11. NUMBER, RANKING & TIME SEQUENCE TEST

TYPE 1 : NUMBER TEST

In this type of questions, generally you are given a long series of numbers. The candidate is required to find out how many times a number satisfying the conditions, specified in the question, occurs.

ILLUSTRATIVE EXAMPLES

Ex. 1. How many 5's are there in the following sequence which are immediately followed by 3 but not immediately preceded by 7 ? (Bank P.O. 1*97)
8 9 5 3 2 5 3 8 5 5 6 8 7 3 3 5 7 7 5 3 6 5 3 3 5 7 3 8
(a) One *ib)* Two (c) Three *(d)* Four (e) More than four

Sol. As you know, a number which comes after a given number is said to follow it while the one which comes before the given number precedes it.
Thus, the numbers satisfying the given conditions, can be shown as follows :
8 9 ® 3 2 [T] 3 8 5 5 6 8 7 3 3 5 7 7 5 3 6 [5] 3 3 5 7 3 8
Clearly, there are three such numbers. Hence, the answer is (c). j

Ex. 2. How many even numbers are there in the following sequence of numbers which are immediately followed by an odd number as well as immediately preceded by an even number ? (Bank P.O. 1995)
8 6 7 6 8 9 3 2 7 5 3 4 2 2 3 5 5 2 2 8 1 1 9
(a) One (6) Three (c) Five *(d)* Six *(e)* None of these

Sol. As you know, numbers divisible by 2 are called even while those not divisible by 2 are called odd numbers.
Thus, the numbers satisfying the given conditions, can be shown as follows :
8 **[B] 7 6 r 5**] 9 3 2 7 5 3 4 2 **(T**] 3 5 5 2 2 [8] 1 1 9
Clearly, there are four such numbers. Hence, the answer is (e).

Ex. 3. In the series,
6 4 1 2 2 8 7 4 2 1 5 3 8 6 2 1 7 1 4 1 3 2 8 6
how many pairs of successive numbers have a difference of 2 each ?
(a) 4 (6) 5 (c) 6 *id)* 7
(C A T . 1997)

Sol. Clearly, the pairs of successive numbers having a difference of 2 can be shown as follows :
[6 4] 1 2 2 8 7 [4 2] 1 | T T] [8 6] 2 17 14 Q T] 2fg~6]
Thus, there are six such pairs. Hence, the answer is (c).

Ex. 4. How many 8's are there in the following number series whifch are cxactly divisible by its immediately preceding and also divisible by immediately succeeding numbers ?
8 2 4 5 1 7 2 8 4 8 4 2 2 8 2 6 9 8 4 5 4 8 3 2 8 4 3 1 8 3
(a) 1 (6) 2 (c) 3 *id)* 4 (e) None of these

Sol. Clearly, the numbers satisfying the given conditions can be shown as follows
8 2 4 5 1 7 2 [g] 4 [8] 4 2 2 [8] 2 6 9 8 4 5 4 8 3 2 [5] 4 3 1 8 3
Thus, there are four such 8's. Hence the answer is (d).

EXERCISE 11A

1. Which is the third number to the left of the number which is exactly in the middle of the following sequence of numbers ?
1 2 3 4 5 6 7 8 9 2 4 6 8 9 7 5 3 1 9 8 7 6 5 4 3 2 1
(a) 3 *(b)* 4 (c) 5 *(d) 6* *(e) 7*
2. How many 3's are there in the following sequence which are neither preceded by 6 nor immediately followed by 9 ? (S.B.I.P.O. 1994)
9 3 6 6 3 9 5 9 3 7 8 9 1 6 3 9 6 3 9
(o) One (6) Two (c) Three (d) Four (e) None of these
3. Count each 7 which is not immediately preceded by 5 but is immediately followed by either 2 or 3. How many such 7's are there ? (S.S.C. 1993)
5 7 2 6 5 7 3 8 3 7 3 2 5 7 2 7 3 4 8 2 6 7 8
(a) 2 " *(b)* 3 (c) 4 (d) 5
4. How many 6's are there in the following series of numbers which are preceded by 7 but not immediately followed by 9 ? (Railways, 1994)
6 7 9 5 6 9 7 6 8 7 6 7 8 6 9 4 6 7 7 6 9 5 7 6 3
(a) One (b) Two (c) Three (d) Four
5. How many 7's are there in the following series which are not immediately followed by 3 but immediately preceded by 8 ? (L.I.C. 1994)
8 9 8 7 6 2 2 6 3 2 6 9 7 3 2 8 7 2 7 7 8 7 3 7 7 9 4
(a) 10 (6) 3 (c) 2 (c0 0 (e) None of these
6. Count each 1 in the following sequence of numbers that is immediately followed by 2, if 2 is not immediately followed by 3. How many such 1's are there ?
1 2 1 3 4 5 1 2 3 5 2 1 2 6 1 4 5 1 1 2 4 1 2 3 2 1 7 5 2 1 2 5
(a) 2 (6) 4 (c) 5 *id)* 7 *(e)* 9
7. How many 7's are there in the following series which are preceded by 6 which is not preceded by 8 ? (B.S.R.B. 1995)
8 7 6 7 8 6 7 5 6 7 9 7 6 1 6 7^7 6 8 8 6 9 7 6 8 7
(a) Nil (6) One (c) Two (<f) Three (e) None of these
8. In the following list of numerals, how many 2's are followed by 1's but not preceded by 4 ? (C M 1993)
4 2 1 2 1 4 2 1 1 2 4 4 4 1 2 2 1 2 1 4 4 2 1 4 2 1 2 1 2 4 1 4 2 1 2 4 1 4 6
(a) Two (6) Three (c) Four *(d)* Five

Directions ***(Questions 9-10) : Study the number series given below and answer the questions that follow :*** (M.B.A. 1998)

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

9. How many 7's are preceded by 9 and followed by 6 ?
(a) 2 (6)3 (c)4 *(d)* 5 *(e)* None of these
10. Which figures have equal frequency ?
(a) 253 (6) 245 (c) 375 *(d)* 865 (e) None of these

