# 3. SERIES COMPLETION

This chapter deals with questions in which series of numbers or alphabetical letters are given, which are generally called as terms of the series. These terms follow a certain pattern throughout. The candidate is required to recognise this pattern and either complete the given series with the most suitable alternative or find the wrong term in the series.

## TYPE 1 : NUMBER SERIES

Case I : Completing the Given Series

Ex. 1. Which number would replace question mark in the series 7, 12, 19, ?, 39.

***ia)*** 29 ***ib)*** 28 ***ic)*** 26 ***id)*** 24

(C.B.I. 1995)

Sol. Clearly, the given sequence follows the pattern :

+ 5, +7, +9 ... i.e., 7 + 5 = 12, 12 + 7=19

Missing number = 19 + 9 = 28.

Hence, the answer is (6).

Ex. 2. Which is the number that comes next in the sequence :

0. 6. 24. 60. 120. 210 ? (Hotel Management, 1995)

***ia)*** 240 ***ib)*** 290 ***ic)*** 336 ***id)*** 504

Sol. Clearly, the given series is $1^3 - 1$, $2^3 - 2$, $3^s - 3$, $4^3 - 4$. $5^3 - 5$. 6.

Next number = $7^3 - 7 = 343 - 7 = 336$.

Hence, the answer is ic).

Ex. 3. Which is the number that comes next in the following sequence ?

4, 6. 12, 14. 28. 30. (....)

***ia)*** 32 ***ib)*** 60 <c) 62 ***id)*** 64

Sol. The given sequence is a combination of two series :

I. 4. 12, 28, (....) and II. 6. 14, 30.

Now, the pattern followed in each of the above two series is :

+ 8, + 16. + 32

So. missing number = (28 + 32) = 60.

Hence, the answer is ***ib).***

Ex. 4. Find out the missing number in the following sequence :

1. 3, 3, 6, 7, 9, ?, 12, 21.

(a) 10 ***ib)*** 11 ***ic)*** 12 ***id)*** 13

Sol. Clearly, the given sequence is a combination of two series :

I. 1, 3, 7, ?, 21 and II. 3. 6. 9. 12

The pattern followed in I is + 2. + 4....; and the pattern followed in II is + 3.

Thus, missing number = 7 + 6 = 13.

Hence, the answer is ***id).***

Ex. 5. Which fraction comes next in the sequence $\frac{1}{2}, \frac{3}{4}, \frac{5}{8}, \frac{7}{16}$ ?

(a) $\frac{9}{32}$ (b) $\frac{10}{17}$ (c) $\frac{11}{34}$ (d) $\frac{19}{35}$

Sol. Clearly, the numerators of the fractions in the given sequence form the series 1, 3, 5, 7, in which each term is obtained by adding 2 to the previous term.

The denominators of the fractions form the series 2, 4, 8, 16, i.e., $2^1, 2^2, 2^3, 2^4$.

So, the numerator of the next fraction will be (7 + 2) i.e., 9 and the denominator will be $2^5$ i.e., 32.

$\therefore$ The next term is $\frac{9}{32}$

Hence, the answer is (a).

Elementary idea of Progressions

I. Arithmetic Progression (AP.) — ***The progression of the form a, a + d, a + 2d, a + 3d,... is known as an A.P. with first term = a and common difference = d.***

Ex. 3, 6, 9, 12, ... is an A.P. with $a = 3$ and $d = 6 - 3 = 3$.

In an A.P., we have nth term $= a + (n - 1)d$.

II. Geometric Progression (G.P.) — ***The progression of the form $a, ar, ar^2, ar^3, \ldots$ is known as a G.P. with first term = a and common ratio*** = r.

Ex. 1, 5, 25, 125, ... is a G.P. with $a = 1$ and $r = \frac{5}{1} = \frac{25}{5} = \ldots = 5$.

In a G.P., we have nth term $= ar^{n-1}$.

Ex. 6. In the series 357, 363, 369, .... what will be the 10th term ?

(a) 405 (b) 411 (c) 413 (d) 417

Sol. The given scries is an A.P. in which $a = 357$ and $d = 6$.

10th term $= a + (10 - 1)d = a + 9d$.

$= (357 + 9 \times 6) = (357 + 54) = 411$.

Hence, the answer is (b).

Ex. 7. How many terms are there in the series 201, 208, 215, ..... 369 ?

(a) 23 (b) 24 (c) 25 (d) 26

Sol. The given series in an A.P. in which $a = 201$ and $d = 7$.

Let the number of terms be $n$.

Then. $369 = 201 + (n - 1) \times 7$ or $n = 25$.

Hence, the answer is (c).

Ex. 8. In the series 7, 14, 28 .... what will be the 10th term ?

(a) 1792 (b) 2456 (c) 3584 (d) 4096

Sol. Clearly. $7 \times 2 = 14$. $14 \times 2 = 28$, ... and so on.

So, the given series is a G.P. in which $a = 7$ and $r = 2$.

10th term $= ar^{10-1} = ar^9 = 7 \times 2^9 = 7 \times 512 = 3584$.

Hence, the answer is (e).

## EXERCISE 3A .

Directions : ***In each of the following questions, a number series is given with one term missing. Choose the correct alternative that will continue the same pattern and fill in the blank spaces.***

1. 1, 4, 9. 16, 25, (....) (Assistant Grade, 1995)
   (a) 35 (***b***) 36 ***ic)*** 48 ***id)*** 49
2. 20, 19, 17, (....), 10, 5 (C.B.I. J 995)
   ***ia)*** 12 (6) 13 (c) 14 ***id)*** 15
3. 2, 3, 5. 7, 11. (....). 17
   (a) 12 (6) 13 (c) 14 ***id)*** 15
4. 6, 11, 21, 36. 56. (....) (Assistant Grade, 1997)
   (a) 42 (6) 51 ***ic)*** 81 ***id)*** 91
5. 1. 6. 13. 22. 33. (....) (L Tax & Central Excise. 1994)
   ***ia)*** 44 (6) 45 (c) 46 ***id)*** 47
6. 3. 9. 27. 81. (....) (S.C.ILA. 1994)
   (a) 324 (6) 243 (c) 210 ***id)*** 162
7. 1. 9. 17. 33. 49. 73. (....) (Hotel Management. 1993)
   (a) 97 (6) 98 ***ic)*** 99 ***id)*** 100
8. 2. 5. 9. (....), 20. 27 (S.C.ILA. 1993)
   (a) 14 ***ib)*** 16 ***ic)*** 18 ***id)*** 24
9. 5, 9, 17, 29. 45, (....) (8.8.C. 1995)
   (a) 60 (6) 65 ***ic)*** 68 ***id)*** 70
10. 3. 7, 15, 31. 63. (....)
    ***ia)*** 92 (6) 115 (c) 127 ***id)*** 131
11. 1. 6, 15, (....), 45, 66, 91 (Hotel Management, 1995)
    ***ia)*** 25 ***ib)*** 26 ***ic)*** 27 ***id)*** 28
12. 1. 2, 3, 5, 8. (....) (M.BJV. 1994)
    (a) 9 (6) 11 ***ic)*** 13 ***id)*** 15
13. 0.5, 1.5, 4.5, 13.5, (....) (Railways. 1994)
    ***ia)*** 45.5 (6) 39.5 (c) 30.5 ***id)*** 40.5
14. 121, 225, 361, (.....) (P.C.S. 1996)
    (a) 441 (6) 484 (c) 529 ***id)*** 729
15. 0. 2. 8, 14. (....). 34
    (a) 24 ***ib)*** 22 ***ic)*** 20 ***id)*** 18
16. 19. 2. 38. 3. 114. 4. (....) (Bank P.O. 199«)
    (a) 228 (6) 256 ***ic)*** 352 ***id)*** 456
17. 1, 2. 3. 6. 9. 18. (....). 54
    (a) 18 ***(b) 27*** ***ic)*** 36 ***id)*** 81
18. 4. 5, 9, 18, 34, (....)
    (a) 43 (6) 49 (c) 50 ***id)*** 59
19. 3, 6, 18, 72. (....) (I. Tax & Central Excise, 1995)
    (a) 144 (***b***) 216 (c) 288 ***id)*** 360



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20. 66. 36, 18. (....)
(a) 3 (6) 6 (c) 8 (d) 9

21. 21, 25, 33, 49, 81, (....) (Railways, 1998)
(a) 145 (6) 129 (c) 113 (d) 97

22. 12, 32, 72, 152, (....) (Assistant Grade, 1996)
(a) 312 (6) 325 (c) 515 ***(d)*** 613

23. 3, 6, 5, 20, 7, 42, 9, (....)
(a) 54 (6) 60 (c) 66 (d) 72

24. 1, 3, 4, 8, 15, 27. (....)
(a) 37 (6) 44 (c) 50 (d) 55

25. 2, 15, 41, 80, (....) (M.B.A. 1997)
(a) 111 (6)120 (c) 121 (d) 132

26. 8, 10, 14, 18, (....). 34, 50, 66 (M.B.A. 1998)
(a) 24 (6) 25 (c) 26 (d) 27

27. 1,2, 6,24, (....) (C.A.T. 1997)
(a) 60 (6) 95 (c) 120 (d) 150

28. 2, 3, 8, 63, (....) (R.R.B. 1998)
(a) 1038 (6) 1998 (c) 3008 (d) 3968

29. 95, 115.5, 138, (....), 189 (8J3.C. 1993)
(a) 154.5 (6) 162.5 (c) 164.5 (d) 166.5

30. 4, 10, (....), 82, 244, 730 (C.B.I. 1993)
(a) 24 (6) 28 (c) 77 (d) 218

31. 4, 32, 128, (....)
(a) 128 (6) 144 (c) 192 (d) 256

32. 2. 5, 9, 19, 37, (....)
(a) 76 (6) 75 (c) 74 (d) 72

33. 24, 60, 120, 210, (....) (Section Officers' 1993)
(a) 300 (6) 336 (c) 420 (d) 525

34. 165, 195, 255, 285, 345, (....)
(a) 375 (6) 420 (c) 435 (d) 390

35. 5, 17, 37, 65, (....), 145 (U.D.C. 1995)
(a) 95 (6) 97 (c) 99 (d) 101

36. 9, 11, 20, 31, (....), 82 a Tax & Central Excise, 1996)
(a) 41 (6) 51 (c) 60 (d) 71

37. 5, 16, 49, 104, (....) (C.B.I. 1995)
(a) 115 (6) 148 (c) 170 (d) 181

38. 34, 1». 10, 6, 4, (....)
(a) 0 (6) 1 (c) 2 (d) 3

39. 462, 420, 380, (....), 306 (LA.8. 1994)
(a) 322 (6) 332 (c) 342 (d) 352

40. 3, 8, 22, 63, 185, (....)
(a) 550 (6) 310 (c) 295 (d) 285

41. 1, 2. 5, 12, 27, 58, 121, (....)
(a) 246 (6) 247 (c) 248 (d) 249
(Hotel Management, 1995)

