   (2) abcaa

(3) accab   (4) bacaa

Sol. **(1)** The series is a a̲ b c c / b b̲ c a a̲ / c c a b̲ b / a a b c̲ c. The letters move in a cyclic order and in each group, the first and third letters occur twice.

ILLUSTRATION 15 :

ab .... aa .... caab .... c .... abb c

(1) bbcaa   (2) bcbca

(3) cabac   (4) cbbac

Sol. **(4)** The series is a b c̲ / a a b c / a a b b̲ c / a̲ a b b c̲ c. First all the letters occur once, then a occurs twice, then both a and b occur twice and finally all the three letters appear twice.

ILLUSTRATION 16 :

c .... baa .... aca .... cacab .... acac .... bca

(1) acbaa   (2) bbcaa

(3) bccab   (4) cbaac

Sol. **(1)** The series is

c a̲ b / a a / c̲ a c a b̲ / c a c a b / a̲ a / c a c a̲ b/ c a.

Thus, the pattern cacab, cacab, aa is repeated.

ILLUSTRATION 17 :

bca – b – aabc – a – caa

(1) acab   (2) bcbb

(3) cbab   (4) ccab

Sol. **(1)** The series is bca̲a/bc̲aa/bca̲a/b̲caa.

Thus, the pattern 'bcaa' is repeated.

ALPHA - NUMERIC SERIES :

A series in which both alphabets and numbers are used is called Alpha numeric.

DIRECTIONS (ILLUSTRATION 18-20) : In each of the following questions, a letter number series is given with one or more terms missing as shown by (?). Choose the missing term out of the given alternatives.

ILLUSTRATION 18 :

D-4, F-6, H-8, J-10, ? ?

(1) K-12, M-13   (2) L-12, M-14

(3) L-12, N-14   (4) K-12, M-14

Sol. **(3)** The letters in the series are alternate and the numbers indicate their position in the English alphabet from the beginning.

ILLUSTRATION 19 :

2A11, 4D13, 12G17, ?

(1) 36I19   (2) 36J21

(3) 48J21   (4) 48J23

Sol. **(4)** **1st number :** 2 $\xrightarrow{\times 2}$ 4 $\xrightarrow{\times 3}$ 12 $\xrightarrow{\times 4}$ (48)

Middle letter : A $\xrightarrow{+3}$ D $\xrightarrow{+3}$ G $\xrightarrow{+3}$ (J)

3rd number : 11 $\xrightarrow{+2}$ 13 $\xrightarrow{+4}$ 17 $\xrightarrow{+6}$ (23)

ILLUSTRATION 20 :

Find the missing term.

2 Z 5, 7 Y 7, 14 X 9, 23 W 11, 34 V 13, ?

Sol.   First number is the sum of the numbers of the preceeding term.

Middle letter is moved one step backward.

Third number is a series of odd numbers.

∴   6th term = 47 U 15.

Miscellaneous Solved Examples

Choose the missing term from the given options.

EXAMPLE 1 :

    1, 1, 3, 9, 6, 36, 10, 100, ... 225

    (1) **15**   (2) **16**

    (3) **20**   (4) **25**

Sol. (1) The given series is a mixture of two series :

        I.   1, 3, 6, 10, ...

        II. 1, 9, 36, 100, 125

        The logic of I is +2, +3, +4, +5, and the logic of II is the squares of the corresponding numbers of I. So the missing number is $10 + 5$ i.e. 15.

EXAMPLE 2 :

Complete the series : 0, 2, 3, 5, 8, 10, 15, 17, 24, 26, ...

    (1) **35**   (2) **32**

    (3) **30**   (4) **28**

Sol. (1) Sequence given is a combination of two series :

        I. 0, 3, 8, 15, 24, ... and II. 2, 5, 10, 17, 26.

        The pattern in both the series is +3, +5, +7, +9 etc.

DIRECTIONS (Example 3-4) : In each of the following questions, one term is wrong. Find out the wrong term.

EXAMPLE 3 :

    1, 2, 4, 8, 16, 32, 64, 96

    (1) **4**   (2) **32**

    (3) **64**   (4) **96**

Sol. (4) Each term is double the preceding term, so 96 is the wrong term. It should be 128.

EXAMPLE 4 :

    1, 5, 5, 9, 7, 11, 11, 15, 12, 17

    (1) **11**   (2) **12**

    (3) **17**   (4) **15**

Sol. (2) The given sequence is a combination of two series

        I. 1, 5, 7, 11, 12 and II. 5, 9, 11, 15, 17

        The pattern is both I and II is +4, +2, +4, +2. So 12 is wrong and must be replaced by $11 + 2$ i.e. 13.

DIRECTIONS (Example 5-11) : In each of the following questions, a sequence of groups of letters and numbers is given with one term missing as shown by (?). Choose the missing term out of the given alternatives.

EXAMPLE 5 :

What will be next term in BDF, CFI, DHL, ?

    (1) **CJM**   (2) **EIM**

    (3) **EJO**   (4) **EMI**

Sol. (3) Clearly first, second, third letters of each term are respectively moved one, two and three steps forward to obtain the corresponding letters of the next term.

EXAMPLE 6 :

    KM5, IP8, GS11, EV14, ?

    (1) **BX17**   (2) **BY17**

    (3) **CY18**   (4) **CY17**

Sol. (4) The first letter of each term is moved two steps backward and the second letter is moved three steps forward to obtain the corresponding letters of the next term. The number in each term is 3 more than that in the preceding term.

EXAMPLE 7 :

    X O I F ?

    (1) **D**   (2) **F**

    (3) **B**   (4) **E**

Sol. (2) The series following the sequence of the difference decreasing by 3 i. e.

      X   O   I   F   F

          −9   −6   −3   −0

EXAMPLE 8 :

    B D A C F H E G ?

    (1) **J L**   (2) **I K**

    (3) **J K**   (4) **K L**

Sol. (1) The letters in the series are arranged in following order (Four letters are mixed)

      A B C D is written as BDAC; and

      E F G H as FHEG. Similarly,

      I J K L will be JLIK.

      The answer option is JL i.e., A.

EXAMPLE 9 :

    2, 7, 12, 17, 22, 27, ...