11. How many 6s are there in the following number sequence which are immediately preceded by 9 but not immediately followed by 4 ? (B.S.R.B. 1998)
5 6 4 3 2 9 6 3 1 6 4 9 6 4 2 1 5 9 6 7 2 1 4 7 4 9 6 4 2
ia) One (6) Two *Ic)* Three *id)* Four *le)* More than four

12. In the following series of numbers, find out how many times, 1, 3 and 7 have appeared together, 7 being in the middle and 1 and 3 on either side of 7 ?
2 9 7 3 17 3 7 7 1 3 3 17 3 8 5 7 1 3 7 7 1 7 3 9 0 6
la) 3 *lb)* 4 *Ic)* 5
id) More than 5 *le)* None of these (S.B.I.P.O. 1991)

13. In the series,
6 4 1 2 2 8 7 4 2 1 6 3 8 6 2 1 7 1 4 1 3 2 8 6
how many pairs of alternate numbers have a difference of 2 ? (CJLT. 1997)
la) One *ib)* Two *Ic)* Three *Id)* Four

14. How many even numbers are there in the following sequence of numbers which are immediately followed by an odd number as well as immediately preceded by an even number ? (Bank P.O. 1996)
8 6 7 6 8 9 3 2 7 5 3 4 2 2 3 5 5 2 2 8 1 19
la) One (6) Three *Ic)* Five *Id)* Six *ie)* None of these

Directions *IQuestions 15 to 17) : Study the following number sequence and answer the questions given below it :* (Bank P.O. 1995)
5 1 4 7 3 9 8 5 7 2 6 3 1 5 8 6 3 8 5 2 2 4 3 4 9 6

15. How many odd numbers are there in the sequence which are immediately followed by an odd number ?
ia) 1 *lb)* 2 *Ic)* 3 *(d)* 4 (e) More than 4

16. How many even numbers are there in the sequence which are immediately preceded by an odd number but immediately followed by an even number ?
la) 1 *lb) 2* *Ic)* 3 *id)* 4 *ie)* More than 4

17. How many odd numbers are there in the sequence which are immediately preceded and also immediately followed by an even number ?
ia) 1 (6) 2 *ic)* 3 *id)* 4 *ie)* More than 4

18. In the following series, how many such odd numbers are there which are divisible by 3 or 5. then followed by odd numbers and then also followed by even numbers ? (S.B.I.P.O. 1995)
12, 19, 21, 3, 25, 18, 35, 20, 22, 21, 45. 46, 47, 48, 9, 50, 52, 54, 55, 56
ia) Nil (6) One *ic)* Two *id)* Three *ie)* None of these

19. In the following number sequence, how many such even numbers are there which are exactly divisible by its immediate preceding number but not exactly divisible by its immediate following number ? (Bank P.O. 1994)
3 8 4 1 5 7 2 8 3 4 8 9 3 9 4 2 1 5 8 2
ia) One (6) Two (c) Three *id)* Four *ie)* None of these

20. Nitin was counting down from 32. Sumit was counting upwards the numbers starting from 1 and he was calling out only the odd numbers. What common number will they call out at the same time if they were calling out at the same speed ? (L.I.C. 1994)
ia) 19 (6) 21 *ic)* 22
id) They will not call out the same number *le)* None of these

21. If the first and second digits in the sequence 5 9 8 1 3 2 7 4 3 8 are interchanged, also the third and fourth digits, the fifth and sixth digits and so on, which digit would be the seventh counting to your left ? (Bank P.O. 1997)
ia) 1 (6) 4 (c) 7 *id)* 8 *ie)* None of these

22. If the position of the first and the sixth digits of the sequence of numbers 8 9 0 3 2 1 4 6 7 5 are interchanged, the second and the seventh and so on, which number would be seventh from the right end ? (S.B.I.P.O.1992)
ia) 2 *ib)* 6 *ic)* 7 *id)* 8 *ie)* 9

23. The letters L, M, N, O, P, Q, R, S and T in their order are substituted by nine integers 1 to 9 but not in that order. 4 is assigned to P. The difference between P and T is 5. The difference between N and T is 3. What is the integer assigned to N ? LA S. 1994)
ia) 4 (6)5 *ic)* 6 (ci) 7

24. 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. (M.B.A. 1997)
ia) 10 (6) 12 *ic)* 15 *id)* 17

25. In the following sequence of instructions, 1 stands for Run, 2 stands for Stop, 3 stands for Go, 4 stands for Sit and 5 stands for Wait. If the sequence were continued, which instruction will come next ?
4 4 5 4 5 3 4 5 3 1 4 5 3 1 2 4 5 4 5 3 4 5 3
ia) Wait *ib)* Sit *ic)* Go ' *id)* Stop (e) Run

26. In a school, the following codes were used during physical exercise. T means 'start walking", "2* means 'keep standing*, '3' means 'start running at the same spot'. [4]4* means 'sit down'. How many times will a student who performs the following sequence without error from the beginning to the end have to sit down ?
1 2 3 4 2 3 1 4 4 3 2 2 1 2 4 3 1 4 4 1 2
ia) 2 *ib)* 3 *ic)* 4 *id)* 5 *ie)* None of these

27. If the numbers from 1 to 45 which are exactly divisible by 3 are arranged in ascending order, minimum number being on the top, which would come at the ninth place from the top ? ' (Bank P.O. 1993)
ia) 18 (6) 21 *ic)* 24 *id)* 27 *ie)* 30

28. If the numbers from 5 to 85 which are exactly divisible by 5 are arranged in descending order, which would come at the eleventh place from the bottom*?
ia) 35 (6) 45 *ic)* 50 *id)* 60 (e) None of the*e
(B.S.R.B. 1996)

29. How many numbers from 1 to 100 are there each of which is not only exactly divisible by 4 but also has 4 as a digit ?
ia) 7 (6) 10 *ic)* 20 . *id)* 21 *ie)* More than 21

30. How many numbers amongst the numbers 9 to 54 are there which are exactly divisible by 9 but not by 3 ? (Railways, 1995)
ia) 8 (6)6 *ic)* 5 *id)* Nil

31. How many numbers from 11 to 50 are there which are exactly divisible by 7 but not by 3 ?
ia) Two (6) Four *ic)* Five *id)* Six (e) Seven

32. A number is greater than 3 but less than 8. Also, it is greater than 6 but less than 10. The number is
(a) 5 *ib)* 6 (c) 7 (*d*) 8 (*e*) 9

ANSWERS

1. (6): There are 27 numbers in the given sequence.
So. middle number - 14th number - 9.
Clearly, the third number to the left of this 9 is 4.