42. 0.5, 0.55, 0.65. 0.8, (....)
(a) 0.9 (6) 0.82 (c) 1 ***(d)*** 0.95
(8.S.C. 1993)

43. 3. 8, 13, 24, 41, (....)
(a) 70 (6) 75 ***(c)*** 80 ***(d)*** 85

44. 97, 86, 73, 58, 45, (....)
(a) 34 (6) 54 (c) 55 ***(d)*** 56
(I. Tax & Central Excise, 1995)

45. 17, 19, 23, 29, (....), 37
(a) 31 (6) 33 (c) 35 (<*) 36
(Assistant Grade, 1996)

46. 5, 6, 9, 15, (....). 40
(a) 21 (6) 25 (c) 27 ***(d)*** 33
(C.A.T. 1997)

47. 3, 12, 27, 48, 75, 108, (....)
(a) 147 (6) 162 (c) 183 ***(d)*** 192
(M.lkA. 1997)

48. 134, 245, 356, 467, (....)
(a) 579 (6) 578 (c) 568 (d) 478
(Railways, 1995)

49. 6, 13, 28, (....)
(a) 56 (6) 57 (c) 58 (d) 59

50. 563, 647, 479, 815, (....)
(a) 672 (6) 386 (c) 279 (d) 143
(Assistant Grade, 1995)

51. 11, 12, 17, 18, 23, 24, (....)
(a) 12 (6) 29 (c) 30 (d) 35
(Central Excise, 1996)

52. 225. 336, 447, ( ), 669, 7710
(a) 114 (6)338 (c) 558 (d) 991
(CJ8.I. 1995)

53. 840, 168, 42, 14, 7, (....)
(a) 1 (6) 7 (c)9 (d) 12
(8.CJLA. 1996)

54. 5, 6, 7, 8, 10, 11, 14, (....)
(a) 15 (6) 16 (c) 17 (d) 18

55. 0, 2, 3, 5, 8, 10, 15, 17, 24, 26, (....)
(a) 35 (6) 32 (c) 30 (d) 28

56. 0, 4, 6, 3, 7, 9, 6, (....), 12
(a) 8 (6) 10 (c) 11 (<*) 14
(Hotel Management, 1995)

5***1.*** 1, 1, 3, 9, 6, 36, 10, 100, (....), 225
(a) 15 (6) 16 (c) 20 (d) 22
(Stenographers' Exam, 1994)

58. 2, 1, 2, 4, 4, 5, 6, 7, 8, 8, 10, 11, (....)
(a) 9 (6) 10 (c) 11 ***id)*** 12
(Assistant Grade, 1998)

59. 4, 23, 60, 121, (....)
(a) 212 (6) 221 (c) 241 ***id)*** 242

60. 1, 4, 2, 8, 6, 24, 22, 88, (....)
(a) 86 (6) 90 (c) 154 ***(d)*** 352
(CJLT. 1997)

61. 13, 32, 24, 43, 35, (....), 46, 65, 57^ 76
(a) 45 (6) 52 (c) 54 (d) 55
(C.B.I. 1997)

62. 3, 4. 7, 7, 13, 13, 21, 22, 31, 44, (....)
(a) 42 (6) 43 (c) 51 (d) 52

63. 2, 6, 12, 20. 30, 42, 56, (....)
(a) 60 ***ib)*** 64 ***ic)*** 70 ***id)*** 72

64. 8, 9. 8, 7. 10, 9, 6. 11, 10, (....). 12 (8.8.C. 1993)
(a) 5 ***ib)*** 7 (c) 8 ***id)*** ***U***

65. 90, 180, 12, 50, 100, 200, (....), 3, 50, 4, 25, 2, 6, 30, 3
***(a)*** 150 (6) 175 (c) 225 (d) 250

66. 11. 10. (....). 100, 1001, 1000, 10001 (Assistant Grade, 1998)
(a) 101 (6) 110 (c) 111 ***(d)*** None of these

67. 123456147. 12345614. 2345614. 234561, (....)
(a) 3456 ***ib)*** 2345 ***ic)*** 23456 ***id)*** 34561

68' 5 ' 5 ' ' <....»• 39 86 <LA& 1998)

, » 17 ,M 19 , * 20
la> 40 (6) 42 45

cq 2 3 4 5 (M.B.A. 1997)
\S' 5' 5 v5 ' '25' (....)

***ib)*** 25 \5 (C) 6 125

70. i 1 1 , 12 | , u | . ie | . (....)

(a) 8 j (6) 9 n (c) 10 (rf) 20

71. (2, 3), (3. 5), (5. 7). <7, 11), (11, 13), (....) (S.C.R.A. 1994)
(a) (13. 15) ***ib)*** (15. 16) (c) (13. 17) ***id)*** (13, 19)

72. In the series 10. 17. 24. 31, 38, ... which of the following will be a number of the series ?
(a) 48 (6) 346 (c) 574 (d) 1003

73. Which of the following will not be a number of the series 1, 8. 27. 64, 125, ... ?
(a) 256 ***ib)*** 512 (c) 729 (rf) 1000 (Railways, 1992)

74. In the series 3. 9. 15. . . . what will be the 21st term ?
***ia)*** 117 ***ib)*** 121 (c) 123 ***id)*** 129

75. In the series 2. 6. 18. 54. ..., what will be the 8th term ? (R.R.B. 1990)
***ia)*** 4370 ***ib)*** 4374 (c) 7443 ***id)*** 7434

78. Which term of the series 5. 8. 11, 14, ... is 320 ?
(a) 104th (6) 105th (c) 106th ***id)*** 64th

77. Which term of the series 5. 10. .20, 40, ... is 1280 ?
***ia)*** 10th (6) 9th ***ic)*** 8th ***id)*** None of these

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## ANSWERS

1. (6): The numbers are $1^2$, $2^2$, $3^2$, $4^2$ $5^2$
   A Missing number = $6^2$ = 36.
2. tS : The pattern is - 1, - 2, ...
   Missing number = 17 - 3 = 14.
3. (6) : Clearly, the given series consists of prime numbers starting from 2. The prime number after 11 is 13. So, 13 is the missing number.
4. (<?): The pattern is + 5, + 10, + 15, + 20,...
   Missing number = 56 + 25 ^ 81.
5. (c): The pattern is + 5. + 7, + 9, + 11,...
   .\ Missing number =33 + 13 = 46.
6. (6) : Each term of the given series is obtained by multiplying its preceding term by 3.
   Missing number = 81x3 = 243.
7. (a): The- pattern is + 8,4- 8, + 16, + 16, + 24....
   Missing number = 73 + 24 = 97.
8. (a): The pattern is + 3, + 4,...
   .*. Missing number • 9 + 5* 14.
9. (6): The pattern is + $4_V$ + 8, + 12, + 16....
   Missing number * 45 + 20 * 65.
10. (c): Each number in the series is the preceding number multiplied by 2 and then increased by 1.
    Thus. (3 x 2) + 1 = 7, (7x2) + 1 = 15, (15x2)+1=31 and soon.
    Missing number =(63 x 2) + 1 = 127.
11. (d) : The pattern is + 5, + 9 , + 21, + 25
    /. Missing number »15 + 13 ^ 28.
12. (c): Each term in the series is the sum of the preceding two terms.
    Thus, 1 + 2 • 3; 2 + 3 = 5; 3 + 5 = 8 and so on.
    Missing number = 5 8 = 13.
13. *(d) :* Each term of the series is obtained by multiplying the preceding term by 3.
    .\ Missing number * 13.5 x 3 m 40.5.
14. (c) : The numbers are $11^2$, $15^2$, $19^2$.... *i.e.* $II^2$, $(11 + 4 \times 1)^2$ $(11 + 4 \times 2)^2$,...
    .*. Missing number =$(11 + 4 \times 3)^2 = (23)^2$ = 529.
15. (a): The'numbers are $1^2 - 1$, $2^2 - 2$, $3^2 - 1$, $4^2 - 2$,...
    Missing number = 5 - 1» 24.
16. (c/): The sequence is a combination of two series :
    I. 19, 38, 114, (....) and II. 2, 3, 4
    The pattern followed in I is x 2, x 3, ...
    Missing number = 114 x 4 =456.
17. (6): The numbers arJ alternately multiplied by 2 and | •

    Thus, 1x2 = 2, 2 x $\frac{3}{-}$ • 3, 3 x 2 = 6, « x $\frac{3}{|}$ = 9 and so on.

    .\ Missing number = 18 x $\frac{Q}{-}$ = 27.

18. (d): The pattern is • 1, + 4. + 9. + 16,... U., + I$^2$, + 2* + 3$^2$, 4 4$^2$,...
Missing number * 34 • 6$^2$ - 54 + 25 « 59.

19. ***id)***: The pattern is x 2, x 3, x 4,...
A Missing number - 72 x 5 - 360.

20. (c): Each number in the series is the product of the digits of the preceding number.
Thus, 6 x 6 a 36. 3 x 6 « 18 and so on.
.% Missing number = 1 x 8 = 8.

21. ***ia)***: The pattern is • 4. + 8. • 16, + 32,... U. • 2$^2$. • 2$^3$, • 2$^4$, + 2$^s$,...
Missing number = 81 + 2$^8$ * 81 + 64 =• 145.

22. (a): The pattern is • 20,4 40, + 80,...
/. Missing number « 152 + 160 « 312.

23. (rf): The sequence is a combination of two series :
L 3, 5, 7, 9 and II. 6, 20, 42, (....)
The pattern followed in II is • 14, • 22,...
/. Missing number = 42 + 30 * 72.

24. (c): The sum of any three consecutive terms of the series gives the next term.
Thus. 1 + 3 + 4 = 8; 3 • 4 • 8 « 15; 4 + 8 + 15 - 27 and so on.
.*. Missing number - 8 + 15 • 27 » 50.

25. (<d): The pattern is • 13, + 26, + 39,...
.\ Missing number = 80 • 52 * 132.

26. (c): The pattern is + 2, + 4, • 4,... • 16, + 16.
.\ Missing number a 18 + 8 « 26.

27. (c): The pattern is x 2, x 3, x 4,...
Missing number = 24 x 5 = 120.

28. (d): Each term in the series is one less than the square of the preceding term.
% Thus. 2$^2$ - 1 - 3, 3* - 1 - 8, 8$^2$ - 1 = 63.
.\ Missing term - (63)$^2$ -U 3969 - 1 » 3968.

29. ***ib)***: The pattern is + 20.5.«- 22.5....
Missing term = 138 + 24.5 = 162.5.

30. ***ib)***: Each number in the series is the preceding number multiplied by 3 and then decreased by 2.