Sol. Here the difference between the two successive terms is the same i.e. 5.

    The next number is therefore $27 + 5 = 32$.

EXAMPLE 10 :

    23, 35, 57, 711, 1113, ...

Sol. This is a series obtained from the prime numbers taken in pairs, so the next term is 1317.

EXAMPLE 11 :

    12, 25, 53, 111, 229, ...

Sol. The number follow the rule

    $\times 2 + 1, \times 2 + 3, \times 2 + 5, \times 2 + 5, \times 2 + 7$ etc. The next number is $229 \times 2 + 9 = 467$.

DIRECTION (Example 12-19) : In the following first examples there is a letter series in the first row and a number series in the second row. Each number in the number series stand for a letter. Since in each of that series some terms are missing, you have to find out as to what those terms are and answer the question based on these as given below the series.

EXAMPLE 12

- b - - b - - - - a b - - - - -

1 - - 2 - 1 - - - - 2 - - - - -

The last four terms in the series are

(1) 1 2 2 2   (2) 2 2 2 1

(3) 2 2 1 2   (4) 2 2 2 2

Sol. **(3)** Observe the options for the answer. We have only 1 and 2 in numbers and a, b in letters. It is easily seen that b is matched with 2 and so 'a' should be matched with 1. We have a b in the beginning. It is again repeated after a few places. We have ab – bba. This strongly suggests that in the first blank, we have 'a'. With a careful observation we see that the pattern is

a b a b   b a b b   b a b b   b b a b

1 2 1 2   2 1 2 2 2 1 2 2   2 2 1 2

Hence the last four terms in the series are 2 2 1 2.

EXAMPLE 13 :

a c b - - d e b c a - c - e d d - - -

- 2 - 3 5 - - - - 4 - - 1 - - - -

The last five terms in the number series are

(1) 53214   (2) 35124

(3) 35531   (4) 53124

Sol. **(3)** We have five letters a c b e d which are reversed in the second round as 'd e b c a' and so on we therefore have

a → 4, c → 2, e → 3, d → 5 and the remaining b → 1.

EXAMPLE 14 :

a b - - b c - - c - e - d - - - -

- 3 - - - 5 - 7 - - 9 9 - 7

The last four terms in the letter series are

(1) c d e e   (2) c d f e

(3) e f f e   (4) b c d e

Sol. **(3)** We notice b's again separated by two spaces. Between c's we have 'd' and between d's we have 'f'. Hence the series should be a, b c c b, c d d c , d e e d, e f f e.

EXAMPLE 15 :

- b x p m - x g m p - - b p - - - -

2 - 3 - 5 1 - - - 4 - - - - - - - -

The last five terms in the number series are

(1) m b g p x   (2) m g b p x

(3) p x m g b   (4) g b x m p

Sol. **(1)** Compare to arrive at the following correspondence x → 3, m → 5, p → 4. Remaining letters b and g should correspond to 2 and 1 or 1 and 2 respectively. The first place is to be filled by g, hence it is most probable that g → 2 and b → 1.

Hence the number series is

2	1	3	4	5
1	3	2	4	4
-	-	1	4	-
-	-	-	-	-

2, 1, 3 is changed to 1, 3, 2, then it should be changed to 3, 2, 1 and finally as 2, 1, 3.

EXAMPLE 16 :

What number should replace the question mark ?

7	4	5	3
1	6	3	7
3	8	1	7
6	1	8	?

Sol. **(2)** Each alternate row and column sums to 19 and 17.

EXAMPLE 17 :

6, 50, 402, 3218 ?

What number comes next in the above sequence ?

Sol. **25746**

Multiply the previous number by 8 and add 2 each time.

EXAMPLE 18 :

1, 2, 9, 4, 25, 6, ...

(1) 8   (2) 27

(3) 36   (4) 49

Sol. **(4)** In fact, this is the combination of two series viz., $1^2, 3^2, 5^2, 7^2$, ... and 2, 4, 6, ... The numbers of the two series are placed alternately.

EXAMPLE 19 :

GMSY, IOUA, KQWC, ?

(1) MSYE   (2) NSYE

(3) MTYE   (4) MSYF

Sol. **(1)** The series is formed by moving each letter two steps forward from one group to the next.

(The series restarts from A on reaching Z)

Exercise 1

1. Complete the series : 13, 24, 46, 90, 178, ...
   - (1) 354
   - (2) 266
   - (3) 364
   - (4) 344

DIRECTIONS (Qs 2) : In the following question, choose the missing term out of the given alternatives. Reference : 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

2. AZ, CX, FU, ...
   - (1) IR
   - (2) IV
   - (3) JQ
   - (4) KP

DIRECTIONS (Qs. 3-4) : In each of the following questions, choose the missing term out of the given alternatives. Reference : 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

3. AZ, CX, FU, ...
   - (1) IR
   - (2) IV
   - (3) JQ
   - (4) KP

4. 3F, 6G, 11I, 18L, ...
   - (1) 21O
   - (2) 25N
   - (3) 27P
   - (4) 27Q

DIRECTIONS (Qs. 5-15) : In each of the following questions, a sequence or groups of letters and numbers is given with one term missing as shown by (?). Choose the missing term out of the given alternatives.

5. Find the missing term in the series
   EJO, TYD, INS, XCH, ?
   - (1) NRW
   - (2) MRW
   - (3) MSX
   - (4) NSX

6. J2Z, K4X, I7V, ?, H16R, M22P
   - (1) I11T
   - (2) L11S
   - (3) L12T
   - (4) L11T

7. B Y C X D W E ?
   - (1) S
   - (3) T
   - (2) U
   - (4) V

8. 3, 8, 35, 48, ?, 120
   - (1) 64
   - (2) 72
   - (3) 80
   - (4) 99

9. B D G K ? V
   - (1) N
   - (2) P
   - (3) Q
   - (4) M

10. B C D B D D B E D B F D B G ?
    - (1) B D
    - (2) B F
    - (3) H B
    - (4) D B

11. A D E H I L M P Q T U ?
    - (1) X Y
    - (2) Y Z
    - (3) U V
    - (4) V W

12. 3, 6, 18, 72, 360, ...
    - (1) 1296
    - (2) 2160
    - (3) 2254
    - (4) 4329

13. 5, 9, 21, 37, 81, ...
    - (1) 153
    - (2) 150
    - (3) 158
    - (4) 151

14. 1, 2, 10, 4, 3, 14, 9, 5, ...
    - (1) 19
    - (2) 20
    - (3) 17
    - (4) 18

15. Find out the missing number.
    240, ? 120, 40, 10, 2 –
    - (1) 120
    - (2) 240
    - (3) 40
    - (4) 10

DIRECTIONS (Example 16-26) : In each example on some letters are missing shown by (...). The missing letters are given in proper sequence as one of the five alternatives given under each question. Find out the correct alternative.