2. (f>): 9 [3] 6 6 3 9 5 9 0] 7 8 9 1 6 3 9 6 3 9

3. (a): 5 7 2 6 5 7 3 8 3 0 3 2 5 7 2 0 3 4 8 2 6 7 8

4. (c): 6 7 9 5 6 9 7 [lT] 8 7 [jf] 7 8 6 9 4 6 7 7 6 9 5 7 0] 3

5. (c): 8 9 8 [0 6 2 2 6 3 2 6 9 7 3 2 8 [0 2 7 7 8 7 7 7 9 4

6. (6) : Q] 2 l 3 4 5 1 2 3 5 2 [T] 2 6 1 4 5 l | T] 2 4 1 2 3 2 1 7 5 2 | T | 2 5

7. (<f): 8 7 6 0] 8 6 7 5 6 0 9 7 6 0 6 [0 7 6 8 8 6 9 7 6 8 7

8. (c): 4 2 1 {0 1 4 2 1 1 2 4 4 4 1 2 [If] 1 [lT] 1 4 4 2 1 4 2 1 [2] 1 2 4 1 4 2 1 2 4 1 4 6

9. (a): 7 8 9 {0 6 5 3 4 2 8 9 7 2 4 5 9 2 9 [0 6 4 7

10. *id)*: In the given scries, 2 occurs 3 times; 3 occurs once; 4 occurs 3 times; 5 occurs 2 times; 6 occurs 2 times; 7 occurs 5 times; 8 occurs 2 times and 9 occurs 4 times.
Clearly, the frequency of 5. 6 and 8 is the same *i**., 2.

11. (6): 5 6 4 3 2 9 03 1 6 4 9 6 4 2 1 5 9 07 2 1 4 7 4 9 6 4 2

12. (a): 2 9 7 3 17 3 7 7 13 3 1 7 3 8 5 7 13 7 7 1 7 3 9 0 6

13. (6) : We proceed by checking the difference between pairs of alternate numbers *i.e.,* (6,1), (4,2), (1,2), (2,8), (2,7), (8,4), (7,2), (4,1), (2,5), (1.3). (5.8). (3.6). (8.2). (6.1). (2.7). (1,1), (7.4). (1,1), (4.3). (1.2). (3.8). and (2.6). Of these, the pairs with a difference of 2 are (4.2) and (1.3). Clearly, there are two such pairs.

14. (e): 8 0 7 6 0 9 3 2 7 5 3 4 2 0 3 5 5 2 2 0 1 1 9

15. («):' 5 1 4 0 0 9 8 0 7 2 6 0 0 5 8 6 3 8 5 2 2 4 3 4 9 6

16. (c) : 5 1 4 7 3 9 8 5 7 0 6 3 1 5 0 6 3 8 5 0 2 4 3 4 9 6

17. *(d)* "S 1 4 7 3 9 8 5 7 2 6 3 1 5 8 6 0 8 0 2 2 4 0 4 0 6

18. (c): 12, 19. 21, 0 , 25, 18, 35. 20, 22. >2l], 45. 46, 47. 48, 9. 50, 52. 54. 55. 56

19. (6): 3 8 4 1 5 7 2 0 3 4 0 9 3 9 4 2 1 5 8 2

20. (d): Nitin : 32 31 30 29 28 27 26 25 24 23 22 21 20...
Sumit : 1 3 5 7 9 11 13 15 17 19 21 23 26...
Clearly, both will never call out the same number.

21. (rf) : The new sequence becomes 9 5 1 8 2 3 4 7 8 3.
Counting to the left, the seventh number is 8.

22. (c): The new sequence becomes 1 4 6 7 5 8 9 0 3 2.
From the right end, the seventh number is 7.

23. (c): P = 4 and T - P • 5 => T»9.
T - N = 3 and T = 9 =» N = 6.

24. (c): 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 8 S C S 8 SjS S C S 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 row = 15.

25. *(e):* The given sequence may be analysed as under :
4 / 45 / 453 / 4531 / 45312 / 45 / 453 / 453
Following the above sequence, the next number is 1 which stands for 'Run'.

26. (c) : Clearly, the student will have to sit down at the places marked by boxes :
1 2 3 0 2 3 1 [TI] 3 2 2 1 2 0 3 1 [44] 1 2

27. (d): The required numbers in ascending order are :
3. 6. 9. 12, 15. 18. 21, 24. 27, 30, 33, 36, 39, 42, 45.
If the minimum number i.e., 3 is considered to be at the top. the ninth number from the top is 27.

28. <e): The required numbers in descending order are :
85. 80. 75, 70. 65. 60, 55. 60, 45. 40, 35, 30, 25, 20, 15, 10, 5.
The eleventh number from the bottom is 55.

29. (a): The numbers from 1 to 100 which are exactly divisible by 4 are 4, 8, 12, 16, 20. 24, 28, 32, 36, 40, 44, 48, 52, 56, 60, 64, 68, 72, 76. 80, 84, 88, 92. 96, 100.
But each number should have 4 as its digit.
The required numbers are 4, 24, 40, 44, 48, 64, 84. Clearly, there are 7 such numbers.

30. *id):* Any number divisible by 9 is also divisible by 3.

31.(6): The numbers from 11 to 50. which are divisible by 7 are 14, 21, 28. 35. 42. 49. But out of these. 21 and 42 are divisible by 3.
.*. The required numbers are 14, 28, 35, 49.
Clearly, there are four such numbers.

32. (c): According to first condition, the number is greater than 3 but less than 8. Such numbers are 4, 5, 6, 7.
According to the second condition, the number is greater than 6 but less than 10. Such numbers are 7, 8. 9.
Clearly, the required number is the number satisfying both the above conditions *i.e.,* 7.