31. ***id)***: The pattern is x 8, x 4$_V$..
.\ Missing term = 128 x 2 = 256.

32. (6): The pattern is x 2 + 1, x 2 - 1, x 2 + 1. x 2 - l$_f$ ...
.\ Missing number = 37 x 2 + 1» 75.

33. (6): The pattern is • 36. • 60, • 90,... U.
+16 x (6 + 0)1, + [6 x (6 + 4)1. + [6 x (6 + 9)1,...
/. Missing number • 210 • [6 * (6 + 15)1 = 210 + 126 = 336.

34. ***ic)***: Each number is 15 multiplied by a prune number ***Le.*** 15 x 11, 15 x 13. 15 x 17, 15 x 19, 15 x 23.
Missing term * 15 x 29 s 435

35. ***id)***: The numbers are 2$^2$ • 1,4$^2$ • 1,6$^2$ + 1,8$^2$ + 1, 12$^2$ + 1.
.'. Missing number = 10$^2$ • 1 - 101.

36. (6): Each term in the series is the sum of the preceding two terms.
Missing number - 20 + 31 • 51.

37. *(d)* : The pattern is + 11, + 33, + 65, ...t i.e.+(11 x 1), +(11 x 3),+ (11 x 5),...
Missing number = 104 + (11 x 7) = 181.

38. *id)* : Each term is divided by 2 and then increased by 1 to obtain the next term.
Missing term = (4 + 2) + 1 = 3.

39. (c): The pattern is - 42, - 40,...
Missing number = 380 - 38 = 342.

40. (a): The pattern is x 3 - 1, x 3 - 2, x 3 - 3, x 3 - 4, ...
.\ Missing number = (185 x 3) - 5 » 550.

41. (c) : The pattern is x 2 + 0, x 2 + 1, x 2 + 2, **<2** + 3, x 2 + 4. x 2 + 5,...
Missing number = 121 x2 + 6 = 248.

42. *(c)*: The pattern is + 0.05,0.10, + 0.15,...
:*. Missing number = 0.8 + 0.20 = 1.

43. (a) : The pattern followed is :
nth term • (n + 1) th term + (n + 1) * (n + 2) th term.
Thus, 1st term + 2nd term + 2 = 3rd term;
2nd term + 3rd term + 3 = 4th term and so on.
Missing term = 6th term = 4 th term + 5th term + 5
= 24 + 41 + 5 = 70.

44. (a): The pattern is - 11, - 13, - 15. - 13,...
Missing number = 45 - 11 = 34.

45. (a): The given series consists of consecutive prime numbers starting from 17. The next prime number after 29 is 31.
So, the missing number is 31.

46. *(b):* The pattern is + 1, + 3, + 6,... *i**. + 1, + (1 + 2), + (1 + 2 + 3),...
Missing number = 15 + (1 + 2 + 3 + 4) = 25.

47. (a): The numbers are $3 \times 1^2$, $3 \times 2^2$. 3 x 3* 3 x $4^2$, $3 \times 5^2$,3 x 6*...
.\ Missing number = $3 \times 7^2 = 3 \times 49 = 147$.

48. (6): Each term is obtained by adding 111 to the preceding term.
:*. Missing number =467 + 111 =578.

49. (d) : The pattern is x 2 + 1,.x 2 + 2, ...
Missing number = 28 x 2 + 3 * 59.

50. *(d)*: The pattern is + 84, - J68, • 336,... i.e. + 84, - (84 x 2), + (84 x $2^2$), ...
Missing number • 815 - (84 x $2^3$) - 815 - 672 » 143.

51. (6): The given sequence is*a combination of two series :
I. 11. 17, 23, (....) and II. 12, 18, 24.
The pattern in both 1 and II is + 6.
So, missing number = 23 + 6 = 29.

52. (c): The first two digits of the numbers in the given series are 22, 33, 44, 66, 77. The third digits of the numbers form the series 5, 6, 7, 9, 10.
So, the first two digits of the missing number are 55 and the third digit is 8.
/. Missing number is 55$.

53. (6): The pattern is -s 5, + 4, + 8, + 2,...
Missing number =7 + 1 = 7.

54. (a): The given sequence is a combination of two series :
I. 5, 7. 10, 14 and II. 6, 8, 11, (....)
The pattern in both I and II is + 2, + 3, + 4,...
Missing number = 11 + 4 = 15.

55. (a): The given sequence is a combination of two series :
I. 0. 3, 8. 15. 24. (....) and II. 2. 5, 10, 17, 26.
The pattern in both I and II is + 3, + 5, + 7, + 9,...
/. Missing number = 24 4 11 = 35.

56. (6): The given sequence is a combination of three series :
L 0, 3, 6 n. 4, 7, (....) III. 6, 9, 12
The pattern in each of these series is 4 3.
Missing number « 7 4- 3 = 10.

57. (a): The given sequence is a combination of two series :
I. 1, 3, 6. 10, (....) H. 1, 9, 36, 100, 225
The pattern in I is 4- 2, + 3, • 4,...
The numbers in II are squares of the corresponding numbers of I.
.\ Missing number = 10 + 5 = 15.

58. (6): The given sequence is a combination of three series :
I. 1st, 4th, 7th, 10th, 13th terms ***Le.*** 2, 4, 6, 8, (....)
II. 2nd, 5th, 8th, 11th terms ***Le.*** 1, 4, 7, 10
III. 3rd, 6th, 9th, 12th terms i.e. 2, 5, 8, 11.
Clearly, I consists of consecutive even numbers.
So, the missing number is 10. 4

59. (a): The numbers are $2^3 - 4$, $3^3 - 4.4^3 - 4$, $5^3 - 4$....
/. Missing number = $6^3 - 4 = 216 - 4 = 212$.

60. (a): The pattern is x 4, - 2, x 4, - 2,...
Missing number - 88 - 2 - 86.

61. (c): The given sequence is a combination of two series :
I. 13, 24. 35, 46. 57 and II. 32, 43. (....), 65. 76.
The pattern in both I and II is +11.
Missing number = 43 4-11 = 54.

62. (6): The given sequence is a combination of two series :
I. Odd numbered terms i.e. 3, 7, 13, 21, 31, (....)
II. Even numbered terms ***Le.*** 4, 7, 13, 22, 44.
The pattern in I is 4- 4, 4 6, • 8, 4 10,...
The pattern in II is 4 3,4- 6, + 9, 4 12, ...
Missing term » 31 + 12 = 43.

63. (*d*) : The sequence is 1 x 2,2 x 3,3 x 4, 4 x 5.5 x 6, 6 x 7,7 x 8.
/. Missing number = 8 x 9 = 72.

64. (a): The given sequence is a combination of three series :
I. 1st, 4th, 7th, 10th terms ***Le.*** 8, 7, 6, (....)
II. 2nd, 5th, 8th, 11th terms i.e. 9, 10, 11, 12.
III. 3rd, 6th. 9th terms ***Le.*** 8, 9, 10.
The pattern in I is - 1.
So, missing number = 6 - 1 • 5.

65. (a): Clearly, 90 = 30 x 3, 180 = 6 x 30, 12 - 2 x 6, 50 • 25 x 2, 100 = 4 x 25, 200 = 50 x 4.
Missing number = 3 x 50 = 150.

66. ***(a):*** The given sequence is a combination of two series :
I. 11, (....>• 1001, 10001 . and II. 10, 100, 1000.
In I, an extra zero is added between the two 1's.
So, the missing number is 101.

67. (d>: The digits are removed one by one from the end as well as from the beginning in order so as to obtain the next *term* of the series.

68. (6): The sequence in the numerators is + 5. + 10. + 20,... and that in the denominators is + 11.+ 22.+ 44. ...

So. the numerator of the missing fraction should be (9 + 10) *i.e.* 19 and the denominator should be (20 + 22) *i.e. 42.*

69. *ib)*: Clearly, the numerators of the given fractions arc consecutive natural numbers.

So, the numerator of the missing fraction should be 6

*Also,* the denominator of each fraction is multiplied by >6 to obtain the denominator of the next fraction.

So, the denominator of the missing fraction should be 25 ^5.

Hence, the missing fraction is $25^{g}5$ '

70. *id) :* The given sequence is $\frac{100}{\bullet}\ \frac{25}{\bullet}\ \frac{100}{\bullet}\ \frac{50}{\bullet}$ -y- -j- •... *i.e.,* $\frac{100}{\bullet}\ \frac{100}{\bullet}\ \frac{100}{\bullet}\ \frac{100}{6}$

So, the missing term should be ^^ i.e. 20.

71. (c) : The given sequence consists of pairs of consecutive prime numbers.

72. *ib)*: The given series consists of numbers which on dividing by 7 leave a remainder 3. No other number except 346 satisfies the property.

73. (a): The given series consists of cubes of natural numbers only. 256 is not the cube of any natural number.

74. (c): Clearly. 3 + 6 = 9, 9 + 6« 15

So. the series is an A. P. in which 0 = 3 and $d = 6$.

, 21st term * $a$ + (21 - 1)<f-a + 2W =3 + 20 x 6 = 123.

75. *ib)*: Clearly, 2 * 3 = 6. 6 * 3 = 18. 18 * 3 = 54

So. the series is a G.P. in which $a = 2$ and $r = 3$.

.'. 8th term = $or^{1}$**$or^{?}$»2 x $3^{7}$ -(2 x 2187)-4374.

76. ic); Clearly, 6 + 8 - 8. 8 + 3 - 11, 11+ 3* 14

So. the series is an A.P. in which $a = 5$ and $d$«= 3.

Let the number of terms be $n$.

Then. 320 = 5 + (n - 1) * 8 or $(n - 1) = 105$ or $n = 106$

77. *ib)*: Clearly. 5 x 2 = 10.10 x 2 = 20.20 x 2 - 40,...P

So. the series is a G.P. in which $a$ - 5 and r = 2.

Let the number of terms be $n$.

Then, 5 x $2^{*\sim 1} = 1280$ $2^{*\sim 1} = 256 = 2^{*}$

$n$ - 1 = 8 or $n = 9$.

Case II : Finding the Wrong Term in the Given Series

Ex. 1. Find the wrong number in the series :

$7_{f}$ 28, 63. 124,215,342.611

***ia) 7*** ***ib) 28*** (c) 124 ***id)*** 215 ***ie)*** 342

Sol. Clearly, the correct sequence is

$2^{3} - 1$, $3^{3} - 1$, $4^{3} - 1$, $5^{3} - 1$, $6^{3} - 1$, $7^{*} - 1$, $8^{3} - 1$.

/. 28 is wrong and should be replaced by - 1) ***i.e.*** 26.

Hence, the answer is (6).

Ex. 2. Find the wrong number in the series :

3, 8, 15, 24, 34, 48, 63

(a) 15 (6) 24 (c) 34 ***id)*** 48 (e) 63

Sol. The difference between consecutive terms of the given series are respectively 5. 7. w. 11 and 13.