16. A ......BBC......AAB .....CCA........BBCC
    - (1) BACB
    - (2) ABBA
    - (3) CABA
    - (4) ACBA

17. C.......BCCD....CCDB ....CDBCC ......BC
    - (1) DBCD
    - (3) DBDD
    - (2) BDAA
    - (4) BDCD

18. BA.......B.......AABB.......A......... ....A........BB
    - (1) ABAAABB
    - (2) BBAABB
    - (3) ABABBA
    - (4) BAAABB

19. C.....BBA....CAB.......AC........AB......AC
    - (1) ABBCC
    - (2) ABCBC
    - (3) BABCC
    - (4) ACBCB

20. What number should replace the question mark ?

4	2	9	8	6
3	8	7	9	5
8	1	7	?	1

    - (1) 72431
    - (2) 81781
    - (3) 54296
    - (4) 39284

21. What number should replace the question mark ?

    163   524   949   1898   ?
    - (1) 10878
    - (2) 10899
    - (3) 10879
    - (4) 12879

22. 16, 33, 67, 135, ...
    - (1) 251
    - (2) 259
    - (3) 271
    - (4) 289

23. 5, 9, 16, 29, 54, ...
    - (1) 103
    - (2) 105
    - (3) 109
    - (4) None of these

24. Find the wrong letter in the below given series.
    X S N I C Y
    - (1) Y
    - (2) C
    - (3) S
    - (4) I

25. Fill in the blanks spaces in the series:
    ab – – a – d c a cb – a c d –
    - (1) d c b d b
    - (2) c d b b d
    - (3) d a b d b
    - (4) c d b d b

26. ZYYZR, ABVUM, ?, BCUTL, XWABT, CDTSK
    - (1) YXZAS
    - (2) ZYABT
    - (3) XWYZR
    - (4) YXZAB

DIRECTIONS (Qs. 27-40) : Which of the following would come in place of the question mark ? In the following letter number series ?

27. Z, S, W, O, T, K, Q, G, ..., ...
(1) N, C   (2) N, D
(3) S, E   (4) O, D

28. E D C H G F K J I N ?
(1) L M   (2) O P
(3) M O   (4) M L

29. A L W B M X C N ?
(1) V   (2) W
(3) Y   (4) X

30. 0, 2, 2, 3, 3, 5, 8, 4, 10, ?
(1) 6   (2) 7
(3) 9   (4) 15

31. 2, 3, 10, 15, 26, 35, 50, 63, ?
(1) 80   (2) 82
(3) 83   (4) 84

32. 5, 14, 27, 44, 65, ?
(1) 88   (2) 90
(3) 109   (4) 130

33. 3, 5, 9, 17, 33, ?
(1) 48   (2) 49
(3) 63   (4) 65

34. 1, 2, 7, 7, 13, 12, ?
(1) 19   (2) 18
(3) 12   (4) 14

35. 5, 6, 10, 19, 35 ?
(1) 50   (2) 55
(3) 60   (4) 71

36. 4, 6, 6, 15, 8, 28, 10, ?
(1) 36   (2) 39
(3) 45   (4) 38

37. 1, 2, 9, ?, 65, 126
(1) 28   (2) 82
(3) 99   (4) 108

38. P 3 C   R 5 F   T 8 I   V 12 L ?
(1) Y 17 O   (2) X 17 M
(3) X 17 O   (4) X 16 O

39. CFL   EIK   GLJ   IOI   ?
(1) KRH   (2) KRJ
(3) JRH   (4) KOH

40. Z, L, X, J, V, H, T, F, ..., ...
(1) R, D   (2) R, E
(3) S, E   (4) Q, D

DIRECTIONS (Qs. 41-42) : In each question, there is a series of letters which follow some definite order. Look at the letters and determine the order, then form the suggested responses find out one which gives the next two letters in the series in their correct order. Letter sequence 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