TYPE 2 : RANKING TEST

In this, generally the ranks of a person both from the top and from the bottom are mentioned and the total number of persons is asked. However, sometimes this question is put in the form of a puzzle of interchanging seats by two persons.

ILLUSTRATIVE EXAMPLES

Ex. 1. Rahul ranked ninth from the top and thirty eighth from the bottom in a class. How many students are there in the class ? (M.B.A. 1998)
(a) 45 (6) 46 (c) 47 *(d)* 48

Sol. Clearly, the whole class consists of:
(i) 8 students who have a rank higher than Rahul;
(ii) Rahul; and
(iu) 37 students who have rank lower than Rahul.
ije.% (8 + 1 + 37) = 46 students.
Hence, the answer is (6).

Ex. 2. In a row of 21 girls, when Monika was shifted by four places towards the right, she became 12th from the left end. What was her earlier position from the right end of the row ?

ia) 9th (6) 10th *ic)* 11th *id)* 12th (e) 14th

Sol. The change of place by Monika can be shown as under :

1 2 3 4 5 6 7 ~~8 9 10 11~~ M 13 14 15 16 17 18 19 20 21

i *

Clearly, Monika's earlier position was 8th from the left end and 14th from the right end. Hence, the answer is (e).

Ex. 3. In a row of boys, Deepak is seventh from the left and Madhu is twelfth from the right. If they interchange their positions, Deepak becomes twenty-second from the left. How many boys are there in the row ? (B.S.R.B. 1996)

(a) 19 (b) 31 ic) 33

(d) Cannot be determined (e) None of these

Sol. Deepak's new position is 22nd from left. But it is the same as Madhu's earlier position which is 12th from the right.

Thus, the row consists of (21 + 1 + 11) - 33 boys.

Hence, the answer is (c).

EXERCISE 11B

1. In a row of trees, one tree is fifth from either end of the row. How many trees are there in the row ? (Assistant Grade, 1995)
   (a) 8 (b) 9 (c) 10 (d) 11
2. In a queue, Amrita is 10th from the front while Mukul is 25th from behind and Mamta is just in the middle of the two. If there be 50 persons in the queue, what position does Mamta occupy from the front ? (C.A.T. 1997)
   ia) 20th (6) 19th (c) 18th (d) 17th
3. Raman ranks sixteenth from the top and forty ninth from the bottom in a class. How many students are there in the class ? (B.8.R.B. 1998)
   ia) 64 (b) 65 (c) 66
   (d) Cannot be determined (e) None of these
4. Saiyeev ranks seventh from the top and twenty eighth from the bottom in a class. How many students are there in the class ? (Railways, 1998)
   (a) 37 (6) 36 (c) 35 (d) 34
5. If Atul finds that he is twelfth from the right in a line of boys and fourth from the left, how many boys should be added to the line such that there are 28 boys in the line ? (L.I.C. 1994)
   (a) 12 (b) 13 (c) 14 *id)* 20 *ie)* None of these
6. Manisha ranked sixteenth from the top and twenty ninth from the bottom among those who passed an examination. Six boys did not participate in the competition and five failed in it. How many boys were there in the class ?
   (a) 40 (6) 44 *(c)* 50 *id)*-55 (e) 58
   (Bank P.O. 1997)
7. Some boys are sitting in a row. P is sitting fourteenth from the left and Q is seventh from the right. If there are four boys between **P** and **Q,** how many boys are there in the row ?
   ia) 25 (6) 23 (c) 21 *id)* 19 *ie)* None of these

8. Aruna ranks twelfth in a class of forty-six. What will be her rank from the last ? (B.S.R.B. 1997)
(a) 33 *ib)* 34 (c) 35 (*d*) 37 (e) None of these

9. Manoj and Sachin are ranked seventh and eleventh respectively from the top in a class of 31 students. What will be their respective ranks from the bottom in the class ?
ia) 20th and 24th *ib)* 24th and 20th (c) 25th and 21st
id) 26th and 22nd (e) None of these

10. Ravi is 7 ranks ahead of Sumit in a class of 39. If Sumit's rank is seventeenth from the last, what is Ravi's rank from the start ? (R.R.B.1998)
(a) 14th (6) 15th (c) 16th \ *id)* 17th

11. In a class of 60. where girls are twice that of boys, Kamal ranked seventeenth from the top. If there are 9 girls ahead of Kamal, how many boys are after him in rank ? ' (B.S.R.B. 1995)
(a) 3 (6) 7 (c) 12 *id)* 23 (e) 32

12. In a row of ten boys, when Rohit was shifted by two places towards the left, he became seventh from the left end. What was his earlier position from the right end of the row ? (SAC. 1995)
(a) First *ib)* Second (c) Fourth *id)* Sixth

13. In a queue. Vijay is fourteenth from the front and Jack is seventeenth from the end, while Mary is in between Vijay and Jack. If Vyay be ahead of Jack and there be 48 persons in the queue, how many persons are there between Vyay and Mary ? (M.B.A. 1994)
(a) 8 *ib)* 7 (c) 6 *id)* 5 *ie*) None of these

14. In a row of girls, Rita and Monika occupy the ninth place from the right end and tenth place from the left end, respectively. If they interchange their places, Rita and Monika occupy seventeenth place from the right and eighteenth place from the left, respectively. How many girls are there in the row ?
ia) 25 (6) 26 *ic)* 27
id) Data inadequate (e) None of these (Bank P.O. 1997)

15. In a row of girls. Shilpa is eighth from the left and Reena is seventeenth from the right. If they interchange their positions. Shilpa becomes fourteenth from the left. How many girls are there in the row ? (B.S.R.B. 1996)
(a) 25 (6) 27 (c) 29 *(d)* 32 (e) None of these

16. In a queue of children, Kashish is fifth from the left and Mona is sixth from the right. When they interchange their places among themselves, Kashish becomes thirteenth from the left. Then, what will be Mona's position from the right ?
(a) 4th *ib)* 8th *ic)* 14th *id)* 15th
(I. Tax & Central Excise. 1995)