Clearly 34 is a wrong number and must be replaced by (24 +11) ***i.e.*** 35.

Hence, the answer is (c).

## EXERCISE 3B

Directions : ***In each of the following questions, one term in the number series is wrong. Find out the wrong term.***

1. 24, 27. 31, 33, 36 (C.B.I. 1996)

(a) 24 (ft) 27 (c) 31 (d) 33

2. 196. 169, 144, 121, 80 (M.B.A. 1998)

80 (***b)*** 121 (c) 169 ***id)*** 196

3. 3. 5. 7, 9, 11, 13

(«) 3 (***b***) 5 (c) 7 (d) 9

4. 121, 143, 165, 186, 209 (S.S.C. 1995)

(a) 143 (ft) 165 (c) 186 ***(d) 209***

5. 1. 2, 4. 8, 16. 32. 64, 96 (Assistant Grade, 1994)

(a) 4 (6) 32 (c) 64 ***(d)*** 96

6. 8, 14. 26, 48, 98, 194, 386

(a) 14 (6) 48 (c) 98 ***(d) 194***

7. 8. 13. 21, 32. 47, 63, 83

(a) 13 (ft) 21 (c) 32 ***(d)*** 47

8. 3, 10. 27, 4, 16, 64, 5, 25, 125 (S.8.C. 1993)

(a) 3 (ft) 4 (c) 10 W) 27

9. 380, 188, 92, 48, 20, 8, 2

(a) 188 (ft) 92 (c)48 ***(d) 20***

10. 1, 3, 7, 15, 27, 63. 127 (S.S.C. 1996)

(a) 7 . (6) 15 (c) 27 ***(d) 63***

11. 5, 10. }7. 24. 37 (C.A.T. 1997)

(a) 10 (ft) 17 (c) 24 ***(d)*** 37

12. 1. 3, 10, 21. 64. 129, 256, 778

(a) 10 (ft) 21 (c) 129 (***d***) 256

13. 15, 16, 22, 29, 45, 70

(a) 16 (ft) 22 (9) 45 (<f) 70

14. 6. 14, 30, 64. 126 (C.B.I. 1993)

(a) 6 (ft) 14 (c)64 ***(d)*** 126

15. 10, 26, 74. 218, 654, 1946. 5834

(a) 26 (ft) 74 (c) 218 ***(d)*** 654

16. 3, 7, 15, 39, 63, 127, 255, 511

(a) 15 (ft) 39 (c) 63 ***(d)*** 127

17. 445. 221, 109, 46, 25, 11, 4
(a) 25 ***(b)*** 46 (c) 109 (d) 221

18. 1236, 2346. 3456. 4566. 5686
(a) 1236 ***ib)*** 3456, (c) 4566 (Assistant Grade, 1997)
***(d)*** 5686

18. 5, 10. 40. 80, 320, 550. 2560
(a) 80 (b) 320 (c) 550 (S.C.&A. 1994)
***(d)*** 2560

20. 3. 2, 8. 9. 13, 22, 18, 32, 23. 42
(a) 8 (6) 9 (c) 13 (S.S.C. 1993)
***(d)*** 22

21. 8. 27. 125. 343, 1331
(a) 8 (6) 343 <c) 1331 (d) None of these

22. 10. 14. 28. 32, 64. 68. 132
(a) 28 (6) 32 (c) 64 ***(d)*** 132

23. 1, 5. 5. 9. 7. 11, 11, 15, 12, 17
(a) 11 (f>) 12 (c) 17 ***(d)*** 15

24. 11, 2. 21, 3. 32, 4. 41, 5, 51, 6
(a) 21 (6) 11 (c) 32 (Assistant Grade, 1998)
***(d)*** 51

25. 11. 5, 20. 12. 40. 26, 74, 54
(a) 5 (b) 20 (c) 40 (C.B.I. 1993)
***(d)*** 26

26. 56. 72, 90, 110, 132, 150
(a) 72 (6)90 (c) 110 ***id)*** 150

27. 8, 13, 21, 32, 47, 63. 83
(a) 13 (6) 32 (c) 47 (d) 63

28. 89. 78. 86. 80, 85, 82, 83
(a) 83 (6) 82 (c) 86 (Assistant Grade, 1998)
(d) 78

29. 25, 36. 49. 81, 121, 169, 225
(a) 36 (6) 49 (c) 169 (d) 225

30. 2, 5. 10, 17, 26. 37, 50, 64
(a) 17 (6) 26 (c) 37 (d) 64

31. 1, 5. 9. 16. 25, 37, 49
(a) 9 (6) 15 (c) 25 (8.8.C. 1995)
(d) 37

32. 2, 5, 10. 50. 500. 5000
(a) 5 (6) 10 (c) 50 (d) 5000

33. 46080. 3840. 384, 48, 24. 2. 1
(a) '384 (fc) 48 (c) 24 (d) 2

34. 105, 85. 60. 30. 0. - 45. - 90
(a) 105 (6) 60 (c) 0 (d) - 45

35. 325, 259, 202, 160, 127, 105. 94
(a) 94 (ft) 127 (c) 202 (d) 259

36. 125, 126, 124, 127, 123, 129
(a) 126 (6) 124 (c) 123 (d) 129

37. 3, 4, 10, 32, 136, 685, 4116
(a) 10 (6) 32 (c) 685 ***id)*** 4116

38. 3, 10, 27, 4, 16. 64. 5, 25, 125
(a) 3 (6) 4 (c) 10 (8.S.C. 1993)
(d) 27

39. 5. 27, 61, 122, 213, 340, 509 (Assistant Grade, 1998)
(a) 27 (6) 61 (c) 122 (d) 509

40. 16. 22. 30, 45, 52. 66
(a) 30 (6) 45 <c) 52 (d) 66

Directions (***Questions 41 to 45) : In each of the following number series, either one term is missing or is wrong which has been given as one of the four alternatives under It. This alternative is your answer.***

(Hotel Management, 1996)

41. 1, 2, 5,)10. 17. 28
***(a)*** 30 ***(b)*** 28 (c) 27 W) 17

42. 1, 5, 11, 19. 29. 55
(a) 55 (6) 41 (c) 29 (<f) 19

43. 2. 3, 5, 8, 13, 34
{a) 21 (6) 25 (c) 29 (rf) 34

44. 0, 3, 8-, 15. 24. 33
\ (a) 8 (6) 15 (c) 26 ***(d) 33***

46J i, 5, 14, 30, 55. 93
(a) 97 (6) 95 . (c) 93 (d) 55-

Directions (Questions ***46 to 50) i In each of the following number series, two terms hape been put within brackets. Mark your answer as***

(a) if both the bracketed terras are right;
(б) if the first bracketed term is right and second is wrong;
(c) if the first bracketed term is wrong and second is right;
(<f) if both the bracketed terms are wrong. (L.LCAA.O. 1995)

46. 4, 6.40, (*2), 16, (14), 22
47. 3, 10, 29. (66), (127), 218
48. 2. 3, (6). 11. 18. (30). 38
49. (2), 5. (12), 25. 41. 61
50. 4,7,(9). 10. 13, 15,(16), 19

## ANSWERS

1. (c): Each term in the series is increased by 3 to obtain the next term.
So. 3t is wrong and must be replaced by (27 + 3) ***i.e.*** 30.
2. (0): The sequence is $(14)^2$. $(13)^2$. <12)$^2$, $(11)^2$. $(10)^2$.
So. 80 is wrong and must be replaced by $(10)^2$ ***i.e.*** 100.
3. ***(d)***: The series consists of consecutive prime numbers. So. 9 is wrong.
4. (c): Each term of the series is increased by 22 to obtain thfe next term.
So. 186 is wrong and must be replaced by (165 + 22) ***i.e.*** 187.
5. (rf) : Each term of the series is obtained by multiplying the preceding term by 2
So, 96 is wrong and must be replaced by l64 * 2) ***i.e.*** 128.
6. (5): Each term in the series is less than twice the preceding term by 2.
So. 48 is wrong and should be replaced by (26 x 2 - 2) ***i.e.*** 50.
7. ***Id):*** The sequence is * 6, + 8, + 11
.*. 47 is wrong and must be replaced by (32 • 14) ***i.e.*** 46. ,

***8.*** (c) : The correct sequence is 3, $3^2$, $3^3$, 4, $4^2$.$4^3$,5, $6^2$, $5^3$.

So, 10 is wrong and must be replaced by $3^2$ ***i.e.*** 9.

9. (c): Each terra in the series is four more than two timer the next term.
So, 48 is wrong and must be replaced by (20 * 2 4- 4) ***i.e.*** 44.

10. (c): The sequence is 4 2. + 4. • 8,... i + 2 , + $2^2$, 4 $2^3$,....

So. 27 is wrong and must be replaced by (15 4 2*) ***i.e.*** (15 4-16) or 31.

11. (c): The sequence is 4 5, 4- 7,....

So, 24 is wrong and should be replaced by (17 4 9) ***Le.*** 26.

12. (d) : The sequence is x 2 4-1, x 3 4-1, x 2 4 1, x 3 4 1,....

So. 256 is wrong and must be replaced by (129 x 2 4 1) ***Le.*** 259.

13. (6): The pattern is 4 1, 4 4, 4 9, 4 16, 4 25,... ***i£.*** 4 $1^2$, 4 $2^2$, 4 $3^2$, 4- $4^3$, 4- $5^2$,....

So, 22 is wrong and must be replaced by (16 + 4) ***ix.*** 20.

14. (c): Each term is multiplied by 2 and then increased by 2 to obtain the next term.
So, 64 is wrong and must be replaced by (30 x 2 4 2) ***i.e.*** 62.

15. ***(d):*** Each term is 4 less than thrice the preceding number.
So, 654 is wrong and must be replaced by (218 x 3 - 4) - 650.

16. (6): Each number in the series is multiplied by 2 and the result increased by 1 to obtain the next number.

So, 39 is wrong and should be replaced by (15 x 2 4 1) ***Le.*** 31.

17. (6): 3 is subtracted from each number and the result is divided by 2 to obtain the next number of the series.

$\frac{109-3}{2}$

***Sd.*** 46 is wrong and must be replaced by — - — i e ^

18. ***id):*** The first digits of the numbers form the series 1, 2, 3, 4, the second digits form the series 2, 3, 4, 5, 6; the third digits form the series 3, 4, 5, 6; while the last digit in each of the numbers is 6.
So, 5686 is wrong and must be replaced by 5676.

19. (c) : The sequence is x 2, x 4, x 2, x 4
So, 550 is wrong and must be replaced by (320 x 2) ***i.e.*** 640.

20. (6): The given sequence is a combination of two series :
I. 3, 8, 13, 18, 23 and II. 2, 9, 22, 32, 42
The pattern in I is 4 5, and the pattern in II is 4 10.
So. in II, 9 is wrong and must be replaced by (2 + 10) ***Le.*** 12.