41. Y A W E T I P M - -
(1) KQ   (2) VM
(3) LK   (4) JK

42. A C F J O U B J - -
(1) JK   (2) SC
(3) KL   (4) CM

43. What number comes next ?
1, 1, 3, 6, 5, 11, 7, ?
(1) 16   (2) 18
(2) 20   (4) 22

44. 1, 5, 11, 19, 29, ?
(1) 45   (2) 39
(3) 41   (4) 47

45. Give the next number in this series :
220, 200, 100, 80, 40, 20, ?
(1) 20   (2) 10
(3) 30   (4) 40

46. 3, 8, 18, 23, 33, (?), 48
(1) 37   (2) 39
(3) 40   (4) 38

47. APZLT, CQYNR, ERXPP, GSWRN, ITVTL (?)
(1) KUUVJ   (2) KVUUJ
(3) JUVUR   (4) KVUVJ

48. ACEGI, JLNPR, SUWYA, (?), KMOQS
(1) LBGHI   (2) ADIFH
(3) YWXAC   (4) BDFHJ

49. 41, 31, ?, 17, 11, 5
(1) 19   (2) 21
(3) 23   (4) 27

50. 8, 15, 28, 53, ?
(1) 106   (2) 98
(3) 100   (4) 102

51. 5, 10, 13, 26, 29, 58, ?, 122
(1) 60   (2) 61
(3) 111   (4) 91

52. 2, 3, 10, 15, 26, ?, 50
(1) 32   (2) 33
(3) 34   (4) 35

53. 2, 4, ?, 16, 32
(1) 6   (2) 10
(3) 8   (4) 12

54. 0, 7, 26, ?, 124, 215
(1) 37   (2) 51
(3) 63   (4) 88

55. 1, 8, 9, ?, 25, 216, 49
(1) 60   (2) 64
(3) 70   (4) 75

56. What should the term shown as ? be ?
336, 210, 120, ?, 24, 6, 0
(1) 40   (2) 50
(3) 60   (4) 70

57. 2, 9, 28, ?, 126, 217
(1) 36   (2) 42
(3) 56   (4) 65

58. 2, 12, 36, 80, 150, ?
(1) 194   (2) 210
(3) 252   (4) 258

59. 25, 43, 44, 53, ?, 72
(1) 55   (2) 63
(3) 65   (4) 71

60. 24, 6, 18, 9, 36, 9, 24, ?,
    (1) 24   (2) 12
    (3) 8   (4) 6
    (5) 4

61. 1, 1, 2, 3, 5, 8, 13, ?
    (1) 20   (2) 21
    (3) 28   (4) 36

62. 7, 13, 27, 53, ?, 213
    (1) 106   (2) 107
    (3) 105   (4) 108

63. 24, 46, 68, ?
    (1) 801   (2) 89
    (3) 88   (4) 810

64. 6, 7, 15, 46, 185 ?
    (1) 226   (2) 230
    (3) 271   (4) 926

65. 5, 8, 14, 26, ?, 98
    (1) 62   (2) 50
    (3) 40   (4) 35

66. 1, 3, 6, 10, 15, ?, 28
    (1) 20   (2) 21
    (3) 22   (4) 24

67. 14, 12, 21, ?, 28, 24, 35, 30
    (1) 16   (2) 18
    (3) 20   (4) 22

68. 1, 8, 81, 16, ?, 1296
    (1) 16   (2) 25
    (3) 64   (4) 125

69. 1, 1, 2, 6, 24, 120, ?
    (1) 1440   (2) 720
    (3) 480   (4) 240

70. 5, 9, 17, 33, 65, ?
    (1) 100   (2) 111
    (3) 129   (4) 145

71. 3, 4, 5, 5, 12, 13, 7, 24, 25, 9, 41 ?
    (1) 16   (2) 24
    (3) 35   (4) 40

72. 0, 1, 3, 7, 15, ?, 63
    (1) 18   (2) 21
    (3) 31   (4) 41

73. 1, 4, 27, 256, ?
    (1) 5   (2) 25
    (3) 3125   (4) 625

74. Z T P K H F.
    Which alphabet is wrongly placed in the series.
    (1) Z   (2) P
    (3) T   (4) F

75. – ab a a a b a – a – a
    (1) a b a   (2) abb
    (3) aab   (4) b a b

76. 1, 1, 1, 2, 4, 8, 3 —, —
    (1) 6, 12   (2) 9, 18
    (3) 18, 27   (4) 9, 27

77. 2, 3, 10, 15, 26, —
    (1) 37   (2) 36
    (3) 35   (4) 48

78. 1, 1, 1, 2, 2, 4, 3, 8, 5, 16, 8 —
    (1) 24   (2) 32
    (3) 48   (4) 64

79. 2, 5, 10, 5, 8, 16, 11, 14, ?
    (1) 22   (2) 24
    (3) 26   (4) 28

80. 10, 17, 26, 37, 50, ...
    (1) 57   (2) 76
    (3) 95   (4) 65

81. 1, 3, 5, 7, 9, ...
    (1) 9   (2) 11
    (3) 8   (4) 19

82. 64, 32, 96, 48, ...
    (1) 72   (2) 108
    (3) 144   (4) 124

83. If the following series is written in the reverse order, which number will be fourth to the right of the seventh number from the left ?
    7, 3, 9, 7, 0, 3, 8, 4, 6, 2, 1, 0, 5, 11, 13
    (1) 0   (2) 5
    (3) 9   (4) 11

84. 8, 48, 16, 96, 32, ?
    (1) 192   (2) 150
    (3) 58   (4) 288

85. 2, 3, 6, 18, 108, ?
    (1) 1944   (2) 1658
    (3) 648   (4) 1008

86. 80, 63, 72, 72, 64, 81, 56, ?
    (1) 96   (2) 98
    (3) 89   (4) 90

87. 2, 4, 4, 8, 16, 16, 256, ?
    (1) 64   (2) 36
    (3) 180   (4) 32

88. 19, 4, 14, 7, 10, 11, 7, ?
    (1) 16   (2) 15
    (3) 17   (4) 23

Exercise 2

DIRECTIONS (Qs. 1-5) : Which of the following would come in place of the question mark. In the following letter number series ?

1. 1, 5, 7, 14, 18, 20, 40, 44, 46, ?
    (1) 48   (2) 50
    (3) 52   (4) 92

2. $\dfrac{1}{81}, \dfrac{1}{54}, \dfrac{1}{36}, \dfrac{1}{24}, ?$

    (1) $\dfrac{1}{52}$ (2) $\dfrac{1}{9}$

    (3) $\dfrac{1}{16}$ (4) $\dfrac{1}{18}$

3. 3, 5, 5, 19, 7, 41, 9, ?
    (1) 71   (2) 61
    (3) 72   (4) 69

4. Q 1 F   S 2 E   U 6 D   W 21 C   ?
    (1) Y 66 B   (2) Y 88 B
    (3) Z 88 B   (4) Y 44 B

5. A   D   E   H   I   L ?
- (1) MP
- (2) MN
- (3) MO
- (4) MS

DIRECTIONS (Qs. 6-7) : In each question, there is a series of letters which follow some definite order. Look at the letters and determine the order, then form the suggested responses find out one which gives the next two letters in the series in their correct order. Letter sequence 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