17. In a row of boys, Kapil is eighth from the right and Nikunj is twelfth from the left. When Kapil and Nikunj interchange positions, Nikunj becomes twenty first from the left. Which of the following will be Kapil's position from the right ?
(a) 8th *ib)* 17th *ic)* 21st
id) Cannot be determined (e) None of these (Bank P.O. 1995)

18. Three persons A, B and C are standing in a queue. There are five persons between A and B and eight persons between B and C. If there be three persons ahead of C and 21 persons behind A, what could be the minimum number of persons in the queue ? (Hotel Management, *1997)*
(a) 41 (*b*) 40 (c) 28 *(d)* 27

ANSWERS

1. (6): Clearly, number of trees in the row = (4 • 1 + 4) = 9.
2. (c): Number of persons between Amrita and Mukul « 50 -(10 • 25) ® 15.
Since Mamta lies in middle of these 15 persons, so Mamta's position is 8th from Amrita *i.e.* 18th from the front.
3. (o): CleaHy. number of students in the class »(15 + 1 • 48) = 64
4. *id)*: Clearly, number of students in the class = (6 4-1 + 27) • 34.
5. (6): Clearly, number of boys in the line = (11 • 1 + 3) = 15.
.\ Number of boys to be added = 28 - 15 = 13.
6. (d) : Number of boys who passed = (15 + 28) a 44.
Total number of boys in the class = 44 + 6 + 5 = 55
7. (a): Number of boys in the row
= number of boys uptil P • number of boys between P and Q
• number of boys including Q and those behind Q
« 14 ^ 4 • 7 * 25
8. (c): Number of students behind Aruna in rank = (46 - 12) = 34.
So, Aruna is 35th from the last.
9. (c): Number of students behind Manoj in rank • (31 - 7) = 24.
So, Manoj is 25th from the bottom.
Number of students behind Sachin in rank = (31 - 11) = 20.
So, Sachin is 21st from the bottom.
10. (c): Sumit is 17th from the last and Ravi is 7 ranks ahead of Sumit. So, Ravi is 24th from the last.
Number of students ahead of Ravi in rank = (39 - 24) m 15.
So, Ravi is 16th from the start.
11. (c): Let the number of boys be x. Then, number of girls = 2x.
$x + 2x$ = 60 or 3x = 60 or * = 20.
So, number of boys = 20 and number of girls = 40.
Number of students behind Kamal in rank = (60 - 17) = 43.
Number of girls ahead of Kamal in rank * 9.
Number of girls behind Kamal in rank = 40 - 9 * 31.
/. Number of boys behind Kamal in rank * 43 - 31 • 12.
12. (6): Number of boys in the row = 10.
Rohit's new position is 7th from the left or 4th from the right.
His earlier position was two places to the right of his new position *i.e.,* his earlier position was second from the right.
13. (a) : Number of persons between Vijay and Jack = 48 - (14 + 17) = 17.
Now. Mary lies in middle of these 17 persons *i£.f* at the eighth position.
So. number of persons between Vijay and Mar}' 7.
14. (6) : Since Rita and Monika exchange places, so Rita's new position is the same as Monika's earlier position.
This position is 17th from the right and 10th from the left.
Number of girls in the row =• (16 + 1 • 9) = 26.

16. (e): Since Shilpa and Reena interchange positions, so Shilpa's new position is the same as Reena's earlier position.
This position is 14th from the left (Shilpa s new position) and 17th from the right (Reena's earlier position).
Number of girls in the row = (13 + 1 + 16) = 30.

16. (c): Since Kashish and Mona interchange places, so Kashish's new position (13th from left) is the same as Mona's earlier position (6th from right).
So. number of children in the queue = (12 + 1 + 5) = 18.
Now, Mona s new position is the same as Kashish's earlier position u., fifth from left.
Monas position from the right = (18 - 4) * 14th.

17. (6): Since Kapil and Nikunj interchange places, so Nikunj'* new position (21st from left) is the same as Kapil's earlier position (8th from right).
So, number of boys in the row = (20 + 1 + 7) = 28.
Now. Kapil's new position is the same as Nikunj's earlier position i£.t 12th from left.
Kapil's position from the right =(28- 11) = 17th.

18. (c): Three persons A, B, C can be arranged in a queue in six different ways ABC. CBA, BAC, CAB, BCA, ACB. But since there are only 3 persons ahead of C, so C should be in front of the queue. Thus, there are only two possible arrangements *i.e.,* CBA and CAB. We may consider the two cases as under :

Case I : < $\overline{3}$ C < $\overline{8}$ • B < $\overline{5}$ • A $\overline{21}$ •

Clearly, number of persons in the queue =(3 + 1+ 8 + 1+ 5 + 1+ 21) = 40,

Case II : < $\overline{3}$ C A < $\overline{5}$ •B

Number of persons between A and C = (8 - 6) = 2.
Clearly, number of persons in the queue • (3 + l + 2 + l + 21)«28.
Now, 28 < 40. So, 28 is the minimum number of persons in the queue.

TYPE 3 : TIME SEQUENCE TEST

Ex. I. Satish remembers that his brother's birthday is after fifteenth but before eighteenth of February whereas his sister fcyal remembers that her brother's birthday is after sixteenth but before nineteenth of February. On which day in February is Satish's brother's birthday ? (Bank P.O. 1998)
(a) 16th (6) 17th (c) 18th *(d)* 19th (e) None of these

Sol. According to Satish, the brother's birthday is on one of the days among 16th and 17th February.
According to Kajal, the brother's birthday is on one of the days among 17th and 18th February.
Clearly, Satish's brother s birthday is on the day common to both the above groups j*., 17th February.
Hence, the answer is (6).

Ex. 2. A bus for Delhi leaves every thirty minutes from a bus stand. An enquiry clerk told a passenger that the bus had already left ten minutes ago and the next bus will leave at 9.35 a.m. At what time did the enquiry clerk give this information to the passenger ?

(a) 9.10 a.m. (6) 8.55 a.m. (c) 9.08 p.m.
(d) 9.05 a.m. (e) 9.15 a.m.

Sol. The next bus will leave at 9.35 a.m. This means that the previous bus had left at 9.05 a.m. But it happened ten minutes before the clerk gave the information to the passenger.