21. ***id) :*** The numbers are cubes of prime numbers ***Le.*** $2^3$, $3^3$, $5^3$, $7^3$f $11^3$. Clearly, none is wrong.

22. (d): Alternately, the numbers are increased by four and doubled to get the next number.
Thus. 104-4 = 14; 14x2 = 28; 2844-32; 32x2-64 and soon.
So, 132 is wrong and must be replaced by (68 x 2) ***Le.*** 136.

23. (6): The given sequence is a combination of two series :
I. 1, 5, 7, 11, 12 and II. 5, 9, 11, 15, 17
The pattern in both I and II is 4 4, 4 2,4 4, 4 2.
So, 12 is wrong and must be replaced by (11 4 2) i.e. 13.

24. (c): The given sequence is a combination of two series :
1.11,21,32,41,51 , and 11.2,3,4^5,6.
. Clearly, the pattern irt I is 4-10.
So, 32 is wrong and should be replaced by (21 4 10) ***Le.*** 31.

25. (c): The given sequence is a combination of two series :
I. 11. 20. 40. 74 and II. 5, 12, 26, 54
The pattern in I becomes • 9, + 18, + 36,... if 40 is replaced by 38.
So, 40 is wrong.

26. (d): The numbers are 7 x 8, 8 x 9, 9 x 10, 10 x 11,11 x 12, 12 x 13.
So, 150 is wrong and must be replaced by (12 x 13) i.e. 156.

27. (c): The sequence is + 5, + 8, • 11, —
So. 47 is wrong and must be replaced by (32 • 14) ***i.e.*** 46.

28. (c): The sequence is - 11, • 9, - 7, • 5. - 3, + 1.
So, 86 is wrong and should be replaced by (78 + 9) ***i.e.*** 87.

29. (a): The correct sequence is $5^2$, $7^2.9^2$, $11^2$. $13^2$. $15^2$.
So, 36 is wrong.

30. ***(d):*** The numbers are $1^2 + 1, 2^2 + 1.3^2 + 1$ and so on.
So. 64 is wrong. The correct term is $(8^2 + 1)$ ***Le.*** 65.

31. (6): The given sequence is a combination of two series :
I. 1, 9, 25, 49 and, II. 5, 15, 37
Tho pattern in I is + $8_t$ + 16. + 24.
The sequence in II is $2^2 + 1$, $4^2 + 1, 6^2 + 1$.
So, 16 is wrong and must be replaced by $(4^{A} + 1)$ ***i.e.*** 17.

32. (d): Each term of the series is the product of the preceding two terms.
So, 5000 is wrong and must be replaced by (50 x 500) ***Le.*** 25000.

33. (c): The terms are successfully divided by 12. 10, 8, 6, ... .
So, 24 is wrong and must be replaced by (48 • 6) ***Le.*** 8.

34. (c): The sequence is - 20, - 25, - 30
So, 0 is wrong and must be replaced by (30 - 35) ***Le.*** - 5.

35. (c): The sequence is - 66, - 55, - 44, - 33, - 22, - 11.
So. 202 is wrong. The correct term is. (259 - 55) ***Le.*** 204.

36. (d): The sequence is • 1, - 2, • 3, - 4, • 5.
So, 129 is wrong and must be replaced by (123 • 5) ***ijt.*** 128.

37. (6): The sequence is as follows :
2nd term = (1st term + 1) x 1
3rd term = (2nd term 4 1) x 2
4th term - (3rd term + I) x 3 and so on.
So, 32 is wrong and miist be replaced by (10 + 1) x 3 ***Le.*** 33.

38. (c): The correct sequence is 3,3* $3^3$, 4, $4^2$,$4^3$,5, $5^2$, $5^3$.
So, 10 is wrong and should be replaced by $3^2$ i.e. 9.

39. (a): The correct sequence is $2^3 - 3$, $3^3 - 3$, $4^3 - 3$, $5^3 - 3$, $6^3 - 3$, $7^3 - 3$, $8^3 - 3$.
So, 27 is wrong and should be replaced by $3^s - 3$ ***i.e.*** 24.

40. (6) : The correct sequence is + 6, + 8, + 10, + 12, + 14.
So, 45 is wrong and must be replaced by (30 + 10) ***i.e.*** 40.

41. (6) : The correct sequence is + 1, + 3, + 5, + 7, + 9.
So, 28 is wrong and must be replaced by (17 49) ***Le.*** 26.

42. (6): The correct sequence is + 4, + 6, + 8, + 10, ....
So, next term after 29 = 29 + 12 = 41.
The term after 41 will then be (41 -f 14) i.e. 55.
41 is missing.

43. (a) : Clearly, each term of the series is the sum of the preceding two terms.
Now, 8+13 = 21 and 13 + 21 = 34.
So. the term 21 is missing.

44. (d) : The correct sequence is + 3, + 5, + 7, + 9. • 11.
So. 33 is wrong and must be replaced by (24 + 11) ***i e.*** 35.

45. (c) : The correct sequence is + 4, + 9, + 16, + 25, + 36 ***Le.*** + 2*, + $3^2$, + $4^2$, + $5^2$ + $6^2$.
So. 93 is wrong and should be replaced by (55+36) ***Le.*** 91.

46. (6): The correct sequence is + 2, + 4. • 2, + 4
Clearly, the term 12 is correct.
But. 14 is wrong and must be replaced by (16 + 2) ***Le.*** 18.

47. (a): The sequence is $1^3$ + 2, $2^3$ + 2,$3^s$ + 2, $4^3$ + 2,$5^3$ + 2,$6^3$ + 2.
Clearly, both the terms 66 and 127 are correct.

48. (ft): The correct sequence is + 1, + 3, + 5, + 7, + 9, + 11. Clearly, the term 6 is correct.
But, 30 is wrong and should be replaced by (18 + 9) ***Le.*** 27.

49. ***(d):*** The correct sequence is + 4, • 8, • 12, + 16, + 20.
Clearly, 2 is wrong and must be replaced by (5 - 1) ***Le.*** 4.
Also, 12 is wrong and should be replaced by (5 + 8) ***Le.*** 13.

50. (a): The correct sequence is + 3, + 2, + 1, + 3, + 2, + 1, + 3.
Clearly, both the terms 9 and 16 are correct.

## TYPE 2 : ALPHABET SERIES

Ex. 1. What terms will fill the blank spaces ?
Z X V T R (....), (....)
***(a)*** O, K (6) N, M (c) K, S ***(d)*** M, N (e) P, N

Sol. Clearly, the given series consists of alternate letters in a reverse order. So, the missing terms would be P and N.
Hence, the answer is ***(e).***

Ex. 2. Which term comes next in the sequence : nd iy dt yo tj ?
(a) mp (6) nq (c) of (d) oe (e) me

Sol. Clearly, the first and second letters of each term are moved five steps backward ***to*** obtain the corresponding letters of the next term.
Hence, the answer is ***(d).***

Ex. 3. What will be the next term in : BDF, CFI, DHL, ? (SAC. 1996)
(a) CJM (***b***) EIM (c) EJO ***(d)*** EMI

Sol. Clearly, the first, second and third letters of each term are respectively moved one. two and three steps forward to obtain the corresponding letters of the next term. So, the missing term is EJO.
Hence, the answer is (c).

Ex. 4. Which term comes next in the series : YEB, WFD, UHG, SKI ?
***(a)*** QOL ***(b)*** QGL ***(c)*** TOL ***(d)*** QNL
(Bank P.O. 1996)

Sol. Clearly, the first letter of each term is moved two steps backward to obtain the first letter of the next term. So, the first letter of the missing term will be Q. The second letter of the first, second, third, fourth terms are respectively moved one, two, three and four steps forward to obtain the corresponding letter of the subsequent term. So, the second letter in the missing term will be O.

The third letter is alternately moved two and three steps forward to obtain the corresponding letter of the subsequent term. So, the third letter in the missing term will be L.

Thus, the missing term is QOL.

Hence, the answer is (a).

Ex. 5. Which term will replace the question mark in the series :

ABD, DGK, HMS, MTB, SBL, ? (M.B.A. 19&7)

(a) ZKW (6) ZKU (c) ZAB *(d)* XKW

Sol. Clearly, the first letters of the first, second, third, fourth and fifth terms are moved three, four, five, six and seven steps forward respectively to obtain the first letter of the successive terms. The second letters of the first, second, third, fourth and fifth terms are moved five, six, seven, eight and nine steps forward respectively to obtain the second letter of the successive terms. The third letters of the first, second, third, fourth and fifth terms are moved seven, eight, nine, ten and eleven steps forward respectively to obtain the third letter of the successive terms.

Thus, the missing term would be ZKW.

Hence, the answer is (a).

Ex. 6. Choose the term which will continue the following series :

P 3 C, R 5 F, T 8 I, V 12 L, ?

(a) Y 17 O (6) X 17 M (c) X 17 O ***(d)*** X 16 O

Sol. Clearly, the first letters of the terms are alternate. The sequence followed by the numbers is + 2, + 3, + 4,.... The last letter of each term is three steps ahead of the last letter of the preceding term. Thus, the next term would be X 17 O.

Hence, the answer is (c).