6. M A Z N L B Y O K C X P J - -
- (1) QW
- (2) GH
- (3) DW
- (4) QJ

7. ZY   ML   XW LJ VU   IH   TS --
- (1) EF
- (2) SG
- (3) DW
- (4) QJ

8. a a b – a a a – b b a –
- (1) b b a
- (2) a b b
- (3) b a b
- (4) b b b

9. 24, 49, ?, 94, 15, 31, 59, 58
- (1) 51
- (2) 63
- (3) 77
- (4) 95

10. 4, 15, 16, ?, 36, 63, 64
- (1) 25
- (2) 30
- (3) 32
- (4) 35

11. 3, 6, 24, 30, 63, 72, ?, 132
- (1) 42
- (2) 58
- (3) 90
- (4) 120

12. 1, 1, 2, 4, 7, 11, 16, ?,
- (1) 20
- (2) 21
- (3) 22
- (4) 23

13. 8, 24, 16, ?, 7, 14, 6, 18, 12, 5, 5, 10
- (1) 14
- (2) 10
- (3) 7
- (4) 5

14. 8, 1, 64, 27, ?, 125
- (1) 216
- (2) 196
- (3) 169
- (4) 81

15. 5, 12, 7, 15, 8, 18, 10, ?
- (1) 28
- (2) 21
- (3) 11
- (4) 10

16. 78, 79, 81, ?, 92, 103, 119
- (1) 88
- (2) 85
- (3) 84
- (4) 83

17. b – a – bab – ab – a
- (1) a b a b
- (2) b a b a
- (3) b a bb
- (4) a bb a

18. a – baa – baa – ba
- (1) aab
- (2) bab
- (3) bba
- (4) bbb

19. a – bbc – aab – caaa – bca –
- (1) cabad
- (2) bacba
- (3) bbaaa
- (4) aabba

20. – baa – ba –aab –
- (1) baba
- (2) bbaa
- (3) abbb
- (4) bbab

21. abc – c – c –ba – – bca
- (1) abacb
- (2) babac
- (3) baabc
- (4) bacba

22. – b aa – bbb – ab –
- (1) a b a b
- (2) a a b b
- (3) b a a b
- (4) b b a b

23. ab – –a – dcacb – acd –
- (1) dcbdb
- (2) cdbbd
- (3) dabdb
- (4) cdbdb

24. 336, 210, 120, —, 24, 6, 0
- (1) 40
- (2) 50
- (3) 60
- (4) 70

25. 1, 1, 2, 4, 3, 27, 4 —, —
- (1) 5, 64
- (2) 64, 81
- (3) 64, 5
- (4) 16, 5

26. m n o n o p q o p q r s — — — — —
- (1) mnopq
- (2) oqrst
- (3) pqrst
- (4) qrstu

27. 3, 5, 9, 16, 22, 30, 41, ?
- (1) 49
- (2) 50
- (3) 51
- (4) 52

28. 2, 3, 6, 7, 10, ...
- (1) 11
- (2) 13
- (3) 14
- (4) 14

29. 8, 15, 24, 35, ...
- (1) 42
- (2) 52
- (3) 48
- (4) None of these

30. 1, 1, 4, 2, 9, 3, 16, 4, ...
- (1) 18
- (2) 15
- (3) 25
- (4) 32

31. 0, 3, 4, 7, 8, ...
- (1) 13
- (2) 11
- (3) 14
- (4) 15

32. 4, 9, 24, 69, ...
- (1) 165
- (2) 193
- (3) 204
- (4) None of these

33. Thirty six vehicles are parked in a parking lot in a single row. After the first car, there is one scooter. After the second car, there are two scooters. After the third car, there are three scooters and so on. Work out the number of scooters in the second half of the row.
- (1) 10
- (2) 12
- (3) 15
- (4) 17

34. 3, 8, 13, 24, 41, ?
- (1) 65
- (2) 75
- (3) 70
- (4) 80

35. 0, 8, 24, 48, 80, ?
- (1) 110
- (2) 96
- (3) 120
- (4) 140

36. What number comes next in the sequence below ?
3624, 4363, 3644, 4563, 3664, ?
- (1) 4763
- (2) 3763
- (3) 3624
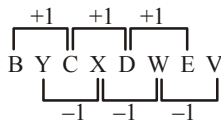- (4) 6763

37. What number should replace the question mark ?
27, 27, 30¼, 23¾, 33½, 20½, 36¾, 17¼, ?
- (1) 30
- (2) 20
- (3) 40
- (4) 10

Hints & SOLUTIONS

Exercise 1

1. **(1)** The rule is +11, +22, +44, +88, +176.
   The next number is 178 + 176 = 354.

2. **(3)** First letter : +2, +3, +4, +5 etc.
   Second letter : –2, –3, –4, –5 etc.

3. **(3)** First letter : +2, +3, +4, +5 etc.
   Second letter : –2, –3, –4, –5 etc.

4. **(3)** +1, +2, +3, +4 in letters; +3, +5, +7, +9 in numbers.

5. **(2)** There is a gap of four letters between first and second, second and third letter of each term. Also there is a gap of 4 letters between the last letter of a term and the first letter of the next term.

6. **(4)** The first letters in odd numbered terms from the series J, I, H and in even numbered terms from the series K, L, M.

   The sequence followed by the numbers is +2, +3, +4, +5, +6. The third letter of each term is moved two steps backward to obtain the third letter of the next term.

7. **(4)** There are two alternate series .

   $$\begin{matrix} & +1 & & +1 & & +1 & \\ B & Y & C & X & D & W & E & V \\ & & -1 & & -1 & & -1 & \end{matrix}$$

   Series I : BCDE (natural order)

   Series II : YXWV (reverse order)

8. **(4)** $3 = 2^2 – 1$, $8 = 3^2 – 1$:
   $35 = 6^2 – 1$, $48 = 7^2 – 1$:
   $? = 10^2 – 1$, $120 = 11^2 – 1$.

9. **(2)** The difference between the letters increases at each step after beginning with two.

   $$\begin{matrix} B & D & G & K & P & V \\ & +2 & +3 & +4 & +5 & +6 \end{matrix}$$

10. **(4)** The actual letters which are moving one step forward in the series are packed between B and D.

    B C D B D D B E D B F D B G D
    +1   +1   +1   +1
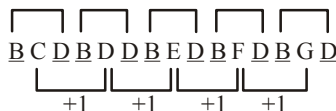
11. **(1)** The series is formed by moving the letters three and one steps forward alternately.

    A D E H I L M P Q T U X Y
    +3 +1 +3 +1 +3 +1 +3 +1 +3 +1 +3 +1

12. **(2)** The first number 3 is multiplied by 2 to get next number 6. The successive numbers are multiplied by 3, 4, 5, 6 etc.
    Hence the number next to 360 × 6 = 2160.