Thus, the enquiry clerk gave the information at 9.15 a.m.

Hence, the answer is *(e).*

Ex. 3. If the seventh day of a month is three days earlier than Friday, what day will it be on the nineteenth day of the month ? (C.B.I. 1994)

(a) Sunday (/>) Monday (c) Wednesday (d) Friday

Sol. As mentioned, the seventh day of the month is three days earlier than Friday, which is Tuesday.

So. the fourteenth day is also Tuesday and thus, the nineteenth day is Sunday.

Hence, the answer is (a).

Ex. 4. If it was Saturday on 17th December, 1982 what will be the day on 22nd December, 1984 ? (R.R.B. 1998)

(a) Monday (6) Tuesday (c) Wednesday (</) Sunday

Sol. Clearly, every day repeats itself on the seventh day. Now, 17th Dec. 1982-17th Dec. 1983 is a period of 365 days. Dividing by 7, we get 52 weeks and one day. Thus, the 365th day will be the same as the first day i.e., 16th Dec. 1983 is also Saturday.

Now, 16th Dec, 1983-16th Dec, 1984 is a period of 366 days (because 1984, being a leap year, has 29 days in February). Thus, as shown above, 14th Dec. 1984 will be the same as 16th Dec. 1983 Saturday. So, 21st Dec. 1984 is also Saturday and thus. 22nd Dec. 1984 is a Sunday.

Hence, the answer is *(d).*

Note : For such questions as Ex. 4. remember

(i) A year has 365 days.

(ii) Years, divisible by 4, are leap years eg., 1980, 1984, 1988, 1992, 1996,... They have 366 days.

(ui) February in a leap year has 29 days.

(if) The last day of a year is the same as first day.

Thus, if the first day of a year is Friday, then the last day of the year is Friday and the first day of the next year is Saturday.

However, if the first day of a leap year is Friday, then the last day of the year is Saturday and the first day of the next year is Sunday.

EXERCISE 11C

1. Kailash remembers that his brother Deepak's birthday falls after 20th May but before 28th May, while Geeta remembers that Deepak's birthday falls before 22nd May but after 12th May. On what date Deepak's birthday falls ?

   (a) 20th May (6) 21st May (c) 22nd May

   Id) Cannot be determined (e) None of these

2. Sangeeta remembers that her father's birthday was certainly after eighth but before thirteenth of December. Her sister Natasha remembers that their father's birthday was definitely after ninth but before fourteenth of December. On which date of December was their father's birthday ? (Bank P.O. 1998)

(a) 10th (6) 11th (c) 12th
(d) Data inadequate *(e)* None of these

3. Standing on a platform, Amit told Sunita that Aligarh was more than ten kilometres but less than fifteen kilometres from there. Sunita knew that it was more than twelve but less then fourteen kilometres from there. If both of them were correct, which of the following could be the distance of Aligarh from the platform ? (R8.R.B. 1997)
(a) 11 km *(b)* 12 km (c) 13 km *[d)* 14 km (e) 15 km

4. Ashish leaves his house at 20 minutes to seven in the morning, reaches Kunal's house in 25 minutes, they finish their breakfast in another 15 minutes and leave for their office which takes another 35 minutes. At what time do they leave Kunal's house to reach their office ? (Bank P.O. 1997)
(a) 7.40 a.m. (6) 7.20 a.m. (c) 7.45 a.m. (d) 8.15 a.m. (e) 7.55 a.m.

5. Ajay left home for the bus stop 15 minutes earlier than usual. It takes 10 minutes to reach the stop. He reached the stop at 8.40 a.m. What time does he usually leave home for the bus stop ? (L.I.C. 1994)
(a) 8.30 a.m. (6) 8.45 p.m. (c) 8.55 a.m.
(d) Data inadequate (e) None of these

6. Reaching the place of meeting on Tuesday 15 minutes before 08.30 hourfc, Anuj found himself half an hour earlier than the man who was 40 minutes late. What was the scheduled time of the meeting ? (8.8.C. 1996)
(a) 8.00 hrs (b) 8.05 hrs (c) 8.15 hrs (d) 8.45 hrs

7. The priest told the devotee, The temple bell is rung at regular intervals of 45 minutes. The last bell was rung five minutes ago. The next bell is due to be rung at 7.45 a.m." At what time did the priest give this information to the devotee ? (B.8.R.B. 1996)
(a) 7.40 a.m. (b) 7.05 a.m. (c) 7.00 a.m.
(d) 6.55 a.m. (e) None of these

8. The train for Lucknow leaves every two and a half hours from New Delhi Railway Station. An announcement was made at the station that the train for Lucknow had left 40 minutes ago and the next train will leave at 18.00 hrs. At what time was the announcement made ?
(a) 15.30 hrs (6) 17.10 hrs (c) 16.00 hrs
(d) 15.50 hrs (e) None of these

9. An application was received by inward clerk in the afternoon of a week day. Next day he forwarded it to the table of the senior clerk, who was on leave that day. The senior clerk next day evening put up the application to the desk officer. Desk officer studied the application and disposed off the matter on the same day i.e., Friday. Which day was the application received by the inward clerk ?
(a) Monday (6) Tuesday (c) Wednesday
(d) Earlier week's Saturday (e) None of these (Bank P.O. 1997)

10. There are twenty people working in an office. The first group of five works between 8.00 A.M. and 2.00 P.M. The second group often works between 10.00 A.M. and 4.00 P.M. And the third group of five works between 12 noon and 6.00 P.M. There are three computers in the office which all the employees frequently use. During which of the following hours the computers are likely to be used most ? (C3.1.1996)

t

(a) 10.00 A.M. — 12 noon (6) 12 noon — 2.00 P.M.
(c) 1.00 P.M. — 3.00 P.M. (d) 2.00 P.M. — 4.00 P.M.