## EXERCISEIC"

Directions : ***In each of the following questions, various terms of a letter series are given with one term missing as shown by (?). Choose the rpissing term out of the given alternatives.***

1. U. 0, I. ?, A (S.S.C. 1994)

(a) E ***(b) C*** (c) S (d) G

2. Y, W. U, S, Q. ?, ?

(a) N. J <fc) M, L (c) J. R (d) L. M (e) 0, M

3. A. B, D. G, ? vM.B.A. 1997)

(a) M (6) L (c) K (d) H

4. Z. U, Q. ?. L (Assistant Grade, 1996)

(a) I (6) K (c) M (d) N

5. A, C, F, H, ?, M (CJB.I. 1997)

(a) L (***b***) K (c) J (d) I

6. A, Z, X. B. V. T. C, R, ?, ?

(a) P. D (***b***) E, 0 (c) Q, E (d) 0, Q (e) Q. 0

7. R. M, ?, F, D, ?

(a) C, B (6) J. H (c) B. H (d) H. C (e) I, C

8. Z, L, X. J. V. H, T, F, ?, ? (Assistant Grade. 1994)
   *ia)* R, D (6) R, E (c) S, E *id)* Q. D
9. Z, S, W, 0, T, K, Q, G, ? (UJ).C. 1995)
   *ia)* N, C (*b*) N, D (c) 0, C (rf) 0, D
10. W, V, T, S, Q, P, N, M. ?, ? (C.B.I. 1996)
   (a) I, J (6) J, I (c) J, K *id)* K, J
11. Z, Y, X. U, T, S. P, 0, N. K, ?, .
   *ia)* H. G (6) H, I (c) I, H *(d)* J, I
12. b e d f ? h j ? J (L Tax, 1996)
   (a) i m *ib)* m i (c) i n *(d)* j m
13. AZ, BY, CX, ?
   (a) EF *ib)* GH (c)IJ (rf) DE *ie)* DW
14. AZ, CX, FU. ? (I.AS. 1996)
   ( a m (6) IV (c) JQ *(d)* KP
15. AZ, GT. MN, ?, YB (C.B.I. 1995)
   (a) KF (6) RX (c) SH *(d)* TS
16. BF, CH. ?. HO, LT (L.LC. 1994)
   (a) DN *ib)* EL (c) EK *(d)* EM *ie)* FJ
17. CE. GI. KM, OQ, ?
   (a) TW (6) TV (c) SU *(d)* RT *ie)* UW
18. BD, GI. LN, QS, ?
   (a) TV (fc) UW (c) WX (d) WY *ie)* VX
19. AD, EH, IL, ?, QT (I. Tax & Central Excise, 1996)
   (a) LM *(b)* MN (c) MP *(d)* OM
20. JE, LH, OL, SQ, ? (BAR.B. 1997)
   (a) WV (6) WX (c) VW (rf) vx (e) XW
21. DF, GJ, KM, NQ, RT, ? *I*
   > *(a)* UW (6) YZ (c)XZ *id)* UX *ie)* YA
22. cx fu ir ? ol ri (Assistant Grade, 1998)
   (a) lo (6) mn (c) no *(d)* op *(e)* or
23. OTE, PUF, QVG, RWH, ?
   (a) SYJ *(b)* TXI (c) SXJ *(d)* SXI (e) TYJ
24. eac gee ieg ?
   (a) jhi (6) jgi (c) kgi *id)* khi (e) ky
25. ejo tyd ins xch ?
   (a) nrw (6) mrw (c) msx id) nsx *ie)* nsw
26. CAT, FDW, IGZ, ?
   (a) KJA (6) KTC (c) LHD W) LJC (C.B.I. 1997)
27. BEH, KNQ, TWZ, ? (Assistant Grade, 1995)
   (a) IJL (6) CFI (c) BDF id) ADG
28. deb *ijg* nol ? xy\-
   (a) rsp (*b*) stp (c) rsq id) stq (e) sto

29. ? siy oeu kaq gwm cri
(a) wnc (6) wnb (c) vnc ***(d)*** vmc (e) wrac

30. QPO, SRQ, UTS. WVU, ?
(a) XVZ (***b***) ZYA (c) YXW ***id)*** VWX ***(e)*** AZY

31. ? ayw gee mki sqo
(a) zxw (6) bzw (c) usq ***(d)*** may (e) xyv

32^ydfe jih mln ? vut
(o) oqp (6) psr (c) prq ***id)*** rep (e) oqr

33. DEF, HIJ, MNO, ?
(a) STU (6) RST (c) RTV ***(d)*** SRQ (e) TUV

34. FLP, INS. LPV, ? (8.S.C. 1995)
(a) ORY ***(b)*** UXZ (c) VXY ***(d)*** SVW

35. shg rif qje pkd ? (Assistant Grade, 1998)
(a) ole (***b***) ole (c) nmc ***(d)*** nib

36. LXF, MTJ, NPN, OLR, ? (Bank P.O. 1997)
(a) PHV (6) PIU (c) PJW ***(d)*** PKX (e) PPV

37. MHZ. NIW, OKT, PNQ, ? (B.S.R.B. 1998)
(a) RRN (6) QRN (c) QRM ***„{d)*** QQN

38. AYD, BVF, DRH, ?. KGL
(d) FMI (6) GMJ (c) HLK ***(d) GU***

39. AB. BA. ABC. CBA, ABCD, ? (B.S.R.B. 1996)
(a) ACBD (***b***) BACD (c) CABD ***(d)*** DBAC (e) DCBA

40. AB.^DEF, HIJK, ?, STUVWX
(a) MNOPQ (6) LMNOP ***\c)*** LMNO ***(d)*** QRSTU

41. A. CD. GHI. ?. UVWXY
(a) LMNO (***b***) MNO (c) NOPQ (d) MNOP

Directions : ***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.***

42. D-4, F-6, H-8, J-10, ?, ?
(a) K-12, M-13 (6) L-12, M-14 , (c) L-12, N-14 (d) K-12, M-14

43. 3F, 6G, 111, 18L, ? (S.B.I.P.O. 1994)
(a) 210 • (6) 25N (c) 27P ***id)*** 27Q ***(e)*** 25P

\ 44. KM5, IP8, GS11, EV14. ? (B.S.R.B. 1995)
(a) BX17 (6) BY17 (c) CY18 (rf) CZ17 (e) CY17

45. J2Z. K4X. I7V, ?, H16R, M22P (Bank P.O. 1995)
(a) I11T ***(b)*** L11S (c) L12T (d) LI IT (e) L12S

46. 2Z5. 7Y7, 14X9, 23W11, 34V13. ? (B.S.R.B. 1996)
(a) 27U24 (b) 47U15 (c) 45U15 ***id)*** 47V14

47. 2A11, 4D13, 12G17, ?
(a) 36119 (6) 48J21 36J21 (d) 48J23

48. C4X, F9U, I16R, ?. (M.BJL 1998)
(a) K25P (6) L25P (c) L250 (d) L27P

49. Q1F, S2E, U6D, W21C, ?
(a) Y66B (b) Y44B (c) Y88B (d) Z88B

50. Find the wrong term in the letter-number series given 'oelow :
G4T$_f$ J10R, M20P, P43N, S90L (Bank P.O. 1994)
*(a)* G4T (***b***) J10R (c) M20P . ***id)*** P43N (e) S90L

## ANSWERS

1. (a): The series consists of vowels A. E, I, O, U written in a reverse order.
2. ***(e)***: The series consists of alternate letters in reverse order.
3. (c): The first, second, third,. . . . letters of the series are respectively moved one, two, three. steps forward to obtain the successive terms.
4. *(d) :* The first, second, third. . . . . letters of the series are respectively moved five, four. three. . . . . steps forward to obtain the successive terms.
5. *(b)*: The letters are alternately moved tyo and three steps forward to obtain the successive terms.
6. (a): The first, fourth and seventh letters are in alphabetical order. So, tenth letter would be the letter after C *i.e.* D.
   Also, the second and third letters are alternate and in reverse order and so are the fifth and sixth letters and the eighth and ninth letters.
7. ***(e)***: Letters are in reverse order in which from the last 0, 1, 2, 3 and 4 letters are missing between two consecutive letters.
8. (a): The given sequence consists of two series — Z, X, V, T, ? and L, J, H, P, ?, both consisting of alternate letters in a reverse order.
9. (a) : The given sequence consists of two series :
   I. i, W, T, Q. ? in which each letter is moved three steps backward to obtain the next term.
   II. S, O, K, G in which each letter is moved four steps backward to obtain the next term.
10. *(d)* : The letters are alternately moved one and two steps backward to obtain the successive terms.
11. (cf): The given series consists of three consecutive letters from the end, then two letters skipped, then again three consecutive letters from the end and so on.
12. (a): The series may be divided into groups as shown :
    b e d / f i h / j m 1 .
    In each group, first letter is moved two steps forward to obtain the third letter while the third letter is moved one step forward to obtain the second letter.
13. (e): The first letter of each term is moved one step forward and the second letter is moved one step backward to obtain the corresponding letters of the next term.
14. (c): The first letter of the first, second, third. . . . . terms are respectively moved two, three, four,. . . . steps forward to obtain the first letter of the successive term. The second letter of the first, second, third,. . . . terms are respectively moved two, three, four, steps backward to obtain the second letter of the successive terms.
15. (c): The first letter of each term is moved six steps forward while the second letter is moved six steps backward to obtain the corresponding letters of the next term.
16. (c): The first letter of the first, second, third, ....jderms are respectively moved one, two. three,. . . . steps forward while the second letters are respectively moved two. three, four,. . . . steps forward to obtain the corresponding letters of the successive terms.
17. (c): The letters of each term are alternate and also the last letter of each term and the first letter of the next term are alternate.

18. (e): Each term of the series consists of two alternate letters and there is a gap of two letters between the last letter of each term and the first letter of the next term.

19. ***(c):*** The first and second letters of each term are moved four steps forward to obtain the corresponding letters of the next term.

20. (e): The first letter of the first, second, third,. . . . .terms are respectively moved two. three. four,. . . . .steps forward while the second letters of these terms are respectively moved three, four, five,. . . . .steps forward to obtain the corresponding letters of the successive terms.

21. (d): There is a gap of one letter between both the letters of first term, a gap of two letters between both the letters of second term and again a gap of one and two letters * between the letters of third and fourth terms respectively. Besides, the last letter of each term and the first letter of next term are in alphabetical order.

22. (a): The first letter of each term is moved three steps forward and the second letter is moved three steps backward to obtain the corresponding letters of the next term.

23. ***(d):*** The first letters of the terms are in alphabetical order, and so are the second and third letters.

24. (c): The first letters of the terms are alternate and so are the second and third letters.

25. ***(b)***: There is a gap of four letters between the first and second, the second and third letters of each term, and also between the last letter of a term and the first letter of the next term. %

26. (rf): All the letters of each term are moved three steps forward to obtain the corresponding letters of the next term.

27. (6): All the letters of each term are moved nine steps forward to obtain the corresponding letters of th* next term.

28. ***(d)***: The letters in each term are moved five steps forward to obtain the corresponding letters of the next terxjp.

29. (e): The letters in each term are moved four steps backward to obtain the corresponding letters of the next term.

30. (c): Each term in the series consists of three consecutive letters in reverse order. The first letter of each term and the last letter of the next term are the same.

91. (c): Each term in the series consists of alternate letters in reverse order. The first letter of each term and the last letter of the next term are also alternate.

3il. ***ic)***: There is a gap of three letters between the first letter of each term and the last. letter of the next term.

33. (o): The letters in each term are consecutive. There is a gap of one letter between the last letter of the first term and the first letter of the second term and a gap of two letters between the last letter of the second term and the first letter of third term. So, there would be a gap of three letters between the last letter of the third term and the first letter of the fourth term.

34. (a): The first and third letters <f each term arc moved three steps forward and the second letter is moved (wo steps forward to obtain the corresponding letters of the next term.

35. (fe): The first and third letters of each term are moved one step backward and the second letter is moved one step forward to obtain the corresponding letters of the next term.

36. (a): The first letter of each term is moved one step forward, the second letter is moved four steps backward and the third letter is moved four steps forward to obtain the corresponding letters of the next term.

37. (6): The first letters of the terms arc consecutive letters. The Xhird letter of each term is moved three steps backward to obtain the third letter of the successive term. The middle letters of the first, second, third and fourth terms are moved one, two, three, ^ and four steps forward respectively to obtain the middle letter of the successive terms.