13. **(1)** The sequence is × 2 – 1, × 2 + 3, × 2 – 5, × 2 + 7, × 2 – 9 etc.
    The next number is 81 × 2 – 9 = 153.

14. **(4)** The given sequence comprises of three sequences
    1, 4, 9, 16   (Square on 1, 2, 3, 4)
    2, 3, 5, 7   (Prime number series)
    10, 14, 18, 22   (Common difference 4)
    The missing number belongs to series number three, so it is 18.

15. **(2)**

    240 240 120 40 10 2
    ×1   ×2   ×3   ×4   ×5
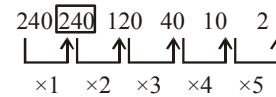
16. **(4)** A A B B C C / A A B B C C / A A B B C C
    Therefore the required missing letters are 'ACBA'

17. **(1)** C D B C/C D B C/C D B C/C D B C/C D B C
    Therefore the required missing letters are 'D B C D'

18. **(3)** B A A B/B A A B/B A A B/B A A B/B A A B/B
    ∴ The proper series of missing letters are 'A B A B B A'

19. **(4)** C A B B A C / C A B B A C/ C A B B A C
    There fore , the required letters are 'A C B C B'

20. **(2)** Add the top row of numbers to the second row to obtain the bottom row ;
    42986 + 38795 = 81781

21. **(3)** Add the number to the reverse of its digits.
    For example : 163 + 361 = 524, etc.

22. **(3)** Multiply each number in the series by 2, and then add '1' to get the next number, like (16 × 2 + 1) = 33, (33 × 2 + 1) = 67, and so on.

23. **(1)** Multiply each number by '2' and then deduct
    1, 2, 3, 4, ...to get the next consecutive number.
    Like (5 × 2 – 1) = 9, (9 × 2 – 2) = 16,
    (16 × 2 – 3) =29 etc.

24. **(2)** The pattern in the series is –5 i. e.

    $$\begin{matrix} X & S & N & I & D & Y \\ & -5 & -5 & -5 & -5 & -5 \end{matrix}$$

    D should be in place of C.

25. **(4)** The following pattern fits well

    a   b   c   d

    a   b   d   c

    a   c   b   d

    a   c   d   b

    Answer is alternatives

26. **(1)** A careful look will show that there are two series of group of letters namely
    (i) ZYYZR, (?), XWABT
    (ii) ABVUM, BCUTL, CDTSK
    In the first series, Let us see the relations of letters in different positions.

Positions		Rule	(?)
I	Z ? X	l letter backward	Y
II	Y ? W	l letter backward	X
III	Y ? A	1 letter forward	Z
IV	Z ? B	– do –	A
V	R ? T	– do –	S

    Hence the missing letter group is YXZAS i.e it is the answer.

27. **(1)** The sequence is consisting of two series.

Z, W, T, Q,.......and S, O, K, G. The logic is three steps backward and four step backward respectively.

28. **(4)** Three letters form a group. They are in natural series but the letters in each group are written backwards.

EDC   HGF   KJI   NML

29. **(3)** There are three alternate series.

A L W B M X C N Y

Series I : ABC

Series I : LMN

Series I : WXY

30. **(4)** The three series 0, 3, 8, 15; 2, 3, 4, 5; 2, 5, 10, 17 are considered.

31. **(2)** There are two series 2, 10, 26, 50, and 3, 15, 35, 63. Difference in the first and second series are 8, 16, 24, 32 etc, and 12, 20, 28, 36 etc.

32. **(2)** The difference of terms are 9, 13, 17, 21, 25 etc.

33. **(4)** +2, +4, +8, +16, +32.

34. **(1)** Given sequence consists of two series.

1, 7, 13, i.e., difference between consecutive nos is 6.

2, 7, 12, i.e., difference between consecutive nos is 5.

So, next number in the 1st series is 19.

35. **(3)** Add 1^2, 2^2, 3^2, 4^2, 5^2 etc.

36. **(3)** First series :   4, 6, 8, 10

Second series :   6, 15, 28, ?

Differences in the second series are 9, 13, 17 etc.

Hence the next term is 28 + 17 = 45.

37. **(1)** The sequence is $0^3 + 1$, $1^3 + 1$, $2^3 + 1$, $3^3 + 1$, $4^3 + 1$, $5^3 + 1$ etc.

38. **(3)** $P \rightarrow R \rightarrow T \rightarrow V \rightarrow X$

$3 \rightarrow 5 \rightarrow 8 \rightarrow 12 \rightarrow 17$

$C \rightarrow F \rightarrow 1 \rightarrow L \rightarrow O$

39. **(1)** In each term the first letter is moved two steps forward, the second three steps forward and the third letter is moved one step backward to write the next term.

40. **(1)** These are two series in alternate places.

Z, X, V, T – and L, J, H, F, ...

41. **(1)** The following two series are combined to get the given series.

Y   W   T   P   K

A   E   I   M   Q

42. **(2)** The letters in the series are moved 2, 3, 4, 5, 6, 7, 8, 9, 10 steps forward respectively to write the next letter.

43. **(1)** There are two alternate sequences that increase by 2 and 5, respectively, i.e., 1, 3, 5, 7 and 1, 6, 11, 16.

44. **(3)** Difference between successive terms : 4, 6, 8, 10

Continuing in this way next term is 41.

45. **(2)** –20, x/2, –20, x/2, –20, x/2

46. **(4)** The successive differences in this series form a pattern. The differences are 5, 10, 5, 10..............

Next difference should be 5 so that the missing term is 33 + 5 = 38. This matches with the pattern of differences is 5, 10, 5, 10, 5, 10.... Hence the correct answer is 38

47. **(1)** Letters in the 2nd place are

P, Q, R, S, T next should be U.

Letters in the 3rd place are Z, Y, X, W, V. These are continuous letters in the reverse order.

Hence next letter should be U.

With two letters only we could say that the answer (1)

The third letter confirms the same.

48. **(4)** A–C – E – G – I i.e, there is a gap of one letter in the first group. Second group starts with J, i.e. Immediately after the last letter I in the first group, and there is a gap of one J - L - N - P - R Following this pattern, the answer is BDFHU i.e, (4)

49. **(3)** This is a series of prime number

50. **(4)** Let x = 8

then 15 = 2x – 1 = y

28 = 2y – 2 = z

53 = 2z – 3 = m

Next term in the pattern should be 2m – 4 = 2 x 53 – 4 = 102

51. **(2)** Add 3 after doubling the previous number.