11. A monkey climbs 30 feet at the beginning of each hour and rests for a while when he slips back 20 feet before be again starts climbing in the beginning of the next hour. If he begins his ascent at 8.00 a.m., at what time will he first touch a flag at 120 feet from the ground ? (M.B.A. 1997)
(a) 4 p.m. (6) 5 p.m. (c) 6 p.m. (d) None of these

Directions ***(Questions 12 to 14): Study the following information carefully and answer ihe questions given below it :*** (S.B.I.P.O. 1997)

(I) Kamal is available at home from 12 noon to 4 p.m. on Tuesday, Thursday and Sunday.
(II) His younger brother Navin is available at home on Monday, Thursday. Friday and Sunday between 10 a.m. to 2 p.m.
(III) The eldest brother Rajiv is available between 9 a.m. to 12 noon on Monday, Wednesday and Thursday and 2 p.m. to 4 p.m. on Friday, Saturday and Sunday.

12. At a time, on which day of a week all the three brothers are available at home ?
(a) None *(b)* Sunday (c) Thursday
(d) Cannot be determined (e) None of these

13. For how many days only one brother is available at a particular time in a week ?
(a) One (6) Two (c) Three *(d)* Four *(e)* None of these

14. On which day(s) of a week, the youngest and the eldest brothers are available at home at the same time ?
(a) Only Monday (6) Only Thursday (c) Only Friday
(d) Both Monday and Thursday *(e)* Both Sunday and Friday

15. If the day before yesterday was Thursday, when will Sunday be ?
(a) Today *(b)* Two days after today
(c) Tomorrow (d) Day after tomorrow (Section Officers[1] 1993)

16. If the day before yesterday was Saturday, what day will fall on the day after tomorrow ? (CJ.1. 1993)
(a) Friday (6) Thursday (c) Wednesday *(d)* Tuesday

17. Mohini went to the movies nine days ago. She goes to the movies only on Thursday. What day of the week is today ? (Railways, 1994)
(a) Thursday (6) Saturday (c) Sunday *id)* Tuesday

18< If the third day of a month is Monday, which of the following will be the fifth day from 21st of the month ?
• (a) Monday (6) Tuesday *(c)* Wednesday
(d) Thursday *(e)* None of these

19. 1.12.91 is the first Sunday. Which is the fourth Tuesday of December 91 ?
(a) 17.12.91 (6) 24.12.91 (c) 26.12.91 (d) 31.12.91
(CJUL 1994)

20. If Thursday was the day after the day before yesterday five days ago. what is the least number of days ago when Sunday was three days before the day after tomorrow ? (Railway*, 1994)
(a) Two (6) Three (c) Four (d) Five

21. If the 25th of August in a year is Thursday, the number of Mondays in that month is (S.S.C. 1996)
(a) 3 (6) 4 *ic)* 5 *id)* 6
22. If 1st October is Sunday, then 1st November will be (C.A/T. 1997; R.R.B. 1998)
ia) Monday *ib)* Tuesday (c) Wednesday (*d*) Thursday
23. If 3rd December, 1990 is Sunday, what day is 3rd January, 1991 ? (S.S.C. 1994)
ia) Tuesday (6) Wednesday (c) Thursday *id)* Friday
24. If February 1, 1996 is Wednesday, what day is March 3, 1996 ? (M.B.A. 1996)
(a) Monday *ib)* Sunday *ic)* Saturday *id)* Friday
25. If the first day of the year (other than the leap year) was Friday, then which was the last day of that year ? (S.S.C. 1996)
ia) Monday (*b*) Friday *ic)* Saturday *id)* Sunday
26. If 18th February, 1997 falls on Tuesday then what will be the day on 18th February, 1999 ? (Railways, 1998)
ia) Monday (6) Tuesday *ic)* Thursday *id)* Friday
27. How many days will there be from 26th January, 1996 to 15th May, 1996 (both days included) ?
ia) 110 (6) 111 *ic)* 112 *id)* 113 *ie)* None of these
28. Which two months in a year have the same calendar ?
(a) June, October (6) April, November
ic) April, July *id)* October, December

ANSWERS

1. *ib)*: According to Kailash, Deepak's birthday falls on one of the days among 21st, 22nd, 23rd, 24th, 25th. 26th and 27th May
According to Geeta, Deepak's birthday falls on one of the days among 13th, 14th, 15th, 16th. 17th. 18th, 19th, 20th and 21st May.
The day common to both the groups is 21st May.
Deepak's birthday falls on 21st May.
2. *id)*: According to Sangeeta, the father's birthday falls on one of the days among 9th. 10th. 11th and 12th December. According to Natasha, the fathers birthday falls on one of the days among 10th, 11th, 12th and 13th December.
The days common to both tho groups are 10th, Uth and 12th December. So, the father's birthday falls on any one of those days.
3. ic): Clearly, according to Sunita, the distance was more than 12 kms but less than 14 kms. which is 13 kms.
4. (6): Ashish leaves his house at 6.40 a.m
He reaches Kunal's house in 25 minutes i.e., at 7.05 a.m.
Both leave for office 15 minutes after 7.05 a.m. i.e., at 7.20 a.m.
5. *ie):* Clearly. Ajay left home 10 minutes before 8.40 a.m. *i.e.,* at 8.30 a.m. But it was 15 minutes earlier than usual. So, he usually left for the stop at 8.45 a.m.
6. (6): Anuj reached the place at 08.15 hours.
Clearly, the man who was 40 minutes late would reach the place at 08.45 hours.
So, the scheduled time of the meeting was 08.05 hours.
7. (6): Clearly, the last bell rang 45 minutes before 7.45 a.m. *Le.,* at 7.00 a.m. But it happened five minutes before the priest gave the information to the devotee. So, the information was given at 7 05 a.m.

8. (e): Clearly, the last train left two and a half hours before 18.00 hours *i.e.* at 15.30 hours. But this happened 40 minutes before the announcement was made. So, the announcement was made at 16.10 hours.
9. (c) : Desk officer received the application on Friday.
Clearly, the application was forwarded to the table of the senior clerk on Thursday.
So. the application was received by the inward clerk on Wednesday.
10. (6): Clearly, the computers would be used most when all the three groups are working simultaneously and thin happens during the period 12 noon to 2 p.m.
11. (c): Clearly, the monkey climbs 10 feet in one hour.
So. it will climb upto a height of 90 feet in 9 hours *i.e.,* at 5.00 p.m. It will then ascend a height of 30 feet in the next hour to touch the peak at 6.00 p.m.