38. (6): The first letters of the first, second, third and fourth terras art? moved one. two. three and four steps forward respectively to obtain the first letter of the successive terms. The second letters of the first, sccond, third and fourth terms are moved three, four, five and six steps backward respectively to obtain the second letters of the successive terms. The last letters of the terms are alternate.

39. <*): The first group of letters is reversed to obtain the second group. The second group % is reversed and the next consecutive letter is added to it to obtain the subsequent group.

40. (a): The number of letters in the terms goes on increasing by 1 at each step. Each term consists of letters in alphabetical order. The hist letter of each term and the first letter of the next term are alternate.

41. (<f) : The number of letters in the terms goes on increasing by one at each step. Also, there is a gap of one letter between the last letter of the first term and first letter of the second term and a gap of two letters between the last letter of the second term and first letter of the third terra. So, the first letter of the required term would be four steps ahead of the last letter of the third term.

42. (c): The letters in the series are alternate and the numbers indicate their position in the alphabets from the beginning.

43. (c): The letters in the first, second, third and fourth terms are respectively moved one, two, three and four steps forward to obtain the letter in the subsequent terms. The sequence followed by the numbers is + 3, • 5. + 7, + 9.

44. ***(e):*** The first letter of each term is moved two steps backward and the sccond 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

45. (rf): The first letters in odd numbered terms form series J. I. H and in even numbered terms form 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 terra.

46. (6): The first numbers in the terms follow the sequence + 5, + 7, + 9, + U, + 13. The middle letters form the series Z, Y, X, W, V, U. The last numbers form the series 5, 7, 9, 11. 13. 15.

47. (tf): The first numbers in the terms follow the sequence x 2, * 3, x 4. The middle letter of each term is moved three steps forward to obtain the corresponding letter of the next term. The last numbers follow the sequence + 2, + 4, + 6.

48. (c): The first letter of coch term is moved three steps forward und the last letter is moved three steps backward to obtain the corresponding letters of the next term. The numbers form the sequence $2^2$. $3^2$, $4^2$. $5^2$.

49. (c): The first letter of each term is moved two steps forward and the last letter is moved one step backward to obtain the corresponding letters of the next term. The number series runs as follows :

$$1x14-1 = 2,\ 2x2 + 2 = 6.\ 6x3 + 3 = 21,\ 21x4 + 4 = 88.$$

50. (6) : The first letter of each terra is moved three steps forward and the last letter is moved two steps backward to obtain the corresponding letters of the next term. The numbers follow the sequence x 2 + 1, x 2 + 2, x 2 + 3, x 2 + 4.
So. 10 is wrong and must be replaced by (4 x 2 + 1) *i.e.* 9.

## TYPE 3 : LETTER SERIES

This type of questions usually consist of a series of small letters which follow a certain pattern. However, some letters are missing from the series. These missing letters arc then given in a proper sequence as one of the alternatives. The candidate is required to choose this alternative as the answer.

Example : aab___aaa___bba

(a) baa (6) abb (c) bab ***(d)*** aab (e) bbb

Solution : We proceed step by step as shown below :

1. The first blank space should be filled in by ⁴b* so that we have two a's followed by two b's.
2. The second blank space should be filled in either by ⁴a' so that we have four a's followed by two b's, or by V so that we have three a's followed by three b's.
3. The last space must be filled in by ⁴a\
4. Thus, we have two possible answers : ⁴baa' and ⁴bba\ But, only 'baa* appears in the alternatives. So, the answer is (a).
5. In case, we had both the possible answers in the alternatives, we would have chosen the one that forms a more prominent pattern, which is aabb/ aaabbb/aa. Thus, our answer would have been ⁴bba\

Correspondence Series : This type of series consists of three sequences with three different elements (usually capital letters, digits and small letters). On the basis of the similarity in positions in the three sequences, a capital letter is found to correspond with a unique digit and a unique small letter, whenever it occurs. The candidate is required to trace out this correspondence and accordingly choose the elements to be filled in at the desired places.

Consider the following example :

Ex, In the following series, choose the alternative which contains the numerals to be filled in the marked spaces, in the correct order :

B_____D_____C A B D A C B

4 1 3 2_____? ? ? ?

a____a____b c____c

(a) 1, 2, 3, 4 (6) 2, 3, 1, 4 (c) 1, 2, 4, 3 (<d) 2, 1, 4, 3

Sol. Clearly, in the second series, 1 occurs at the same position as D occurs in the first series. So, 1 corresponds to D. Thus, the first question mark below D is to be replaced by 1.

Now, in the third series, c at the eighth place corresponds to A in the first series, while c at the sixth place corresponds to 2 in the second series. So, 2 corresponds to A Thus, the second question mark below A is to be replaced by 2.

In the third series, a at the first place corresponds to B in the first series and a at the third place corresponds to 4 in the second series. So, 4 corresponds to B. Thus, the question mark below B is to be replaced by 4.

Now, only 3 remains. So, 3 corresponds to C. TTma, the question mark below C is to be replaced by 3. Thus, DACB corresponds to lt 2, 3, 4.

Hence, the answer is (a).

## | EXERCISE 3D [

Directions : ***In each of the following letter seriesf some of the letters are missing which are given in that order as one of the alternatives below it. Choose the correct alternative.***

Questions 1 to 5 (Stenographer's Exam, 1994) .

1._____aba_____ba____ab

(a) abbba (6) abbab (c) baabb - ***(d)*** bbaba

2. ab_____b___bbaa
   (a) abaab (6) abbab (c) baaab ***(d)*** babba
3. baa___aab___a___a
   ***(a)*** aabb (6) aaba (c) abab ***(d)*** baab
4. babbba___a
   ***(a)*** ababb ***(b)*** baaab ***(c)*** bbaba (id) babbb
5. aa___ab_____aaa___a
   ***(a)*** aaab ***(b)*** aabb (c) abab ***(d)*** baaa

Questions 6 to 10 (Assistant Grade, 1992)

6. a___bbc___aab___cca___bbcc
   ***(a)*** bacb (6) acba (c) abba ***(d)*** caba
7. ab___aa___bbb___aaa___bbba
   (a) abba ***(b)*** baab (c) aaab (d) abab
8. be___b___c___b___ccb
   (a) cbcb ***(b)*** bbcb (c) ebbe ***(d)*** bcbc
9. abb___baa___a___bab___aba
   (a) abba (6) abab (c) ccac (d) aabb
10. abca___bcaab___ca _ bbc____a
    (a) ccaa (6) bbaa (c) abac ***(d)*** abba

Questions 11 to 15

11. bbca___bcca___ac___a___cb (Hotel Management, 1996)
    (a) abcba (6) acbab (c) bacab ***(d)*** bcaab
12. bcc___ac _ aabb'i_ ab____cc
    (a) aabca (6) abaca (c) bacab ***(d)*** bcaca
13. a___bccb _ ca _ cca _ baab____c
    (a) ababc (6) abcaa (c) accab ***(d)*** bacaa
14. ab___aa___caab___c___abb___c
    (a) bbcaa (6) bcbca (c) cabac (<d) cbbac
15. c___baa___aca___cacab _ acac____bca
    (a) acbaa (b) bbcaa (c) bccab ***(d)*** cbaac

Questions 16 to 20

16. aba___cabc___dcba___bab___a
    ***n*** ***(a)*** abdea (b) bcadc (c) abedd ***(d)*** cbdaa
17. a___cdaab cc _. daa___bbb _ ccddd
    ***(a)*** bdbda (6) bddca (c) dbbca ***(d)*** bbdac
18. a___abbb _ ccccd ddccc _ bb _ ba
    ***(a)*** abeda (6) abdbc (c) abdeb ***(d)*** abcad
19. _ bcdbc _ dcabd _ bcdbc _ dc ._ b d
    ***(a)*** aaaaa (6) ccccc (c) bbbbb ***(d)*** ddddd
20. adb___ac _ da _ eddeb___dbc _. cbda
    (a) beeba (6) ebbaa (c) ccbba ***(d)*** bbcad

Questions 21 to 25 (S.C.RA. 1994)

21. c___bbb_____abbbb___abbb _
    (a) aabcb (6) abccb (c) abacb ***(d)*** bacbb

22. b____abbe____bbca _ bcabb_____ab
(a) acaa (6) acba (c) cabc (d) cacc

23. ac____cab____baca____aba____acac
(a) aacb (6) aebe ic) babb (d) bebb

24. acca____ccca____acccc _ aaa
(a) acca (6) caaa (c) ccaa (d) caac

25. _ be_____bb _ aabc
(a) acac (b) babe (c) abab (d) aacc

Questions 26 to 31

26. aa _ aaa _ aaaa_____aaaa____b
(a) baaa (b) bbaa (c) bbbb (d) bbba

27. aba____baca ;_ ba____bacaabac _ aca
(a) cacb (6) ccab (c) cabc (rf) abcc

28. ab____be _ c _ ba _ c
(a) banc (b) aabb (c) caab (d) aaab

29. a____ca____be____bcc____bca
(a) bbaa ***(b)*** bbab (c) aabb ***(d)*** baba

30. ab____bcbca_____c _ bab
***(a)*** aebe , v (6) baaa (c) abcc ***(d)*** ccaa

31. a____cacbc____baca_____b
(a) baba ***(b)*** babe (c) abac ***(d)*** cacb

Questions 32 to 36 (Hotel Management, 1993)

32. aaba____bba____bba____abaa____b
(a) aabab (6) ababa (c) baaba (d) bbaba

33. ab____bbc____c____ab____ab____b
(a) ccaac (6) cbabc (c) cacac (c/) bccab

34. bca _ cca_____ca____b____c
(a) aaaaa (b) bbbab (c) aabaa (d) bbabb

35. b____ac____cc____cb____ab____ac
(a) cbaba (b) bbaac (c) abbbc (d) aabba

36. c____ac____aa____aa____be____bcc
***(a)*** cabba (6) ccbbb (c) bbbbb ***(d)*** cbacb

Questions 37 to 40 i

37. abc____d____be____d____b____cda (CJB.1.1994)
(a) bacde (6) cdabe (c) dacab (d) decdb

38. ba _ b _ aab _ a _ b (C.B.I. 1995)
(a) abaa (6) abba (c) baab ***(d)*** babb

39. gfe____ig____eii____fei____gf____ii (Assistant Grade, 1997)
(a) eifgi (***b***) figie (c) ifgie ***(d)*** ifige

40. mnonopqopqrs_____(C.B.1.1994)
(a) mnopq (6) oqrst (c) pqrst ***(d)*** qrstu

Questions 41 to 50

41. aab _ ab _ cabcca _ bcab _ c
***(a)*** bbbc (6) bbab (c) cabc ***(d)*** cbab

42. ccbab____caa bccc _ a
***(a)*** babb (6) bbba (c) baab ***(d)*** babe

43. ba____b____aabb a_____a bb
(a) bbaabb ***(b)*** ababba (c) ababab ***id)*** bababa