52. **(4)** The series exhibits the pattern of $n^2 + 1$, $n^2 – 1$, alternatively, n taking values 1, 2.............

53. **(3)** The terms exhibit the pattern 2^1, 2^2, 2^3 and so on.

54. **(3)** Try the pattern $n^3 – 1$. n = 1, 2, ...

55. **(2)** Can you see that the pattern is

1^2, 2^3, 3^2, 4^3, 5^2, 6^3, 7^2

56. **(3)** Note that $0 = 1^3 – 1$

$6 = 2^3 – 2$

$24 = 3^3 – 3$

57. **(4)** The terms exhibit the pattern $n^3 + 1$, n taking values 1, 2, 3.......

58. **(3)** $2 = 1^2 + 1^3$

$12 = 2^2 + 2^3$

$36 = 3^2 + 3^3$ and so on.

59. **(4)** Two sequences namely

25, 43, 44, 53, 71, 72

60. **(2)** Consider pairs of numbers:

24 : 6, 6 is one-fourth of 24 :

18, 9, 9 is half of 18;

36, 9 : 9 is one fourth of 36

61. **(2)** Each term is the sum of two preceding terms.

62. **(2)** × 2 ± 1. Thus 53 × 2 + 1 = 107

63. **(4)** Consecutive even number. Next term is 810.

64. **(4)** Preceding term is multiplied by 1, 2, 3, 4, 5 respectively and then 1 is added to the product

65. **(2)** Each difference is twice the previous difference.

66. **(2)** Triangular numbers, differences increase by 1.

67. **(2)** Two sequences of numbers are alter natively arranged.

68. **(4)** Numbers are in sets of three such that

$1^2 = 1$, $2^3 = 8$, $3^4 = 81$ and so on

69. **(2)** Preceding term is multiplied by 1, 2, 3, 4, 5 respectively to get the next term.

70. **(3)** Each number is 1 less than twice the preceding number.

71. **(4)** Numbers are in sets of three such that each set forms a Pythagorean triple, i.e,

$3^2 + 4^2 = 5^2$, $5^2 + 12^2 = 13^2$, $7^2 + 24^2 = 25^2$ and so on.

Quicker : 2nd number in each set is (1st number × n + n)

Method : Where, n = 1, 2, 3 .... is set no.

next number in the series is (9 × 4 + 4) = 40

72. **(3)** Differences are 2^0, 2^1, 2^2, 2^3. and so on.

73. **(3)** The terms are
1^1, 2^2, 3^3, 4^4 and so on.

74. **(2)** The difference between the letters is decreased by one at each step .

Z   T   O   K   H   F
$\underset{-6}{}\quad\underset{-5}{}\quad\underset{-4}{}\quad\underset{-3}{}\quad\underset{-2}{}$

O should be in place of P.

75. **(3)** – abaaaba – ab – a
Option (3) i.e., aab provides the pattern a aba / aaba/ aaba

76. **(4)** Form groups of 3 numbers viz.
$(1, 1, 1) = (1^1, 1^2, 1^3)$
$(2, 4, 8) =(2^1, 2^2, 2^3)$
$(3, -, -,) = (3^1, 3^2, 3^3)$

77. **(3)** Each term is of the type
$n^2 + 1$, $n^2 – 1$, alternately, e.g.
$2 = 1^2 + 1$
$3 = 2^2 – 1$
$10 = 3^2 + 1$

78. **(2)** Two sequences of number appearing alternately. 2nd, 4th, 6th, 8th numbers are 1, 2, 4, 8, 16, 32
The other series is Fibonacci series.

79. **(4)** Three sequences whose third term is double of the second term.

80. **(4)** Numbers in the series can be obtained by adding '1' to the square of the natural numbers starting from 3 onwards, such as
$3^2 + 1$, $4^2 + 1$, $5^2 + 1$, $6^2 + 1$, $7^2 + 1$, etc.

81. **(2)** It's a series of all odd numbers in ascending order.

82. **(3)** Divide the first number by 2 and then multiply by 3 to get second and third term of the series viz., 64/2 = 32, then 32 × 3 = 96 is the third term.

83. **(1)** The given series when written in the reverse order becomes.
13, 11, 5, 0, 1, 2, 6, 4, 8, 3, 0, 7, 9, 3, 7
The 7th number from the left is 6. The 4th number to the right of 6 is 0.

84. **(1)** Explanation I : the sequence in the series is × 6, ÷ 3 which is repeated .

8   48   16   96   32   192
$\underset{\times 6}{}\ \underset{\div 3}{}\ \underset{\times 6}{}\ \underset{\div 3}{}\ \underset{\times 6}{}$

Explanation II : there are two alternate series and the numbers are multiplied by 2.

8   48   16   96   32   192

85. **(1)** Every third number in the series is the product of previous two numbers.

2   3   6   18   108   1944
2×3
3×6
6×18
18×108

86. **(4)** There are two alternate series :

80 63 72 72 64 81 56 90
(–8, –8, –8 above; +9, +9, +9 below)

Series I : 80, 72, 64, 56 (following - 8 pattern)
Series I : 63, 72, 81, 90 (following + 9 pattern)

87. **(4)** There are two alternate series :

2 4 4 8 16 16 256 32
(×2, ×4, ×16 above; ×2, ×2, ×2 below)

Series I : 2, 4, 16, 256, (next number is the square of previous number)
Series II : 4, 8, 16, 32, (number is multiplied by 2 to get the next number)

88. **(1)** There are two alternate series :

19 4 14 7 10 11 7 16
(–5, –4, –3 above; +3, +4, +5 below)

Series I : 19, 14, 10, 7 (The sequence following is –5 –4, –3)
Series II : 4, 7, 11, 16 (The sequence following is +3, +4, +5)

Exercise 2

1. **(4)** The sequence follows + 4, + 2, × 2.

2. **(3)** Multiply each term by $\dfrac{3}{2}$ to get the next term.