Question* 12-14 ,

We prepare a table as under :

	Mon	Tue	Wed	Thu	Fri	Sat	Sun
9 a.m. to 10 a.m.	R		R	R			
10 a.m. to 12 noon	N.R		R	N. R	N		N
12 noon to 2 p.m.		K		K, N	N		K, N
2 p.m. to 4 p.m.	H	K		K	R	R	K. R

12. (a) : Clearly, all the three brothers are not available at the same time on any day of the week.
13. (d) : Clearly, one brother is available at a particular time on all seven days of the week.
14. (d) : Clearly. Navin and Rajiv are available at home at the same time on Monday and Thursday
15. (c): If day before yesterday was Thursday, so today is Saturday.
/. Tomorrow will be Sunday.
16. (c) : If day before yesterday was Saturday, so today is Monday.
Thus, tomorrow will be Tuesday and day after tomorrow will be Wednesday.
17. (b): Clearly, nine days ago. it was Thursday.
Today is Saturday.
18. (c): The 3rd day is Monday. So. the 10th and 17th days are also Mondays.
Thus, the 21st day is Friday.
.'. The fifth day from the 21st will be Wednesday.
19. (b): 1.12.91 is the first Sunday of December 91.
So, 3.12.91 is the first Tuesday of the month.
Clearly, 10.12.91, 17.12.91, 24.12.91 and 31.12.91 are also Tuesdays.
So, 24.12.91 is the fourth Tuesday.
20. (a): Day after the day before yesterday is yesterday.
Now. five days ago. yesterday was Thursday.
So. five days ago. it was Friday.
Today is Wednesday.
Now, three days before the day after tomorrow is yesterday.
Now. it is on Monday that we say *Yesterday was Sunday.
21. (c): 25th August is a Thursday.
So, 22nd August is a Monday.
So. Mondays fall on 1st. 8th. 15th, 22nd and 29th of August.
Thus, there are five Mondays.

22. (c): Clearly 1st, 8th, 15th. 22nd. and 29th October are Sundays.
So, 31st October is Tuesday.
.'. 1st November will be Wednesday.

23. (6): Clearly. 3rd. 10th. 17th. 24th and 31st December 1990 are Sundays.
So. 1st January 1991 is Monday and 3rd January 1991 is Wednesday.

24. (c): 1996 is a leap year and so February has 29 days.
Now. 1st. 8th, 15th. 22nd and 29th February are Wednesdays.
•So, 1st March is Thursday and 3rd March is Saturday.

25. (6) : If the year is not a leap year, then the last day of the year is the same as the first day.

26. (c): 18th February, 1997 was Tuesday.
So. 18th February. 1998 was Wednesday.
18th February. 1999 will be Thursday.

27. (6): Number of days = (6 + 29 + 31 + 30 + 15) = 111.
Note : 1988 is a leap year. So. number of days in February = 29.

28. (c) : Two months will have the same calendar if the period between them is divisible by 7. Now.
(a) June • July + Aug. + Sep. » 30 + 31 + 31 + 30 » 122 (not divisible by 7)
(б) Apr. • May + June + July • Aug. + Sep. + Oct.
= 30 + 31 + 30 + 31 • 31 + 30 • 31
• 213 (not divisible by 7)
(c) Apr. + May + June « 30 + 31 + 30 = 91 (divisible by 7)
(rf) October + November * 31+ 30 = 61 (not divisible by 7)

12. MATHEMATICAL OPERATIONS

This section deals with questions on simple mathematical operations. Here, the four fundamental operations — addition, subtraction, multiplication and division and also statements such as less than\ 'greater than', 'equal to', 'not equal to[1], etc. are represented by symbols, different from the usual ones. The questions involving these operations are set using artificial symbols. The candidate has to substitute the real signs and solve the questions accordingly, to get the answer.

TYPE 1 : PROBLEM-SOLVING BY SUBSTITUTION

In this type, you are provided with substitutes for various mathematical symbols, followed by a question involving calculation of an expression or choosing the correct/ incorrect equation. The candidate is required to put in the real signs in the given equation and then solve the questions as required.

Note : While solving a mathematical expression, proceed according to the rule BODMAS — *i.e.,* Brackets, Of, Division, Multiplication, Addition, Subtraction.

eg., (36 - 12) + 4 + 6 + 2 x 3 = 24 + 4 + 6 + 2 x 3 (Solving Bracket)
= 6 + 3 x 3 (Solving Division)
= 6 + 9 (Solving Multiplication)
= 15 (Solving Addition)

ILLUSTRATIVE EXAMPLES"

Ex. 1. If V means 'divided by[1], [4]- means 'multiplied by', V means 'minus and V means 'plus', which of the following will be the value of the expression 16+ 8- 4 + 2 x 4 ? (Bank P.O. 1995)
(a) 16 (6) '28 (c) 32 *(d)* 44 (e) None of these

Sol. Putting the proper signs in the given expression, we get :
16+ 8 x 4 + 2- 4 = 16+ 8 x 2 - 4 = 16+ 16 - 4 = 32 - 4 = 28.
So, the answer is (6).

Ex. 2. If + means +, - means x, + means + and x means then
36 x 12 + 4 + 6 + 2 - 3 = ?

(a) 2 (6) 18 (c) 42 *Id)* 6 | (e) None of these

Sol. Using the proper signs, we get :
36- 12 + 4 + 6 + 2 x 3 = 36 - 3 + 3 x 3 = 36 - 3 + 9 = 45 - 3 = 42.
So, the answer is (c).

Ex. 3. If A means 'plus', B means 'minus', C means 'divided by' and D means 'multiplied by', then 18 A 12 C 6 D 2 B 5 = ? (B.S.R.B. 1996)
(a) 15 (6) 25 (c) 27 (tf) 45 *(e)* None of these

Sol. Using the proper signs, we get :
Given expression = 18+ 12+ 6 x 2 - 5 = 18+ 2 x 2 - 5
= 18 + 4- 5 - 2 2 - 5 = 17.
So. the answer is (*).