44. a____c____abb _ a____be____be __ ab
***(a)*** cbcaaa (6) bcccab (c) bccaac ***(d)*** acbabc

45. cab____a____c be _ be____b _. ab
(a) bebbab (6) bebbbe (c) acacab ***(d)*** cbaaac

46. cccbb____aa____cc____bbbaa____c
(a) aebe (6) baca (c) baba ***(d)*** acba

47. _ abb_____bb a____bbab ba
(a) bababa (6) bbabbb (c) ababaa ***(d)*** aaaabb

48. ccb____c____bbc ._ b _ cc ccbb
(a) beebbb (6) bcccbb (c) aaaaba ***(d)*** bbbbbb

49. abca____bcaab __ aa _ caa _ c
***(a)*** bbac (***b***) bbaa (c) aebb ***(d)*** acac

50. b _ b _ bb _ _ bbb _ bb _ b
(a) bbbbba (6) bbaaab (c) ababab ***(d)*** aabaab

Questions 51 to 55 (L.LC.A.A.0.1995)

51. c____bba____cab ac ab ac
(a) abebe (6) acbcb (c) babcc ***(d)*** bcacb

52. a____be____c ._ abb____bca _
***(a)*** cccbc (6) cbbac (c) accba ***(d)*** abbba

53. _ c _ bd _ cbcda____a____db____a
(a) adabed (6) cdbbca - (c) daabbc ***id)*** bdbeba

54. a____be____a beda____ccd____bed .
(a) adbcad ***(b)*** adbbad (c) acbdbb ***(d)*** abddbd

55. cb____ca __ bacb____ca____bac d
(a) bddddb (6) bbbddd (c) addddb C***d***) addbbb

Directions (***Questions 56 to 60) : In each of the following questions, three sequences of letters I numerals are given which correspond to each other in some way. In each question, you have to find out the letters/numerals that come in the vacant places marked by (t). These are given as one of the four alternatives under the question. Mark your answer as instructed.***

(Hotel Management, 1997)

56. C B_____D_____B A B C C B
1 2 4 3_____? ? ? ?
a_____a b_____c_____b
(a) 3, 4, 4. 3 ***(b)*** 3. 2. 2. 3 (c) 3, 1, 1, 3 (c0 1, 4. 4, 1

57. _ A C _ B D _ C D C D
2 _ 4 1 _ 1 4
c d_____b e _ a ? ? ? ?
(a) a. b, a, b Ib) a, c, a, c (c) c, b, c, b (d) c, d, c, d

58. C _ B _ D _ A _ B B D D
2 4 _ 3 4 ? ? ? ?
_ a c b a d _
(a) 2, 2. 1, 1 (b> 2, 2, 3, 3 (c) 3, 3, 4.4 (rf) 3, 3, 1, 1

59. A _ B A C D _ B C D C
_ 3 _ 2 _ 1 _ 4 ? ? ? ?
d c b a c b
(a) 1, 3. 4. 3 (*b*) 1, 4. 3, 4 (c) 2, 3, 4,3 *id)* 3, 4, 1. 4

60. A D A C B B D C c
1 3 1 2 4 2
a b c d ? ? ? ?
(a) a. c, d, d (6) a, d, c, C (c) c, a. d, d (*d*) d, c, a, a

## ANSWERS

1. (6): The series is abteb/aiyab/ab/ab.
Thus, the pattern ab is repeated.
2. (c): The series is abtyaab/abb/aah.
Thus, the pattern abb, aab is repeated.
3. (c): The series is abate ha/aba/aba -
Thus, the pattern aba is repeated.
4. (***d***): The series is hababb/bafcahh.
Thus, the pattern bababb is repeated.
5. (a) : The series is aa&aba/aaaaka.
Thus, the pattern aaaaba is repeated.
6. (6): The series is aabbctfaabbcc/aabbcc.
Thus, the pattern aabbcc is repeated.
7. (6): The series is abtyaaabbb/aaaafcbbb/a.
Thus, .the letters are repeated twice, then thrice, then four times and so on.
8. (a): The series is bccbljcch/bccb.
Thus, the pattern bccb is repeated.
9. (a): The series is abb&'baak/ahba/baab/a.
Thus, the pattern abba, baab is repeated.
10. (c): The series is abc/a&bc/aabbc/aabbc&'a.
11 *Ab):* The series is abbc/ac/bcca/bc/caab'cb.
12. (c): The series is hbccua/ccaabb/aabhcc. <
The letter pairs move in a cyclic order.
13. (a): The series is aabcc/bbcaa/ccafcb/aabcc.
The letters move in a cyclic order and in each group, the first and third letters occur twice.
14. (d) : The series is abtf aabc/aabfec/aabbgc.
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.
15. (a): The series is cabWcacatycacab/fla/cacab/ca.
Thus, the pattern cacab. cacab, aa is repeated.
16. to) : The series is aabafecabcddcbacbabaa.
Thus, the letters equidistant from the beginning and the end of series are the same.

17. *id)*: The series is afccd/aabbccdd/aaabbbcccddd.
Thus, each letter of first sequence is repeated two times in the second sequence and three times in the third sequence.
18. (c): The series is aaa/bbbb/cax/dddd/cccc/bbhb/a.
19. (o) : The series is abcd/bcad/cabd/abcd/bcad'cabd.
Thus, the pattern abcd/bcad/cabd is repeated twice.
20. (6): The series is adbc acbd abed deba dbca cbda.
Thus, the letters equidistant from the beginning and the end of series are the same.
21. (6) : The series is cabbbfa/fiabbbb/cabbbb.
Thus, the pattern cabbbb is repeated
22. (c): The series is b£ab/bcaMxab/bcaM)cab.
Thus, the pattern bcab is repeated.
23. (a): The series is acac/abab/acac/abab/acac.
Thus, the pattern acac, abab is repeated.
24. (b): The series is ca/cca^axaaa/ccccaaaa.
25. (a): The series is flbc/cab/bca'abc.
26. *id)*: The series is aab^aaa^aaaa^aaaaab.
Thus, the number of a's is increasing by one in the successive sequence.
27. (a): The series is aba£foaca/&bag1)aca/abac/baca.
Thus, the pattern abac, baca is repeated.
28. (c) : The series is ab</bca/cftb/abc.
Thus, the letters are written in a cyclic order.
29. (a): The series is abcafcOxabc/cabca.
30. *(d)*: The series is abcbc/bcaca/cabab.
Thus, the series consists of three sequences. The first sequence begins with a, the second with b and the third with c. Each sequence consists of a letter followed by other two letters repeated twice.
31. (6): The series is abcac/bcaba/ca&b
Thus, the series consists of three sequences. The first three letters of each sequence are in a cyclic order and the last two letters of each sequence are the same as the first and third letters of the sequence.
32. (a): The series is aaab/aabb/afebhtaaah/aahb.
33. (c): The series is abfi/b/bca/c/cab/ft/ab&I).
34. (6): The series is bbca/bcca/bcaa/bfcc.
35. *id)*: The series is bfiac/accb/cbba/basc.
36. (6): The series is ccactfaafcaa/fcbcbb/cc.
37. (c): The series is abcdd/abccd'abbcd'a.
38. (6): The series is baab/haab/fcaab.
Thus, the pattern baab is repeated.
39. (c): The series is gfeii/gfeii/gfeii/gffiii.
Thus, the pattern gfeii is repeated.
40. (c): The series is mno/nopq/opqrs/pqrst.
41. (</): The series is aa/b£ah/kcab/cca&/bcab/bc.
Thus, the pattern ccaa followed by bcab repeated twice, makes up the series.
42. (a): The series is ccba/bfcca/aabc/ccba/h-
43. (6): The series is baah/baah/baafriaab/b.
Thus, the pattern baab is repeated.
44. (c): The series is afccfcab/bcaabc/abccab.
Obviously, the pattern abccablxraabc is repeated.

46. *id)*: The series is cato'cab/cahcab^ab.
Thus, the pattern cab is repeated.
46. (6): The series is ccc bbb aa^cct bbb aajtfc.
Thus, the pattern ccc bbb aaa is repeated.
47. (6): The series is habb/habb'bahb/babk'ba.
Thus, the pattern babb is repeated.
48. (a): The series is cchb/ccbb-'ccbtycchfcchh.
Thus, the pattern ccbb is repeated.
49. (c): The series is a/bcaa<T>a*a^aa/bcaaJbc.
Thus, the pattern Uaa is repeated
50. <c): The series is babiybbab/bbbabbbb.
Thus, in each sequence, a moves one step forward and b takes its place and finally in the fourth sequence, it is eliminated.
51. (6): The series i? cabbac/cabfaac/cabbac.
Thus, the pattern cabbac in repeated.
52. (c) • The senes in aa/Vcectfa^hb/c/aa
53. (a): The series is acdb/dacb/cdatfacdb/da.
The third letter in each sequence becomes the first letter in the following sequence.
54. (b): The scries is aabcd/ahbcd-'abccd'ftbcdd.
Thus, a. b. c and d are repeated twicc one by one.
55. tc): The series is acbd/cadb/acbd'cadb/achd.
Thus, the pattern acbd'cadb is repeated.
56. (c) : Comparing the positions of the capital letters, numbers and small letters, we find :
a corresponds to C and 1 corresponds to a. So, a and 1 correspond to C.
b corresponds to A and 2 corresponds to b. So. b and 2 correspond to A.
Also, 4 corresponds to D.
So. tho remaining number u., 3 corresponds to B. So, BCCB corresponds to 3, 1, 1. 1.
57. (a): Clearly, 4 corresponds to C and a corresponds to 4. So, a corresponds to C.
1 corresponds to D and b corresponds to 1. So, b corresponds to D.
Thus. CDCD corresponds to a. b, a, b.
58. *id)*: Clearly. 2 corresponds to C and 4 corresponds to A. So. 1 and 3 correspond to B and D. Thus, the missing sequence is 1, 1, 3, 3 or 3, 3, 1, L
59. (6): Clearly, 2 corresponds to A
Now, b corresponds to C and 4 corresponds to b. So, 4 corresponds to C.
c corresponds to D and 3 corresponds to c. So, 3 corresponds to D.
So, the remaining number *Le.*, 1 corresponds to B.
Thus, BCDC corresponds to 1, 4, 3, 4.
60. *(d)* : Clearly, b corresponds to A
1 corresponds to C and a corresponds to 1. So, a corresponds to C.
2 corresponds to B and d corresponds to 2. So. d corresponds to B.
So, the remaining letter ie., c corresponds to D. Thus. BDCC corresponds to d, c, a. a.



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