3. **(1)** First series   3, 5, 7, 9
Second series   5, 19, 41, ?
Difference of second series 14, 22, 30 etc. Next term is 41 + 30 i.e., equal to 71.

4. **(2)** In each term, the first letter is moved two steps forward and the last letter is moved one step backward. The number series run as follows : Previous no × n + n, where, n = 1, 2,

5. **(1)** Alphabets are grouped in rows of 4(ABCD, EFGH, UKL.....) and an initial and final letter of the row in horizontal position is taken.

6. **(3)** The following four series are combined to get the given series.

M	L	K	J	I
A	B	C	D	
Z	Y	X	W	
N	O	P	Q	

7. **(2)** The following four series are combined to get given series

ZX	V	T	R
Y	W	U	S
M	K	I	G
L	J	H	F

8. **(1)** Observe the above letter series

1. The first blank space should be filled in by 'b' so that two a' are

2. The second blank space should be filled in by either 'a' in which case four 'a' s are followed by two 'b's. or it should be filled in by 'b' s.

3. The last space must be filled in by 'a'

4. Possible answers are b a a or b b a. Since the alternatives contains only 'b a a. (1) is the answer.

5. In case both ' b a a' and 'b b a' has appeared as possible alternatives, then we would choose one which is more prominent pattern. a a b b/ a a a b b b/ a a

would be a better choice so that the answer in that case would be b b a.

9. **(4)** It is a combination of two series, namely

24, 49, – 94; and 15, 31, 59, 58

The two series correspond to x, $(2x + 1)$, $(4x – 1)$, $(4x – 2)$

Hence the missing term is

$4 × 24 – 1 = 95$

10. **(4)** pattern is 2^2, $4^2 – 1$, 4^2, $6^2 – 1$, 6^2 and so on.

11. **(4)** Terms taken alternately form two sequences.

These are

3, 24, 63 ?	6, 30, 72, 132
$3 = 2^2 – 1$	$6 = 2^2 + 2$
$24 = 5^2 – 1$	$30 = 5^2 + 5$
$63 = 8^2 – 1$	$72 = 8^2 + 8$

Next term = $11^2 – 1 = 120$

12. **(3)** Alternate terms from two sequences.

13. **(3)** Numbers are in sets of three: first set has middle term as the sum of the terms on its left and right: the second set has middle term as the difference and so on

14. **(1)** Alternate terms are cubes of even and odd numbers respectively.

15. **(2)** Second, fourth, sixth numbers are the sum of number on their left and right.

Quicker Method :

It consists of two alternate series. 5, 7, 8, 10 and 12, 15, 18

Next term in the second series is 21.

16. **(2)** Differences of the first set of differences are increasing by 1 viz.

17. **(1)** b– a – bab – ab –

Option (1) i.e, abab provides the pattern baa bba / baa bb a

18. **(4)** a – baa – baa – ba

Option (4) i.e, bbb provides the pattern in which first six terms are laterally inverted as below. abbaab/ baabba

19. **(4)** a – bbc – aab – caaa – bca –

Option (4) i.e, aabba provides the pattern a abbca/ aab bca / aabbca/a

20. **(3)** – baa – ba – aab –

Option (3) i.e, abbb provides the pattern a baabbabaabb

21. **(3)** abc – c–c– ba – bca

Option (3) i.e, baabc gives the pattern abc/ cab /abc/ bca (abc rotate in cyclic order)

22. **(4)** –baa –bbb–ab–

Option (4) i.e, bbab provides the pattern b baa bb / bbaabb

23. **(4)** ab – a – dcacb – acd –

Option (5) i.e, cdbdb provides the pattern abcd/ abdc/ acdb

24. **(3)** Each number is of the form

n^3 – n.e.g.

$336 = 7^3 – 7$

$210 = 6^3 – 6$

$120 = 5^3 – 5$

25. **(4)** Consider pair of numbers

$(1, 1) = (1, 1^3)$

$(2, 4) = (2, 2^2)$

$(3, 27) = (3, 3^3)$

$(4, 16) = (4, 4^2)$

Next number will be 5.

26. **(3)** The series is mno/nopq/opqrs/pqrst

27. **(3)** Consider first three terms. Differences are 2, 4. In the next three, Differences are 6, 8. In the next three differences should be 10, 12.

28. **(1)** Add '1' and '0' to the alternate number to a series of odd-numbers in ascending order, viz.

$1 + 1, 3 + 0, 5 + 1, 7 + 0, 9 + 1, 11 + 0, 13 + 1$, etc. to get 2, 3, 6, 7, 10, 11, etc.

29. **(3)** The numbers in series are in the order of $3^2 – 1$, $4^2 – 1$, $5^2 – 1$, etc.

30. **(3)** It's the combination of two series,

1, 2, 3, 4, 5,......... and 1^2, 2^2, 3^2, 4^2, ... etc., the numbers of the two series are placed alternatively.

31. **(2)** Subtract '1' from the alternate terms of the series

1, 3, 5, 7, ... etc. Like, $1 – 1, 3, 5 – 1, 7, 9 – 1, 11$, etc.

32. **(3)** Multiply each by 3 and then subtract '3' to get the next number of the series

33. **(3)** Let C and S denote car and scooter respectively. Then, the sequence of parking is

C S C S S C S S S C S S S S C S S S / S S C S S S S S C S S S S S S S C

The above sequence has been divided into two equal halves by a line. Clearly, number of scooters in second half of the line = 15.

34. **(3)** The sequence in the series is (number + next number) + addition of natural number increasing by 1 at each step, after beginning from 2.
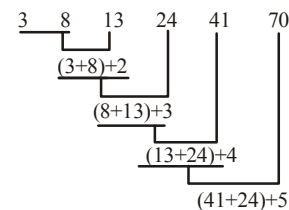
35. **(3)** The sequence of the series consists of the product of 2 even numbers in natural order i. e. ,

0	8	24	48	80	120
↓	↓	↓	↓	↓	↓
(0×2)	(2×4)	(4×6)	(6×8)	(8×10)	(10×12)

36. **(1)** Reverse the previous number and add 1 to the second and third digit alternately.

37. **(3)** There are 2 series :

(+3¼) 27, 30¼, 33½, 36¾, 40

(– 3¼) 27, 23¾, 20½, 17¼, 14